MASSACHUSETTS
Department of Elementary
and Secondary Education

2022 Next-Generation MCAS and MCAS-Alt Technical Report

September 2023

**Prepared by Cognia and the
Massachusetts Department of Elementary and Secondary Education**

Massachusetts Department of Elementary and Secondary Education
75 Pleasant Street, Malden, MA 02148-4906
Phone 781-338-3000 TTY: N.E.T. Relay 800-439-2370
www.doe.mass.edu

Table of Contents

List of Tables and Figures

Chapter 1. Overview

1.1 Purposes of the MCAS and This Report

The Massachusetts Comprehensive Assessment System (MCAS) was originally developed in response to provisions in the Massachusetts Education Reform Act of 1993, which established greater and more equitable funding to schools, accountability for student learning, and statewide standards and assessments for students, educators, schools, and districts.

The Act defines the purposes of the MCAS in Chapter 69 of the Massachusetts General Laws as follows:

- Establish “whether students are meeting the academic standards described,” in the state curriculum frameworks ensuring that “such instruments shall be criterion referenced.” (Ch 69, Sec 1I)
- Provide “a comprehensive diagnostic assessment of individual students” in the required grades. (Ch. 69, Sec 1I)
- Support the annual publication of assessment results in all public schools, districts, and the state. (Ch. 69, Sec 1I)
- Provide a “competency determination,” defined as the requirement that all high school graduates have fulfilled a measure of the “mastery of a common core of skills and knowledge” in mathematics, science and technology, English, and history and social sciences. (Ch. 69, Sec. 1D)
- Set and activate goals for high standards of innovation, quality, and accountability in schools. (Ch 69, Sec. 1B)

Additional tests and requirements have been added to the MCAS program to meet the requirements of the No Child Left Behind Act (NCLB) of 2001 and the Every Student Succeeds Act (ESSA) of 2015.

The purpose of this *2022 Next-Generation MCAS and MCAS-Alt Technical Report* is to document the technical quality and characteristics of the 2022 next-generation MCAS English language arts (ELA), mathematics, grades 5 and 8 science and technology/engineering (STE), and biology and introductory physics tests and of the 2022 MCAS-Alt, in order to present evidence of the validity and reliability of test score interpretations, and to describe modifications made to the program in 2022.

Technical reports for previous testing years are available on the DESE website. The previous technical reports, as well as other documents referenced in this report, provide additional background information about the MCAS program, its development, and its administration.

This report is primarily intended for experts in psychometrics and educational measurement. It assumes a working knowledge of measurement concepts, such as reliability and validity, as well as statistical concepts of correlation and central tendency. For some sections, the reader is presumed to have basic familiarity with advanced topics in measurement and statistics, such as item response theory (IRT), standard errors of measurement, reliability and factor analysis.

In addition, this report provides technical evidence for how the MCAS is designed to fulfill the requirements of the Act described above, as well as federal requirements under ESSA for assessments in ELA, mathematics, and STE.

The MCAS is designed to:

- Assess all students who are educated with Massachusetts public funds in designated grades, including students with disabilities and English learner (EL) students. (Historically, Massachusetts has had an annual state participation rate over 98% across all grades, subjects, and assessments [see section 3.3.3]).

- Measure student performance in relation to the state's learning standards as detailed in the Massachusetts curriculum frameworks. As described throughout this document, the MCAS tests are designed to measure the standards in the curriculum frameworks. The process for ensuring alignment to the standards begins with the test and item specifications and test blueprints, continues through the development process with rigorous review by educators and other experts, and culminates with the release of test information (including standards alignment) to students, schools, and districts.
- Produce scaled scores and achievement levels that indicate students' readiness to engage in academic work at the next grade level, and to inform parents and students if they are not on track based on their test results.
- Help families and educators better understand how students are being assessed on the content standards and how instruction can be targeted to achieve better outcomes at the individual or aggregate levels by releasing test items each year—and by providing item descriptions, standards, and other related information for all test questions, whether released or unreleased.

1.2 Organization of This Report

This report provides detailed information regarding test design and development, scoring, and analysis and reporting of 2022 next-generation MCAS and MCAS-Alt results at the student, school, district, and state levels. This detailed information includes, but is not limited to, the following:

- content descriptions of all tests
- an explanation of test administration
- an explanation of equating and scaling of tests
- statistical and psychometric summaries of the tests
    - item analyses
    - reliability evidence
    - validity evidence

In addition, the appendices contain detailed item-level and summary statistics related to each 2022 next-generation MCAS test and its results.

Chapter 1 of this report provides a brief overview of what is documented within the report, including updates made to the MCAS program during 2022. Chapter 2 explains the guiding philosophy, purposes, uses, components, and validity evidence of MCAS. The next two chapters cover test design and development, test administration, scoring, and analysis and reporting of results for the standard MCAS assessments (Chapter 3) and the MCAS Alternate Assessment (Chapter 4). These two chapters include information about the characteristics of test items, how scores were calculated, the reliability of scores, how scores were reported, and validity evidence of results. Numerous appendices are referenced throughout the report.

1.3 Current Year Updates

In 2017, Massachusetts began a transition from the legacy paper-based MCAS tests (administered since 1998) to next-generation MCAS tests that are administered primarily via computer and aligned with the most recent Massachusetts curriculum frameworks. The 2020 MCAS administration was intended to be a continuation of this transition with the introduction of the next-generation high school biology and introductory physics tests. However, due to the COVID-19 pandemic, no new next-generation tests were administered in 2020 or 2021, and the next-generation high school biology and introductory physics tests were first administered in 2022.

Table 1-1 shows which MCAS tests were administered at each grade level in spring 2022 and whether the tests were next-generation (NG) or legacy (L) assessments. Legacy retests in grade 10 ELA and mathematics were also offered in spring 2021 and November 2021 for students in the classes of 2022 and earlier.

Table 1-1. Spring 2022 MCAS Tests Administered, by Grade Level

Content Area	Grade Level							
	3	4	5	6	7	8	9	10
English Language Arts	NG	NG	NG	NG	NG	NG		NG
Mathematics	NG	NG	NG	NG	NG	NG		NG
Science and Technology/Engineering			NG			NG	NG	L/NG*

** Students must take a high school STE test by the end of grade 10. The legacy chemistry and technology/engineering tests will be phased out after the 2023 administration. Additional information about the biology and introductory physics tests is available in Chapter 3.*

1.3.1 About the Next-Generation MCAS Assessments

On November 17, 2015, the Massachusetts Board of Elementary and Secondary Education (the Board) voted to endorse the use of next-generation MCAS assessments starting in 2017. The next-generation MCAS assessments include the following elements:

- high-quality test items aligned to the Massachusetts learning standards;
- item types that assess both skills and knowledge, such as writing to text in English language arts (ELA) and solving complex problems in mathematics and science and technology/engineering (STE);
- achievement levels that send clear signals to students, parents, and educators about readiness for work at the next level (including results at grade 10 that signal readiness for college and career);
- a full range of student accessibility features and accommodations; and
- both computer-based and paper-based test administrations, with computer-based testing as the primary method.

In 2022, all students in grades 3–8 and 10 took the next-generation assessments in ELA and mathematics; students in grades 5 and 8 took the next-generation assessments in STE. In addition, the next-generation high school biology and introductory physics tests were first administered in 2022. Computer-based administration was required for all content areas at grades 3–8, for grade 10 ELA and mathematics, and for high school biology and introductory physics, but paper-based tests were available as a test accommodation at all grades.

1.3.2 Background on the Transition to Next-Generation Assessments

The following are some key milestones for developing and implementing the next-generation MCAS tests.

- **2010**: Massachusetts joins PARCC, a multi-state consortium formed to develop a new set of assessments for ELA and mathematics.
- **2013**: The Board votes to conduct a two-year “test drive” of the PARCC assessments to decide whether Massachusetts should adopt them in place of the existing MCAS assessments in ELA and mathematics.
- **2014**: The PARCC assessments are field-tested in a randomized sample of schools in Massachusetts and in the other consortium states.
- **Spring 2015**: Massachusetts districts (including charter schools and vocational-technical high schools) are given the choice of administering either PARCC or MCAS to their students in grades 3–8. Approximately one-half of the students at those grade levels take the MCAS assessments, and about one-half take the PARCC assessments.

- **November 2015**: Former Commissioner Mitchell Chester recommends to the Board that the state transition to a next-generation MCAS that would be administered for the first time in spring 2017 and that would utilize both MCAS and PARCC test items. The Board votes to endorse his recommendation.
- **Spring 2017**: Next-generation MCAS tests are administered statewide in ELA and mathematics grades 3–8 for the first time. The tests include a mixture of MCAS and PARCC items.
- **Spring 2018**: The second administration of next-generation MCAS tests in ELA and mathematics grades 3–8. PARCC items are used only for a small number of items on the mathematics tests.
- **Spring 2019**: The third administration of next-generation MCAS tests in ELA and mathematics grades 3–8. The first administration in ELA and mathematics grade 10 and STE grades 5 and 8. The tests include only MCAS items, and PARCC items are no longer included.
- **Spring 2020:** Due to the COVID pandemic, MCAS tests are not administered.
- **Spring 2021**: The fourth administration of next-generation MCAS tests in ELA and mathematics grades 3–8, using one-session tests and some remote administration. The second administration in ELA and mathematics grade 10 using full test forms and in STE grades 5 and 8 using one-session tests.
- **Spring 2022**: The return to full administration of next-generation MCAS tests in ELA and mathematics grades 3–8. The third administration of ELA and mathematics grade 10 and STE grades 5 and 8 plus the first administration of next-generation introductory physics and biology in grades 9 and 10.

1.4 Special Issues

Throughout 2022, the Department (DESE) continued to monitor the progressive recovery from COVID-19 and sought to understand more fully the cumulative impact of the pandemic on instruction. DESE's response to COVID-19 is documented in the 2021 MCAS Next-Generation Technical Report.

1.4.1 Return to Regular Administration

As recovery from the pandemic progressed in 2021–2022, DESE endeavored to return to regular administration of the MCAS, including administration of the full ELA, mathematics, and STE tests to all students. No provision was made for remote testing.

1.4.2 Change in ELA Equating Procedure

The dimensionality results from the 2022 DETECT analyses indicated a change in the dimensionality structure for ELA. It was decided to implement a two-step equating method for ELA to prevent dimensionality changes from adversely affecting the maintenance of the scale from year to year. This topic is discussed in more detail in Sections 3.5.3 and 3.6.3.

.

Chapter 2. The State Assessment System: MCAS

2.1 Guiding Philosophy

The MCAS and MCAS Alternate Assessment (MCAS-Alt) programs play a central role in helping all stakeholders in the Commonwealth's education system—students, parents, teachers, administrators, policy leaders, and the public—understand the successes and challenges in preparing students for higher education, work, and engaged citizenship.

Since the first administration of the MCAS tests in 1998, DESE has gathered evidence from many sources suggesting that the assessment reforms introduced in response to the Massachusetts Education Reform Act of 1993 have been an important factor in raising the academic expectations of all students in the Commonwealth and in making the educational system in Massachusetts one of the country's best.

The MCAS testing program has been an important component of education reform in Massachusetts for over 25 years. The program continues to evolve. As described in section 1.3, Massachusetts is in the process of transitioning from the legacy MCAS tests to next-generation MCAS assessments that

- align MCAS items with the revised Massachusetts academic learning standards;
- incorporate innovations in assessment, such as computer-based testing, technology-enhanced item types, and upgraded accessibility and accommodation features;
- provide achievement information that sends clear signals about a student's readiness for academic work at the next level; and
- ensure that MCAS measures the knowledge and skills students need to meet the challenges of the 21st century.

2.2 Alignment to the Massachusetts Curriculum Frameworks

All items included on the MCAS tests are developed to measure the standards contained in the Massachusetts curriculum frameworks. Each test item correlates and is aligned to at least one standard in the curriculum framework for its content area.

The 2022 next-generation MCAS tests were aligned to the 2017 Massachusetts curriculum frameworks for English language arts (ELA) and mathematics and the 2016 Massachusetts curriculum frameworks for science and technology/engineering (STE).

All learning standards defined in the frameworks are addressed by and incorporated into local curriculum and instruction, whether they are assessed on MCAS or not.

2.3 Uses of MCAS Results

MCAS results from the next-generation ELA and mathematics tests in grades 3–8 and 10 and the next-generation STE tests in grades 5 and 8 and high school are intended as follows:

1. To be used within the state's framework for district accountability and assistance, in accordance with state priorities and federal requirements

2. To provide information to support program evaluation at the school and district levels
3. To provide transparency into student performance through comprehensive reporting on the results of individual students, schools, districts, and the state
4. To help determine ELA, mathematics, and STE competency (see Appendix A for modified competency determination information) for the awarding of high school diplomas. Students must achieve a passing score on the ELA, mathematics, and STE tests (or successfully file an MCAS appeal) as one condition for high school graduation.

2.4 Validity of MCAS and MCAS-Alt

Validity information for the MCAS and MCAS-Alt assessments is provided throughout this technical report, including information on

- test design and development;
- administration;
- scoring;
- technical evidence of test quality (classical item statistics, differential item functioning, item response theory statistics, reliability, dimensionality, decision accuracy and consistency); and
- reporting.

Tables 2-1 and 2-2 summarize validity information for MCAS and MCAS-Alt provided in specific sections of this report. Note that some of these sections will point the reader to additional validity evidence located in the appendices of the report.

Table 2-1. Summary of Validity Evidence for the Next-Generation MCAS Tests

Type of Validity Evidence	Section	Description of Information Provided
Reliability and classical item analyses; scoring consistency and classification consistency by achievement level	3.4 Appendices G and H	Scoring consistency, interrater agreement, and scoring accuracy
	3.5 Appendices I and J	Classical item analyses
	3.7 Appendix N	Overall reliability and standard error of measurement by test; reliability by student subgroups
	3.7.5	Decision accuracy and consistency (DAC): estimates of accuracy for student classification by achievement level and for each achievement level cut score
Content-related validity evidence	3.2 and 3.9.1 Appendices B, C, and U	Test blueprints: item alignment to test blueprints and standards
Construct-related and structural validity evidence	3.9.2	Response process validity evidence
	3.5 to 3.7 Appendices K and L	Item response theory modeling; dimensionality; scaling; differential item functioning
Consequential validity	3.8 Appendices L, O, and P	MCAS reporting
	3.9.5	Supporting the valid use of MCAS data

MCAS-Alt assessment results are sometimes aggregated with other MCAS results. Therefore, validity information with respect to reliability and content-related validity provided for MCAS also pertains, to some extent, to the MCAS-Alt. In addition, MCAS-Alt also includes reliability and construct-related characteristics specific to the alternate assessment, as described below in Table 2-2.

Table 2-2. Summary of Validity Evidence for MCAS-Alt

Type of Validity Evidence	Section	Description of Information Provided
Content-related validity evidence	4.2.1 Appendix C	Assessment design (test blueprints aligned to MCAS blueprints but with modifications made for the range and complexity of standards); descriptions of primary evidence and supporting documentation
Cognitive processes	4.5.5 Appendix W, Appendix Z	Distributions of score frequencies indicate that the tests elicit the expected range of cognitive processes for this population
Precision over the full continuum	4.7.3 Appendix W	Measurement error calculated over respondent subgroups at each performance level indicate that the tests are sufficiently precise over the full performance continuum
Validity based on other variables	4.10.5, 4.1.3, 4.2.1.1, and 4.6	Resource Guides capturing the judgments of educators and experts about the curricular expectations
Reliability and subgroup statistics and scoring consistency	4.4, 4.7.4, and 4.8 Appendices H, O, S, and T	Procedures to ensure consistent scoring; interrater scoring statistics
	4.5 Appendix I	Classical item statistics
	4.7.1 and 4.7.2 Appendix N	Overall and subgroup reliability statistics
Construct-related and structural validity evidence	4.5.3	Interrelations among scoring dimensions
	4.6	Item bias review and procedures

2.5 Next-Generation MCAS Achievement-Level Descriptors

The achievement-level descriptors (ALDs) used to define expectations on the next-generation MCAS assessments were established to identify students who are prepared for academic work at the next grade level. Massachusetts's *Meeting Expectations* level is also aligned to the level of academic work a student must perform to eventually be prepared for college-level work upon completion of high school.

2.5.1 General Achievement-Level Descriptors

The general ALDs for the next-generation MCAS tests at grades 3–8 and 10 are as follows:

Exceeding Expectations

A student who performed at this level exceeded grade-level expectations by demonstrating mastery of the subject matter.

Meeting Expectations

A student who performed at this level met grade-level expectations and is academically on track to succeed in the current grade in this subject.

Partially Meeting Expectations

A student who performed at this level partially met grade-level expectations in this subject. The school, in consultation with the student’s parent/guardian, should consider whether the student needs additional academic assistance to succeed in this subject.

Not Meeting Expectations

A student who performed at this level did not meet grade-level expectations in this subject. The school, in consultation with the student’s parent/guardian, should determine the coordinated academic assistance and/or additional instruction the student needs to succeed in this subject.

2.5.2 Grade-Specific Achievement-Level Descriptors

The grade-specific ALDs provided in Appendix B illustrate the knowledge and skills students at each grade are expected to demonstrate on MCAS at each achievement level. Knowledge and skills are cumulative at each level. No descriptors are provided for the *Not Meeting Expectations* achievement level because a student’s work at this level, by definition, does not meet the criteria of the *Partially Meeting Expectations* level.

Chapter 3. MCAS

3.1 Overview

MCAS tests have been administered to students in Massachusetts since 1998. In 1998, English language arts (ELA), mathematics, and science and technology/engineering (STE) were assessed at grades 4, 8, and 10. In subsequent years, additional grades and content areas were added to the testing program. Following the initial administration of each new test, performance standards were set.

Public school students in the graduating class of 2003 were the first students required to earn a Competency Determination (CD) in ELA and mathematics as a condition for receiving a high school diploma. To fulfill the requirements of the No Child Left Behind (NCLB) Act, tests for several new grades and content areas were added to the MCAS in 2006. As a result, all students in grades 3–8 and 10 are now assessed in both ELA and mathematics, and students are assessed in grades 5, 8, and 9/10 in STE. In 2017, MCAS began the transition to a “next-generation” test that is administered primarily through a computer-based platform.

The MCAS program is managed by DESE staff with assistance and support from the assessment contractor, Cognia, and its subcontractor, Pearson. The next-generation computer-based tests were administered through Pearson’s TestNav application. Massachusetts educators play a key role in MCAS through service on a variety of committees related to the development of MCAS test items, the development of MCAS achievement-level descriptors, and the setting of performance standards. The program is supported by a five-member national Technical Advisory Committee (TAC).

More information about the MCAS program is available at www.doe.mass.edu/mcas/.

3.2 Next-Generation Test Design and Development

In 2022, the MCAS next-generation operational tests were administered at grades 3–8 and 10 in both ELA and mathematics and grades 5, 8, and 9/10 in STE. In 2022, the next-generation tests in ELA, mathematics, and STE were administered primarily on a computer with paper accommodations available. Legacy high school STE tests in chemistry and technology/engineering were administered on paper to grade 10+ students. Since legacy tests were administered to less than 1,000 students and because they will be phased out in 2023, this report focuses on the next-generation tests.

3.2.1 Test Specifications

3.2.1.1 Criterion-Referenced Test

In 2022, the items used on the next-generation MCAS tests were developed specifically for Massachusetts. All items were aligned to content standards in the Massachusetts curriculum frameworks. These content standards are the basis for the reporting categories in each content area and are used to guide the development of test items. Items on the 2022 next-generation MCAS tests were coded to the 2017 Massachusetts curriculum frameworks in ELA and mathematics and the 2016 Massachusetts curriculum framework for STE. All items were coded to at least one content standard and some were coded to more than one standard. In the next-generation STE tests, items were also coded to a science practice, if applicable. See section 3.2.4.1 for more information about science practices.

3.2.1.2 Item Types

The types of items and their functions, by content area, are described below.

English Language Arts (ELA)

- **Selected-response (SR) items** are worth one or two points and consist of the following:
  - **Multiple-choice items** (computer and paper) make efficient use of limited testing time and allow for coverage of a wide range of knowledge and skills within a content area. Each one-point, multiple-choice item requires students to select the single best answer from four response options. Items are machine-scored: students earn 1 point for a correct response and receive 0 points for an incorrect or blank response.
  - **Two-part, multiple-choice items** (computer and paper) have two parts. In the first part, students select the single best answer from four response options. In the second part, students select, from four response options, the evidence from the stimulus that supports the answer from the first part. (In some limited cases, item directions instruct students to select two correct answers in the second part.) The items are machine-scored: correct responses are worth 2 points, partially correct answers are worth 1 point, and incorrect and blank responses receive 0 points. Students who answer the first part incorrectly receive a score of 0; students must answer the first part correctly to receive 1 or 2 points.
  - **Two-point, technology-enhanced (TE) items** (computer only) use computer-based interactions such as inline choice, hot spots, and drag and drop that require the student to choose from a range of options presented. The items are machine-scored: correct responses are worth 2 points, partially correct answers are worth 1 point, and incorrect and blank responses receive 0 points.
- **Constructed-response (CR) items** (computer and paper) are worth 3 points and are used only on grades 3 and 4 tests. Students are expected to generate approximately one paragraph of text in response to a passage-driven question. Student responses are hand-scored and receive a score of 3, 2, 1, or 0 points.
- **Essays (ES)** (computer and paper) are on all tests in grades 3–8 and 10 and are text-based. Students are required to type or write an essay in response to a prompt which is based on the passage or passage set they have read. Essays are hand-scored and receive a score of 0–7 possible score points for grades 3–5 and 0–8 possible score points for grades 6–8 and 10.

See section 3.4 for more details on the scoring of CR and ES items.

Mathematics

- **Selected-response (SR) items (computer and paper) are worth one or two points and consist of the following:**
  - **Multiple-choice items** make efficient use of limited testing time and allow for coverage of a wide range of knowledge and skills within a content area. The items require students to select the single best answer from four response options. Items are machine-scored: students earn 1 point for a correct response and receive 0 points for an incorrect or blank response.
  - **Multiple-select items** require students to select two or more correct answers from a set of answer options. Students are typically instructed to select a certain number of options. There are typically five to six options to choose from. Items are machine-scored: students earn 1 point for a correct response and receive 0 points for an incorrect or blank response.
  - **Technology-enhanced (TE) items** (computer only) use interactions such as inline choice, hot spot, and drag and drop that require the student to choose from a range of options presented. These TE items are machine-scored. Items are machine-

scored: students earn 1 point for a correct response and receive 0 points for an incorrect or blank response.
    - **Two-part items** have two parts (Part A and Part B) and are worth two points, each part being worth 1 point. They can be multiple-choice, multiple-select, TE, or a combination thereof. Items are machine-scored: students earn 1 point for each correct part and receive 0 points for an incorrect or blank response.
- **Short-answer (SA) items** (computer and paper) are worth one or two points and consist of the following:
    - **Short-answer items** are used to assess students' skills and abilities to work with brief, well-structured problems that have one solution or a very limited number of solutions (e.g., mathematical computations). The advantage of this type of item is that it requires students to demonstrate knowledge and skills by generating, rather than selecting, an answer. These items are machine-scored: students earn 1 point for a correct response and receive 0 points for an incorrect or blank response. For the paper versions of these items, students write their numbers in boxes and then complete a number grid, which is machine-scored.
    - **Technology-enhanced (TE) items** (computer only) use interactions such as fraction models or line plots that require the students to demonstrate knowledge and skills by generating an answer or selecting an answer from a wide range of options. These TE items are machine-scored. For 1-point TE items, students earn 1 point for a correct response and receive 0 points for an incorrect or blank response. Two-point TE items are assessed in grades 4–8 and 10. For two-point TE items, there are two parts, and each part is worth 1 point. The two parts are scored independently from each other. Students earn points for 2 correct parts, 1 point for only 1 correct part, and receive 0 points for no correct parts.
- **Constructed-response (CR) items** (computer and paper) require students to solve problems and generate responses to prompts. Students are required to use higher-order thinking skills, such as analyzing and explaining, to construct responses. Some CR items include a technology-enhanced part, such as creating a graph or completing a model using drag and drop technology. Student responses are hand-scored. CR items are worth either 3 or 4 points.
    - **Three-point constructed-response items** are used only on the grade 3 test. Students are expected to solve problems and generate one to two sentences in response to a prompt. Student responses are hand-scored. Students earn 3, 2, 1, or 0 score points for these items.
    - **Four-point constructed-response items** are used on the grades 4–8 and 10 tests. Students are expected to solve problems and generate one to two sentences in response to a prompt. Student responses are hand-scored. Students earn 4, 3, 2, 1, or 0 score points for these items.

Science and Technology/Engineering (STE)

- **Selected-response (SR) items** (computer and paper) are worth 1 or 2 points and consist of the following:
    - **Multiple-choice items** make efficient use of limited testing time and allow for coverage of a wide range of knowledge and skills within a content area. The items require students to select the single best answer from four response options. Items are machine-scored: students earn 1 point for a correct response and receive 0 points for an incorrect or blank response.
    - **Multiple-select items** require students to select two or more correct answers from a set of answer options. Students are instructed to select a certain number of options. There are typically four to six options to choose from. Items are machine-scored: students earn 1 point for a correct response and receive 0 points for an incorrect or blank response.

    - **Technology-enhanced (TE) items** (computer only) use interactions such as inline choice, hot spot, and drag and drop that require the student to choose from a range of options presented. These TE items are machine-scored. For one-point TE items, students earn 1 point for a correct response and receive 0 points for an incorrect or blank response.
    - **Two-part items** have two parts (Part A and Part B) and are worth 2 points, each part being worth 1 point. They can be multiple-choice, multiple-select, TE, or a combination thereof. Items are machine-scored: students earn 1 point for each correct part and receive 0 points for an incorrect or blank response.
- **Constructed-response (CR) items** (computer and paper) typically require students to process information about a scenario and to use higher-order thinking skills, such as analyzing and explaining, to construct responses to prompts (e.g., identify, describe, explain) about the scenario. The scenario information may include narrative descriptions, models, and data tables or graphs. Some CR items include a technology-enhanced part, such as completing a model using drag and drop technology. Student responses are hand-scored, and each item is worth either 2, 3, or 4 score points. For 2-point CR items, students may earn 2, 1, or 0 score points. For three-point CR items, students may earn 3, 2, 1, or 0 score points. For 4-point CR items, students may earn 4, 3, 2, 1, or 0 score points.

3.2.1.3 Description of Test Designs

The MCAS assessments contain both common and matrix items. The common items are administered to all students and count toward a student's overall score. Matrix items are either field-test items or equating items. Field-test items are tried out to see how they perform and do not count toward a student's score. Equating items are used to link one year's results to those of previous years and do not count toward a student's score. Equating and field-test items are distributed among multiple forms of the test for each grade and content area.

The number of test forms varies by grade and content area and typically ranges between 10 to 20 forms. Each student takes one form of the test and therefore answers a subset of matrix items. Common and matrix items are not distinguishable to test takers. Because all students are given matrix items, an adequate sample size (typically a minimum of 1,500 responses per item) is obtained to produce data that can be used to inform equating decisions and common item selection for future tests.

A computer-based test (CBT) common form and a paper-based test (PBT) common form were developed for grades 3–8 and 10 ELA and mathematics and for grades 5, 8, and 9/10 STE. To create the PBT common form, technology-enhanced items on the CBT form were revised and made into paper-based items, typically multiple-choice items. The PBT items tested the same content as the technology-enhanced items on the CBT.

3.2.2 ELA Test Specifications

3.2.2.1 Standards

The 2022 MCAS grades 3–8 and 10 ELA tests, including all matrix items, were aligned to the following learning standards from the *2017 Massachusetts Curriculum Framework for English Language Arts and Literacy*:

- Anchor Standards for Reading
    - Key Ideas and Details (Standards 1–3)
    - Craft and Structure (Standards 4–6)
    - Integration of Knowledge and Ideas (Standards 7–9)
- Anchor Standards for Language

    - Conventions of Standard English (Standards 1 and 2)
    - Knowledge of Language (Standard 3)
    - Vocabulary Acquisition and Use (Standards 4–6)
- Anchor Standards for Writing
    - Text Types and Purposes (Standards 1–3)
    - Production and Distribution of Writing (Standard 4)

The *2017 Massachusetts Curriculum Framework for English Language Arts and Literacy* can be found at www.doe.mass.edu/frameworks/ela/2017-06.pdf.

3.2.2.2 ELA Item Types

The grades 3–8 and 10 ELA tests used several item types, as shown in Table 3-1.

Table 3-1. ELA Item Types and Score Points

Item Type	Possible Raw Score Points	Grade Levels
Multiple-choice (SR)	0 or 1	3–8, 10
Two-part, multiple-choice (SR)	0, 1, or 2	3–8, 10
Technology-enhanced (SR)	0, 1, or 2	3–8, 10
Constructed-response (CR)	0, 1, 2, or 3	3–4
Essay (ES)	0 to 7	3–5
	0 to 8	6–8, 10

SR = selected-response, CR = constructed-response, ES = essay

3.2.2.3 Passage Types

Passages used in the ELA tests are authentic published passages selected for the MCAS assessment. Test developers, including DESE test developers, review numerous texts to find passages that possess the characteristics required for use in ELA tests. Passages must

- be of interest to and appropriate for students in the grade being addressed;
- have a clear beginning, middle, and end;
- contain appropriate content;
- support the development of a sufficient number of unique assessment items; and
- be free of bias and sensitivity issues.

Passages ranged in length from approximately 600 to 2500 words per passage set. Word counts are on a scale outlined in the passage specifications and are less at lower grades. Passage sets consisted of either a single passage or paired/tripled passages. Passages were selected from published works; no passages were specifically written for the MCAS tests.

Passages are categorized into one of two types:

1. **Literary passages** represent a variety of genres: poetry, drama, fiction, biographies, memoirs, folktales, fairy tales, myths, legends, narratives, diaries, journal entries, speeches, and essays. Literary passages are not necessarily fictional passages.
2. **Informational passages** are reference materials, editorials, encyclopedia articles, and general nonfiction. Informational passages are drawn from a variety of sources, including magazines, newspapers, and books.

In grades 3–8, each common form included three passage sets, with some forms containing two literary passage sets and one informational passage set, while other forms contained one literary passage set and two informational passage sets. In grade 10, each common form included four passage sets; two sets were literary and two were informational. Across the forms, sets may be single, paired, or tripled selections.

The MCAS ELA test is designed to include a selection of passage sets with a balanced representation, considering gender, race and ethnicity, and socioeconomic status. Another important consideration is that passages be of interest to the tested age group.

Differences among the passages used at each grade level include the length of the passages (typically increases with increasing grade levels) and the degree of complexity (increasing sophistication in language and concepts as the grade level increases). Test developers use a variety of readability measures to aid in the selection of passages appropriate at each grade level. In addition, Massachusetts teachers use their grade-level expertise when participating in passage selection as members of the Assessment Development Committees (ADCs).

3.2.2.4 ELA Test Design

All items are coded to ELA framework standards. There are no stand-alone items on the tests; all vocabulary, grammar, and mechanics questions are associated with a passage set.

Students read a passage set and answer questions that follow. Question types include selected-response items, constructed-response items (grades 3 and 4 only), and essay items. Please see section 3.2.1.2 above for additional details on item types. Approximately 20% of the items were technology-enhanced items.

Test Design by Grade

Grades 3–4

The common portion of each test at grades 3 and 4 included three passage sets. Two of the common passage sets included ten to twelve 1- or 2-point selected-response items plus one 7-point text-based essay item or one 3-point constructed-response item. The other common passage set included seven or eight 1 or 2-point selected-response items. Each test contained a total of 44 common points distributed across two testing sessions.

Grade 5

The common portion of each test at grade 5 included three passage sets. Two of the passage sets included eleven 1- or 2-point selected-response items and one 7-point text-based essay item and the other passage set included seven 1- or 2- point selected-response items. The test contained a total of 48 common points distributed across two testing sessions.

Grades 6–8

The common portion of each test at grades 6–8 included three passage sets. Two of the passage sets included eleven or twelve 1- or 2-point selected-response items and one 8-point text-based essay item. The other common passage set included seven or eight 1-point items. The test contained a total of 50 common points distributed across two testing sessions.

Grade 10

The common portion of each test at grade 10 included four passage sets. Three passage sets in the common portion included eight 1- or 2-point selected-response items and two of those three sets included one 8-point text-based essay item. The fourth common passage set included four 1- or 2-point selected-response items. The test contained a total of 51 common points distributed across two testing sessions.

Matrix

For grades 3–8, the matrix portion included two passage sets. In grades 3–4, one matrix passage set included eight to eleven 1- or 2-point selected-response items, and either two constructed-response items or one essay. The other matrix passage set included seven 1- or 2-point machine-scored items. In grades 5–8, one matrix passage set included eight to ten 1- or 2-point selected-response items and one essay item and the other matrix passage set included seven 1- or 2-point selected-response items.

The grade 10 matrix portion included two passage sets. One matrix passage set included eight 1- or 2-point selected-response items and one 8-point text-based essay item. The other matrix passage set included four 1- or 2-point selected-response items.

Table 3-2 shows the recommended testing times. MCAS tests are untimed; therefore, the times shown in the table are approximate.

Table 3-2. ELA Recommended Testing Times, Grades 3–8 and 10

Grade	Session 1 Recommended Testing Time (min)	Session 2 Recommended Testing Time (min)	Total Recommended Testing Time (min)
3	120–150	120–150	240–300
4	120–150	120–150	240–300
5	120–150	120–150	240–300
6	120–150	120–150	240–300
7	120–150	120–150	240300
8	120–150	120–150	240–300
10	150	150	300

Common and Matrix Item Distribution

The grades 3–8 and 10 ELA tests were administered to a large majority of students on the computer with relatively few students taking the paper form as an accommodation. The paper form was derived from Form 1 of the CBT. Both forms had the same number of common and matrix points. Table 3-3 shows the distribution of common and matrix items in each 2022 ELA test, by grade level.

Table 3-3. Distribution of ELA Common and Matrix Items by Grade and Item Type

Grade and Test			Items per Form							
			Common				Matrix			
Grade	Test	# of Forms	SR (1 pt.)	SR (2 pt.)	CR	ES	SR (1 pt.)	SR (2 pt.)	CR[1]	ES
3	ELA	10	24	5	1	1	14	3	0-2	0-1
4	ELA	10	24	5	1	1	14	3	0-2	0-1
5	ELA	10	24	5	0	2	14	3	0	1
6	ELA	10	24	5	0	2	14	3	0	1
7	ELA	8	26	4	0	2	14	3	0	1
8	ELA	10	24	5	0	2	14	3	0	1
10	ELA	24[2]	21	7	0	2	9	3	0	1

[1] Each grade 3 and grade 4 matrix form contained either two constructed-response items or one essay item.
2 For G10, Cognia has included the two retest forms in this number.

3.2.2.5 ELA Blueprints

Table 3-4 shows the target and actual (in parentheses) percentages of common item points by reporting category. Reporting categories are based on the anchor standards in the 2017 Massachusetts curriculum framework for ELA. An in-depth look at the test blueprints is available in Appendix C.

Table 3-4. Target (and Actual) Distribution of ELA Common Item Points by Reporting Category

Reporting Category	Percent of Points at Each Grade (+/-5%)						
	3	4	5	6	7	8	10
Language	25 (30)	25 (27)	25 (29)	25 (26)	25 (22)	25 (24)	25 (21)
Reading	65 (61)	65 (63)	55 (54)	55 (54)	55 (58)	55 (56)	55 (59)
Writing	10 (9)	10 (9)	20 (17)	20 (20)	20 (20)	20 (20)	20 (20)
Total	100	100	100	100	100	100	100

3.2.2.6 ELA Cognitive Levels

Each item on the ELA tests is assigned a cognitive level according to the cognitive demand of the item. Cognitive levels are not synonymous with item difficulty. The cognitive level provides information about each item based on the complexity of the mental processing a student must use to answer the item correctly. The three cognitive levels used in ELA tests are described below:

- **Level I (Identify/Recall)**—Level I items require that the student recognize basic information presented in the text. Examples of skills at this level include identifying main ideas/facts/details; recalling and locating details; identifying genre or setting; and identifying definitions, parts of speech, or functions of punctuation. Key words include identify, list, match, recognize, describe, and distinguish.
- **Level II (Infer/Analyze)**—Level II items require that the student understand a given text by making inferences and drawing conclusions related to the text. Examples of skills at this level include understanding the whole text (Big Picture)/generalizing; interpreting, making connections, visualizing, and forming questions; explaining a character's role/motives; determining whether an idea is fact or opinion; filtering important information and key concepts; and determining the meaning of a word in context. Key words include infer, analyze, describe, interpret, determine, conclude, explain, summarize, and classify.
- **Level III (Evaluate/Apply)**—Level III items require that the student understand multiple points of view and be able to project their own judgments or perspectives on the text. Examples of skills at this level include understanding another point of view; analyzing/evaluating an author's purpose, style, and message; arguing/defending a point of view with evidence from the text; using reasoning to determine an outcome; applying information from the text; and synthesizing elements of text(s) in order to create a whole. Key words include critique, evaluate, analyze, predict, agree/disagree, argue/defend, apply, synthesize, judge, compare, and contrast.

Each cognitive level is represented in the ELA tests. Table 3-5 below shows the range of score points and associated percentages targeted on the operational forms.

Table 3-5. Targeted Percentage of Score Points by Cognitive Skill Level in English Language Arts

Grade	Cognitive Skill Level	Total Points	Percent of Score Points (+/-5%)	Score Points
3 - 4	I	44	5%	0–5
	II		70%	29–33
	III		25%	10–14
5	I	48	5%	0–5
	II		60%	26–31
	III		35%	14–17
6 - 8	I	50	5%	0–5
	II		60%	27–32
	III		35%	16–20
10	I	51	5%	0–5
	II		60%	28–33

3.2.2.7 ELA Reference Materials

The use of bilingual word-to-word dictionaries was allowed during both ELA tests only for current and former English learner (EL) students. No other reference materials were allowed during the ELA tests.

3.2.3 Mathematics Test Specifications

3.2.3.1 Mathematics Standards

The 2022 MCAS grades 3–8 and 10 mathematics tests, including all field-test items, were aligned to the learning standards from the *2017 Massachusetts Curriculum Framework for Mathematics*. The 2017 standards are grouped by domains in grades 3–8 and conceptual categories in grade 10, as shown below:

- Domains for grades 3–5
  - Operations and Algebraic Thinking
  - Number and Operations in Base Ten
  - Number and Operations—Fractions
  - Geometry
  - Measurement and Data
- Domains for grades 6 and 7
  - Ratios and Proportional Relationships
  - The Number System
  - Expressions and Equations
  - Geometry
  - Statistics and Probability
- Domains for grade 8
  - The Number System
  - Expressions and Equations
  - Functions
  - Geometry
  - Statistics and Probability
- Conceptual Categories for grade 10
  - Number and Quantity
  - Algebra
  - Functions
  - Geometry
  - Statistics and Probability

The *2017 Massachusetts Curriculum Framework for Mathematics* can be found at www.doe.mass.edu/frameworks/math/2017-06.pdf.

3.2.3.2 Mathematics Item Types

The 2022 mathematics tests included several item types, as shown in Table 3-5. Approximately 25–30% of the items were technology-enhanced items.

Table 3-6. Mathematics Item Types and Score Points

Item Type	Possible Raw Score Points	Grade Levels
Multiple-choice (SR)	0 or 1	3–8, 10
Multiple-select (SR)	0 or 1	3–8, 10
Technology-enhanced (TE) (SA or SR)	0 or 1 0, 1, or 2	3 4–8, 10
Two-part (SA or SR)	0, 1, or 2	4–8, 10
Short-answer (SA)	0 or 1	3–8, 10
Constructed-response (CR)	0, 1, 2, or 3 0, 1, 2, 3, or 4	3 4–8, 10

SA = short-answer, SR = selected-response, CR = constructed-response

3.2.3.3 Mathematics Test Design

Test Design by Grade

Grade 3

The common portion of the grade 3 test included thirty-six 1-point selected-response or short-answer items and four 3-point constructed-response items. The matrix portion included three 1-point selected-response or short-answer items and one 3-point constructed-response item. The test contained a total of 48 common points distributed across two testing sessions.

Grades 4–6

The common portion of the grades 4–6 tests included thirty-four 1-point selected-response or short-answer items, two 2-point selected-response items, and four 4-point constructed-response items. The matrix portion included two 1-point selected-response or short-answer items, one 2-point selected-response or short-answer item, and one 4-point constructed-response item. Each test contained a total of 54 common points distributed across two testing sessions.

Grades 7–8

The common portion of the grades 7–8 tests included thirty-four 1-point selected-response or short-answer items, two 2-point selected-response items, and four 4-point constructed-response items. The matrix portion included two 1-point selected-response or short-answer items, two 2-point selected-response or short-answer items, and two 4-point constructed-response items. Each test contained a total of 54 common points distributed across two testing sessions. Items in session 2 were developed to assess content where the students may need a calculator. These items were either calculator-neutral (calculators are permitted but not required to answer the question) or calculator-active (students are expected to use a calculator to answer the question).

Grade 10

The common portion of the grade 10 test included thirty-two 1-point selected-response or short-answer items, six 2-point selected-response items, and four 4-point constructed-response items. The matrix portion included eight 1-point selected-response or short-answer items, two 2-point selected-response or short-answer items, and two 4-point constructed-response items. Each test contained a total of 60 common points distributed across two testing sessions. Items in session 2 were developed to assess content where the students may need a calculator. These items were either calculator-neutral (calculators are permitted but not required to answer the question) or calculator-active (students are expected to use a calculator to answer the question).

Table 3-6 shows the distribution of common and matrix points on the 2022 mathematics tests, as well as recommended testing times. Since MCAS tests are untimed, the times shown are approximate.

Table 3-6. Mathematics Recommended Testing Times and Common/Matrix Points per Test, Grades 3–8 and 10

Grade	# of Sessions	Session 1 Recommended Testing Time (in minutes)	Session 2 Recommended Testing Time (in minutes)	Total Recommended Testing Time (in minutes)	Common Points	Matrix Points
3	2	90	90	180	48	6
4–6	2	90	90	180	54	8–9
7–8	2	90	90	180	54	12–14
10	2	90–120	90–120	180–240	60	24

Grades 3–8 and 10 mathematics tests were administered to a large majority of students on the computer with relatively few students taking the paper form as an accommodation. The paper form was derived from Form 1 of the CBT. Both forms had the same number of common and matrix points. Table 3-7 shows the distribution of common and matrix item types by grade level.

Table 3-7. Distribution of Mathematics Common and Matrix Items by Grade and Item Type

Grade	# of Forms	Common				Matrix	
		SR/SA/TE		CR		SR/SA/TE	CR
		(1 pt.)	(2 pt.)	(3 pt.)	(4 pt.)	(1 or 2 pt.)	(3 or 4 pt.)
3	28	36	0	4	0	3	1
4	28	34	2	0	4	3	1
5	28	34	2	0	4	3	1
6	28	34	2	0	4	3	1
7	21	34	2	0	4	4	2
8	22	34	2	0	4	4	2
10	20	32	6	0	4	10	2

3.2.3.4 Mathematics Blueprints

Tables 3-8 through 3-11 show the target and actual percentages of common item points by reporting category. Reporting categories are based on the Massachusetts curriculum framework domains.

Table 3-8. Target (and Actual) Distribution of Math Common Item Points by Reporting Category, Grades 3–5

Domain	% of Points at Each Grade (+/-5%)		
	3	4	5
Operations and Algebraic Thinking	30 (29)	20 (20)	15 (15)
Number and Operations in Base Ten	15 (15)	20 (19)	30 (30)
Number and Operations – Fractions	20 (21)	30 (30)	25 (26)
Geometry	10 (10)	10 (11)	10 (13)
Measurement and Data	25 (25)	20 (20)	20 (17)
Total	**100**	**100**	**100**

Table 3-9. Target (and Actual) Distribution of Math Common Item Points by Reporting Category, Grades 6 and 7

Domain	% of Points at Each Grade (+/-5%)	
	6	7
Ratios and Proportional Relationships	20 (20)	20 (20)
The Number System	20 (20)	20 (19)
Expressions and Equations	30 (30)	25 (26)
Geometry	15 (15)	15 (15)
Statistics and Probability	15 (15)	20 (20)
Total	**100**	**100**

Table 3-10. Target (and Actual) Distribution of Math Common Item Points by Reporting Category, Grade 8

Domain	% of Points at Each Grade (+/-5%)
The Number System and Expressions and Equations	40 (39)
Functions	20 (20)
Geometry	30 (30)
Statistics and Probability	10 (11)
Total	**100**

Table 3-11. Target (and Actual) Distribution of Math Common Item Points by Reporting Category, Grade 10

Conceptual Category	% of Points at Each Grade (+/-5%)
Number and Quantity	15 (15)
Algebra & Functions	35 (35)
Geometry	35 (35)
Statistics and Probability	15 (15)
Total	**100**

3.2.3.5 Mathematics Cognitive Levels

Each item on the mathematics test is assigned a cognitive level according to the cognitive demand of the item. Cognitive levels are not synonymous with difficulty. The cognitive level provides information about each item based on the complexity of the mental processing a student must use to answer the item correctly. The three cognitive levels used in the mathematics tests are described below:

- **Level I (Recall and Recognition)**—Level I items require that the student recall mathematical definitions, notations, simple concepts, and procedures, and apply common, routine procedures or algorithms (that may involve multiple steps) to solve a well-defined problem.

- **Level II (Analysis and Interpretation)**—Level II items require that the student engage in mathematical reasoning beyond simple recall, in a more flexible thought process, and in enhanced organization of thinking skills. These items require a student to make a decision about the approach needed, to represent or model a situation, or to use one or more non-routine procedures to solve a well-defined problem.
- **Level III (Judgment and Synthesis)**—Level III items require that the student perform more abstract reasoning, planning, and evidence-gathering. In order to answer questions of this cognitive level, a student must engage in reasoning about an open-ended situation with multiple decision points, represent or model unfamiliar mathematical situations, and solve more complex, non-routine, or less well-defined problems.

Cognitive Levels I and II are represented by items in all grades and across item types. Cognitive Level III is best represented by constructed-response items; an attempt was made to include Level III items at each grade. Table 3-13 show the target score points and associated score point percentage by cognitive skill level.

Table 3-13. Targeted Percent of Score Points by Cognitive Skill Level in Mathematics

Grade	Cognitive Skill Level	Total Points	Percent of Score Points (+/-5%)	Score Points
3	I	48	25–40%	12–20
	II		55–65%	26–32
	III		6–15%	3–7
4 – 8	I	54	25–40%	13–22
	II		55–65%	29–35
	III		6–15%	3–8
10	I	60	25–35%	15–21
	II		55–65%	33–39
	III		7–20%	4–12

3.2.3.6 Mathematics Reference Materials

Rulers were provided to students in grades 3–8. Handheld rulers were provided to students taking the paper version of the mathematics test. Students taking the computer-based mathematics test had access to two separate computer-based rulers: a centimeter ruler and a 1/8-inch ruler; students were not permitted to use handheld rulers on the computer-based test.

Reference sheets were provided to students at grades 5–8 and 10. These sheets contain information, such as formulas, that students may need to answer certain items.

The second session of the grades 7, 8, and 10 mathematics tests was a calculator session. All items included in this session were either calculator-neutral (calculators are permitted but not required to answer the question) or calculator-active (students are expected to use a calculator to answer the question). Each student taking the computer-based grade 7 mathematics test had access to a five-function calculator and a scientific calculator during session 2 of the mathematics test. Each student taking the computer-based grade 8 and grade 10 mathematics tests had access to a scientific calculator, a TI-84 graphing calculator, and a Desmos graphing calculator during session 2 of the mathematics test. Students taking the paper-based mathematics tests in grades 7, 8, and 10 had access to comparable handheld calculators.

3.2.4 Science and Technology/Engineering (STE) Test Specifications

3.2.4.1 STE Standards and Practices

The next-generation STE MCAS tests for grades 5, 8, and 9/10 were aligned to the standards in the 2016 Massachusetts Science and Technology/Engineering Curriculum Framework*.* In addition, Instructional Guidelines were developed to help clarify some standards and can be found at www.doe.mass.edu/stem/ste/.

The grade 5 test was based on the grades 3–5 standards, and the grade 8 test was based on the grades 6–8 standards. The 2016 Pre-K–8 standards are grouped into the following four domains:

- Earth and Space Science
- Life Science
- Physical Science
- Technology/Engineering

The grade 9/10 tests were based on the High School Biology standards (Biology test) and the High School Introductory Physics (Introductory Physics test) standards. The 2016 standards are grouped into four domains for Biology:

- Molecules to Organisms
- Heredity
- Evolution
- Ecology

The 2016 standards are grouped into three domains for Introductory Physics:

- Motion, Forces, and Interactions
- Energy
- Waves

In addition, the next-generation STE MCAS tests assessed the science and engineering practices incorporated into the standards. There are eight practices included in the standards:

1. Asking questions (for science) and defining problems (for engineering)
2. Developing and using models
3. Planning and carrying out investigations
4. Analyzing and interpreting data
5. Using mathematics and computational thinking
6. Constructing explanations (for science) and designing solutions (for engineering)
7. Engaging in argument from evidence
8. Obtaining, evaluating, and communicating information

3.2.4.2 STE Item Types

The grades 5, 8, and 9/10 STE tests included several item types, as shown in Table 3-12.

Table 3-12. STE Item Types and Score Points

Item Type	Possible Raw Score Points	Grade Level
Multiple-choice (SR)	0 or 1	5, 8, and 9/10
Multiple-select (SR)	0 or 1	5, 8, and 9/10
Technology-enhanced (SR)	0 or 1	5, 8, and 9/10
Two-point (SR)	0, 1, or 2	5, 8, and 9/10
Constructed-response (CR)	0, 1, 2, 3, or 4	5, 8, and 9/10

SR = selected-response, CR = constructed-response

3.2.4.3 STE Test Design

Test Design

The common portion of the grades 5 and 8 tests included thirty-two 1-point selected-response items, three 2-point selected-response items, two 2-point constructed-response items, and four 3-point constructed-response items. The tests included two common modules, which are groups of items based on a scenario/phenomenon. Each module contained three 1-point selected-response items and one 3-point constructed-response item. Module items made up 12 points of the test, while discrete items made up 42 points of the test. The matrix portion included five 1-point selected-response items, one 2-point selected-response or constructed-response item, and one 3-point constructed-response item, for a total of 10 points. Some forms contained matrix modules (equating or field test) while other forms only included discrete items. The test contained a total of 54 common points distributed across two testing sessions. Approximately 25–30% of the items were technology-enhanced items.

The common portion of the grade 9/10 tests included thirty-two 1-point selected-response items, five 2-point selected-response items, two 3-point constructed-response items, and three 4-point constructed-response items. The tests included two common modules, which are groups of items based on a scenario/phenomenon. Each module contained three to five 1-point selected-response items, zero to one 2-point selected-response items, and one 3-point constructed-response item. Each module was made up of a total of 8 points and module items in total made up 16 points of the test; discrete items made up 44 points of the test. The matrix portion included eleven to thirteen 1-point selected-response items, two to three 2-point selected-response items, one 3-point constructed response item, and one 4-point constructed-response item, for a total of 24 points. Each form contained a matrix module (field test) and discrete items. The test contained a total of 60 common points distributed across two testing sessions. Approximately 25% of the items were technology-enhanced items.

Table 3-13 shows the distribution of common and matrix points on the STE tests, as well as recommended testing times. Since MCAS tests are untimed, the times shown are approximate.

Table 3-13. STE Recommended Testing Times and Common/Matrix Points per Test

Grade	# of Sessions	Session 1 Recommended Testing Time (in minutes)	Session 2 Recommended Testing Time (in minutes)	Total Recommended Testing Time (in minutes)	Common Points	Matrix Points
5	2	60–90	60–90	120–180	54	10
8	2	60–90	60–90	120–180	54	10
9/10	2	60-90	60-90	120–180	60	24

The STE tests were administered to a large majority of students on the computer with relatively few students taking the paper form as an accommodation. The paper form was derived from Form 1 of the

CBT. Both forms had the same number of common and matrix points. Table 3-14 shows the distribution of common and matrix item types by grade level.

Table 3-14. Distribution of STE Common and Matrix Items by Grade and Item Type

Grade	# of Forms	Common SR1 (1 pt.)	Common SR2 (2 pt.)	Common CR2 (2 pt.)	Common CR3 (3 pt.)	Common CR4 (4 pt.)	Matrix SR1 (1 pt.)	Matrix SR2/CR2 (2 pt.)	Matrix CR3 (3 pt.)	Matrix CR4 (4 pt.)
5	19	32	3	2	4	0	5	1	1	0
8	19	32	3	2	4	0	5	1	1	0
9/10	14	32–34	4-5	0	2	3	11–13	2–3	1	1

3.2.4.4 STE Blueprints

Tables 3-15 through 3-17 show the target and actual percentages of common item points by content reporting category. Content reporting categories are based on the Massachusetts curriculum framework domains.

Table 3-15. Target (and Actual) Distribution of STE Common Item Points by Reporting Category, Grades 5 & 8

Domain	% of Points at Each Grade (+/-5%) 5	8
Earth and Space Science	25 (26)	25 (26)
Life Science	25 (26)	25 (26)
Physical Science	25 (26)	25 (24)
Technology/Engineering	25 (22)	25 (24)
Total	**100**	**100**

Table 3-16. Target (and Actual) Distribution of STE Common Item Points by Reporting Category, Grade 9/10 – Biology

Domain	% of Points
Molecules to Organisms	35 (35)
Heredity	25 (25)
Evolution	20 (20)
Ecology	20 (20)
Total	**100**

Table 3-17. Target (and Actual) Distribution of STE Common Item Points by Reporting Category, Grade 9/10 – Introductory Physics

Domain	% of Points at Each Grade (+/-5%)
Motion, Forces, and Interactions	50 (50)
Energy	30 (30)
Waves	20 (20)
Total	**100**

In addition to the content reporting categories, over 50% of the items were coded to an MCAS science and engineering practice category. These items were dually coded, meaning they were coded to both a content reporting category and a practice reporting category. The MCAS practice reporting categories are listed in Table 3-18.

Table 3-18. STE Practices Assessed on MCAS

MCAS Practice Category	Science and Engineering Practices
A. Investigations and Questioning	Asking Questions and Defining Problems Planning and Carrying Out Investigations
B. Mathematics and Data	Analyzing and Interpreting Data Using Mathematics and Computational Thinking
C. Evidence, Reasoning, and Modeling	Developing and Using Models Constructing Explanations and Designing Solutions Engaging in Argument from Evidence Obtaining, Evaluating, and Communicating Information

Regarding the STE practices, each content standard includes a reference to one STE practice. For example, standard 5-ESS2-1 states:

> *Use a model to describe the cycling of water through a watershed through evaporation, precipitation, absorption, surface runoff, and condensation.*

Although only a single practice category is referenced within each standard, different practices may be assessed with the associated content. In the example above, items assessing standard 5-ESS2-1 may assess not only the “developing and using models” practice; they may also assess any other practice, such as constructing explanations or analyzing and interpreting data.

Each item that assessed a practice was coded to one of the three practice categories listed in Table 3-18.

3.2.4.5 STE Cognitive Levels

Each item on the STE tests is assigned a cognitive level according to the cognitive demand of the item. Cognitive levels are not synonymous with difficulty. The cognitive skill describes each item based on the complexity of the mental processing a student must use to answer the item correctly. Only one cognitive skill is designated for each item. STE uses a modified revised Bloom’s taxonomy to code items by cognitive level. Items generally fall into either the understanding or applying/analyzing cognitive skill level. Table 3-19 is an example (grade 5 STE) of the descriptions of the cognitive skills used for the STE test items. Each STE test has its own cognitive skill description.

Table 3-19. Gr. 5 STE Cognitive Skill Descriptions

Cognitive Skill	Description
Understanding/ Level 1	**Students show an understanding of scientific and engineering concepts and skills by:** • Ordering events or quantities for a simple phenomenon, such as ordering the age of rock layers. • Completing a simple model, such as labeling some parts of the water cycle or adding an arrow to complete a model showing the path that light takes for an object to be seen. • Identifying a scientific or engineering process, such as erosion or encoding in a given model or based on a description. • Identifying or describing basic characteristics of an organism, substance, object, event, or environment such as the function of a plant's roots or that a desert receives only small amounts of rain. • Interpreting information to determine a straightforward conclusion, such as where volcanoes occur on a map with plate boundaries. • Determining the materials and tools needed for a basic investigation or to build a prototype, such as a ruler for measuring length or a thermometer for measuring temperature. • Describing the purpose of a design feature for a given design solution, such as plastic being used because it is waterproof, or glass being used because it is see-through.
Applying/ Level 2	**Students apply their science and engineering knowledge and skills by:** • Interpreting data from a graph or table to draw a conclusion, such as the amount of fresh water available for use by humans and other organisms. • Interpreting a model to draw a conclusion, such as determining the flow of energy in a food web. • Completing an unfamiliar or complex model, such as adding an arrow representing a force on an object to show the object is changing speed. • Setting up a data table for an investigation, given certain criteria. • Providing evidence that supports a claim about a scientific or engineering phenomenon, such as using masses of substances to support a claim that the amount of matter stays the same during a phase change of chemical reaction. • Explaining a scientific or engineering concept when given an unfamiliar context, such as how water changes and moves through several steps of the water cycle for a certain watershed. • Interpreting a diagram of a design solution to draw a straightforward conclusion, including using a ruler to determine if a design solution meets certain criteria. • Determining what scientific question to ask given certain data and criteria. • Determining which variables should be controlled in an investigation and those that may change, such as amount of water, sunlight, or air in a photosynthesis investigation. • Writing a testable question that can be asked for an investigation. (CR items only)
Analyzing/ Evaluating/ Level 3	**Students analyze or evaluate data and information using their science and engineering knowledge and skills by:** • Analyzing data from multiple sources or from a complex graph or table to draw a conclusion or develop an explanation, such as comparing weather or climate data from two or more locations. • Drawing a conclusion from a complex model or multiple models using scientific or engineering knowledge, such as analyzing two life cycles and drawing conclusions about the two organisms. • Evaluating two models or prototypes and explaining why one is better than the other. (CR items only) • Revising a complex model to make it more accurate, such as determining an error in a food web and describing how to correct the error. • Explaining how a design can be changed to address several criteria and constraints. (CR items only) Note: Some items will reach this level due to students needing to construct an explanation in a constructed response (CR) based on an application of their knowledge.

3.2.4.6 STE Reference Materials

Rulers were provided to students in all grades. Handheld rulers were provided to students taking the paper version of the STE test. Students taking the computer-based STE tests had access to two separate computer-based rulers: a centimeter ruler and a 1/8-inch ruler; students were not permitted to use handheld rulers on the computer-based tests.

Students were provided a computer-based five-function calculator in grade 5 and a computer-based scientific calculator in grade 8 and in grade 9/10. Handheld calculators were given to students taking the paper-based tests.

A reference sheet was provided to students taking the introductory physics test. This sheet contains information, such as formulas, that students may need to answer certain items.

3.2.5 Item and Test Development Process

Table 3-20 provides a detailed view of the item and test development process, in chronological order.

Table 3-20. Overview of Item and Test Development Process

Development Step	Detail of the Process
Select reading passages (for ELA only)	Contractor's test developers find potential passages and these passages are reviewed by the contractor's internal diversity, equity, and inclusion committee to minimize bias and sensitivity issue prior to the passages going to DESE. The passages are then presented to DESE for initial approval. DESE-approved passages go to Assessment Development Committees (ADCs) composed of experienced educators, and then to a Bias and Sensitivity Committee (BSC) for review and recommendations. ELA items are not developed until passages have been reviewed by an ADC and a BSC. DESE makes the final determination as to which passages will be developed and used on a future MCAS test.
Develop items	Contractor's test developers generate items and edit items from subcontractors that are aligned to Massachusetts standards and specifications.
DESE and educator review of items	1. Contractor sends draft items to DESE test developers for review. 2. DESE test developers review and edit items prior to presenting the items to ADCs. 3. ADCs review items and make recommendations. 4. BSC reviews items and makes recommendations. 5. DESE test developers edit & revise items based on recommendations from ADC & BSC.
Expert review of items	Experts from higher education and practitioners review all field-tested items for content accuracy. Each item is reviewed by at least two independent expert reviewers. Comments and suggested edits are provided to DESE staff for review.
Benchmark constructed-response items and essays	DESE and contractor test developers meet to determine appropriate benchmark papers for training of scorers of field-tested constructed-response items and essays. Scoring rubrics and notes are reviewed and edited during benchmarking meetings. During the scoring of field-tested items, the contractor contacts DESE test developers with any unforeseen issues.
Item statistics meeting	ADCs review field-test statistics and recommend items for the common-eligible status, for re-field-testing (with edits, for math and discrete STE items, since ELA is passage-based), or for rejection. BSC also reviews items and recommends items to become common-eligible or to be rejected.
Test construction	Before test construction, DESE provides target performance-level cut scores to contractor's test developers. Contractor proposes sets of common items (items that count toward student scores) and matrix items. Matrix items consist of field-test and equating items, which do not count toward student scores. Each common set of items is delivered with proposed cut scores, including test characteristic curves (TCCs) and test information functions (TIFs). DESE test developers and editorial staff review and edit proposed sets of items. Contractor and DESE test developers and editorial staff meet to review edits and changes to tests. Psychometricians are available to provide statistical information for changes to the common form.
Operational test items	Approved common-eligible items become part of the common item set and are used to determine individual student scores.
Released common items	Approximately 50% of common items in grades 3–8 and 100% of common items in grade 10 are released to the public, and the remaining items are returned to the common-eligible pools to be used on future MCAS tests. An item description (a statement specifying the content of the item) is released for each common item (both released and non-released).

3.2.5.1 Item Development and Review

Initial DESE Item Review

As described in the table above, all passages, items, and scoring guides are reviewed and edited by DESE test developers before presentation to the educator committees for review. Passage selection information can be found in section 3.2.2.3. DESE test developers evaluate new items for the following characteristics:

- **Alignment**: Are the items aligned to the standards?
- **Complexity**: Are the items at the appropriate level of complexity?
- **Content**: Is the content accurate? Does the item elicit a response that shows a depth of understanding of the subject?
- **Contexts**: Are contexts grade-level appropriate? Are they realistic? Are they interesting to students?
- **Grade-level appropriateness**: Are the content, language, and contexts appropriate for the grade level?
- **Distractors**: Have the distractors for selected-response items been chosen based on plausible content errors? What are the distractor rationales?
- **Mechanics**: How well are the items written? Are they grammatically correct? Do they follow the conventions of item writing? Is the wording grade-level appropriate and accessible for all students?
- **Technology**: Are the items scoring correctly? Is the item making the best use of the technology? Is there another type of item that is more appropriate?

After DESE's initial review, DESE and the contractor's test developers work collaboratively to revise the proposed item sets in preparation for ADC review. DESE's initial review, subsequent revision, and following work by committees draws on long standing DESE guidance on standards alignment, appropriateness and quality, as well as newly revised guidance on cognitive complexity. This revised guidance defines three "skill levels" of cognitive complexity, articulates what each level means, and provides example items by grade level. More detail on the development of the revised guidance can be found in Appendix Z.

Assessment Development Committee (ADC) and Bias & Sensitivity Committee (BSC) Reviews

ADCs and the BSCs are each composed of approximately 10–12 Massachusetts educators from across the state (see Appendix D for lists of names). There is an ADC for each content area and grade (e.g., ELA grade 3), and one BSC. ADC and BSC members meet several times a year to review new passages and items and to review data from field-test items. Each ADC meeting is co-facilitated by DESE and Cognia's test developers. BSC meetings are facilitated by Cognia staff with one DESE test developer in attendance. ADC and BSC members review items using Pearson's online platform ABBI. Each participant enters their "vote" and recommendations, and the facilitators record the consensus of the committee. All ADC and BSC recommendations remain with each item. DESE takes the recommendations of the ADCs and the BSCs into consideration and makes the final decision to approve items to become field-test eligible.

ADC Passage Review (ELA Only)

ELA ADCs review passages before any corresponding items are written. Committee members consider all the elements noted in section 3.2.2.3. Committee members are also asked to consider whether a passage is well known or comes from a book that is widely taught, since such a passage would likely provide an unfair advantage to those students who are familiar with it. Committee members vote to accept or reject each passage, and the facilitators record the consensus of the group.

For each passage recommended for acceptance, committee members provide suggestions for item development. They also provide recommendations for the presentation of the passage, including suggestions for the purpose-setting statement, words to be footnoted/glossed or redacted, and graphics, illustrations, or photographs to be included with the text.

ADC Item Review

Once DESE test developers have reviewed and edited new items and scoring guides, the items are reviewed by the ADCs. Committee members review and suggest edits to items for the following:

- content accuracy
- grade-level appropriate context and wording
- clearly written stem and question
- clear and accurate graphs, tables, and graphics
- correct answer(s) and scoring notes
- plausible but incorrect distracters
- alignment to correct standard(s)
- alignment to the correct practice (science only)
- alignment to correct cognitive skill
- appropriate use of technology-enhanced items

Members vote to accept, accept with edits (members may include suggested edits), or reject each item. If an item needs significant edits, it will be brought back to the ADC for review again. The meeting facilitators record the consensus/majority opinion of the group, including the suggested edits or reasoning for rejection.

BSC Passage and Item Review

After passages and items have been approved by the ADCs, they are also reviewed by a separate BSC. The role of the committee is to identify whether a passage or item contains material that is likely to significantly favor or disadvantage one group of students for reasons that are not educationally relevant. The purpose of the committee's review is to ensure that the ability to answer an item correctly reflects a student's learning, not cultural opportunities, or life experiences. Specifically, a passage or item is flagged by the committee if it is insensitive or disrespectful to a student's ethnic, religious, or cultural background (including disability, socio-economic status, and regional differences). The BSC uses a set of guiding questions, which provide the members with a list of considerations in their review of the passages and items for bias and sensitivity. The BSC votes to accept, accept with edits (including suggested edits), or reject (including their reasoning) each passage or item. The meeting facilitators record the consensus of the group.

External Content Expert Item Review

When items are selected to be included on the field-test portion of the MCAS, they are submitted to expert reviewers for their feedback. The task of the expert reviewer is to consider the accuracy of item content. Each item is reviewed by two independent expert reviewers. All expert reviewers for MCAS hold a doctoral degree (either in the content they are reviewing or in the field of education) and are affiliated with an institution of higher education in either a teaching or research position. Each expert reviewer has been approved by DESE. The External Content Experts recommend either accepting, accepting with edits, or rejecting an item, including their reasoning for edits or rejecting an item. Expert reviewers' comments remain with each item.

Status and Editing of Items

DESE test developers review the recommendations of the ADC, BSC, and expert reviewers and determine whether to revise or reject an item based on the suggested edits (in ELA, items are submitted for expert review after the field-test administration; reviewers' comments are considered for the next development cycles and items are rejected for use on the operational test if issues are found). The items are also reviewed and edited by DESE and Cognia editors to ensure adherence to style guidelines in *The Chicago Manual of Style*, *American Heritage Dictionary*, MCAS Style Guidelines, and to sound testing principles. According to these principles, all items should:

- demonstrate correct grammar, punctuation, usage, and spelling;
- be written in a clear, concise style;
- contain unambiguous descriptions of what is required for a student to attain a maximum score; and
- be written at a reading level that allows students to demonstrate their knowledge of the subject matter being tested.

3.2.5.2 Field-Testing of Items

Items that pass the reviews as described above are approved to be field-tested. Field-tested items appear in the matrix portions of the tests. Each matrix item is typically answered by a minimum of 1,500 students, resulting in enough responses to yield reliable performance data.

Scoring of Field-Tested Items

All field-tested items, except for constructed-response items and essays, are machine-scored. These items include multiple-choice, multiple-select, short-answer, and technology-enhanced items.

All field-tested constructed-response items and essays are hand-scored. To train scorers, DESE works closely with the scoring staff to refine rubrics and scoring notes, and to select benchmark papers that exemplify the score points and variations within each score point. We scored approximately 2,000 responses per field-tested constructed-response item or essay. See section 3.4 for additional information on scorers and scoring.

Data Review of Field-Tested Items

Data Review by DESE

DESE test developers review all item statistics as available prior to committee review by the ADCs and BSCs. An item displaying statistics that indicate it did not perform as expected is closely reviewed and, if found to be flawed, it is rejected from the pool of items. After ADC and BSC reviews of item statistics, DESE test developers make final decisions regarding any recommendations.

Data Review by ADCs

The ADCs meet to review the field-test items with their associated statistics. ADCs review the following item statistics:

- item difficulty (or mean score for polytomous items)
- item discrimination
- Differential Item Functioning (DIF)
- distribution of scores across answer options and score points
- distribution of answer options and score points across quartiles
- distribution of unique student responses (for some items)

The ADCs make one of the following recommendations for each field-tested item:

- accept
- edit and field-test again (this recommendation is made for mathematics and discrete STE items only, since ELA items are passage-based)
- reject

Data Review by BSCs

The BSC also reviews the statistics for the field-tested items. The committee reviews only the items that the ADCs have accepted. The BSC pays special attention to items that show DIF when comparing the following subgroups of test takers:

- female compared with male
- African American/Black compared with white
- Hispanic or Latino/a compared with white
- English learners (EL) and former EL compared with non-EL

3.2.5.3 Item Selection for Operational Test

Cognia's test developers propose a set of previously field-tested or common, non-released items to be used in the common portion of the test. Test developers work closely with psychometricians to ensure that the proposed tests meet the statistical requirements set forth by DESE. In preparation for meeting with the DESE test developers, the contractor's test developers consider the following criteria in selecting items to propose for the common portion of the test:

- **Content coverage/match to test design and blueprints**. The test designs and blueprints stipulate a specific number of items per item type and per reporting category for each content area. A broad coverage of standards and cognitive skills is expected. The previous year's common test should also be considered, and items should not be duplicated.
- **Item difficulty and complexity**. Item statistics drawn from the data analysis of items are used to ensure similar levels of difficulty and complexity from year to year as well as high-quality psychometric characteristics. Items can be "reused" if they have not been released and were not used the previous year. When an item is reused in the common portion of the test, the latest usage statistics accompany that item.
- **"Clueing" items**. Items are reviewed for any information that might "clue" or help the student answer another item.
- **Item types**. A variety of item types, including approximately 20–30% technology-enhanced items, should populate the common slots.

Field-test items are also selected during form construction. Field-test items are drawn from the field-test eligible pools and should mirror the operational test to the extent needed. If a standard or reporting category is lacking in the common eligible item pool, items should be chosen to fill this need. During assembly of the test forms, the following criteria are considered:

- **Key patterns**. The sequence of keys (correct answers) is reviewed to ensure that the key order appears random.
- **Option balance**. Items are balanced across forms so that each form contains a roughly equivalent number of key options.
- **"Clueing" items**. Items are reviewed for any information that might "clue" or help the student answer another item.
- **Item types**. A variety of item types should populate the matrix slots.

3.2.5.4 Operational Test Draft Review

The proposed operational test is posted for DESE to review. DESE test developers consider the proposed items, make recommendations for changes, and then meet with Cognia's test developers to construct the final forms of the tests. After form construction meetings, the test forms enter several rounds of review by test developers and editors. Items are checked to ensure that requested changes were made after the test construction meetings, and to ensure that all items are scoring correctly. In addition, items are checked again for any grammatical or “fatal flaw” errors, and these are corrected before the test forms are published.

3.2.5.5 Special Edition Test Forms

Students with Disabilities

MCAS is accessible to students with disabilities through the universal design of test items, provision of special edition test forms, and the availability of a range of accommodations and accessibility features for students taking the standard tests. To be eligible to receive a special edition test form, a student must have a disability that is documented either in an individualized education program (IEP) or in a 504 plan. All MCAS 2022 operational tests and retests were available in the following special editions for students with disabilities:

- **Large-print**—Form 1 of the operational test was translated into a large-print edition. The large-print edition contains all common and matrix items found in Form 1.
- **Braille**—This form included only the common items found in the operational test. If an item indicates bias toward students with visual disabilities (e.g., if it includes a complex graphic that a student taking the Braille test could not reasonably be expected to comprehend as rendered), then simplification of the graphic is considered, with appropriate rewording of the item text, as necessary. If a graphic such as a photograph cannot be rendered in Braille, or if the graphic is not needed for the student to respond to the item, the graphic is replaced with descriptive text or a caption or eliminated altogether. Three-dimensional shapes that are rendered in two dimensions in print are rendered on the Braille test as “front view,” “top view,” and/or “side view,” and are accompanied where necessary by a three-dimensional wooden or plastic manipulative wrapped in a Braille-labeled plastic bag. Modifications to original test items for the Braille version of the test are made only when necessary, as determined by the Braille test subcontractor and DESE staff, and only when they do not provide clues or assistance to the student or change what the item is measuring. When successful modification of an item or graphic is not possible, all or part of the item is omitted, and may be replaced with a similar item.
- **Screen reader**—This accommodation was available only for those students who are blind or have a visual disability. Students who used a screen reader were also given a separate hard-copy Braille edition test in order to have the appropriate Braille graphics. All answers are entered onscreen, either by the student using a Braille writing device or by the test administrator.
- **Text-to-speech**—This functionality was embedded in the grades 3–8 and 10 computer-based tests (CBT). Students typically use headphones with this format but may also be tested individually in a separate setting to minimize distractions to other students (from hearing what is being read aloud).
- **American Sign Language (ASL)**—The grade 10 MCAS mathematics computer-based test and the grade 9/10 STE computer-based tests are available to students who are deaf or hard-of-hearing in an American Sign Language edition, which contains only the common items found in the operational test.
- **Spanish-English**—This version of the grade 10 mathematics test and grade 9/10 STE tests are intended for Spanish-speaking EL students who have been in the United States less than 3 years. Spanish-English tests are available in computer- and paper-based formats. Paper-based tests consist of English-Spanish facing pages (side-by-side) and computer-based tests consist of “stacked” Spanish text above English text. Students may respond either in Spanish or English. (Note: For all other MCAS test versions, students must respond in English.)

Appendix E details other accommodations that did not require a special edition test form and lists accessibility features that were available to all students, such as screen magnification and highlighting. After testing was completed, DESE received a list with the number of students who participated in the 2022 MCAS with each accommodation, based on information compiled in the Personal Needs Profile in PearsonAccess Next.

3.3 Test Administration

3.3.1 Test Administration Schedule

The grades 3–8 and 10 next-generation MCAS tests were administered in spring 2022 with staggered start dates, as shown in Table 3-21.

Table 3-21. Test Administration Schedule—ELA and Mathematics Grades 3–8 & 10, STE 5 & 8, and High School STE

Content Area	Complete the Student Registration/ Personal Needs Profile Process	Receive Test Administration Materials	Test Administration Windows	Deadline to Complete the Principal's Certification of Proper Test Administration (PCPA); Update Students' Accommodations, and Mark CBT as Complete	Deadline for Return of Materials to Contractor (for PBT Only)
February Biology	December 6 – December 17	January 26	February 2 – 3 (Last day for makeup testing: February 7; Last day for extraordinary circumstances: February 8)	February 8*	February 9
March Retests (ELA and Mathematics)	January 18 – 31	March 2	March 9 – 16 (Last day for makeup testing: March 18; Last day for extraordinary circumstances: March 21)	March 21	March 22
Grades 3–8 ELA	January 24 – February 4	March 14	March 28 – April 29 (Last day for makeup testing: April 29; Last day for extraordinary circumstances: May 2)	May 31	May 3
Grades 3–8 Mathematics	January 24 – February 4	April 11	April 25 – May 27 (Last day for makeup testing: May 27; Last day for extraordinary circumstances: May 31)	May 31	June 1
Grades 5 & 8 Science and Tech/Eng.	January 24– February 4	March 14	April 26 – May 27 (Last day for makeup testing: May 27; Last day for extraordinary circumstances: May 31)	May 31	June 1
Grade 10 ELA	January 24 – February 4	March 8	Primary: March 22–23 Secondary: March 24–25 (Last day for makeup testing: March 30; Last day for extraordinary circumstances: March 31)	May 26; March 31	April 1
Grade 10 Mathematics	January 24 – February 4	March 8	Primary: May 17–18 Secondary: May 19–20 (Last day for makeup testing: May 25; Last day for extraordinary circumstances: May 26)	May 26; March 31	May 27
HS Science and Tech/Eng.	April 4 – 15	May 24	NG Biology & Introductory Physics: June 7 – 10. Last day for makeup testing: June 10. Last day for extraordinary circumstances: June 13 Legacy Chemistry & Tech/Eng.: June 7 – 8. Last day for makeup testing: June 10. Last day for extraordinary circumstances: June 13	June 13	June 14
November 2022 Retest	September 19 – 30	November 2	ELA: November 9–10 Math: November 15–16 (Last day of makeup testing for all tests: November 21)	November 21	November 22

**There was no CBT administration for biology in February of 2022; it was the last legacy administration.*

3.3.2 Security Requirements

Principals were responsible for ensuring that all test administrators complied with the requirements and instructions contained in the *Test Administrator's Manual*s. In addition, other administrators, educators, and staff within the school were responsible for complying with the same requirements. Schools and school staff who violated the test security requirements were subject to numerous possible sanctions and penalties, including delays in reporting of test results, the invalidation of test results, the removal of school personnel from future MCAS administrations, employment consequences, and possible licensure consequences for licensed educators.

If test content is breached, quick identification and resolution of the breach are critical to the integrity of a testing program. In addition to reports of breaches in the field, the MCAS program used the Pearson proprietary web monitoring tool to perform web monitoring. The Pearson web monitoring system leverages technology tools and human expertise to identify, prioritize, and monitor sites where sensitive test information may be disclosed. The following strategies were used:

- systematically patrolling the internet, websites, blogs, discussion forums, video archives, social media, document archives, brain dumps, auction sites, and media outlets
- identifying and verifying threats to MCAS test security and notified DESE and Cognia, as required
- working systematically through the steps necessary to have infringing content removed if a threat was verified
- providing summary reporting that included overall and specific threat analysis

Full security requirements, including details about responsibilities of principals and test administrators, examples of testing irregularities, guidance for establishing and following a document tracking system, and lists of approved and unapproved resource materials, can be found in the *Spring 2022 Principal's Administration Manual* (PAM), the *Spring 2022 Test Administrator's Manual for Computer-Based Testing* (CBT TAM), and the *Spring 2022 Test Administrator's Manual for Paper-Based Testing* (PBT TAM).

3.3.3 Participation Requirements

In spring 2022, students educated with Massachusetts public funds were required by state and federal laws to participate in MCAS testing. The 1993 Massachusetts Education Reform Act, state law M. G. L. Chapter 69, section 1I, mandates that **all** students in the tested grades who are educated with Massachusetts public funds participate in the MCAS, including the following groups of students:

- students enrolled full-time at all publicly funded K-12 schools including
    - district schools
    - charter schools
    - publicly run innovation schools
    - Commonwealth of Massachusetts Virtual Schools
    - educational collaboratives
- students enrolled in private schools receiving special education that is publicly funded by the Commonwealth, including approved and unapproved private special education schools within and outside Massachusetts
- students enrolled in institutional settings receiving educational services at public expense
- students in military families enrolled in public schools
- students in the custody of either the Department of Children and Families (DCF) or the Department of Youth Services (DYS)
- students with disabilities, including students with temporary disabilities such as a broken arm
- English learner (EL) students
- students who have been expelled but receive educational services from a district
- foreign exchange students who are coded as #11 under "Reason for Enrollment" in the Student Information Management System (SIMS) in grades 3–8 and 10

It was the responsibility of the principal to ensure that all enrolled students participated in testing as mandated by state and federal laws. To certify that **all** students participated in testing as required, principals were required to complete the online Principal's Certification of Proper Test Administration (PCPA) following test administration. For a summary of participation rates, see the 2022 MCAS Participation Report on DESE's School and District Profiles website.

3.3.3.1 Students Not Tested on Standard Tests

A very small number of students educated with Massachusetts public funds were not required to take the standard MCAS tests. These students were strictly limited to the following categories:

- EL students in their first year of enrollment in U.S. schools, who are not required to participate in ELA testing, and who were required to participate in the ACCESS for ELLs test
- students with significant disabilities who were unable to take the standard MCAS tests and instead participated in the MCAS-Alt (see Chapter 4 for more information)
- students with a medically documented absence who were unable to participate in make-up testing, including students participating in post-concussion “graduated reentry” plans who were determined to be not well enough for standard MCAS testing

More details about test administration policies and participation requirements for students without disabilities, for students with disabilities, for EL students, and for students educated in alternate settings can be found in the PAM.

3.3.4 Administration Procedures

In 2022, DESE determined to return to regular administration of the MCAS to all students. No provision was made for remote testing.

It was the principal’s responsibility to coordinate the school’s 2022 MCAS test administration. This coordination included the following responsibilities:

- understanding and enforcing test security requirements and test administration protocols
- reviewing plans for maintaining test security with the superintendent
- ensuring that all enrolled students participated in testing at their grade level
- coordinating the school’s test administration schedule and ensuring that tests were administered in the correct order and during the prescribed testing windows
- ensuring that test accommodations were properly provided and that transcriptions, if required for any accommodation, were done appropriately (Accommodation frequencies during 2022 testing can be found in Appendix F [note that the information presented in Appendix F is based on all test takers, and counts are broken out by all students, EL students, and students with IEP/Plan 504]; for a list of test accommodations, see Appendix E.)
- completing and ensuring the accuracy of information provided on the PCPA;
- monitoring DESE’s website (www.doe.mass.edu/mcas/) throughout the school year for important updates
- reading the Student Assessment Update emails throughout the year for important information
- providing DESE with correct contact information to receive important notices during test administration

More details about test administration procedures, including ordering test materials, scheduling test administration, designating and training qualified test administrators, identifying testing spaces, meeting with students, providing accurate student information, and accounting for and returning test materials, can be found in the PAM.

The MCAS program is supported by the MCAS Service Center, which includes a toll-free telephone line and email answered by staff members who provide support to schools and districts. The MCAS Service Center operates weekdays from 7:00 a.m. to 5:00 p.m. (Eastern Time), Monday through Friday.

3.4 Scoring

3.4.1 Preparation

3.4.1.1 Preparation of Student Responses

Scoring of the 2022 MCAS tests was conducted by both Cognia and Pearson.

Scoring responses to short-answer, constructed-response, and essay items began by first preparing the documents for scoring. Student identification information, demographic information, and school contact information was converted to alphanumeric format. Digitized student responses to constructed-response items were sorted into specific content areas, grade levels, and items before being scored.

Scoring consistency across scoring departments on all item types was established as follows:

- Cognia provided annotated anchor, practice, and qualification sets for all existing items to Pearson for review in advance of scoring. Content specialists at Pearson and Cognia consulted with each other to address any questions and ensure clarity of training materials.
- Cognia facilitated in-person benchmarking meetings for field test items.
- For operational ELA items that needed additional benchmarked responses, content specialists from Cognia, Pearson, and DESE collaborated on the establishment of final scoring decisions.
- Weekly meetings between the Cognia and Pearson scoring departments were held to address any issues and questions before and during scoring.

Table 3-22 shows the breakdown of how scoring work was divided between Cognia and Pearson.

Table 3-22. Breakdown of Scoring Work

Cognia	Pearson
ELA & mathematics grade 10 operational ELA & mathematics grades 3–8 & 10 field tests ELA & mathematics grades 3–8 operational preparation of expanded training materials for hand-off to Pearson STE grades 5, 8, and HS operational and field tests	ELA & mathematics grades 3–8 operational

Select Response Items

DESE reviewed all items in the online item bank (ABBI) and approved all selected-response answer keys during test construction. The item scoring specifications (in Question and Test Interoperability [QTI]) were configured using the test maps and keys provided for the tests. Once the scoring system was configured, a quality-assurance group verified that the selected responses entered by the student for an item as shown in the uploaded image corresponded to the response recorded in the database, for both the pre-score and the scored student data files.

Scoring for selected-response items was verified against the specific DESE requirements for the item, the requirement of the test map, which includes the QTI response, and the keys and validations made for an individual student's derived scores per level of the test. This process included a review of all score-value-related fields—such as raw scores, object scores (part one and part two of multi-part items), strand scores, performance levels, pass/fail indicators, attempt rules, and scaled scores—against the tables provided by Pearson psychometrics.

For computer-based tests, images for field-test constructed response and essay items were loaded into iScore, Cognia's secure scoring platform. For operational constructed response and essay items, images were uploaded into the ePEN scoring platform.

For paper-based tests, Cognia scanned each MCAS student answer booklet. Images for field-test constructed response and essay items were loaded into iScore. Images for operational constructed response and essay items were transferred via FTP site to Pearson for uploading into the ePEN scoring platform. A set of quality-control procedures was enacted for scanning paper test forms. These procedures are provided in Appendix G and included

- checks of the answer booklet codes against the grade level, to ensure that the correct answer booklets were scanned in each batch;
- counting checks, to ensure that all booklets were accounted for; and
- spot checks, in which the scanned results were checked against randomly selected answer booklets to ensure that the scanners were working as intended.

3.4.2 Benchmarking Meetings

Samples of student responses of field-test items were read, scored, and discussed by members of Cognia's Scoring Services and Content Development and Publishing (CDP) Departments and by DESE test developers and content leads. Each benchmarking meeting was content- and grade-specific (e.g., grade 6 ELA). All decisions were recorded and considered final upon DESE signoff.

The primary goals of the field-test benchmarking meetings were to

- revise, as necessary, an item's scoring guide and/or scoring rubric;
- revise, as necessary, an item's scoring notes based on student responses—these, along with scoring guides, provide detailed information about how to score an item;
- assign final score points with justifications to a given set of student responses;
- approve anchor and practice sets of responses that are used to train scorers; and
- score additional papers that may be used for qualification sets.

3.4.3 Short Answer Items

Student responses to selected-response and short-answer items were machine-scored by PearsonAccess Next (PAN) Scoring. Student responses with multiple marks (possible only on paper-based tests) and blank responses were assigned zero points.

3.4.4 Scoring of Constructed Response and Essay Items

3.4.4.1 Scoring Plan and Staff

The following scoring plan summarizes the approach to the scoring for all grades and content areas:

- All scoring was conducted applying a virtual/synchronous scoring model maintaining the same quality control measures that were applied in a center-based, regional scoring environment.
- Prior to the start of scoring, scorers attended connectivity sessions to support their readiness for virtual/synchronous scoring and to answer any technology-related questions.
- Scorers evaluated student work on a fixed daily schedule under constant supervision of leadership.

- Training and all interaction between leadership and scorers occurred live via Zoom (Cognia) or Teams (Pearson) and/or via pre-recorded training module or a recording of live training.
- Breakout rooms were used to facilitate scorer training and individualized coaching.
- DESE had remote access to the scoring systems and Zoom/Teams links were provided to observe training sessions and scoring.
- Scorers worked in a non-public setting and were required to be on camera during training, scoring, and any one-on-one or group coaching sessions.
- A post-scoring survey was sent out to all MCAS scoring associates to elicit feedback on their scoring experience. The results were shared with DESE.

The following staff members were involved with scoring the 2022 MCAS responses:

- Cognia Staff
    - The *Scoring Director for Content and Quality* provided guidance, direction, and leadership to MCAS scoring.
    - The *Scoring Director for Operations and Logistics* and *Scoring Operations Managers* provided guidance and oversight of all operational and logistical matters related to scoring.
    - The *Scoring Project Manager* was responsible for the communication and coordination of MCAS scoring between Cognia and Pearson, and between Cognia and DESE.
    - *Scoring Content Specialists* facilitated all benchmarking meetings to ensure consistency of content area benchmarking and field-test scoring across all grade levels. They also handled all aspects for scoring of grade 10 ELA and mathematics, and grades 5, 8, and HS STE. Scoring content specialists prepared training materials for all operational scoring of ELA and mathematics grades 3–8 prior to scoring by Pearson. They also fielded any questions between Pearson and Cognia to ensure a consistent scoring approach across the scoring groups and years.
    - *Scoring Supervisors* were responsible for the training and qualification of both scorers and Scoring Team Leaders, and for ensuring quality targets for their assigned items.
    - *Scoring Team Leaders* provided support and direction to scorers on quality, accuracy, and timely completion of scoring.
- Pearson Staff
    - The *Scoring Portfolio Manager* was responsible for the coordination, management, and oversight of MCAS scoring for Pearson.
    - The *Scoring Project Manager* oversaw communication and coordination of MCAS scoring between Pearson and Cognia.
    - *Scoring Content Specialists* ensured consistency of content area scoring across all grade levels. Scoring content specialists monitored the quality of scoring and worked closely with a group of scoring directors to ensure the accurate and timely completion of scoring. Scoring content specialists also coordinated communication with their counterparts at Cognia regarding the training materials.
    - *Scoring Directors* were responsible for the training and qualification of both scorers and scoring supervisors and ensuring quality targets for their assigned items.
    - *Scoring Supervisors* provided support and direction to scorers on quality, accuracy, and timely scoring completion.
    - *Automated Scoring Team Members* were responsible for training and monitoring the scoring performance of the Intelligent Essay Assessor (IEA) on the subset of the ELA prompts selected for automated scoring.

3.4.4.2 Scorer Recruitment and Qualifications

MCAS scorers, a diverse group of individuals with a wide range of backgrounds, ages, and experiences, were recruited to meet contract requirements. These requirements included successful completion of at least two years of college, although hiring preference was given to individuals with a four-year college degree. Those scoring high school students' responses must have at least a 4-year degree and must either have a degree related to the content they were working on OR have at least two classes related to the content and have prior experience in the content area.

Teachers, tutors, and administrators (e.g., principals, guidance counselors) currently under contract or employed by or in Massachusetts schools, and people under 18 years of age, were not eligible to score MCAS responses. Potential scorers were required to submit an application and documentation of qualifications, such as résumés and transcripts, which were carefully reviewed. Regardless of their qualifications, potential scorers who did not clearly demonstrate content area knowledge or have at least two college courses with average or above-average grades in the content area they wished to score were eliminated from the applicant pool. A summary of scorers' backgrounds is provided in Table 3-23.

Table 3-23. Summary of Scorer and Scoring Leadership Backgrounds (Operational Scoring)

Education	Cognia Scorers		Cognia Leadership	
	Number	Percent	Number	Percent
Master's degree/doctorate	401	41	56	40
Bachelor's degree	582	59	85	60
Associate's degree/more than 48 college credits	0	0	0	0
Less than 48 college credits	0	0	0	0
TOTAL	983	100	141	100
Teaching Experience				
College instructor	94	10	12	9
Teaching certificate or experience	205	21	22	15
No teaching certificate or experience	684	69	107	76
Scoring Experience				
3+ years of experience	153	15	69	49
1–3 years of experience	156	16	48	34
No previous experience as scorer/first season	674	69	24	17
Education	**Pearson Scorers**		**Pearson Leadership**	
	Number	**Percent**	**Number**	**Percent**
Master's degree/doctorate	506	40	52	47
Bachelor's degree	1249	100	109	100
Associate's degree/more than 48 college credits	0	0	0	0
Less than 48 college credits	0	0	0	0
TOTAL	1755	-	161	-
Teaching Experience				
College instructor	0	0	0	0
Teaching certificate or experience	868	69	71	65
No teaching certificate or experience	381	31	38	35
Scoring Experience				
3+ years of experience	363	29	84	77
1–3 years of experience	244	20	20	18
No previous experience as scorer/first season	642	51	5	5

3.4.4.3 Scorer Training

Scoring content specialists had overall responsibility for ensuring that responses were scored consistently, fairly, and according to the approved scoring guidelines. Scoring materials were carefully compiled and checked for consistency and accuracy. Student identification information, demographic information, and school contact information were not visible to scorers. The sequence and manner in which the materials were presented to scorers was standardized to ensure that all scorers had the same training environment and scoring experience, regardless of content, grade level, or item scored.

Three training methods were used to train scorers of MCAS hand-scored items:

- live group training via Zoom/Teams
- recording of live group training
- pre-recorded interactive modules

Scorers started the training process by receiving an overview of MCAS; this general orientation included the purpose and goal of the testing program and any unique features of the test and the testing population. Scorer training for a specific item to be scored always started with a thorough review and discussion of the scoring guide, which consisted of the task, the scoring rubric, and any specific scoring notes for that task. All scoring guides were previously approved by DESE during field-test benchmarking meetings and used without any additions or deletions.

As part of training, prospective scorers carefully reviewed three different sets of student responses, some of which had been used to train scorers when the item was a field-test item:

- **Anchor sets** were DESE-approved sets consisting of two or three sample responses at each score point. Each response represented a typical response, rather than an unusual or uncommon one; it was solid and had a true score, meaning that this response had a precise score. Anchor sets were used to exemplify each score point.
- **Practice sets may** have included unusual, discussion-provoking responses, illustrating the range of responses encountered in operational scoring (including exceptionally creative approaches; extremely short or disorganized responses; responses that demonstrate attributes of both higher-score anchor papers and lower-score anchor papers; and responses that show traits of multiple score points). Practice sets were used to refine the scorers' understanding of how to apply the scoring rules across a wide range of responses.
- **Qualifying sets** consisted of 10 responses that were clear, typical examples of each of the possible score points. Qualifying sets were used to determine whether scorers could score consistently according to the DESE-approved scoring standards.

Meeting or surpassing the minimum acceptable standard on an item's qualifying set was an absolute requirement for scoring student responses to that item. An individual scorer must have attained a scoring accuracy rate of 70% exact and 90% exact-plus-adjacent agreement[1] (at least 7 out of the 10 were exact score matches and either zero or one discrepant) on either of two potential qualifying sets. For multi-trait ELA items, each scorer had to meet the 70% / 90% passing threshold for each individual trait.

3.4.4.4 Leadership Training

Scoring content specialists also had overall responsibility for ensuring that scoring leadership (Cognia scoring supervisors and Pearson scoring directors) continued their history of scoring consistently, fairly, and according to the approved scoring guidelines. Once they had completed their item-specific training, scoring leadership was required to meet or surpass a qualification standard of at least 80% exact and 90% exact-plus-adjacent scoring accuracy. For multi-trait ELA items, scoring leadership had to meet the 80% and 90% passing threshold for each individual trait.

3.4.4.5 Hand-Scoring of Constructed Response and Essay Items

Hand-scoring by human scorers was conducted on all field-test items in grades 3–8 and high school and on all operational items in Science and Mathematics across all grades and for ELA high school. In addition to human scoring, for 10 essay items in ELA in grades 3–8, 10% double-blind scoring (described below in this section) was conducted via automated scoring using Pearson's Intelligent Essay Assessor (IEA). The double-blind scoring on the other 3–8 ELA and Mathematics items was done by human scorers at a rate of 10%. All high-school operational scoring received 100% double-blind human scoring.

1 "Adjacent agreement" means that a pair of scores (for the same response) are only off by one point. "Exact-plus-adjacent agreement" means that a pair of scores are either the same or off by only one point.

Information on how the IEA works and how it was used on the MCAS essay scoring is provided in section 3.4.4.7 below.

The 2022 MCAS tests included constructed-response items and essays that were scored by hand. Hand-scored items included the following:

- constructed-response items with assigned scores of 0–3 (ELA grades 3 and 4 only)
- constructed-response items with assigned scores of 0–3 (mathematics grade 3) and 0–4 (mathematics grades 4–8 and 10)
- constructed-response items with assigned scores of 0–2 and 0–3 (STE grades 5, 8, and HS)
- essays with assigned scores of 0–7 (ELA grades 3–5) and 0–8 (ELA grades 6–8)

For each of these hand-scored items, a scoring guide was created. For examples of item-specific scoring guides, see the MCAS Student Work/Scoring Guides webpage at www.doe.mass.edu/mcas/student/.

The final non-numeric scores assigned by Cognia and Pearson could be designated as the following:

- Blank: The written response form is completely blank.
- Unreadable: The response cannot be read because of poor penmanship, or spelling cannot be deciphered, or writing is too small, too faint to see, or only partially visible.
- Non-English: Response was written entirely in a language other than English or without enough English or numbers to provide a score.
- Off Topic: Response does not address the topic or task for the item. The response is irrelevant to the item prompt, or the response states that the student is refusing to participate in testing.
- Direct Copy: Direct copy of text from the passage or item prompt.

Scorers at both Cognia and Pearson could also flag a response as a “Crisis” response, which would be sent to scoring leadership for immediate attention.

A response would be flagged as a “Crisis” response if it indicated

- perceived, credible desire to harm self or others;
- perceived, credible, and unresolved instances of mental, physical, or sexual abuse;
- presence of language or thoughts that may require professional intervention;
- sexual knowledge well beyond the student’s developmental age;
- ongoing, unresolved misuse of legal/illegal substances (including alcohol);
- knowledge of or participation in real, unresolved criminal activity; or
- direct or indirect request for adult intervention/assistance (e.g., crisis pregnancy, doubt about how to handle a serious problem at home).

3.4.4.6 Single-Scoring, Double-Blind Scoring, and Read-Behind Scoring

Student responses were either single scored (response was scored once by a single scorer) or double-blind scored (response was independently read and scored by two scorers).

Double-Blind Scoring

In double-blind scoring, scorers were not aware that double-blind scoring was taking place. For a double-blind response with adjacent scores (within one point of each other), the higher score was used. Any double-blind response with discrepant scores greater than one point was sent to the arbitration queue and read by scoring leadership, where the expert score resolved the scoring discrepancy.

Double-blind scoring with the IEA scoring platform was conducted on 10% of the responses for ten ELA essay items across grades 3–8. For the remaining items in grades 3–8, human scorers conducted double-blind scoring at a rate of 10%. For the grade 10 ELA essay items, human scorers conducted double-blind scoring at a 100% rate.

A description of how the IEA functions and how it was used is provided in section 3.4.4.7. Scoring agreement statistics provided in Tables 3-27 and 3-28 are based on comparing human scoring to the 10% double-blind scoring (IEA scoring or human scoring depending on the prompt).

Read-Behind Scoring

In addition to the 10% or 100% double-blind scoring, scoring leadership, at random points throughout the scoring shift, engaged in read-behind (back-read) scoring for each scorer assigned to their team. In this process, scoring leadership views responses recently scored by a particular scorer and assigns a score to that same response. Scoring leadership then compared scores and advised or counselled the scorer as necessary.

Table 3-24 illustrates how the rules were applied for instances when two read-behind scores were not an exact match or when two scorers conducting double-blind scoring assigned scores that did not match. The examples are based on a 0–4-point high school (HS) item.

Table 3-24. Read-Behind and Double-Blind Resolution Examples

Read-Behind Scoring[1]			
Scorer #1	Scorer #2	Scoring Leadership Resolution	Final
4	-	4	4
3	3	4	4
3	-	2	2
Double-Blind Scoring[2]			
Scorer #1	Scorer #2	Scoring Leadership Resolution	Final
4	3	-	4
4	2	3	3
1	3	1	1
1	2	-	2
4	2	1	1
1	1	-	1

[1] In all cases, the scoring leadership score is the final score of record.
[2] At Grades 3–8: If double-blind scores are adjacent (only 1 point different), the first score is the final score. At Grade HS: If double-bind scores are adjacent, the higher score is used as the final score. If double-blind scores are neither exact nor adjacent, the resolution score is used as the final score.

3.4.4.7 Double-Blind Scoring with the Intelligent Essay Assessor (IEA)

The Intelligent Essay Assessor (IEA) is used to score student responses to essay prompts. Like human scorers, IEA evaluates the content and meaning of text, as well as grammar, style, and mechanics. IEA learns to score via a range of machine learning and natural language processing technologies. The engine is trained individually on each prompt and trait using hundreds or thousands of human-scored student responses.

IEA measures the content and quality of responses by determining the features human scorers evaluate when scoring a response. Given a set of human-scored responses to a prompt, IEA computes hundreds of different metrics that characterize each response in numerical ways. Some examples of these metrics include the following:

- number of grammar errors
- types of grammar errors
- variety of words
- maturity of vocabulary
- variety of sentence types
- coherence of the response
- similarity of the response to other responses and/or source materials

All these different metrics are fed to machine learning algorithms that determine which of them best predict the scores assigned by human scorers.

One of the hallmarks of IEA is its ability to score constructed responses in content areas beyond just ELA using a unique implementation of Latent Semantic Analysis (LSA). LSA analyzes large bodies of relevant text to generate semantic similarity of words and passages. LSA can then “understand” the meaning of text in much the same way as a human scorer.

IEA’s background knowledge of English is based on a collection of text of about 12 million words—roughly the amount of text a student will read over the course of their academic career. Because LSA operates over the semantic representation of texts, rather than at the individual word level, it can evaluate similarity even when texts have few or no words in common. For example, LSA finds the following two sentences to have a high semantic similarity:

> *Surgery is often performed by a team of doctors.*
>
> *On many occasions, several physicians are involved in an operation.*

IEA was used operationally for the third consecutive year as the second double-blind score. IEA was trained before the operational assessment was administered using responses collected during the field test and scored by trained human scorers. For each prompt, IEA was trained using approximately 1,300 responses per prompt and then evaluated using approximately 640 responses. Table 3-25 includes the specific N counts for each prompt. The responses were randomly assigned to each set (training or evaluation). Performance on the evaluation set was measured using a variety of criteria comparing IEA with human scoring using the standard metrics shown in Table 3-26.

Table 3-25. N Counts by Prompt

Grade	Prompt	Training Set Size	Evaluation Set Size
3	EL912362165	1,284	624
4	EL909132428	1,297	635
5	EL806746086	1,345	696
5	EL834856783	1,301	628
6	EL911525969	1,296	640
6	EL913132900	1,297	633
7	EL811753816	1,309	652
7	EL909750218	1,305	645
8	EL836248600	1,287	630
8	EL911774388	1,276	620

Table 3-26. Standard Metrics for Evaluating Automated Scoring[2]

Measure	Threshold
Pearson R	≥ 0.70
Quadratic Weighted Kappa (QWK)	≥ 0.70
Kappa	≥ 0.40
Exact Agreement	≥ 65% (or better than human-human agreement)
Per score point agreement	≥ 50% (or better than human-human agreement)
Standardized Mean Difference (SMD)	Within |0.15|

[2] *Williamson, D. M., Xi, X., & Breyer, F. J. (2012). A framework for evaluation and use of automated scoring. Educational Measurement: Issues and Practices, 31, 2.*

Ten prompts met the required performance criteria and were approved by DESE to be scored by IEA as the double-blind score to monitor quality during the operational assessment. Scoring performance on the operational assessment is described in the next section.

Table 3-27 shows a comparison of IEA to human scoring on the validity papers, by exact score point (validity papers are student responses with known scores interspersed among the other student responses; these papers are used to check scoring accuracy). As shown below, IEA scoring accuracy on these validity papers is similar to or slightly higher than the human scoring accuracy at all score points. IEA accuracy tends to be higher than human accuracy at the highest score point, as seen in the Idea Development agreement statistics for grades 3–8.

Table 3-27. Comparison of Human and IEA Agreement with Validity Papers—ELA

Grade	UIN	Trait	Validity	N	Exact Agreement	Exact Agreement by Score Point 0	1	2	3	4	5
3	EL912362165	Idea Development	IEA	40	83%	100%	75%	73%	80%	100%	--
			Human		88%	98%	91%	84%	72%	74%	--
		Conventions	IEA		88%	50%	94%	82%	100%	--	--
			Human		90%	61%	97%	83%	90%	--	--
4	EL909132428	Idea Development	IEA	88	94%	94%	100%	88%	94%	100%	--
			Human		89%	97%	93%	88%	77%	70%	--
		Conventions	IEA		96%	100%	96%	96%	92%	--	--
			Human		92%	99%	95%	87%	89%	--	--
5	EL806746086	Idea Development	IEA	57	95%	100%	100%	88%	100%	0%	--
			Human		87%	98%	94%	69%	72%	38%	--
		Conventions	IEA		97%	100%	100%	93%	92%	--	--
			Human		86%	93%	92%	67%	81%	--	--
	EL834856783	Idea Development	IEA	73	82%	97%	100%	50%	85%	64%	--
			Human		90%	99%	78%	78%	64%	62%	--
		Conventions	IEA		85%	75%	100%	60%	89%	--	--
			Human		90%	89%	95%	79%	91%	--	--
6	EL911525969	Idea Development	IEA	119	98%	100%	97%	100%	94%	100%	100%
			Human		85%	96%	92%	80%	73%	58%	58%
		Conventions	IEA		98%	100%	97%	100%	92%	--	--
			Human		83%	93%	79%	75%	81%	--	--
	EL913132900	Idea Development	IEA	28	100%	100%	100%	100%	100%	100%	100%
			Human		93%	99%	92%	91%	80%	52%	75%
		Conventions	IEA		100%	100%	100%	100%	100%	--	--
			Human		94%	99%	91%	90%	87%	--	--
7	EL811753816	Idea Development	IEA	108	83%	96%	88%	82%	83%	54%	86%
			Human		83%	95%	90%	83%	63%	50%	54%
		Conventions	IEA		98%	100%	95%	100%	97%	--	--
			Human		88%	95%	84%	82%	85%	--	--
	EL909750218	Idea Development	IEA	48	75%	80%	82%	100%	60%	71%	50%
			Human		83%	87%	93%	80%	69%	77%	70%
		Conventions	IEA		88%	100%	92%	73%	88%	--	--
			Human		87%	97%	88%	73%	89%	--	--
8	EL836248600	Idea Development	IEA	96	93%	100%	95%	94%	94%	76%	100%
			Human		81%	97%	84%	80%	74%	64%	51%
		Conventions	IEA		97%	100%	84%	100%	100%	--	--
			Human		87%	94%	73%	80%	93%	--	--
	EL911774388	Idea Development	IEA	90	84%	100%	100%	91%	58%	69%	100%
			Human		80%	97%	89%	85%	76%	49%	61%
		Conventions	IEA		98%	100%	95%	95%	100%	--	--
			Human		90%	97%	87%	84%	92%	--	--

3.4.4.8 Monitoring of Scoring Quality

Once MCAS scorers met or exceeded the minimum standard on a qualifying set and were allowed to begin scoring, they were constantly monitored throughout the entire scoring window to ensure they scored student responses as accurately and consistently as possible. If a scorer fell below the minimum standard on any of the quality-control indicators, some form of intervention occurred, ranging from counseling to retraining to dismissal. Scorers were required to meet or exceed the minimum standard of 70% exact and 90% exact-plus-adjacent agreement on the following quality control methods listed and further defined below:

- daily recalibration set (Cognia)
- embedded responses (Cognia)
- validity responses (Pearson)
- read-behind scoring (RBs)/back-reading
- double-blind scoring (DBs)
- compilation reports (summary of scoring agreement statistics)

Daily recalibration sets (Cognia) were administered at the very beginning of a scoring shift and each set consisted of five responses representing various scores. If scorers had an exact score match on at least four of the five responses, and were at least adjacent on the fifth response, they were allowed to begin scoring operational responses. Scorers who had discrepant scores, or only two or three exact score matches, were retrained and, if approved by leadership, were allowed to return to scoring with extra monitoring. Scorers who had zero or one out of the five exact were typically reassigned to another item or released for the day.

Embedded responses (Cognia) were approved by the scoring content specialist and loaded into iScore for blind distribution to scorers at random points during the scoring of their first 200 operational responses. Embedded responses comprised 5% of responses scored by a scorer during this period. Scorers who fell below the 70% exact and 90% exact-plus-adjacent accuracy standard were provided counseling and additional read-behind monitoring.

Validity responses (Pearson) were used to monitor the scorer's accuracy of scoring. These responses were approved by scoring leadership and distributed to scorers based on a percentage of their total number of responses scored. For the first two days, validity responses routed to scorers comprised 6% of their responses for ELA and 3% for mathematics. Starting with the third day of live scoring, these rates were reduced to 4% for ELA and 2% for mathematics. At the third-day rate, a full shift of scoring was expected to result in 6–19 validity responses per day in ELA and around 8 validity responses per day in mathematics, based on expected read rates.

Alert messages were issued to scorers who did not meet minimum validity metrics after 10 validity responses. If after an additional five validity responses, the scorer had not improved, ePEN automatically blocked that scorer, and launched a 10-response targeted calibration set. The scorer was required to attain at least 70% exact agreement and 90% exact-plus-adjacent agreement on this calibration set to continue scoring the item for which the calibration set was administered. If the scorer passed the targeted calibration, ePEN was unblocked and the scorer regained admission to operational responses. The scorer was required to continue maintaining scoring standards for validity, as validity statistics continued to be checked every 10 validity responses. If validity fell below scoring standards at any of these subsequent intervals, the scorer was released from the project and all scores assigned immediately reset.

Read-behinds involved responses that were first read and scored by a scorer, then read and scored by a member of scoring leadership. Scoring leadership would, at various points during the scoring shift, conduct a review of submitted scorer work. After the scorer scored the response, scoring leadership would give their own score to the response and then compare that score to the scorer's score. Read-behinds were performed at least 10 times for each full-time day shift scorer and at least five times for each evening shift and partial-day shift scorer. Scorers who fell below the 70% exact and 90% exact-plus-adjacent score agreement standard were counseled, given extra monitoring assignments such as additional read-behinds, and allowed to resume scoring if they demonstrated the ability to meet the scoring standards after the intervention.

Double-blinds involved responses scored independently by two different scorers. Scorers knew in advance that some of the responses they scored were going to be scored by others, but they had no way of knowing what responses would be scored by another scorer, or whether they were the first, second, or only scorer. Double-blind scoring served as an indicator for agreement of scoring between two scorers. Responses given discrepant scores by two independent scorers were read and scored by scoring leadership.

Compilation reports were generated at both Cognia and Pearson. Compilation reports displayed all the statistics for each scorer, including the percentage of exact, adjacent, and discrepant scores on the RBs as well as the percentage of exact, adjacent, and discrepant scores on recalibration sets (Cognia) or validity sets (Pearson). As scoring leadership conducted RBs, the scorers' overall percentages on the compilation report were automatically calculated and updated. If the compilation report at the end of the scoring shift listed any individuals who were still below the 70% exact and 90% exact-plus-adjacent standard, their scores for that day were voided. Responses with voided scores were returned to the scoring queue for other scorers to score.

3.4.4.9 Interrater Consistency

Interrater consistency statistics are evaluated to ensure valid and reliable hand-scoring of items and, as such, provide evidence of scoring stability or consistency. As described above, double-blind scoring was the primary process used to monitor the consistency of the hand-scoring of students' constructed responses. Ten percent of responses to constructed-response items in grades 3–8 were randomly selected and scored independently by two different scorers. As described in the previous section, for ten of those prompts, IEA was the second scorer.

A summary of the interrater consistency results is presented in Table 3-26. Results in the table are organized by content area and grade. The table shows the number of score categories (number of possible scores for an item type), the number of included scores, the exact agreement percentage, the adjacent agreement percentage, and the correlation between the first two sets of scores. The percentages of exact and adjacent scores will approach 100%; sums less than 100 denote that some proportion of third-score resolutions took place. This same information is provided at the item level in Appendix H. Linearly weighted kappa is also included in Table 3-28 as a measure of scorer consistency by accounting for chance agreement. It is defined as (Cohen, 1968):

$$\kappa = \frac{O - E}{1 - E}$$

where

$$O = \sum_{i=1}^{n}\sum_{j=1}^{n}\left[1 - \frac{|i-j|}{n-1}\right]a_{ij}$$

$$E = \sum_{i=1}^{n}\sum_{j=1}^{n}\left[1 - \frac{|i-j|}{n-1}\right]p_i q_j$$

with a_{ij} being the proportion of that scorer 1 gives score i and scorer 2 gives score j, $p_i$being the proportion of that scorer 1 gives score i, and q_j being the proportion of that scorer 2 gives score j. O and E are observed agreement and chance agreement, respectively.

Table 3-28. Summary of Interrater Consistency Statistics Organized across Items by Content Area and Grade

Content Area	Grade	Items	Number of Score Categories	Number of Included Scores	Percentage Exact	Percentage Adjacent	Correlation	LW Kappa
ELA	3	5	4	12,587	73.58	25.53	0.74	0.63
		2	5	5,933	75.24	23.09	0.86	0.70
	4	2	5	6,475	70.27	28.29	0.85	0.68
		5	4	13,379	71.87	27.29	0.81	0.73
	5	4	4	13,423	71.73	27.40	0.81	0.68
		4	5	13,423	71.99	26.16	0.86	0.70
	6	4	4	13,446	71.40	28.06	0.84	0.72
		4	6	13,446	70.85	27.81	0.86	0.77
	7	4	4	13,798	72.70	26.90	0.85	0.73
		4	6	13,798	67.39	30.71	0.84	0.71
	8	4	4	14,251	77.05	22.57	0.89	0.79
		4	6	14,251	68.99	29.60	0.89	0.75
	10	3	4	136,720	78.42	21.12	0.85	0.76
		3	9	136,720	62.22	18.65	0.87	0.72
		3	6	136,720	64.80	33.65	0.85	0.74
Mathematics	3	7	4	26,001	91.61	8.17	0.97	0.94
	4	6	5	26,456	86.36	12.89	0.96	0.89
	5	7	5	26,842	84.56	14.25	0.95	0.89
	6	6	5	26,697	87.28	11.98	0.96	0.91
	7	6	5	26,903	87.12	11.92	0.96	0.92
	8	7	5	27,930	82.17	16.47	0.95	0.91
	10	10	5	273,627	84.31	14.76	0.96	0.87
STE	5	3	3	12,713	79.43	20.29	0.77	0.61
		6	4	27,293	70.33	27.15	0.79	0.70
	8	6	4	29,786	70.10	27.76	0.82	0.71
		2	3	13,503	77.66	21.05	0.78	0.73
Biology	HS	4	4	60,347	69.09	26.86	0.81	0.65
		8	5	179,311	73.31	23.14	0.88	0.75
Introductory Physics	HS	4	4	14,307	69.98	28.32	0.79	0.64
		6	5	42,603	74.47	23.46	0.90	0.76

[1]Caution should be used when interpreting the sums of exact and adjacent percentages for ELA items. This is because resolutions are done by response in ELA, and it is entirely possible that only one trait (either idea development or conventions) on a writing response has a non-adjacent score. For instance, if the idea development score for a response were non-adjacent, the response would also receive a third score for conventions, even if it initially received an exact or adjacent score for conventions.

Table 3-28 summarizes the interrater consistency across score categories for the double-blind scored responses. To evaluate the interrater consistency at each score point, Table 3-29 summarizes the proportion of exact agreement by score points at the test level. Item-level results are also included in Appendix H. The proportion of exact agreement at each score point is calculated as the proportion of responses where the double-blind scores are the same as the initial score at each score point. As noted in section 3.4.4.6, the double-blind scores for ten of the grades 3–8 essay responses are generated by IEA, with the remaining item response scores provided by human scorers.

Table 3-29. Summary of Proportion of Exact Agreement by Score Points

Content Area	Grade	Score Categories	Number of Included Scores	Exact	Score Points 0	1	2	3	4	5
ELA	3	3	132	84.19	89.19	89.72	70.51		--	--
		4	6,574	89.92	90.22	93.68	78.84	83.04	--	--
		5	3,153	88.50	97.78	91.46	83.82	69.83	73.28	--
	4	3	190	95.84	95.76	97.78	78.00		--	--
		4	6,800	87.24	94.61	87.65	80.46	83.85	--	--
		5	3,265	89.48	96.71	93.27	88.00	76.63	74.21	--
	5	4	6,843	87.91	91.46	93.17	73.88	84.76	--	--
		5	6,465	88.29	98.39	93.62	73.51	69.48	61.46	--
	6	4	6,590	88.45	96.58	85.04	80.50	83.65	--	--
		6	6,590	88.58	97.91	92.14	84.09	76.38	56.64	66.34
	7	4	7,096	87.55	95.69	86.08	78.00	86.20	--	--
		6	6,716	83.34	91.56	91.33	82.26	65.65	67.07	63.56
	8	4	6,918	88.08	95.11	80.65	82.69	92.23	--	--
		5	182	95.12	100.00	94.82	100.00	93.00	70.00	--
		6	6,736	81.12	97.04	86.63	83.15	75.47	57.80	57.32
Mathematics	3	4	8,234	96.68	99.15	95.86	95.02	96.22	--	--
	4	5	7,692	95.42	95.55	96.50	92.00	95.37	97.09	--
	5	5	7,869	92.62	99.27	92.37	91.05	86.20	94.98	--
	6	5	8,490	93.27	97.02	93.99	91.86	89.49	93.43	--
	7	5	8,618	90.32	98.12	88.33	89.08	87.62	92.41	--
	8	5	8,659	89.89	97.02	90.05	84.35	85.56	93.22	--

As described in section 3.4.4.8, validity responses were used to monitor the scoring accuracy. Table 3-30 provides a summary of these "validity" statistics. These statistics denote accuracy in scoring; they provide an average of the human and IEA agreement with the validity responses (e.g., agreement with the true scores for each essay).

Table 3-30. Summary of Validity Statistics[1]

Subject	Grade	Number of Score Categories[2]	Number of Validity Responses[3]	Exact Agreement	Agreement by Score Point 0	1	2	3	4	5
ELA	3	4 (SR)	3,553	89.2	95.1	91.5	63.1	65.3	--	--
		4 (Conv)	3,153	90.4	76.7	97.0	82.5	89.0	--	--
		5 (ID)	3,153	88.5	97.8	91.5	83.9	69.7	73.4	--
	4	4 (SR)	3,725	83.2	91.9	83.0	73.3	76.8	--	--
		4 (Conv)	3,265	92.4	99.2	94.5	86.6	89.2	--	--
		5 (ID)	3,265	89.5	96.8	93.3	88.0	76.6	74.2	--
	5	4 (Conv)	6,654	88.1	91.3	93.4	73.4	85.5	--	--
		5 (ID)	6,654	88.1	98.4	93.1	74.0	68.7	61.5	--
	6	4 (Conv)	6,590	88.4	96.6	85.0	80.5	83.7	--	--
		6 (ID)	6,590	88.6	97.9	92.2	84.1	76.5	56.7	66.4
	7	4 (Conv)	6,906	87.4	95.7	85.8	78.0	86.4		
		6 (ID)	6,906	83.6	91.8	91.5	82.2	66.4	67.1	63.6
	8	4 (Conv)	6,918	88.1	95.1	80.6	82.7	92.2	--	--
		6 (ID)	6,918	81.5	97.1	86.9	83.7	76.0	58.0	57.2
Mathematics	3	4	8,215	96.4	99.1	95.4	94.3	96.2	--	--
	4	5	7,670	94.9	95.5	96.1	89.2	95.4	97.1	--
	5	5	7,855	92.6	99.3	92.3	91.1	86.1	95.0	--
	6	5	8,462	93.1	97.0	94.0	91.8	88.9	93.4	--
	7	5	8,585	90.6	98.0	88.3	90.4	87.6	92.4	--
	8	5	8,616	89.8	96.9	90.0	84.3	85.5	93.2	--

[1]Includes all operational and equating items for ELA and mathematics.
[2]SR= Short response; Conv= Conventions; ID=Idea Development
[3] This column displays the number of validity reads (how many times all the responses were scored against validity papers) that occurred, not the number of validity papers used.

3.5 Classical Item Analyses

As noted in Brown (1983), “A test is only as good as the items it contains.” A complete evaluation of a test’s quality must include an evaluation of each item. Both Standards for Educational and Psychological Testing (AERA et al., 2014) and the Code of Fair Testing Practices in Education (Joint Committee on Testing Practices, 2004) include standards for identifying quality items. Items should predominantly assess the knowledge and skills that are identified as part of the domain being tested and should avoid assessing irrelevant factors. Items should also be unambiguous and free of grammatical errors, potentially insensitive content or language, and other confounding characteristics. In addition, items must not unfairly disadvantage students—in particular, racial, ethnic, or gender groups.

Both qualitative and quantitative analyses have been conducted to ensure that MCAS items meet these standards. Qualitative analyses, such as those conducted by the ADC committees, are described in earlier sections of this chapter; this section focuses on quantitative evaluations. Statistical evaluations are presented in four parts: (1) difficulty indices, (2) item-test correlations, (3) DIF statistics, and (4) dimensionality analyses. The item analyses presented here are based on the statewide administration of the MCAS assessments in spring 2022. Note that the information presented in this section is based only on the operational items, since those are the items on which student scores are calculated. (Item analyses, not included in this report, have also been performed for field-test items; the statistics are used during the item review process and during form assembly for future administrations.)

3.5.1 Classical Difficulty and Discrimination Indices

All selected-response and constructed-response items are evaluated in terms of item difficulty according to standard classical test theory practices. Difficulty is defined as the average proportion of points achieved on an item and is measured by obtaining the average score on an item and dividing it by the maximum possible score for the item. Selected-response items are scored dichotomously (correct vs. incorrect), so, for these items, the difficulty index is simply the proportion of students who correctly answered the item. Constructed-response items and essay items are scored polytomously, meaning that a student can achieve scores other than just 0 or 1 (e.g., 0, 1, 2, 3, or 4 for a 4-point constructed-response item). By computing the difficulty index as the average proportion of points achieved, the indices for the different item types are placed on a similar scale, ranging from 0.0 to 1.0 regardless of the item type. Although this index is traditionally described as a measure of difficulty, it is properly interpreted as an easiness index, because larger values indicate easier items. An index of 0.0 indicates that all students earned 0% of the item points, and an index of 1.0 indicates that all students received full credit for the item (i.e., all the item points).

Items that are answered correctly by almost all students provide little information about differences in student abilities, but they do indicate knowledge or skills that have been mastered by most students. Similarly, items that are correctly answered by very few students provide little information about differences in student abilities, but they may indicate knowledge or skills that have not yet been mastered by most students. In general, to provide the best measurement, difficulty indices should range from near-chance performance (0.25 for four-option selected-response items or essentially zero for constructed-response items) to 0.90, with the majority of items generally falling between 0.40 and 0.70. However, on a standards-referenced assessment such as the MCAS, it may be appropriate to include some items with very low or very high item difficulty values to ensure sufficient content coverage.

It is desirable for an item to be one on which higher-ability students perform better than lower-ability students. The correlation between student performance on a single item and total test score is a commonly used measure of this item characteristic. Within classical test theory, the item-test correlation is referred to as the item’s discrimination because it indicates the extent to which successful performance on an item discriminates between high and low scores on the test. For 2022 MCAS constructed-response items, the item discrimination index used was the Pearson product-moment correlation; for selected-response items, the corresponding statistic is commonly referred to as a point-biserial correlation. The theoretical range of these statistics is -1.0 to 1.0, with a typical observed range for selected-response items from 0.20 to 0.60.

Discrimination indices can be thought of as measures of how closely an item assesses the same knowledge and skills assessed by the other items contributing to the criterion total score on the assessment. When an item has a high discrimination index, it means that, in general, students selecting the correct response are students with higher total scores, and students selecting incorrect responses are students with lower total scores. Given this definition, an item can discriminate between low-performing examinees and high-performing examinees. Discrimination indices were very useful to consider when selecting items for the new MCAS tests and were provided to the ADC committees along with other item-level statistics, such as difficulty. Very low or negative point-biserial coefficients on field-tested new items can indicate that the items are flawed and should not be considered for the operational tests.

A summary of the item difficulty and item discrimination statistics for each grade and content area combination for the CBT items administered in school is presented in Table 3-31. Note that the statistics are presented for all items as well as separately by item type: selected-response (SR), constructed-response (CR), and essay (ES). The mean difficulty (*p*-value) and discrimination values shown in the table are within generally acceptable and expected ranges and are consistent with results obtained in previous administrations. Note that the information presented in this section and associated appendices are based only on first-time test takers who are not EL students.

Table 3-31. Summary of Item Difficulty and Discrimination Statistics by Content Area and Grade

Content Area	Grade	Item Type	Number of Items	*p*-Value Mean	*p*-Value Standard Deviation	Discrimination Mean	Discrimination Standard Deviation
ELA	3	All	31	0.63	0.14	0.50	0.09
		MC	24	0.66	0.10	0.48	0.08
		OR	6	0.58	0.17	0.55	0.09
		ES	1	0.24	--	0.63	--
	4	All	31	0.61	0.14	0.46	0.11
		MC	24	0.63	0.13	0.44	0.09
		OR	6	0.58	0.12	0.52	0.11
		ES	1	0.34	--	0.72	--
	5	All	31	0.70	0.16	0.51	0.09
		MC	24	0.74	0.13	0.48	0.07
		OR	5	0.66	0.13	0.58	0.02
		ES	2	0.32	0.01	0.71	0.02
	6	All	31	0.64	0.14	0.51	0.09
		MC	24	0.67	0.12	0.48	0.05
		OR	5	0.60	0.08	0.56	0.05
		ES	2	0.36	0.00	0.77	0.02
	7	All	32	0.62	0.11	0.49	0.10
		MC	26	0.65	0.10	0.45	0.06
		OR	4	0.57	0.07	0.55	0.03
		ES	2	0.41	0.04	0.79	0.01
	8	All	31	0.70	0.13	0.49	0.13
		MC	24	0.73	0.11	0.44	0.09
		OR	5	0.68	0.12	0.57	0.04
		ES	2	0.46	0.01	0.82	0.02
	10	All	30	0.75	0.11	0.48	0.12
		MC	21	0.78	0.10	0.43	0.08
		OR	7	0.71	0.11	0.52	0.05
		ES	2	0.61	0.04	0.83	0.01
Mathematics	3	All	40	0.54	0.16	0.52	0.12
		MC	16	0.56	0.15	0.49	0.10
		OR	24	0.53	0.17	0.55	0.13

continued

Content Area	Grade	Item Type	Number of Items	p-Value		Discrimination	
				Mean	Standard Deviation	Mean	Standard Deviation
Mathematics	4	All	40	0.53	0.16	0.55	0.12
		MC	11	0.62	0.16	0.48	0.10
		OR	29	0.49	0.15	0.58	0.11
	5	All	40	0.51	0.15	0.54	0.12
		MC	17	0.53	0.18	0.47	0.11
		OR	23	0.50	0.14	0.59	0.11
	6	All	40	0.48	0.16	0.53	0.13
		MC	15	0.52	0.15	0.44	0.08
		OR	25	0.46	0.16	0.58	0.13
	7	All	40	0.42	0.18	0.52	0.14
		MC	19	0.49	0.16	0.41	0.07
		OR	21	0.36	0.16	0.62	0.11
	8	All	40	0.52	0.13	0.54	0.12
		MC	21	0.56	0.11	0.46	0.08
		OR	19	0.49	0.14	0.62	0.10
	10	All	42	0.53	0.15	0.55	0.13
		MC	20	0.62	0.13	0.47	0.08
		OR	22	0.45	0.13	0.62	0.13
STE	5	All	41	0.59	0.15	0.49	0.09
		MC	22	0.63	0.13	0.46	0.06
		OR	19	0.53	0.15	0.52	0.12
	8	All	41	0.52	0.14	0.46	0.14
		MC	20	0.49	0.16	0.39	0.12
		OR	21	0.54	0.10	0.53	0.12
Biology	HS	All	42	0.55	0.15	0.51	0.12
		MC	21	0.56	0.14	0.47	0.06
		OR	21	0.54	0.16	0.55	0.15
Introductory Physics	HS	All	42	0.60	0.14	0.50	0.14
		MC	28	0.61	0.13	0.46	0.10
		OR	14	0.57	0.17	0.58	0.17

Caution should be exercised when comparing indices across grade levels. Differences may be due not only to differences in the item statistics on the test but may also be affected by differences in student abilities and/or differences in the standards and/or curricula taught in each grade.

Difficulty indices for selected-response items tend to be higher (indicating that students performed better on these items) than the difficulty indices for constructed-response items because selected-response items can be answered correctly by simply identifying rather than providing the correct answer, and by guessing. Similarly, discrimination indices for those constructed-response items with more than two points tend to be larger than those for dichotomous items because of the greater variability of the former (i.e., the partial credit these items allow). The restriction of range (i.e., only two score categories) in dichotomous items tends to make the discrimination indices lower. Note that these patterns are more consistent within item type, and therefore when interpreting classical item statistics, comparisons should be emphasized among items of the same type.

In addition to the item difficulty and discrimination summaries presented above, item-level classical statistics are provided in Appendix I. On these MCAS items, the item difficulty and discrimination indices are within generally acceptable and expected ranges. Very few items were answered correctly at near-chance or near-perfect rates. Similarly, the positive discrimination indices indicate that students who performed well on individual items tended to perform well overall. There are six items with difficulty below 0.20 and three items with discrimination below 0.20. Item-level score point distributions are provided for constructed-response items in Appendix J; for each item, the percentage of students who received each score point is presented.

3.5.2 DIF

The *Code of Fair Testing Practices in Education* (Joint Committee on Testing Practices, 2004) explicitly states that subgroup differences in performance be examined when sample sizes permit and that actions be taken to ensure that differences in performance are attributable to construct-relevant, rather than irrelevant, factors. *Standards for Educational and Psychological Testing* (AERA et al., 2014) includes similar guidelines. As part of the effort to identify such problems, psychometricians evaluated the 2022 MCAS items in terms of DIF statistics. One application of the DIF statistics is to use them to evaluate item quality in the ADC and bias committee item review process.

For the 2022 MCAS, the standardization DIF procedure (Dorans & Kulick, 1986) was employed to evaluate subgroup differences. (Subgroup differences denote significant group-level differences in performance for examinees with equivalent achievement levels on the test.) The standardization DIF procedure is designed to identify items for which subgroups of interest perform differently, beyond the impact of differences in overall achievement. The DIF procedure calculates the difference in item performance for two groups of students (at a time) matched for achievement on the total test. Specifically, average item performance is calculated for students at every total score. Then an overall average is calculated, weighting the total score distribution so that it is the same for the two groups. DIF statistics were calculated for all subgroups with at least 75 students. Note that the information presented in this section and the associated appendix is based only on first-time test takers who are not EL students.

DIF for items is evaluated initially at the time of field-testing. When differential performance between two groups occurs on an item (i.e., a DIF index in the “low” or “high” categories, explained below), it may or may not indicate actual item bias. Consequently, all items with either high or low DIF are examined by content experts and educators to try to identify the cause. If subgroup differences in performance can be traced to differential experience (such as geographical living conditions or access to technology), the inclusion of such items is reconsidered during the item review process. If content experts do not identify a source of bias on the item, the item may be eligible for operational form construction.

Computed DIF indices have a theoretical range from -1.0 to 1.0 for selected-response items, and an adjusted index with the same scale (-1.0 to 1.0) for constructed-response items. Dorans and Holland (1993) suggested that index values between -0.05 and 0.05 denote either a negligible amount of DIF or the absence of DIF. The majority of 2022 MCAS items fell within this range. Dorans and Holland further stated that items with values between -0.10 and -0.05 and between 0.05 and 0.10 (i.e., “low” DIF) should be inspected to ensure that no possible effect is overlooked, and that items with values outside the -0.10 to 0.10 range (i.e., “high” DIF) are more unusual and should be examined very carefully before being used operationally.

For the 2022 MCAS administration, DIF analyses were conducted for all subgroups (as defined in the No Child Left Behind Act) for which the sample size was adequate. Six subgroup comparisons were evaluated for DIF:

- male compared with female
- not EL/FEL compared with EL/FEL[3]
- not Low Income compared with Low Income
- white compared with African American/Black
- white compared with Hispanic or Latino
- without disabilities compared to with disabilities

After the 2022 spring administration, DIF analyses were conducted again as a post-hoc quality check based on the operational data. The tables in Appendix K present the number of items classified as either “low” or “high” DIF, in total and by group favored. Very few items exhibited high DIF in the operational

[3] *EL=English learner / FEL=former English learner*

data, which suggested that the bias and sensitivity review that occurred after the field-testing effectively ruled out items displaying large DIF for the MCAS 2022 spring tests.

3.5.3 Dimensionality Analysis

Because tests are constructed with multiple content area subcategories and their associated knowledge and skills, the potential exists for the invocation of multiple dimensions beyond the common primary dimension. Generally, the subcategories are highly correlated with each other; therefore, a primary dimension typically explains the majority of variance in test scores. The presence of one dominant primary dimension is the primary psychometric assumption to support the use of the unidimensional item response theory (IRT) models that are used for calibrating and scaling the 2022 MCAS assessments.

The purpose of dimensionality analysis is to investigate whether violation of the assumption of test unidimensionality is statistically detectable and, if so, (a) the degree to which unidimensionality is violated and (b) the nature of the multidimensionality. Dimensionality analyses were performed on common items for all MCAS test forms used during the spring 2022 administrations. A total of 18 forms were analyzed; the results for these analyses are reported in sections 3.5.3.1 and 3.5.3.2 below.

The dimensionality analyses were conducted using the nonparametric IRT-based methods DIMTEST (Stout, 1987; Stout, Froelich, & Gao, 2001) and DETECT (Zhang & Stout, 1999). Both methods use as their basic statistical building block the estimated average conditional covariances for item pairs. A conditional covariance is the covariance between two items conditioned on true score (expected value of observed score) for the rest of the test, and the average conditional covariance is obtained by averaging across all possible conditioning scores. When a test is strictly unidimensional, all conditional covariances are expected to take on values within random noise of zero, indicating statistically independent item responses for examinees with equal expected scores. Nonzero conditional covariances are essentially violations of the principle of local independence, and such local dependence implies multidimensionality. Thus, nonrandom patterns of positive and negative conditional covariances are indicative of multidimensionality.

DIMTEST is a hypothesis-testing procedure for detecting violations of local independence. The data are first randomly divided into a training sample and a cross-validation sample. Then an exploratory analysis of the conditional covariances is conducted on the training sample data to find the cluster of items that displays the greatest evidence of local dependence. The cross-validation sample is then used to test whether the conditional covariances of the selected cluster of items display local dependence, conditioning on total score from the non-clustered items. The DIMTEST statistic follows a standard normal distribution under the null hypothesis of unidimensionality.

DETECT is an effect-size measure of multidimensionality. As with DIMTEST, the data are first randomly divided into a training sample and a cross-validation sample (these samples are drawn independently of those used with DIMTEST). The training sample is used to find a set of mutually exclusive and collectively exhaustive clusters of items that best fit a systematic pattern of positive conditional covariances for pairs of items from the same cluster and negative conditional covariances for pairs composed of items from different clusters. Next, the clusters from the training sample are used with the cross-validation sample data to average the conditional covariances: within-cluster conditional covariances are summed; from this sum, the between-cluster conditional covariances are subtracted. This difference is divided by the total number of item pairs, and this average is multiplied by 100 to yield an index of the average violation of local independence for an item pair. DETECT values less than 0.2 indicate very weak multidimensionality (or near unidimensionality); values of 0.2 to 0.4, weak to moderate multidimensionality; values of 0.4 to 1.0, moderate to strong multidimensionality; and values greater than 1.0, very strong multidimensionality (Roussos & Ozbek, 2006).

DIMTEST and DETECT were applied to the operational items of the MCAS tests administered during spring 2022. The data for each grade were split into a training sample and a cross-validation sample. Because DIMTEST had an upper limit of 24,000 students, the training and cross-validation samples for the tests that had over 24,000 students were limited to 12,000 each, randomly sampled from the total sample. DETECT, on the other hand, had an upper limit of 500,000 students, and so every training sample and cross-validation sample used all the available data. After randomly splitting the data into training and cross-validation samples, DIMTEST was applied to each data set to see if the null hypothesis of unidimensionality would be rejected. DETECT was then applied to each data set for which the DIMTEST null hypothesis was rejected to estimate the effect size of the multidimensionality. Note that the information presented in this section is based only on first-time test takers who are not EL students and who took non-accommodated online forms.

3.5.3.1 DIMTEST Analyses

The results of the DIMTEST analyses indicated that the null hypothesis was rejected at a significance level of 0.05 for every data set. Because strict unidimensionality is an idealization that almost never holds exactly for a given data set, the statistical rejections in the DIMTEST results were not surprising. Indeed, because of the very large sample sizes involved in most of the data sets (over 25,000 in 17 out of 18 tests), DIMTEST would be expected to be sensitive to even quite small violations of unidimensionality.

3.5.3.2 DETECT Analyses

Next, DETECT was used to estimate the effect size for the violations of local independence for the 2017 to 2022 tests. Table 3-32 displays the multidimensionality effect-size estimates from DETECT.

Table 3-32. Multidimensionality Effect Sizes by Grade and Content Area

Content Area	Grade	Multidimensionality Effect Size					
		2017	2018	2019	2021* Session 1	2021* Session 2	2022
ELA	3	0.25	0.17	0.27	0.24	0.27	0.20
	4	0.30	0.35	0.29	0.34	0.25	0.25
	5	0.35	0.28	0.34	0.44	0.26	0.23
	6	0.38	0.26	0.42	0.44	0.37	0.33
	7	0.34	0.34	0.49	0.51	0.26	0.35
	8	0.38	0.35	0.47	0.32	0.20	0.31
	10	0.20	0.24	0.26	0.34	--	0.28
	Average	**0.33**	**0.29**	**0.36**	**0.38**	**0.27**	**0.28**
Mathematics	3	0.20	0.17	0.20	0.23	0.18	0.21
	4	0.19	0.22	0.10	0.12	0.20	0.16
	5	0.19	0.15	0.15	0.26	0.22	0.18
	6	0.21	0.13	0.21	0.21	0.21	0.14
	7	0.13	0.14	0.15	0.34	0.14	0.16
	8	0.11	0.15	0.13	0.19	0.25	0.19
	10	0.12	0.09	0.09	0.11	--	0.17
	Average	**0.17**	**0.16**	**0.15**	**0.21**	**0.20**	**0.17**
STE	5	0.08	0.11	0.08	0.22	0.18	0.09
	8	0.08	0.13	0.08	0.19	0.18	0.13
Biology**	HS	--	--	--	--	--	0.10
Introductory Physics**	HS	--	--	--	--	--	0.10
	Average	**0.08**	**0.12**	**0.08**	**0.21**	**0.18**	**0.10**

** In 2021, two sessions in each test were randomly spiraled among students, and each session was analyzed as a separate form. Because each session had a different content blueprint than the entire test, caution should be taken when comparing the 2021 DETECT effect size results to any other year's results.*
*** Because this was the first year of the next-generation tests for high school biology and introductory physics, no dimensionality analysis was conducted for these tests. Thus, no multidimensionality effect sizes were generated for years before 2022.*

The DETECT values mostly indicate weak (0.2 < DETECT < 0.4) or very weak (DETECT < 0.2) multidimensionality for all the 2022 mathematics and next-generation STE test forms, which are consistent with previous years' results. The 2022 high school biology and introductory physics tests also showed very weak multidimensionality (DETECT < 0.2). The 2022 ELA tests show weak multidimensionality (0.2 < DETECT < 0.4; with larger DETECT effect size indicating stronger multidimensionality).

The way in which DETECT divided the tests into clusters was investigated to determine whether there were any discernable patterns with respect to the selected-response and constructed-response item types. Inspection of the DETECT clusters indicated that selected-response/constructed-response separation generally occurred much more strongly with ELA than with mathematics, a pattern that has been consistent across all previous years. Specifically, for the ELA test forms with stronger multidimensionality, every form had one set of clusters dominated by selected-response items and another set of clusters dominated by essay items. These results give solid evidence that the essays form a distinct cluster from the selected-response items. The 2022 ELA DETECT indices showed a consistent pattern of being smaller than what occurred in 2019, indicating a change in the dimensionality structure (possibly due to either the change in the test blueprint between 2019 and 2022 or to differences in how students were taught the construct being measured by the test). With the goal of maintaining the unidimensional composite scale across years, it was decided to implement a two-step equating method for ELA. This topic is discussed in more detail in Section 3.6.3.

On the mathematics and next-generation STE test forms, there was less clear evidence of consistent separation of selected-response and constructed-response items. This lack of evidence is consistent with the weaker multidimensionality exhibited by those subjects historically.

In summary, for the 2022 dimensionality analyses, the violations of local independence, as evidenced by the DETECT effect sizes, were either weak or very weak in mathematics test forms and were weak in ELA test forms. The patterns with respect to the selected-response and constructed-response items were consistent with those in the previous years, with ELA tending to display more separation than mathematics.

3.6 MCAS IRT Linking and Scaling

This section describes the procedures used to calibrate, equate, and scale the MCAS tests. During these psychometric analyses, a number of quality-control procedures and checks on the processes were conducted. These procedures included the following:

- evaluations of the calibration processes (e.g., checking the number of cycles required for convergence for reasonableness)
- checking item parameters and their standard errors for reasonableness
- examination of test characteristic curves (TCCs) and test information function curves (TIFs) for reasonableness
- evaluation of model fit
- evaluation of equating items (e.g., delta analyses, b-b analyses, beta analyses)
- examination of a-plots and b-plots for reasonableness
- evaluation of the scaling results (e.g., comparing look-up tables to the previous year's)

Section 3.6.3 summarizes the equating procedure and results to place the 2022 next-generation MCAS tests on the same scale as the previous year. An equating report (Appendix L), which provided complete documentation of the quality-control procedures and results, was reviewed by DESE and approved prior to production of the *Spring 2022 MCAS Tests Parent/Guardian Reports* (*2021–2022 MCAS Equating*

Report, Cognia Psychometrics and Research Department, unpublished manuscript). Note that the information presented in this section and associated appendices are based only on first-time test takers who are not EL students and who took non-accommodated online forms.

3.6.1 IRT

All MCAS items are calibrated using IRT. IRT uses mathematical models to define a relationship between an unobserved measure of student performance, usually referred to as theta (θ), and the probability [$P(\theta)$] of getting a dichotomous item correct or of getting a particular score on a polytomous item (Hambleton, Swaminathan, & Rogers, 1991; Hambleton & Swaminathan, 1985). In IRT, it is assumed that all items are independent measures of the same construct (i.e., of the same θ). Another way to think of θ is as a mathematical representation of the latent trait of interest. Several common IRT models are used to specify the relationship between θ and $P(\theta)$ (Hambleton & van der Linden, 1997; Hambleton & Swaminathan, 1985). The process of determining the mathematical relationship between θ and $P(\theta)$ is called item calibration. After items are calibrated, they are defined by a set of parameters that specify a nonlinear, monotonically increasing relationship between θ and $P(\theta)$. Once the item parameters are known, an estimate of θ for each student can be calculated. This estimate, $\hat{\theta}$, is considered an estimate of the student's true score or a general representation of student performance. IRT has characteristics that may be preferable to those of raw scores for equating purposes because it specifically models examinee responses at the item level and facilitates equating to an IRT-based item pool (Kolen & Brennan, 2014).

For the 2022 next-generation MCAS tests, the three-parameter logistic (3PL) model was used for traditional four-option selected-response items, and the two-parameter logistic (2PL) model was used for binary-scored selected-response and technology-enhanced items (Hambleton & van der Linden, 1997; Hambleton, Swaminathan, & Rogers, 1991). The graded-response model (GRM) was used for polytomous items (Nering & Ostini, 2010), including polytomously scored multi-part items, constructed-response items, and essays.

The 3PL model for selected-response items can be defined as:

$$P_i(\theta_j) = P(U_i = 1|\theta_j) = c_i + (1 - c_i)\frac{\exp[Da_i(\theta_j - b_i)]}{1+\exp[Da_i(\theta_j - b_i)]},$$

where
U represents the scored response on an item,
I indexes the items,
j indexes students,
α represents item discrimination,
b represents item difficulty,
c is the pseudo guessing parameter,
θ is the student proficiency, and
D is a normalizing constant equal to 1.701.

For the 2PL model, this equation reduces to the following:

$$P_i(\theta_j) = P(U_i = 1|\theta_j) = \frac{\exp[Da_i(\theta_j - b_i)]}{1+\exp[Da_i(\theta_j - b_i)]}.$$

In the GRM for polytomous items, an item is scored in $k + 1$ graded categories that can be viewed as a set of k dichotomies. At each point of dichotomization (i.e., at each threshold), a two-parameter model can be used to model the probability that a student's response falls at or above a particular ordered category, given θ. This implies that a polytomous item with k + 1 categories can be characterized by k item category threshold curves (ICTCs) of the 2-PL form:

$$P_{ik}^{*}(\theta_j) = P(U_i \geq k|\theta_j) = \frac{\exp[Da_i(\theta_j - b_i + d_{ik})]}{1+\exp[Da_i(\theta_j - b_i + d_{ik})]},$$

where
U indexes the scored response on an item,
i indexes the items,
j indexes students,
k indexes threshold,
θ is the student ability,
α represents item discrimination,
b represents item difficulty,
d represents threshold, and
D is a normalizing constant equal to 1.701.

After computing k ICTCs in the GRM, k + 1 item category characteristic curves (ICCCs), which indicate the probability of responding to a particular category given θ, are derived by subtracting adjacent ICTCs:

$$P_{ik}(\theta_j) = P(U_i = \mathrm{k}|\theta_j) = P_{ik}^{*}(\theta_j) - P_{i(k+1)}^{*}(\theta_j),$$

where
i indexes the items,
j indexes students,
k indexes threshold,
θ is the student ability,
P_{ik} represents the probability that the score on item *i* falls in category k, and
P_{ik}^{*} represents the probability that the score on item *i* falls at or above the threshold k
($P_{i0}^{*} = 1$ and $P_{i(m+1)}^{*} = 0$).

The GRM is also commonly expressed as:

$$P_{ik}(\theta_j) = \frac{\exp[Da_i(\theta_j - b_i + d_k)]}{1+\exp[Da_i(\theta_j - b_i + d_k)]} - \frac{\exp[Da_i(\theta_j - b_i + d_{k+1})]}{1+\exp[Da_i(\theta_j - b_i + d_{k+1})]}.$$

Finally, the item characteristic curve (ICC) for a polytomous item is computed as a weighted sum of ICCCs, where each ICCC is weighted by a score assigned to a corresponding category. The expected score for a student with a given theta is expressed as:

$$E(U_i|\theta_j) = \sum_{k}^{m+1} w_{ik} P_{ik}(\theta_j),$$

where w_{ik} is the weighting constant and is equal to the number of score points for score category *k* on item *i*.

Note that for a dichotomously scored item, $E(U_i|\theta_j) = P_i(\theta_j)$. For more information about item calibration and determination, see Lord and Novick (1968), Hambleton and Swaminathan (1985), or Baker and Kim (2004).

3.6.2 IRT Results

IRT calibration was conducted using flexMIRT 3.03 (Cai, 2012). IRT calibration was conducted for the computer-based tests in all grades. Because paper test forms are treated as accommodated forms, item parameters for computer-based items were applied to their paper counterparts. The tables in Appendix L give the IRT item parameters and associated standard errors of all operational scoring items on the 2022 MCAS tests. Appendix L contains graphs of the TCCs and TIFs, which are defined below.

TCCs display the expected (average) raw score associated with each θ_j value typically between -4.0 and 4.0. Mathematically, the TCC is computed by summing the ICCs of all items that contribute to the raw score. Using the notation introduced in section 3.6.1, the expected raw score at a given value of θ_j is as follows:

$$E\left(X\middle|\theta_j\right) = \sum_{i=1}^{n} E\left(U_i\middle|\theta_j\right),$$

where
i indexes the items (and n is the number of items contributing to the raw score),
j indexes students (here, θ_j runs from -4 to 4), and
$E\left(X\middle|\theta_j\right)$ is the expected raw score for a student of ability θ_j.

The expected raw score monotonically increases with θ_j, consistent with the notion that students of high ability tend to earn higher raw scores than students of low ability. Most TCCs are “S-shaped”: they are flatter at the ends of the distribution and steeper in the middle.

The TIF displays the amount of statistical information that the test provides at each value of θ_j. Information functions depict test precision across the entire latent trait continuum. There is an inverse relationship between the information of a test and its standard error of measurement (SEM). For long tests, the SEM at a given θ_j is approximately equal to the inverse of the square root of the statistical information at θ_j (Hambleton, Swaminathan, & Rogers, 1991), as follows:

$$SEM\left(\theta_j\right) = \frac{1}{\sqrt{I\left(\theta_j\right)}}.$$

Compared to the tails, TIFs are often higher near the middle of the θ distribution where most students are located. This is by design. Test items are often selected with middle difficulty levels and high discriminating powers so that test information is maximized for most candidates who are expected to take a test.

The number of cycles required for convergence for each grade and content area during the IRT analysis can be found in Table 3-33. The calibration went smoothly and converged in all subjects/grades.

Table 3-33. Number of Cycles Required for Convergence

Content Area	Grade	Initial Cycles	FCIP Cycles
ELA	3	52	8
	4	32	12
	5	89	11
	6	45	16
	7	34	24
	8	46	31
	10	49	41
Mathematics	3	54	--
	4	60	--
	5	35	--
	6	56	--

continued

Content Area	Grade	Initial Cycles	FCIP Cycles
Mathematics	7	91	--
	8	31	--
	10	63	--
STE	5	43	--
	8	45	--
Biology	HS	47	--
Introductory Physics	HS	53	--

3.6.3 Equating

The purpose of equating is to ensure that scores obtained from different forms of a test are comparable to one another. Equating may be used if multiple test forms are administered in the same year; or one year's forms may be equated to those used in the previous year. Equating ensures that students are not given an unfair advantage or disadvantage because the test form they took is easier or harder than that taken by other students. See section 3.2 for more information about how the test development process supports successful equating.

The 2022 administration of the next-generation MCAS used a raw score-to-theta equating procedure in which test forms were equated to the theta scale established on the reference form (i.e., the form used in the most recent standard setting). The groups of students who take equating items on the MCAS tests are never strictly equivalent to the groups who took the tests in the reference years. IRT is particularly useful for equating scenarios that involve nonequivalent groups (Allen & Yen, 1979). Equating for the MCAS uses the anchor test–nonequivalent groups design described by Petersen, Kolen, and Hoover (1989). In this equating design, no assumption is made about the equivalence of the examinee groups taking different test forms (i.e., naturally occurring groups are assumed). Comparability is instead evaluated by using a set of anchor items (also called equating items), assuming they perform in the same way in both groups and can, thus, accurately measure the differences in the two groups.

For mathematics and STE, the item parameter estimates for 2022 test forms were placed on the reference scale by using the Stocking-Lord method (SL; Stocking & Lord, 1983). However, a two-step equating approach was taken for ELA because of the finding in the 2022 dimensionality analyses that the dimensionality structure of the test displayed evidence of having changed from 2019. The first step involved applying the SL method for all items except the essay items; thus, isolating any dimensionality variability in the essay items from the estimation of the equating relationship across years. Then, the essay items were brought onto the scale established in the first step by applying the fixed common item parameters (FCIP2; Kim, 2006) method. The FCIP2 method is based on the IRT principle of item parameter invariance. According to this principle, the equating items for both tests should have the same item parameters. After the item parameters for the non-essay items were put on the reference scale (the first step), the FCIP2 method was employed to place the essay items onto the operational scale (the second step). This method is performed by fixing the parameters of the "equating" items (in this case, all non-essay items) to their previously obtained on-scale values and then calibrating using flexMIRT to place the remaining items (in this case, the essay items) on scale.

Prior to implementing the SL method, two evaluations of the equating items were conducted to check for parameter drift, as follows.

- Delta method: compares two years' delta values (the percent correct transformed into a scale "with an effective range of 6 [very easy item] to 20 [very difficult item]"[4]) for equating items and flags an item if its standardized distance to the principal axis line is at or above 3 in absolute value.
- *b*-*b* method: compares current year's freely estimated IRT difficulty parameters with the previous year's values for equating items and flags an item if its standardized distance to the principal axis line is at or above 3 in absolute value.

During the implementation of the SL method, a third evaluation of the equating items was conducted to check for parameter drift, as follows.

- IRT curve-based beta method: a measure of the weighted average difference between the item response function (IRF) curves between two years for each equating item (Jiang, Roussos & Yu, 2017; Wang & Roussos, 2018). The current year's IRF is calculated based on transformed item parameters using the SL constants estimated with all equating items. The difference index is denoted as β, its estimate is denoted as $\hat{\beta}$, and the following threshold is used to categorize an item into negligible, moderate, or large drift:
    - $|\hat{\beta}| < 0.05$, negligible drift
    - $0.05 \leq |\hat{\beta}| < 0.1$, moderate drift
    - $|\hat{\beta}| \geq 0.1$, large drift
    - Items that were flagged as a result of these evaluations are listed in Table 3-37. Detailed results from each drift analysis, along with Delta and *b*-plots are presented in Appendix L.

Items that were flagged as a result of these evaluations are listed in Table 3-34. Detailed results from each drift analysis, along with Delta and *b*-plots are presented in Appendix L.

Following the statistical evaluation, each of these flagged items went through a content review process to further investigate whether there are construct-irrelevant or relevant factors that may have resulted in the item parameter drift. Anything pertaining to the content being measured is considered a construct relevant factor, such as any instructional shift in certain content areas. A list of content irrelevant factors follows:

- changes to item administration mode
- word/graphic changes to any part of the item
- change to option order
- change in position (e.g., beginning of test vs. end of test)
- whether an item experiences "clueing" in one administration but not in the other
- whether there are test security risks associated with the flagged items
- any other difference that may affect the testing experience

An item is removed from the equating set if a construct irrelevant reason is identified in the content review. If a content relevant reason is identified, an item is kept as an equating item. If the content review does not find any reason, an item is removed if it is flagged by any of these three criteria: (1) standardized distance in the delta plot ≥ 3, (2) *b*-*b* standardized distance in the *b*-*b* plot ≥ 3, and (3) $|\hat{\beta}| \geq 0.1$.

---

[4] *Walker, M. E. (2014, May 13). Enhancing the Equating of Item Difficulty Metrics: Estimation of Reference Distribution. ETS Research Report Series. P. 1. Retrieved 1.10.20 from: https://onlinelibrary.wiley.com/doi/full/10.1002/ets2.12006*

Table 3-34. Year-to-year Equating Items Watch List*

Content Area	Grade	Item ID	Statistical Reason	Content Reason	Action
ELA	3	IA00450	beta	None identified	Retained
		IA00451	beta	None identified	Retained
		IA00452	beta	None identified	Retained
	4	IA00289	beta	None identified	Retained
	5	IA00505	beta	None identified	Retained
		IA00506	beta	None identified	Retained
		IA01672	beta	None identified	Retained
	6	IA00520	beta	None identified	Retained
		IA00530	beta	None identified	Retained
	7	IA00069	beta	None identified	Retained
		IA00070	beta	None identified	Retained
		IA00658	beta	None identified	Retained
	8	IA00059	beta	None identified	Retained
		IA00062	beta	None identified	Retained
		IA00371	beta	None identified	Retained
		IA00374	beta	None identified	Retained
		IA00379	beta	None identified	Retained
	10	IA04110	beta	None identified	Retained
Mathematics	3	IA00930	beta	None identified	Retained
	4	IA00861	beta	None identified	Retained
		IA00958	beta	None identified	Retained
		IA00963	beta	None identified	Retained
		IA01055	beta	None identified	Retained
		IA01093	beta	None identified	Retained
		IA02819	beta	None identified	Retained
		IA02841	beta	None identified	Retained
	5	IA01155	beta	None identified	Retained
		IA04970	beta	None identified	Retained
	6	IA00827	beta	None identified	Retained
		IA02037	beta	None identified	Retained
	7	IA00796	beta	None identified	Retained
		IA01011	beta	None identified	Retained
		IA04486	beta	None identified	Retained
	8	IA00979	beta	None identified	Retained
		IA01042	beta	None identified	Retained
		IA02495	beta	None identified	Retained
	10	IA04800	beta	None identified	Retained
		IA04846	beta	None identified	Retained
		IA04993	beta	None identified	Retained
		IA05117	beta	None identified	Retained
		IA05144	beta	None identified	Retained
		IA05170	beta	None identified	Retained
STE	8	IA05243	beta	None identified	Retained
		IA05245	beta	None identified	Retained

** Because this was the first year of the next-generation tests for grade 10 biology and introductory physics, no equating was conducted for these tests and thus no items were flagged.*

The equating items that successfully survived these evaluation procedures were then employed in the SL method, and the linking relationship obtained from the SL method was used to transform the item parameters for all items in the 2022 next-generation computer-based administration onto the target scale. The transformed item parameters were then used to build the raw score to theta look-up tables for the 2022 tests. The SL constants are presented in Table 3-35.

Table 3-35. Stocking and Lord Constants*

Content Area	Grade	Slope	Intercept
ELA	3	1.12	-0.15
	4	1.04	-0.30
	5	1.10	-0.22
	6	1.44	-0.33
	7	1.29	-0.29
	8	1.38	-0.18
	10	1.09	-0.13
Mathematics	3	1.11	-0.11
	4	1.04	-0.01
	5	1.01	-0.17
	6	1.01	-0.09
	7	1.08	-0.17
	8	1.02	-0.16
	10	1.01	-0.17
STE	5	1.13	-0.20
	8	1.05	-0.20

** Because this was the first year of the next-generation tests for grade 10 biology and introductory physics, no equating was conducted for these tests and thus no Stocking and Lord Constants were generated.*

3.6.4 Achievement Standards

Cutpoints for the next-generation MCAS tests were set via standard setting in 2017 for grades 3–8 ELA and mathematics tests, in 2019 for grade 10 ELA and mathematics tests and grades 5 and 8 STE tests, and in 2022 for Biology and Introductory Physics (see the *2019 Next-Generation MCAS and MCAS-Alt Technical Report* for the 2019 standard-setting report, the *2017 Next-Generation MCAS and MCAS-Alt Technical Report* for the 2017 standard-setting report, and Appendix M for the 2022 standard-setting report). The standard setting establishes the theta cutpoints used for reporting each year. These theta cuts are presented in Table 3-36. The operational θ-metric cut scores will remain fixed throughout the assessment program unless standards are reset. Also shown in the table are the cutpoints on the reporting score scale.

Table 3-36. Cut Scores on the Theta Metric and Reporting Scale by Content Area and Grade

Content Area	Grade	Theta			Scale Score				
		Cut 1	Cut 2	Cut 3	Min	Cut 1	Cut 2	Cut 3	Max
ELA	3	-1.581	0.011	1.604	440	470	500	530	560
	4	-1.561	0.031	1.623	440	470	500	530	560
	5	-1.659	0.038	1.734	440	470	500	530	560
	6	-1.591	-0.011	1.570	440	470	500	530	560
	7	-1.560	0.011	1.582	440	470	500	530	560
	8	-1.456	0.051	1.559	440	470	500	530	560
	10	-1.728	-0.299	1.130	440	470	500	530	560
Mathematics	3	-1.377	0.027	1.432	440	470	500	530	560
	4	-1.379	0.054	1.487	440	470	500	530	560
	5	-1.551	0.025	1.601	440	470	500	530	560
	6	-1.518	-0.008	1.502	440	470	500	530	560
	7	-1.414	0.031	1.476	440	470	500	530	560
	8	-1.496	-0.008	1.479	440	470	500	530	560
	10	-1.721	-0.317	1.087	440	470	500	530	560
STE	5	-1.621	-0.112	1.398	440	470	500	530	560
	8	-1.499	-0.020	1.459	440	470	500	530	560
Biology	HS	-0.850	0.210	1.300	440	470	500	530	560
Introductory Physics	HS	-1.010	0.120	1.260	440	470	500	530	560

3.6.5 Reported Scale Scores

Because the θ scale used in IRT calibrations is not understood by most stakeholders, reporting scales were developed for the MCAS tests. The reporting scales are linear transformations of the underlying θ scale. As the three θ cutpoints from the standard setting have equal intervals, one single linear transformation was sufficient to transform the θ scale from each performance level category on one reporting scale.

Student scores on the next-generation MCAS tests are reported in integer values from 440 to 560. Because the same transformation is applied to all achievement-level categories, and the reported scaled scores preserve the interval scale properties (except for the truncated scaled scores at the lower and upper end of the score scale), it is appropriate to calculate means and standard deviations with scaled scores.

By providing information that is more specific about the position of a student's results, scaled scores supplement achievement-level scores. Students' raw scores (i.e., total number of points) on the 2022 next-generation MCAS tests were translated to scaled scores using a data analysis process called *scaling*, which simply converts from one scale to another. In the same way that a given temperature can be expressed on either the Fahrenheit or the Celsius scale, or the same distance can be expressed in either miles or kilometers, student scores on the 2022 next-generation MCAS tests can be expressed in raw or scaled scores.

It is important to note that converting from raw scores to scaled scores does not change students' achievement-level classifications. Given the relative simplicity of raw scores, it is fair to question why scaled scores for the MCAS are reported instead of raw scores. The answer is that scaled scores make the reporting of results consistent. To illustrate, standard setting typically results in different raw cut scores across content areas. The raw cut score between *Partially Meeting Expectations* and *Meeting Expectations* could be, for example, 35 in grade 3 mathematics but 33 in grade 4 mathematics, yet both of these raw scores would be transformed to scaled scores of 500. It is this uniformity across scaled scores that facilitates the understanding of student performance. The psychometric advantage of scaled scores over raw scores comes from their being linear transformations of θ. Since the θ scale is used for equating, scaled scores are comparable from one year to the next. Raw scores are not.

The scaled scores are obtained by a simple translation of ability estimates ($\hat{\theta}$) using the linear relationship between threshold values on the θ metric and their equivalent values on the scaled score metric. Students' ability estimates are obtained by mapping their raw scores through the TCC. Scale scores are calculated using the following linear equation, representing the standard deviation of scores on the first administration of the test:

$$SS = m\hat{\theta} + b,$$

where
m is the slope and
b is the intercept.

A separate linear transformation is used for each grade and content area combination. Table 3-37 shows the slope and intercept terms used to calculate the scaled scores for each grade and content area. Note that the values in Table 3-37 will not change unless the standards are reset.

Appendix L contains raw-score-to-scale-score look-up tables for two sessions in each test. The tables show the scaled score equivalent of each raw score for the 2022 next-generation MCAS tests. However, due to the session-level administration in 2021, caution needs to be taken when comparing the 2022 scale scores with those in 2021. Additionally, Appendix L contains scaled score distribution graphs for each grade and content area for each testing form.

Table 3-37. Scale Score Slopes and Intercepts by Content Area and Grade

Content Area	Grade	Slope	Intercept
ELA	3	18.839	499.785
	4	18.846	499.421
	5	17.686	499.335
	6	18.984	500.202
	7	19.098	499.791
	8	19.900	498.981
	10	20.995	506.274
Mathematics	3	21.357	499.413
	4	20.938	498.869
	5	19.039	499.525
	6	19.870	500.165
	7	20.758	499.353
	8	20.172	500.170
	10	21.373	506.775
STE	5	19.875	502.220
	8	20.287	500.409
Biology	HS	27.907	493.721
Introductory Physics	HS	26.432	496.696

3.7 MCAS Reliability

Although an individual item's performance is an important factor in evaluating an assessment, a complete evaluation must also address the way items grouped in a set function together and complement one another. Tests that function well provide a dependable assessment of a student's level of ability. Just like the measurement of physical properties, such as temperature, any measurement tool contains some amount of measurement error, which leads to different results if the measurements were taken multiple times. The quality of items, as the tools to measure the latent ability, determines the degree to which a given student's score can be higher or lower than their true ability on a test.

There are several ways to estimate an assessment's reliability. The approach that was implemented to assess the reliability of the 2022 next-generation MCAS tests is the α coefficient of Cronbach (1951). This approach is most easily understood as an extension of a related procedure, the split-half reliability. In the split-half approach, a test is split in half, and students' scores on the two half-tests are correlated. To estimate the correlation between two full-length tests, the Spearman-Brown correction (Spearman, 1910; Brown, 1910) is applied. If the correlation is high, this is evidence that the items complement one another and function well as a group, suggesting that measurement error is minimal. The split-half method requires psychometricians to select items that contribute to each half-test score. This decision may have an impact on the resulting correlation since each different possible split of the test into halves will result in a different correlation. Cronbach's α eliminates the item selection impact by comparing individual item variances to total test variance, and it has been shown to be the average of all possible split-half correlations. Along with the split-half reliability, Cronbach's α is referred to as a coefficient of internal consistency. The term "internal" indicates that the index is measured internal to each test of interest, using data that come only from the test itself (Anastasi & Urbina, 1997). The formula for Cronbach's α is given as follows:

$$a = \frac{n}{n-1}\left[1 - \frac{\sum_{i=1}^{n} \sigma_{(Y_i)}^2}{\sigma_x^2}\right],$$

where
i indexes the item,
n is the total number of items,
$\sigma^2_{(Y_i)}$ represents individual item variance, and
σ^2_x represents the total test variance.

Note that the information presented in this section and associated appendices are based only on first-time test takers who are not EL students and who took non-accommodated online forms.

3.7.1 Reliability and Standard Errors of Measurement

Table 3-38 presents descriptive statistics, Cronbach's α coefficient, and raw score SEMs for each content area and grade. Statistics are based on operational items only. The reliability estimates range from 0.89 to 0.93, which are generally in acceptable ranges.

Table 3-38. Raw Score Descriptive Statistics, Cronbach's Alpha, and SEMs by Content Area and Grade—Computer-based

Content Area	Grade	Number Of Students	Raw Score			Alpha	SEM
			Maximum	Mean	Standard Deviation		
ELA	3	62,665	44	24.72	9.07	0.91	2.77
	4	62,994	44	24.92	9.08	0.89	2.95
	5	64,521	48	28.69	10.05	0.92	2.92
	6	64,771	50	27.85	10.61	0.92	3.01
	7	66,477	50	28.03	10.71	0.92	3.11
	8	68,852	50	31.57	10.52	0.92	3.04
	10	66,627	51	35.74	10.56	0.92	3.03
Mathematics	3	54,427	48	27.12	11.47	0.93	3.06
	4	54,467	54	30.72	13.02	0.93	3.35
	5	56,517	54	28.99	12.80	0.93	3.39
	6	57,815	54	26.85	12.75	0.93	3.40
	7	60,204	54	23.36	13.07	0.93	3.50
	8	63,247	54	27.70	13.60	0.93	3.56
	10	63,457	60	31.08	15.36	0.94	3.72
STE	5	52,104	54	31.21	10.99	0.92	3.14
	8	59,318	54	27.71	11.87	0.92	3.29
Biology	HS	52,389	60	31.99	13.54	0.93	3.55
Introductory Physics	HS	12,903	60	34.83	12.64	0.92	3.48

Because of the dependency of the alpha coefficients on the test-taking population and the test characteristics, cautions need be taken when making inferences about the quality of one test by comparing its reliability to that of another test from a different grade or content area. To elaborate, reliability coefficients are highly influenced by test-taking population characteristics such as the range of individual differences in the group (i.e., variability within the population), average ability level of the population that took the exams, test designs, test difficulty, test length, ceiling or floor effect, and influence of guessing. Hence, "the reported reliability coefficient is only applicable to samples similar to that on which it was computed" (Anastasi & Urbina, 1997, p. 107).

3.7.2 Subgroup Reliability

The reliability coefficients discussed in the previous section were based on the overall population of students who took the 2022 next-generation MCAS tests. Appendix N presents reliabilities for various subgroups of interest. Cronbach's α coefficients were calculated using the formula defined above based only on the members of the subgroup in question in the computations; values are calculated only for subgroups with 10 or more students. The reliability coefficients for subgroups range from 0.82 to 0.95 across the tests, with a median of 0.91 and a standard deviation of 0.02, indicating that reliabilities are generally within a reasonable range.

For several reasons, the subgroup reliability results should be interpreted with caution. Reliabilities are dependent not only on the measurement properties of a test but also on the statistical distribution of the studied subgroup. For example, Appendix N shows that subgroup sizes may vary considerably, which results in natural variation in reliability coefficients. Alternatively, α, which is a type of correlation coefficient, may be artificially depressed for subgroups with little variability (Draper & Smith, 1998). Third, there is no industry standard to interpret the strength of a reliability coefficient when the population of interest is a single subgroup.

3.7.3 Reporting Subcategory Reliability

Reliabilities were calculated for the reporting subcategories within the 2022 next-generation MCAS content areas, which are described in section 3.2. Cronbach's α coefficients for subcategories were calculated via the same formula defined previously using only the items of a given subcategory in the computations. Results are presented in Appendix N. Lower reliabilities on subcategory scores are associated with lower numbers of items. For example, the grade 3 reporting category Geometry has only 5 items, resulting in a predictably very low reliability statistic of 0.5, the reliability coefficients for the reporting subcategories range from 0.49 to 0.92, with a median of 0.75 and a standard deviation of 0.11. Because they are based on a subset of items rather than the full test, subcategory reliabilities were typically lower than were overall test score reliabilities, approximately to the degree expected based on classical test theory (Haertel, 2006), and interpretations should take this into account. Qualitative differences among grades and content areas once again preclude valid inferences about the reliability of the full test score based on statistical comparisons among subtests.

3.7.4 Reliability of Achievement-Level Categorization

The accuracy and consistency of classifying students into achievement levels are critical components of a standards-based reporting framework (Livingston & Lewis, 1995). For the 2022 next-generation MCAS tests, students were classified into one of four achievement levels: *Not Meeting Expectations*, *Partially Meeting Expectations*, *Meeting Expectations*, or *Exceeding Expectations*. Appendix O shows achievement-level distributions by content area and grade for the 2022 next-generation MCAS tests. Note that the information presented in Appendix O is based on all test takers reported with an achievement level.

Cognia conducted decision accuracy and consistency (DAC) analyses to determine the statistical accuracy and consistency of the classifications. This section explains the methodologies used to assess the reliability of classification decisions and gives the results of these analyses.

Accuracy refers to the extent to which achievement classifications based on test scores match the classifications that would have been assigned if the scores did not contain any measurement error. Accuracy must be estimated because errorless test scores do not exist. Consistency measures the extent to which classifications based on test scores match the classifications based on scores from a second, parallel form of the same test. Consistency can be evaluated directly from actual responses to test items if two complete and parallel forms of the test are administered to the same group of students. In operational testing programs, however, such a design is usually impractical. Instead, techniques have been developed to estimate both the accuracy and the consistency of classifications based on a single administration of a test. The Livingston and Lewis (1995) technique was used for the 2022 next-generation MCAS tests because it is easily adaptable to all types of testing formats, including mixed formats.

The DAC estimates reported in Tables 3-35 and 3-36 make use of "true scores" in the classical test theory sense. A true score is the score that would be obtained if a test had no measurement error. True scores cannot be observed and so must be estimated. In the Livingston and Lewis (1995) method, estimated true scores are used to categorize students into their "true" classifications.

For the 2022 next-generation MCAS tests, after various technical adjustments (described in Livingston & Lewis, 1995), a four-by-four contingency table of accuracy was created for each content area and grade, where cell [i,j] represented the estimated proportion of students whose true score fell into classification i (where i = 1 to 4) and observed score fell into classification j (where j = 1 to 4). The sum of the diagonal entries (i.e., the proportion of students whose true and observed classifications matched) signified overall accuracy.

To calculate consistency, true scores were used to estimate the joint distribution of classifications on two independent, parallel test forms. Following statistical adjustments (per Livingston & Lewis, 1995), a new four-by-four contingency table was created for each content area and grade and populated by the proportion of students who would be categorized into each combination of classifications according to the two (hypothetical) parallel test forms. Cell [i,j] of this table represented the estimated proportion of students whose observed score on the first form would fall into classification i (where i = 1 to 4) and whose observed score on the second form would fall into classification j (where j = 1 to 4). The sum of the diagonal entries (i.e., the proportion of students categorized by the two forms into the same classification) signified overall consistency.

Cognia also measured consistency on the 2022 next-generation MCAS tests using Cohen's (1960) coefficient κ (kappa), which assesses the proportion of consistent classifications after removing the proportion of consistent classifications that would be expected by chance. It is calculated using the following formula:

$$\kappa = \frac{(\text{Observed agreement}) - (\text{Chance agreement})}{1 - (\text{Chance agreement})} = \frac{\sum_i C_{ii} - \sum_i C_{i.} C_{.i}}{1 - \sum_i C_{i.} C_{.i}},$$

where
$C_{i.}$ is the proportion of students whose observed achievement level would be level i (where i = 1–4) on the first hypothetical parallel form of the test;
$C_{.i}$ is the proportion of students whose observed achievement level would be level i (where i = 1–4) on the second hypothetical parallel form of the test; and
C_{ii} is the proportion of students whose observed achievement level would be level i (where i = 1–4) on both hypothetical parallel forms of the test.

Because κ is corrected for chance, its values are lower than other consistency estimates.

3.7.5 Decision Accuracy and Consistency Results

DAC analyses were conducted both for the overall population and for subpopulations at each performance achievement level. Results of the DAC analyses are provided in Tables 3-39 and 3-40. The tables include overall accuracy indices with consistency indices displayed in parentheses next to the accuracy values, as well as overall kappa values. Overall ranges for accuracy (0.80–0.86), consistency (0.72–0.80), and kappa (0.58–0.69) indicate that most students were classified accurately and consistently with respect to measurement error and chance.

In addition to overall accuracy and consistency indices, accuracy and consistency values conditional on achievement level are also given. For the calculation of these conditional indices, the denominator is the proportion of students associated with a given achievement level. For example, from Table 3-39, the conditional accuracy value is 0.81 for *Not Meeting Expectations* for the grade 3 ELA computer-based form. This figure indicates that among the students whose true scores placed them in this classification, 81% would be expected to be in this classification when categorized according to their observed scores. Similarly, a consistency value of 0.71 indicates that 71% of students with observed scores in the *Not Meeting Expectations* level would be expected to score in this classification again if a second, parallel test form were taken.

For some testing situations, the greatest concern may be decisions about achievement level thresholds. For example, for tests associated with the Every Student Succeeds Act (ESSA), the primary concern is distinguishing between students who are proficient and those who are not yet proficient. In this case, accuracy at the *Partially Meeting Expectations/Meeting Expectations* threshold is critically important, since it summarizes the percentage of students who are correctly classified either above or below the particular cutpoint. Table 3-40 provides the accuracy and consistency estimates and false positive and false negative decision rates at each cutpoint. A false positive is the proportion of students whose observed scores were above the cut and whose true scores were below the cut. A false negative is the proportion of students whose observed scores were below the cut and whose true scores were above the cut.

The accuracy and consistency indices at the *Partially Meeting Expectations/Meeting Expectations* threshold shown in Table 3-40 range from 0.90–0.93 and 0.86–0.90, respectively. The false positive and false negative decision rates at the *Partially Meeting Expectations/Meeting Expectations* threshold range from 3%–6% and 3%–5%, respectively. These results indicate that nearly all students were correctly classified with respect to being above or below the *Partially Meeting Expectations/Meeting Expectations* cutpoint.

Table 3-39. Summary of Decision Accuracy and Consistency Results by Content Area and Grade—Overall and Conditional on Achievement Level

Content Area	Grade	Overall	Kappa	Conditional On Achievement Level			
				Not Meeting Expectations	*Partially Meeting Expectations*	*Meeting Expectations*	*Exceeding Expectations*
ELA	3	0.81 (0.73)	0.59	0.81 (0.71)	0.80 (0.74)	0.83 (0.76)	0.76 (0.58)
	4	0.82 (0.75)	0.60	0.81 (0.72)	0.83 (0.78)	0.82 (0.75)	0.74 (0.50)
	5	0.84 (0.78)	0.64	0.81 (0.72)	0.85 (0.81)	0.84 (0.77)	0.80 (0.62)
	6	0.81 (0.74)	0.62	0.87 (0.79)	0.81 (0.74)	0.80 (0.74)	0.74 (0.59)
	7	0.84 (0.77)	0.65	0.87 (0.79)	0.83 (0.78)	0.84 (0.78)	0.73 (0.55)
	8	0.83 (0.76)	0.65	0.86 (0.78)	0.85 (0.80)	0.82 (0.76)	0.70 (0.54)
	10	0.85 (0.78)	0.65	0.81 (0.72)	0.83 (0.78)	0.87 (0.83)	0.76 (0.60)
Mathematics	3	0.83 (0.75)	0.63	0.84 (0.74)	0.83 (0.77)	0.84 (0.78)	0.73 (0.58)
	4	0.85 (0.78)	0.66	0.83 (0.73)	0.86 (0.80)	0.86 (0.81)	0.74 (0.59)
	5	0.86 (0.80)	0.68	0.83 (0.72)	0.87 (0.83)	0.86 (0.81)	0.81 (0.67)
	6	0.86 (0.80)	0.69	0.84 (0.73)	0.86 (0.81)	0.88 (0.83)	0.80 (0.67)
	7	0.85 (0.79)	0.68	0.84 (0.74)	0.87 (0.82)	0.84 (0.78)	0.83 (0.72)
	8	0.85 (0.79)	0.67	0.78 (0.70)	0.87 (0.83)	0.84 (0.77)	0.86 (0.75)
	10	0.86 (0.80)	0.69	0.77 (0.63)	0.85 (0.80)	0.87 (0.83)	0.86 (0.78)
STE	5	0.80 (0.72)	0.58	0.82 (0.70)	0.81 (0.74)	0.80 (0.74)	0.72 (0.55)
	8	0.82 (0.75)	0.62	0.84 (0.74)	0.84 (0.78)	0.81 (0.76)	0.71 (0.51)
Biology	HS	0.83 (0.76)	0.66	0.87 (0.80)	0.82 (0.75)	0.83 (0.76)	0.83 (0.72)
Introductory Physics	HS	0.84 (0.77)	0.67	0.84 (0.76)	0.84 (0.79)	0.83 (0.77)	0.85 (0.75)

Table 3-40. Summary of Decision Accuracy and Consistency Results by Content Area and Grade—Conditional on Cutpoint

Content Area	Grade	*Not Meeting Expectations / Partially Meeting Expectations* Accuracy (Consistency)	False Pos	False Neg	*Partially Meeting Expectations / Meeting Expectations* Accuracy (Consistency)	False Pos	False Neg	*Meeting Expectations / Exceeding Expectations* Accuracy (Consistency)	False Pos	False Neg
ELA	3	0.95 (0.93)	0.02	0.03	0.90 (0.86)	0.06	0.04	0.96 (0.95)	0.02	0.01
	4	0.95 (0.92)	0.03	0.03	0.90 (0.86)	0.05	0.04	0.97 (0.96)	0.02	0.01
	5	0.96 (0.94)	0.02	0.02	0.91 (0.88)	0.05	0.04	0.97 (0.96)	0.02	0.01
	6	0.94 (0.92)	0.03	0.03	0.92 (0.88)	0.04	0.04	0.95 (0.93)	0.03	0.02
	7	0.95 (0.93)	0.02	0.03	0.92 (0.89)	0.04	0.04	0.97 (0.95)	0.02	0.01
	8	0.95 (0.93)	0.02	0.02	0.92 (0.89)	0.03	0.04	0.96 (0.94)	0.03	0.02
	10	0.97 (0.96)	0.01	0.01	0.92 (0.89)	0.04	0.03	0.95 (0.93)	0.03	0.02
Mathematics	3	0.95 (0.93)	0.02	0.02	0.91 (0.88)	0.04	0.04	0.96 (0.94)	0.02	0.02
	4	0.96 (0.95)	0.02	0.02	0.92 (0.89)	0.04	0.04	0.96 (0.94)	0.02	0.02
	5	0.96 (0.95)	0.02	0.02	0.92 (0.89)	0.04	0.04	0.98 (0.97)	0.01	0.01
	6	0.97 (0.95)	0.01	0.02	0.92 (0.89)	0.04	0.04	0.97 (0.96)	0.01	0.01
	7	0.96 (0.94)	0.02	0.02	0.92 (0.89)	0.04	0.04	0.97 (0.96)	0.02	0.01
	8	0.95 (0.93)	0.03	0.02	0.93 (0.89)	0.04	0.03	0.97 (0.96)	0.02	0.01
	10	0.96 (0.95)	0.01	0.02	0.93 (0.90)	0.04	0.03	0.96 (0.95)	0.02	0.02
STE	5	0.95 (0.93)	0.02	0.03	0.90 (0.86)	0.05	0.05	0.95 (0.93)	0.03	0.02
	8	0.95 (0.94)	0.02	0.03	0.91 (0.88)	0.04	0.05	0.95 (0.94)	0.03	0.01
Biology	HS	0.94 (0.91)	0.03	0.03	0.93 (0.90)	0.04	0.03	0.97 (0.95)	0.02	0.02
Introductory Physics	HS	0.95 (0.93)	0.02	0.02	0.92 (0.89)	0.04	0.04	0.96 (0.95)	0.02	0.02

The above indices are derived from Livingston and Lewis's (1995) method of estimating DAC. Livingston and Lewis discuss two versions of the accuracy and consistency tables. A standard version performs calculations for forms parallel to the form taken. An "adjusted" version adjusts the results of one form to match the observed score distribution obtained in the data. The tables use the standard version for two reasons: (1) This "unadjusted" version can be considered a smoothing of the data, thereby decreasing the variability of the results; and (2) for results dealing with the consistency of two parallel forms, the unadjusted tables are symmetrical, indicating that the two parallel forms have the same statistical properties. This second reason is consistent with the notion of forms that are parallel (i.e., it is more intuitive and interpretable for two parallel forms to have the same statistical distribution).

As with other methods of evaluating reliability, DAC statistics that are calculated based on groups with smaller variability can be expected to be lower than those calculated based on groups with larger variability. For this reason, the values presented in Tables 3-39 and 3-40 should be interpreted with caution. In addition, it is important to remember that it might be inappropriate to compare DAC statistics across grades and content areas.

3.8 Reporting of Results

The next-generation MCAS tests are designed to measure student achievement on the Massachusetts content standards. Consistent with this purpose, results on the MCAS were reported in terms of achievement levels, which describe student achievement in relation to these established state standards. There are four achievement levels for ELA and mathematics for students in grades 3–8 and 10 ELA and mathematics: *Not Meeting Expectations, Partially Meeting Expectations, Meeting Expectations,* and *Exceeding Expectations.* (This language is different than that used for the legacy tests.)

Parent/Guardian Reports and student results labels are the only printed reports; one copy of each was mailed to districts for distribution to schools. The schools disseminate the reports to parents/guardians. Parent/Guardian Reports were also made available to schools and districts online in PearsonAccess Next (PAN). See section 3.8.1 for additional details of the Parent/Guardian Report.

DESE also provides numerous reports to districts, schools, and teachers through its Edwin Analytics reporting system. Section 3.9.5 provides more information about the Edwin Analytics system, along with examples of commonly used reports.

3.8.1 Parent/Guardian Report

The Parent/Guardian Report is generated for each student eligible to take the MCAS tests. It is a stand-alone 4-page (11” x 17” sheet of paper) color report that is folded in half. A sample report is provided in Appendix P.

The report is designed to present parents/guardians with a detailed summary of their child’s MCAS performance and to enable comparisons with other students at the school, district, and state levels. DESE has revised the report’s design several times to make the data displays more user-friendly and to add information. The 2017 revisions were undertaken with input from the MCAS Technical Advisory Committee, and from parent focus groups held in several towns across the state, with participants from various backgrounds.

The front cover of the Parent/Guardian Report provides student identification information, including student name, grade, date of birth, ID (SASID), school name, and district name. The cover also presents general information about the test, and website information for parent/guardian resources. The front page also contains text from the Family Guide pertaining to the student’s grade in Fall of 2022 for all subjects.

Each content area page of the report contains the achievement level, scaled score, and standard error of the scaled score for the content area. If the student does not receive a scaled score, the reason is displayed where the achievement level would be displayed. Each achievement level has its own distinct color, and that color is used throughout the report to highlight important report elements based on the student's achievement level and score. These report elements include the student’s earned achievement level, scaled score, the visual scale’s achievement-level title and achievement-level cut scores, and the comparison of the student’s scaled score to the average scaled score at the student’s school, district, and the state levels. All achievement level descriptors are presented as part of the scale score graphical display for each content area. A horizontal gray bar was used to represent the standard error for NextGen content areas. A vertical black bar was used to represent the standard error for legacy content areas.

For next-generation tests, the student’s scaled score is compared to the average scaled score at the school, district, and state levels, based on business requirements that document student inclusion rules for aggregations. These scaled score values are color-coded based on the corresponding achievement levels. The mode of testing—paper, or computer—for the subject is indicated on each content area page. Up to 3 years of scores, including the current year, are reported where available for ELA and mathematics. Growth percentiles are reported for ELA and mathematics in all grades except in grade 3.

If the student took the ELA or mathematics test with one of the following nonstandard accommodations, a note was printed on the report in the area where scaled score and achievement level are reported:

- The ELA test was read aloud to the student.
- The ELA essay was scribed for the student.
- The student used a calculator during the non-calculator session of the mathematics test.
- At the bottom of each subject page grade-specific resources are provided to help parents with the next steps.

The 2022 MCAS administrations saw the return of standard practices that had been temporarily changed during 2020 and 2021. Remote administration was not offered, and students were required to complete all sessions of a test. The reporting category summary was added back to the report. In addition, for ELA and mathematics, the SGP state mean was once again fixed at 50.

New in 2022, Science and Engineering practices were added to the report and were summarized, just as the reporting categories are. These practices were also added to the item grid that illustrates the assignment of specific practices to items associated with that practice (practices are not assigned to all items). A '/' was used to indicate when an item does not have a practice assigned.

The next-generation biology and introductory physics tests were offered for the first time in 2022, and a next-generation grade 9 Parent/Guardian report was designed accordingly. For students in grade 10 or higher, a science template was added to the Parent/Guardian report adjacent to the student's ELA and mathematics results. Students in grade 10 or higher taking ELA and mathematics and chemistry or technology/engineering were reported on the previously existing template for legacy sciences.

3.8.2 Student Results Label

A student results label was produced for each student receiving a Parent/Guardian Report. The following information appeared on the label:

- student name
- grade
- birth date
- test date
- student ID (SASID)
- school code
- school name
- district name
- student's scaled score and achievement level (or the reason the student did not receive a score)

3.8.3 Analysis and Reporting Business Requirements

To ensure that MCAS results are processed and reported accurately, the documents detailing analysis and reporting business requirements and data processing specifications are updated to reflect any changes/additions necessary for reporting each year. The processing, analysis, and reporting business requirements are observed in the analyses of the MCAS test data and in reporting results. These requirements also guide data analysts in identifying which students will be excluded from school-, district-, and state-level summary computations. A copy of the *Analysis and Reporting Business Requirements* document for the 2022 next-generation MCAS administration is included in Appendix Q.

3.8.4 Quality Assurance

Quality-assurance measures are implemented throughout the process of analysis and reporting at Cognia. The data processors and data analysts perform routine quality-control checks of their computer programs. When data are handed off to different units within the data team, the sending unit verifies that the data are accurate before handoff. Additionally, when a unit receives a data set, the first step is to verify the accuracy of the data. Once new report designs were approved by DESE, reports were run using demonstration data to test the application of the analysis and reporting business requirements. The populated reports were then approved by DESE.

Another type of quality-assurance measure used at Cognia is parallel processing. One data analyst is responsible for writing all programs required to populate the student-level and aggregate reporting tables for the administration. Each reporting table is assigned to a second data analyst who uses the analysis and reporting business requirements to independently program the reporting table. The production and quality-assurance tables are compared; when there is 100% agreement, the tables are released for report generation.

The third aspect of quality control involves procedures to check the accuracy of reported data. Using a sample of schools and districts, the quality-assurance group verifies that the reported information is correct. The selection of sample schools and districts for this purpose is very specific because it can affect the success of the quality-control efforts. There are two sets of samples selected that may not be mutually exclusive. The first set includes samples that satisfy all the following criteria:

- one-school district
- two-school district
- multi-school district
- private school
- special school (e.g., a charter school)
- small school that does not have enough students to report aggregations
- school with excluded (not tested) students

The second set of samples includes districts or schools that have unique reporting situations that require the implementation of a decision rule. This set is necessary to ensure that each rule is applied correctly.

The quality-assurance group uses a checklist to implement its procedures. Once the checklist is completed, sample reports are circulated for review by psychometric and program management staff. The appropriate sample reports are then sent to DESE for review and signoff.

3.9 MCAS Validity

One purpose of this report is to describe the technical and reporting aspects of the next-generation MCAS program that support valid score interpretations. According to the *Standards for Educational and Psychological Testing* (AERA et al., 2014), considerations regarding establishment of intended uses and interpretations of test results—and conformance to these uses—are of paramount importance regarding valid score interpretations. These considerations are addressed in this section.

Many sections of this technical report provide evidence of validity, including sections on test design and development, test administration, scoring, scaling and equating, item analysis, reliability, and score reporting. Taken together, these sections provide a comprehensive presentation of validity evidence associated with the MCAS program.

3.9.1 Test Content Validity Evidence

Test content validity demonstrates how well the assessment tasks represent the curriculum and standards for each content area and grade level. Content validity is rooted in the item development process, including how the test blueprints and test items align to the curriculum and standards. All items are developed, edited, administered, reviewed, and scored to represent the expectations from the state curriculum frameworks. This process is described further in sections 3.2, 3.3, and 3.4.

The following are all components of validity evidence based on test content: item alignment with Massachusetts curriculum framework content standards, item bias, sensitivity, and content appropriateness review processes, adherence to the test blueprint, use of multiple item types, use of standardized administration procedures with accommodated options for participation, and appropriate test administration training. As discussed earlier, all MCAS items are aligned by Massachusetts education stakeholders to specific Massachusetts curriculum framework content standards, and they undergo several rounds of review for content fidelity and appropriateness.

A 2017 content alignment study on the next-generation MCAS tests, conducted by Boston College researchers under the leadership of Michael Russell (See the *2019 Next-Generation MCAS and MCAS-Alt Technical Report*, Appendix S for study details), found a high degree of content alignment. For mathematics, over 90% of the domains assessed across the grade level tests showed high levels of alignment. For ELA, alignment was also found to be strong across grade levels and domains. When both the items and essay scoring criteria were considered, over 95% of the alignment considerations were deemed adequate. Only two domains, Grade 7 and Grade 8 Reading Informational Text, were identified as candidates for improved alignment. In addition, analyses of the level of agreement among panel members' ratings showed high levels of agreement for most ratings following the consensus process. While the study found a few select opportunities to improve alignment, the results from the analyses provide evidence of strong alignment across most of the tests examined.

3.9.2 Response Process Validity Evidence

Response process validity evidence can be gathered via cognitive interviews and/or focus groups with examinees. It is particularly important to collect this type of information prior to introducing a new test or test format, or when introducing new item types to examinees. DESE ensures that evidence of response process validity is collected and reported for all new MCAS item types used in the next-generation assessments.

DESE conducted a 2019 study to determine the readiness of grade 10 students and educators in Massachusetts schools to respond to the next-generation MCAS items. Two standalone field tests were administered to students in every high school in the state. Data from these standalone field tests were then analyzed to determine the following:

- the psychometric properties of the test items and the field tests
- the response time students took to successfully respond to the test

Student response time data was used to filter out the results of students who did not spend sufficient time on their answers. The data from the remaining motivated students were used to examine item discrimination and ensure that new scoring rubrics were keyed correctly. Next-generation test forms were then developed from these sampled results.

3.9.3 Internal Structure Validity Evidence

Evidence of test validity based on internal structure is presented in detail in the discussions of item analyses, reliability, and scaling and linking in sections 3.5 through 3.7. Technical characteristics of the internal structure of the assessments are presented in terms of classical item statistics (item difficulty, item-test correlation), DIF analyses, dimensionality analyses, reliability, SEM, and IRT parameters and procedures. In general, item difficulty and discrimination indices were within acceptable and expected ranges. Very few items were answered correctly at near-chance or near-perfect rates. Similarly, the positive discrimination indices indicate that most items were assessing consistent constructs, and students who performed well on individual items tended to perform well overall. See the individual sections for more complete results of the different analyses.

Furthermore, to evaluate whether different reporting categories constitute statistically different dimensions, item-level confirmatory factor analysis (CFA) was conducted to assess the internal structure of the MCAS ELA and mathematics assessments in grade 10 from the School Year 18–19. The CFA model for each test was specified such that the number of factors equaled the number of reporting categories and each item loaded onto the factor that corresponded to the reporting category to which the given item contributed. The results showed very high correlations between different factors, suggesting that there is very little unique variance among the given set of reporting categories. In other words, different reporting categories are essentially measuring the same thing. These results are highly consistent with the unidimensionality results from the DIMTEST and DETECT analyses, as well as the previous CFA analyses conducted on MCAS ELA and mathematics assessments in grades 3–8 from the School Year 17–18. Although the CFA analysis suggested unidimensionality among different reporting categories, the high and positive factor loadings do suggest the items provide good measurement for each reporting category. Unidimensionality, meaning items from one reporting category correlate highly to other reporting categories, can be evidence that students have learned different content areas within each subject in an integrated fashion.

3.9.4 Validity Evidence in Relationship to Other Variables

DESE continues collecting evidence to evaluate the extent to which the next-generation MCAS assessments measure "student readiness for the next level" of schooling, such as readiness for the next grade level, or readiness for postsecondary education. In 2022, DESE conducted concurrent validity studies. They first compared student results on the next-generation MCAS tests to course grades and course-taking in middle school and high school. Specifically, the relationships among MCAS results and student course grades in the respective subjects (in ELA and mathematics) showed that MCAS results were more strongly associated with course grades than other covariates tested, including course level, economic disadvantage, being on an IEP, or being an English learner. In mathematics in grades 8 and 10, MCAS achievement levels were significantly associated with taking advanced mathematics courses. Convergent validity evidence was also reported between MCAS test portions and subjects.

In 2021, DESE conducted a study examining predictive validity of grade 8 MCAS results on grade 9 course-taking patterns and GPAs. Results from this study will be published as a white paper on the DESE website at www.doe.mass.edu/mcas/tech/.

3.9.5 Efforts to Support the Valid Use of Next-Generation MCAS Data

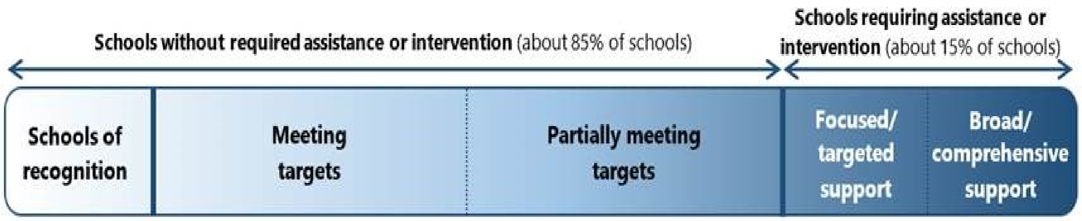
DESE takes many steps to support the intended uses of MCAS data. (The intended uses are listed in section 2.3 of this report.) This section will examine some of the reporting systems and policies designed to address each use.

1. Determining school and district progress toward the goals set by the state and federal accountability systems.

In 2018, DESE updated its accountability plan to conform to state and federal requirements. Measures of student achievement and growth are prominently featured alongside other indicators in the new school and district accountability system. Each school's performance on all measures is compared to its targets and to the performance of other schools in the state. The system includes incentives designed to focus schools on their lowest-performing students from prior years.

In the system, schools are placed into categories that describe their performance relative to state goals. As shown in Figure 3-1, the categories reflect how much assistance or intervention each school requires under the system. School and district accountability report cards are publicly available at www.doe.mass.edu/accountability/report-cards/.

Figure 3-1. School Categories in Massachusetts Accountability System



Students with significant disabilities who are unable to take the MCAS exams even when accommodations are provided can participate in the MCAS-Alt, which requires that students submit an MCAS-Alt Skills Survey as well as a collection of work samples and other documentation that demonstrates their proficiency on the state standards. Technical information on the MCAS-Alt is presented in Chapter 4 of this report.

2. Providing information to support program evaluation at the school and district levels.
3. Providing transparency into student performance through comprehensive reporting on the results of individual students, schools, districts, and the state.

Each year, student-level data from each test administration are shared with parents/guardians and school and district stakeholders in personalized *Parent/Guardian Report*s. The current versions of these reports (see the samples provided in Appendix P) were designed with input from groups of parents. These reports contain scaled scores and achievement levels from the current year and prior years, as well as norm-referenced student growth percentiles, which calculate how a student's current score compares to that of students who scored similarly on the prior one or two tests in that subject. They also contain item-level data broken down by standard. The reports include links that allow parents and guardians to access the released test items on the DESE website.

DESE's secure data warehouse, Edwin Analytics, provides users with more than 150 customizable reports that feature achievement data and student demographics geared toward educators at the classroom, school, and district levels. All reports can be filtered by year, grade, subject, and student demographic group. In addition, Edwin Analytics gives users the capacity to generate their own reports, with user-selected variables and statistics. These reports can help educators review classroom and school patterns, reflect on practice from last year, and plan for incoming classes based on previous performance. DESE monitors trends in report usage in Edwin Analytics. Between June and November (the peak reporting season for MCAS), over one million reports are run in Edwin Analytics, with approximately 400,000 reports generated in August when schools review their preliminary assessment results in preparation for the return to school.

Examples of two of the most popular reports are provided on the following pages. The MCAS School Results by Standards report, shown in Figure 3-2, indicates the mean percentage of possible points earned by students in the school, the district, and the state on MCAS items assessing particular standards/topics. The reporting of total possible points provides educators with a sense of how reliable the statistics are, based on the number of test items/test points. The School/State Diff column allows educators to compare their school or district results to the state results. Filters provide educators with the capacity to compare student results across nine demographic categories, which include gender, race/ethnicity, low income status, and special education status.

The MCAS Growth Distribution report, shown in Figure 3-3, presents the distribution of students by student growth percentile band across years. For each year, the report also shows the median student growth percentile and the percentage of students scoring *Meeting or Exceeding Expectations*. Teachers, schools, and districts use this report to monitor student growth from year to year. As in the report above, all demographic filters can be applied to examine results within student groups.

Figure 3-2. Example of School Results by Standards Report—Mathematics, Grade 7

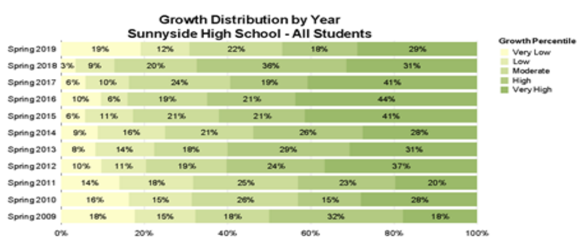
All Students Students (161)

Standards: MA 2017 Standards **Show results with <10 students :** No

	Possible Points	School % Possible Points	District % Possible Points	State % Possible Points	School/ State Diff
Mathematics					
All items	54	48%	48%	47%	1
Question Type					
Constructed Response	16	48%	49%	48%	1
Short Answer	14	41%	42%	39%	2
Selected Response	24	52%	51%	51%	1
Domain / Cluster					
Expressions and Equations	**14**	**47%**	**48%**	**47%**	**-1**
Solve real-life and mathematical problems using numerical and algebraic expressions and equations.	10	54%	54%	52%	2
Use properties of operations to generate equivalent expressions.	4	28%	31%	36%	-8
Geometry	**8**	**42%**	**43%**	**44%**	**-2**
Draw	2	39%	44%	47%	-9
Solve real-life and mathematical problems involving angle measure	6	43%	43%	43%	0
Ratios and Proportional Relationships	**11**	**55%**	**54%**	**53%**	**2**
Analyze proportional relationships and use them to solve real-world and mathematical problems.	11	55%	54%	53%	2
Statistics and Probability	**11**	**36%**	**36%**	**37%**	**0**
Draw informal comparative inferences about two populations.	3	29%	30%	32%	-2
Investigate chance processes and develop	6	36%	35%	36%	0
Use random sampling to draw inferences about a population.	2	48%	45%	47%	2
The Number System	**10**	**62%**	**59%**	**54%**	**8**
Apply and extend previous understandings of operations with fractions to add	10	62%	59%	54%	8

Note: MCAS results are suppressed for group counts less than 10 and school results only include students enrolled in the school since October 1

Figure 3-3. Example of Growth Distribution Report—ELA, Grade 10



Vertical lines at 20%, 40%, 60%, 80% and 100% represent the Statewide distribution for very low, low, moderate, high and very high growth.

Test	# Very Low	# Low	# Moderate	# High	# Very High	Median SGP	Mean SGP	# Students (SGP)	% Proficient or Higher	% Meeting or Exceeding Expectations	# Students (Ach. Level)
Spring 2019	18	11	21	17	27	58.5	55.0	94		65	95
Spring 2018	3	8	17	31	27		66.6	86	99		88
Spring 2017	5	9	21	16	35	70.5		86	100		86
Spring 2016	9	6	18	20	41	71.5		94	99		94
Spring 2015	5	10	18	18	36	73.0		87	99		87
Spring 2014	7	13	17	21	22	65.0		80	95		83
Spring 2013	7	12	15	25	26	67.0		85	100		86
Spring 2012	9	10	18	22	34	70.0		93	98		93
Spring 2011	15	19	27	25	21	53.0		107	85		109
Spring 2010	14	13	22	13	24	51.0		86	74		87
Spring 2009	11	9	11	20	11	60.5		62	88		69
Spring 2008									81		43

Aggregate student growth percentile (SGP) is not calculated if the number of students with SGP is less than 20.

The assessment data in Edwin Analytics are also available on the DESE public website through the school and district profiles (profiles.doe.mass.edu). In both locations, stakeholders can click on links to view released assessment items, the educational standards they assess, and the rubrics and model student work at each score point. The public is also able to view each school's progress toward the performance goals set by the state and federal accountability system.

The high-level summary provided in this section documents DESE's efforts to promote uses of state data that enhance student, educator, and LEA outcomes while reducing less-beneficial unintended uses of the data. Collectively, this evidence documents DESE's efforts to support the use of MCAS results by parents, educators, and leaders in addition to the use of MCAS results as a component of school accountability.

Chapter 4. MCAS Alternate Assessment (MCAS-Alt)

4.1 MCAS-Alt Overview

4.1.1 Background

This chapter presents evidence in support of the technical quality of the MCAS Alternate Assessment (MCAS-Alt) and documents the procedures used to conduct, score, and report student results on MCAS-Alt student assessments. These procedures have been implemented to ensure, to the extent possible, the validity of score interpretations based on the MCAS-Alt. While flexibility is built into the MCAS-Alt to allow teachers to customize academic goals at an appropriate level of challenge for each student, the procedures described in this report are also intended to constrain unwanted variability wherever possible.

For each phase of the alternate assessment process, this chapter includes a separate section that documents how the assessment evaluates the knowledge and skills of students with the most significant cognitive disabilities in the context of grade-level content standards. Together, these sections provide a basis for the validity of the results.

This chapter is intended primarily for a technical audience and requires highly specialized knowledge and a solid understanding of measurement concepts. However, teachers, parents/guardians, and the public will also be interested in how the assessments both inform and emerge from daily classroom instruction.

4.1.2 Purposes of the Assessment System

The MCAS is the state's program of student academic assessment, implemented in response to the Massachusetts Education Reform Act of 1993. Statewide assessments, along with other components of education reform, are designed to strengthen public education in Massachusetts and to ensure that all students receive challenging instruction based on the standards in the Massachusetts curriculum frameworks. The law requires that the curriculum of all students whose education is publicly funded, including students with disabilities, be aligned with state standards. The MCAS is designed to improve teaching and learning by reporting detailed results to districts, schools, and parents/guardians; to serve as the basis, with other indicators, for school and district accountability; and to certify that students have met the Competency Determination (CD) standard to graduate from high school. Students with the most significant cognitive disabilities who are unable to take the standard MCAS tests, even when accommodations are provided, are designated in their individualized education program (IEP) or 504 plan to take the MCAS-Alt. The MCAS-Alt is intended to document the student's achievement and progress in learning the skills, knowledge, and concepts outlined in the state's curriculum frameworks, and to

- provide a basis for including difficult-to-assess students in statewide assessment and accountability systems;
- determine whether students with the most significant cognitive disabilities are receiving a program of instruction based on the state's academic learning standards;
- determine how much the student has learned in the specific areas of the academic curriculum being assessed; and
- assist teachers in providing challenging academic instruction.

The MCAS-Alt was developed between 1998 and 2000 and has been refined and enhanced each year since its initial implementation in the 2000–2001 school year.

4.1.3 Format

The MCAS-Alt consists of a structured set of “evidence” collected during instructional activities in each subject to be assessed during the school year, plus a standardized MCAS-Alt Skills Survey that measures the degree to which students have already learned the range of skills covered by a particular strand or domain of the frameworks. Teachers are required to use the results of the skills survey to identify particular standards and levels of complexity at which to begin assessing the student. The MCAS-Alt also includes the student’s demographic information and weekly schedule, parent/guardian verification and signoff, and a school calendar, all of which are submitted to the state each spring. Preliminary 2022 results were reported to parents/guardians, schools, and the public in June, with final results provided in September.

The Department’s *Resource Guide to the Massachusetts Curriculum Frameworks for Students with Disabilities* (the *Resource Guide*) describes the content to be assessed by the 2022 MCAS-Alt and contains the 2017 English language arts (ELA) standards, the 2017 mathematics standards, and the 2016 science and technology/engineering (STE) standards.

The *Resource Guide* provides strategies for adapting and using the state’s learning standards to instruct and assess students taking the MCAS-Alt. The fall 2021 *Resource Guide* is intended to ensure that all students receive instruction in the Massachusetts curriculum frameworks in ELA, mathematics, and STE at levels that are challenging and attainable for each student. For the MCAS-Alt, students are expected to achieve the same standards as their peers without disabilities. However, they may need to learn the necessary knowledge and skills differently, such as through presentation of the knowledge/skills at lower levels of complexity, in smaller segments, and at a slower pace.

4.2 MCAS-Alt Test Design and Development

4.2.1 Test Content and Design

MCAS-Alt assessments are required for all grades and content areas in which standard MCAS tests are administered. In the MCAS-Alt, the range and level of complexity of the standards being assessed have been modified, yet without altering the essential components or meaning of the standards. The MCAS-Alt content areas and strands/domains required for the assessment of students in each grade are listed in Table 4-1.

Table 4-1. MCAS-Alt Requirements in Each Category

Grade	ELA Strands Required	Mathematics Domains Required	STE Strands Required
3	▪ Language ▪ Reading ▪ Writing	▪ Operations and Algebraic Thinking ▪ Measurement and Data	
4	▪ Language ▪ Reading ▪ Writing	▪ Operations and Algebraic Thinking ▪ Numbers and Operations – Fractions	
5	▪ Language ▪ Reading ▪ Writing	▪ Number and Operations in Base Ten ▪ Number and Operations – Fractions	For any three of the four STE disciplines* select one core idea in each discipline and assess six entry points within each core idea.
6	▪ Language ▪ Reading ▪ Writing	▪ Statistics and Probability ▪ The Number System	
7	▪ Language ▪ Reading ▪ Writing	▪ Ratios and Proportional Relationships ▪ Geometry	
8	▪ Language ▪ Reading ▪ Writing	▪ Expressions and Equations ▪ Geometry	For any three of the four STE disciplines* select one core idea in each discipline and assess six entry points within each core idea.
10	▪ Language ▪ Reading ▪ Writing	Any three of the five mathematics conceptual categories: ▪ Functions ▪ Geometry ▪ Statistics and Probability ▪ Number and Quantity ▪ Algebra	Select three core ideas in <u>one</u> of the following disciplines: ▪ Biology ▪ Chemistry ▪ Introductory Physics or ▪ Technology/Engineering

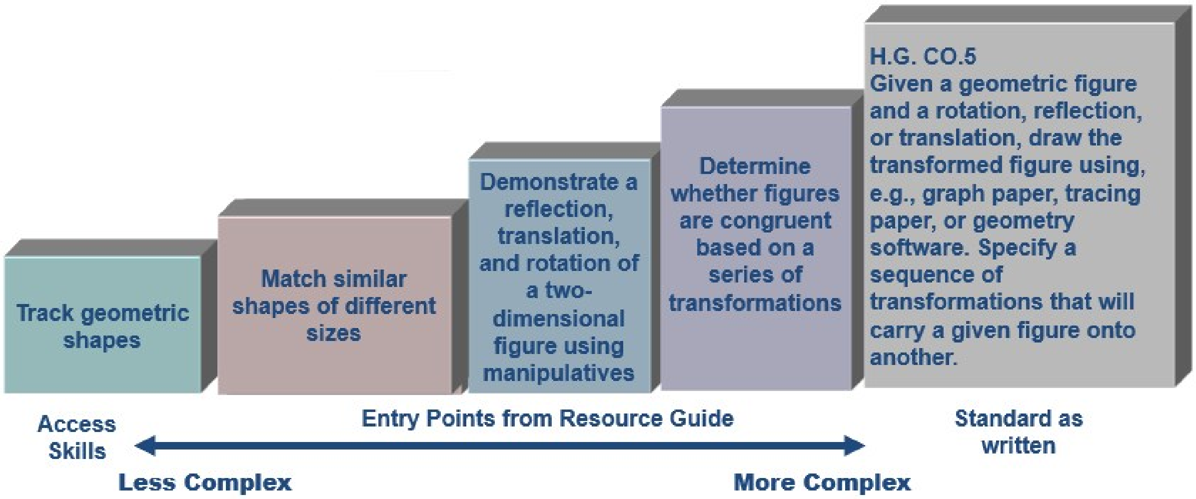
** Earth and Space Science, Life Science, Physical Sciences, Technology/Engineering*

4.2.1.1 Access to the Grade-Level Curriculum

Students with disabilities are expected to achieve the same standards as their peers who do not have disabilities. However, they may need extensive support to learn the necessary knowledge and skills and are likely to require instruction in smaller segments and at a slower pace. The *Resource Guides to the Massachusetts Curriculum Frameworks for Students with Disabilities* identify student-centered academic outcomes, called entry points, based on each grade-level content standard. The *Resource Guide* is intended to assist educators in teaching and assessing appropriately challenging, standards-based academic skills and content aligned with grade-level standards, as required by law. Entry points consist of academic outcomes based on the "essence" of the grade-level content but presented at modified levels of complexity and difficulty. Entry points provide a roadmap for students to make steady progress toward eventually meeting standards at grade-level complexity.

In a small number of cases where students with the most significant cognitive abilities cannot yet address entry points even at the lowest levels of complexity and even with the use of instructional accommodations, those students are instructed and assessed on the acquisition of access skills, which describe the communication and motor skills practiced during age-appropriate activities based on the standards. Entry points and access skills are listed in the *Resource Guides* in ELA, mathematics, and STE for every curriculum framework standard, available online at www.doe.mass.edu/mcas/alt/resources.html.

Figure 4-1. Model of a Method to Access the Grade-Level Curriculum Using Entry Points That Address the Essence of the Standard for Students Who Take the MCAS-Alt (Mathematics Example)



How Resource Guides Were Developed

After each curriculum framework was developed or subsequently revised, DESE convened panels of experts in each of three content areas (ELA, mathematics, and STE) to adapt the general education curriculum standards for students with the most significant cognitive disabilities. Panelists included content specialists, assessment experts, special educators familiar with students with the most significant cognitive disabilities, higher education faculty, parents and advocates, and members of the state's contractor team. Panelists are listed for each content area on the acknowledgements page of each on the Resource Guides here: www.doe.mass.edu/mcas/alt/resources.html.

Each panel reviewed the standards in their respective content area and identified the big ideas, key skills, and content knowledge—the so-called "essence"—contained in each standard. Once panelists agreed upon the essence, they determined "entry points," standards-based outcomes at successively lower levels of complexity than are typically expected of students who are achieving the grade-level standards as originally written. First, the panels determined entry points at the lowest level of complexity at which a student could address the standard without losing its essence. Then, they determined additional entry points at successively higher levels of complexity so teachers could identify and select the entry point at a challenging and attainable level of complexity appropriate for each student. This "continuum of complexity" allows teachers to progress to higher levels of complexity once lower complexity entry points are mastered by the student.

The process of developing the essence and entry points was repeated in each of the three content areas and was replicated each time revisions were made to the curriculum frameworks (1999; 2001; 2006; 2011; 2016; 2017). Subsequently, special educators familiar with students with the most significant cognitive disabilities developed access skills appropriate for students who are unable to address the content and skills at even the lowest level of complexity. Access skills include only motor and communication skills addressed during a standards-based activity in the required strand/domain and are intended for a very small number of students with the most unique, complex, and significant cognitive disabilities. Each Resource Guide lists the standards as written for students in each grade together with entry points and access skills intended for students with the most cognitive disabilities who are designated to participate in the MCAS-Alt.

4.2.1.2 Assessment Design

The MCAS-Alt assessments for ELA–language, ELA–reading, mathematics, and high school STE consist of a completed MCAS-Alt Skills Survey, a collection of primary evidence, supporting documentation, and other required information.

MCAS-Alt Skills Survey

The MCAS-Alt Skills Survey (see Appendix R) is a standardized component of the MCAS-Alt that must be administered by the teacher to each student before selecting an entry point or access skill in the subject required for assessment. The survey determines a student's current level of academic knowledge, skills, and abilities across a broad range of standards. The results of the skills survey are intended to be used as the basis for selecting an entry point or access skill listed in the *Resource Guide* in each subject scheduled for assessment. The survey is also intended to familiarize teachers with the range of entry points in a strand/domain that are available for the assessment.

The survey lists the important skills in each strand/domain/conceptual category/discipline from least to most complex. The skills represented on each survey were identified in collaboration with content experts in order to assess students with the most significant cognitive disabilities on skills that represent the "knowledge of most worth" within each strand ranging from low to high complexity.

To complete the skills survey, teachers may use the sample tasks provided on the survey, design their own simple tasks, use classroom observations, class assignments, progress reports, or locally administered assessments to determine the degree to which the student can perform each skill listed in the survey. A sample strand from the survey is shown in Figure 4-2.

A follow-up skills survey, though not required, is recommended *after* the selected skill has been taught to note the student's progress, especially if the student will attend a different classroom the following year.

Figure 4-2. MCAS-Alt Skills Survey–Reading Sample Strand

Reading (Informational or Literary Text)

	Based on a literary or informational text read by or to the student, student can:	A 0% (unable)	B Up to 25% (rarely)	C Up to 50% (occasionally)	D Up to 75% (more often than not)	E Up to 100% (almost always)
1.	Identify the main character(s) in the text.					
2.	Identify the setting of the text.					
3.	State key details from the text.					
4.	Identify events (or ideas) presented in the text.					
5.	Identify the central (main) idea of the text.					
6.	Explain *why* or *how* something occurred in the text.					
7.	Identify and define unknown words in the text; or match words or phrases from the text to their meaning.					
8.	Differentiate between a fact and the author's opinion.					
9.	Describe the author's point of view.					

Instructions for Completing the Skills Survey

Teachers are instructed to:

Conduct the MCAS-Alt Skills Survey for the most significant entry points listed in the Resource Guide in the required strand/domain for a student in that grade. Check one box (A–E) for each skill in the required strand/domain(s).

Teachers may use any combination of the following methods to conduct a brief assessment of each skill:

a) observations, informal assessments, progress reports, or classroom work
b) 2–4 tasks, based on the examples provided in the survey form or designed by the teacher that are accommodated for each student's instructional level and needs

If using specific tasks or activities to assess the student, the following protocol should be used:

1) Present the first task to the student.
2) If the student does not respond on the first attempt, repeat the task with a verbal reminder or other prompt (if needed), but do not give the answer. (Note: If a prompt is given, the response may be accurate, but is not independent.)
3) If the student responds to the first task, give a second, more complex task. Repeat with a prompt if needed. Make notes on the survey form to remind you of the student's performance of each task.
4) If the student does not respond to the second task, even with a prompt, do not introduce a third task. Simply mark an "X" in the column (A, B, C, D, or E) that most closely describes their performance of the skill.
5) Introduce the next task in the survey. Repeat steps 2 through 4 until all skills in the required strand/domain are assessed.

Once the survey has been completed for each required strand/domain, review the results, and proceed as follows:

- Select a related or higher-level-of-complexity entry point from the Resource Guide based on any skill that has been checked in columns A, B, or C.
- Do not select an entry point for any skills checked in columns D or E.
- If column A ("unable to perform the skill") is checked for all skills in the strand/domain, consider assessing an access skill (i.e., a motor or communication skill).
- If columns D and/or E are checked for most of the skills in the strand/domain, then the IEP team should consider whether the standard MCAS test (paper or online) would be more appropriate for the student in that subject.

Submit a completed MCAS-Alt Skills Survey for each assessed strand just after the Strand Cover Sheet in each student's MCAS-Alt. A strand without a completed Skills Survey will receive a score of *Incomplete*.

MCAS-Alt Skills Survey Pilot

In Fall 2018, 55 MCAS-Alt training specialists (i.e., special educators selected to be peer trainers) were asked to conduct a pilot study of the MCAS-Alt Skills Survey with one or more students in at least one of three content areas and provide responses to the following questions.

- How difficult was it to administer the skills survey?
- How much time did it take to administer each strand of the survey?

- Did conducting the skills survey help you gain a better understanding of your students' abilities?
- Was the skills survey helpful in guiding you to select appropriate entry points to assess?
- Was the skills survey rating system useful in determining a student's performance?
- Do you have suggestions for how the DESE should communicate this new requirement to teachers for the 2019–2020 school year? (Note: The survey was introduced in 2019–2020, but the state's academic assessments were cancelled due to the impact of the pandemic in spring 2020. The survey was first implemented and scored in the 2020–2021 school year.)

DESE received 48 written responses to the questions listed above. Most respondents said the skills survey was easy to administer, though the duration of administration varied widely (between 5–30 minutes per strand, depending on the student's abilities—surveying lower functioning students was completed more quickly while higher functioning students took longer).

Several said it seemed redundant of other broad-based skills assessments they routinely conduct at the start of each school year, though many said the MCAS-Alt Skills Survey was more formal, sequential, systematic, and standards-based. Respondents were about equally divided on the question of its effectiveness in helping gain a better understanding of their student(s), though many said it helped them identify the standards on which to focus for instruction and assessment. A few said their students surprised them with new skills they hadn't been aware they had mastered, and many said it was most helpful in cases when surveying students with whom they were less familiar. Many felt the survey helped them expand their understanding of possible entry points to select for assessment and the range of skills they were willing to teach and assess.

While most respondents acknowledged that the survey would require additional time to conduct, a large proportion said it was not overly time-consuming to administer. A few said it had saved them time, since it revealed the areas that needed the greatest instructional focus and gave them ideas for areas to assess. Some suggested the survey would be a good informal pre- and post-assessment conducted at different points throughout the school year, which could assist with progress monitoring and passing along orientation information to a new teacher the following year. Most felt the skills survey process will make sense to teachers when it is introduced, though they might be unhappy about the additional work requirement and suggested it be made optional.

As a result of feedback from the pilot study, the following adjustments were made to the operational MCAS-Alt Skills Survey:

- The skills survey was incorporated into the online MCAS-Alt forms and graphs application so it could be completed online.
- Multiple skills that had been combined were separated into separate skills.
- A training unit was developed to prepare teachers for implementation.
- The designations used in headers for columns A through E to rate each skill were edited to include both percentages of independence AND descriptors of the students' achievement of the skill (see Figure 4-3 below).
- Additional consultation occurred with content specialists to develop examples of assessment activities, ensure fidelity to the standards, and provide coverage of the most significant entry points across all ability levels.
- Instructional examples were added to the listed skills in Science and Technology/Engineering.

Figure 4-3. Descriptors for Each Column Used on the Skills Survey

A	B	C	D	E
Student is **unable** to perform this skill. ---------OR-------- Teacher is unable to assess student on this skill.	Student is just starting to learn this skill and demonstrates the skill only **rarely** without support. Student performs this skill accurately with **0–25% independence**. ---------OR-------- Student performs this skill independently with **0–25% accuracy**.	Student demonstrates this skill **intermittently** and only **occasionally** without support. Student performs this skill accurately with **26–50% independence**. ---------OR-------- Student performs this skill independently with **26–50% accuracy**.	Student demonstrates this skill **more often than not** without support. Student performs this skill accurately with **51–75% independence**. ---------OR-------- Student performs this skill independently with **51–75% accuracy**.	Student demonstrates this skill **almost all the time** without support. Student performs this skill accurately with **76–100% independence**. --------OR--------- Student performs this skill independently with **76–100% accuracy**.

Primary Evidence

For the evidence collection portion of the MCAS-Alt, the ELA, mathematics, and STE assessments require the inclusion of an instructional data chart and two or more pieces of primary evidence in each assessed strand, plus other supporting documentation that shows or describes the student's performance of the targeted skill.

The ELA–language, ELA–reading, and all required mathematics strands must include a data chart (e.g., field data chart, line graph, or bar graph) that indicates the following:

- the student's performance of the targeted skill based on the learning standard being assessed
- tasks performed by the student on at least eight distinct dates, with a brief description of each activity
- percentage of accuracy for each performance
- percentage of independence for each performance
- progress over time, including an indication that the student has attempted a new skill

Two or more pieces of primary evidence must document the student's performance of the same skill or outcome identified on the data chart. Primary evidence may include

- work samples (created by the student or dictated to a scribe using the student's primary mode of communication),
- photographs of one or more classroom activities, and/or
- audio or video clips of the student performing the targeted activity.

Each piece of primary evidence must clearly show the final product of an instructional activity and be labeled with

- the student's name,
- the date of the activity,
- a brief description of what the student was asked to do and how the task or activity was conducted,
- the percentage of accuracy for the task or activity, and

- the percentage of independence during the task or activity (i.e., the degree to which the student demonstrated knowledge and skills without the use of prompts or cues from the teacher).

The data chart and at least two additional pieces of primary evidence comprise the “core set of evidence” required in each strand, with the exception (noted below) of the ELA–Writing strand and next-generation STE strands.

The MCAS-Alt for ELA–Writing consists of a skills survey, one baseline writing sample (not included in the student’s score), plus three final writing samples in any of three writing types generated using the student’s primary mode of communication. Final writing samples are included in the final score.

The MCAS-Alt assessments for STE in grades 5 and 8 consist of primary evidence in three STE disciplines. Each discipline includes evidence of three entry points within the same core idea. STE evidence consists of the MCAS-Alt Skills Survey plus three work samples that integrate the STE content with three of the eight science practices described in the 2016 Massachusetts Curriculum Framework for STE. The STE assessment for high school consists of a skills survey and three different core ideas in one discipline (either Biology or Introductory Physics). Each core idea consists of three work samples documenting three different science practices, one for each summary sheet.

A detailed description of the instructions given to educators who are conducting the MCAS-Alt is provided in section 4.3, Test Administration.

Supporting Documentation

In addition to the required pieces of primary evidence, supporting documentation may be included at the discretion of the teacher to indicate the context in which the activity was conducted. Supporting documentation may include any of the following:

- photographs of the student that show how the student engaged in the context of the instructional activity
- tools, templates, graphic organizers, or models used by the student
- reflection sheet or evidence of other self-evaluation activities that document the student’s self-awareness, perceptions, choices, decision-making, and self-assessment of the work he or she created and/or the learning that occurred as a result. For example, a student may respond to questions such as these:
    - What did I do? What did I learn?
    - What did I do well? What am I good at?
    - Did I correct my inaccurate responses?
    - How could I do better? Where do I need help?
    - What should I work on next? What would I like to learn?
- work sample description labels providing important information about the activity or work sample

4.2.1.3 Assessment Dimensions (Scoring Rubric Areas)

Trained and qualified scorers examine each piece of evidence in the strand and apply the criteria described in the *Guidelines for Scoring 2022 MCAS-Alt* (see Appendix S), using the MCAS-Alt Rubric for Scoring Each Strand, to produce a subscore for the strand based on the following:

- **completeness** of assessment materials
- **level of complexity** and alignment with learning standards in the Massachusetts curriculum frameworks in the content area being assessed
- **accuracy** of the student’s responses to questions or performance of specific tasks
- **independence** demonstrated by the student in responding to questions or performing tasks
- **self-evaluation** of each task or activity (e.g., reflection, self-correction, goal-setting)

- **generalized performance** demonstrating the skill in different instructional contexts or using different materials or methods of presentation or response

Each strand is scored in each of five rubric dimensions, further described in section 4.4.3.1. Rubric dimensions and possible scores are as follows:

- Level of Complexity (score range of 1–5)
- Demonstration of Skills and Concepts (M, 1–4)
- Independence (M, 1–4)
- Self-Evaluation (M, 1, 2)
- Generalized Performance (1, 2)

(Note: a score of "M" would signify insufficient evidence or information to generate a numerical score in a dimension.)

Scores in Level of Complexity, Demonstration of Skills and Concepts, and Independence are combined to yield a strand subscore; those subscores are combined, as shown in the Analysis and Reporting Business Requirements (Appendix Q) to yield an overall score in the content area. Students taking alternate assessments based on alternate academic achievement standards (AA-AAAS) receive scores of either *Progressing*, *Emerging*, or *Awareness.*

4.2.2 Test Development

4.2.2.1 Rationale

AA-AAAS is the component of the state's assessment system that measures the academic performance of students with the most significant cognitive disabilities. Students with disabilities are required by federal and state laws to participate in the statewide MCAS so their performance of skills and knowledge of content described in the state's curriculum frameworks can be assessed and so that they are visible, included, and accountable in reports of results for each school and district.

The Elementary and Secondary Education Act (ESEA) requires states to include an alternate assessment option for students with the most significant cognitive disabilities. This requirement ensures that students with the most significant cognitive disabilities receive academic instruction based on the state's learning standards, have an opportunity to "show what they know" on the state assessment, and are included in reporting and accountability. Alternate assessment results provide accurate and detailed feedback that can be used to identify challenging instructional goals for each student. When schools are held accountable for the performance of students with disabilities, these students are more likely to receive consideration when school resources are allocated.

Through use of curriculum resources provided by DESE, teachers of students with disabilities have become adept at providing standards-based instruction at a level that challenges and engages each student, and they have informally reported unanticipated gains in student achievement.

4.2.2.2 Test Specifications

MCAS-Alt Skills Survey

Each strand must include a completed MCAS-Alt Skills Survey indicating the results of the student's performance in a broad range of skills. The information compiled in the skills survey must be used by the educator to select a targeted skill from the *Resource Guide* in the content area and strand(s) required for assessment. Only those skills (i.e., entry points and access skills) that the student was unable to perform accurately and independently at least 50 percent of the time on the MCAS-Alt Skills Survey may be selected by the student's teacher for the MCAS-Alt.

Evidence for English Language Arts (Language and Reading only), Mathematics, and Legacy STE (Chemistry and Technology/Engineering) Strands

Each portfolio strand must include a data chart documenting the student's performance of the targeted skill being assessed in the required content area (i.e., the percentage of accuracy and independence of each performance). Data are collected on at least eight different dates to determine the degree to which the skill has been mastered. On each date, the data must indicate the percentage of correct versus inaccurate responses given by the student, and whether the student required cues, prompts, or other assistance to respond (i.e., the overall percentage of independent responses by the student). Each data chart must include a brief description of activities conducted on each date and must describe how the activity addressed the measurable outcome being assessed. Data are collected either during routine classroom instruction or during tasks and activities set up specifically to assess the student. The data chart may include performance data from either a single activity or task; or from a series of responses to specific tasks summarized for each date.

In addition to the data chart, each strand must include at least two individual work samples (including photographs, if the evidence is too large, fragile, or temporary in nature) that documents the percentage of accuracy and independence of the student's responses on a given date, based on the measurable outcome that was also documented on the data chart.

The following information must be provided either on a Work Description or on the evidence itself:

- student's name
- date
- content area, strand/domain, and learning standard being assessed
- entry point being assessed during the activity
- a summary of the percent of student's accuracy and independence during the activity
- description of the activity

Evidence for ELA–Writing

The ELA–Writing strand requires a completed MCAS-Alt Skills Survey and at least three writing samples that demonstrate the student's expressive communication skills, based on any combination of the following text types:

- Opinion (grades 3–5)/Argument (grades 6–8 and 10)
- Informative/Explanatory
- Narrative, including Poetry

In addition to three writing samples, one *baseline* sample must be submitted which may include either an outline, completed graphic organizer, or draft of a writing assignment. The baseline sample should provide information to guide additional instruction in writing in that text type. Teachers are also required to pre-score the student's three final writing samples using a rubric provided by DESE for that purpose. See Appendix T for the Scoring Rubric for ELA–Writing.

Evidence for Next-Generation Science and Technology/Engineering (STE) Strands (Grades 5 and 8)

The format described below is intended to encourage the teaching of units of science based on a core idea, rather than assessing isolated skills. Teachers are directed to complete these steps:

Step 1: Select three (3) of the following STE disciplines:

- Earth and Space Science
- Life Science
- Physical Science
- Technology/Engineering

Step 2: Conduct the STE Skills Survey available to determine the optimal grade-span at which to select entry points for the student. The STE Skills Survey must be conducted once for the entire STE content area, not for each discipline, and must include all eight science practices.

Step 3: Select a core idea within the chosen discipline that is relevant and that engages and challenges the student.

Step 4: Select three (3) entry points or access skills. Three (3) different science practices must be addressed within the selected entry points or access skills. This step encourages teachers to design inter-related activities that address a theme or unit of study.

Step 5: List the following information on each STE Summary Sheet:

- student's name
- date
- core idea
- entry point addressed during the activity
- numbered science practice for that entry point
- accuracy and independence for each task or response in the activity, and the summary percent
- description of the activity

Step 6: Attach three pieces of primary evidence (i.e., work samples) to its corresponding completed STE Summary Sheet. Photographs and/or videos may be submitted as primary evidence if they are labeled and clearly show the final product of instruction.

Evidence for High School STE Strands

Assessment formats differ depending on the educator's selection of either the next-generation or legacy disciplines described below.

Step 1: Choose one (1) of the following next-generation STE disciplines:

- Biology **OR** Introductory Physics

Step 2: Conduct the MCAS-Alt STE Skills Survey to determine the grade-span at which to select entry points in each science practice for the student. Only one skills survey is required for high school Biology and Introductory Physics.

Step 3: Select three (3) *core ideas* within the chosen discipline from the next-generation STE Resource Guide that engage and challenge the student.

For *each* core idea:

Step 4: Select three (3) entry points or access skills. Three (3) different science practices must be addressed within the selected entry points or access skills. If entry points seem too complex at the grade level of the student, select entry points from earlier grade-level clusters in the same core idea. Use the information in the STE skills survey to assist with selection.

Follow Steps 5 and 6 above for each of the three core ideas.

4.3 MCAS-Alt Test Administration

4.3.1 Preparing the MCAS-Alt for Submission

The student's MCAS-Alt must include all elements listed below. Required forms can either be photocopied from those found in the *2022 Educator's Manual for MCAS-Alt* or completed electronically using an online MCAS-Alt Forms and Graphs program available at www.doe.mass.edu/mcas/alt/resources.html.

- **Artistic cover** designed and produced by the student and inserted in the front window of the three-ring binder
- **MCAS-Alt cover sheet** containing important information about the student
- **Student's introduction** to his/her MCAS-Alt produced as independently as possible by the student using his/her primary mode of communication (e.g., written, dictated, or recorded on video or audio) describing "What I want others to know about me as a learner"
- **Verification form** signed by a parent, guardian, or primary care provider signifying that he or she has reviewed the student's completed MCAS-Alt materials or, at minimum, was invited to do so. (In the event no signature was obtained, the school must include a record of attempts to invite a parent, guardian, or primary care provider to view the student's completed MCAS-Alt materials.)
- **Weekly schedule** documenting the student's program of instruction, including participation in the general academic curriculum
- **School calendar** indicating dates in the current academic year on which the school was in session; the calendar is used to verify the dates specified on the data chart and in other evidence.
- **MCAS-Alt Skills Survey** completed for each strand/domain/discipline required for assessment
- **Strand cover sheet** describing the accompanying set of evidence for a particular strand
- **Work sample description** attached to each piece of primary evidence providing required labeling information. (If work sample description labels are not used, this information must be written directly on each piece.)
- **Writing scoring rubric** for ELA–Writing only completed by the teacher for each of three final writing samples
- **STE Summary Sheet** completed by the teacher (as detailed in section 4.2.2.2)

The contents listed above, plus all primary evidence and supporting documentation, constitute the student's MCAS-Alt.

4.3.2 Participation Requirements

4.3.2.1 Identification of Students

All students educated with Massachusetts public funds, including students with disabilities educated inside or outside their home districts, must be engaged in an instructional program guided by the standards in the Massachusetts curriculum frameworks and must participate in statewide assessments that correspond with the grades in which they are reported in DESE's Student Information Management System (SIMS). Students with the most significant cognitive disabilities who are unable to take the standard MCAS tests, even with accommodations, must take the MCAS-Alt, as determined by the student's IEP team or as designated in their 504 plan.

4.3.2.2 Participation Guidelines

A student's IEP team (or 504 plan coordinator, in consultation with other staff) determines how the student will participate in MCAS and other state- and district-wide assessments for each content area scheduled for assessment, either by taking the test routinely or with accommodations, or by taking the alternate assessment if the student is unable to take the standard test, even when accommodations are provided, because of the complexity or severity of their cognitive disabilities. The participation guidelines and the characteristics to consider for students taking the MCAS-Alt are described below and in the participation section of the *Educator's Manual for MCAS-Alt* (available at www.doe.mass.edu/mcas/alt/resources.html). Information on how a student with a disability will participate in state- and district-wide testing must be documented in the student's IEP or 504 plan and revisited on an annual basis. A student may take the general assessment with or without accommodations in one subject and the alternate assessment in another subject.

A decision-making flow chart, entitled the MCAS Decision-Making Tool for MCAS Participation (see Appendix U), was developed in 2003 and updated in 2020 and is intended for use by IEP teams to make annual decisions regarding appropriate student participation in MCAS in each content area. Recent revisions to the tool included the addition of specific criteria determining which students may be considered for accommodations when taking the standard MCAS and which are eligible to participate in the MCAS-Alt. The criteria are located online (www.doe.mass.edu/mcas/alt/essa/DesignatingStudents.html) and in Appendix V. IEP teams are strongly encouraged to use the tool to guide the team's discussion and decision-making regarding statewide assessments.

The student's team must consider the following questions each year for each content area scheduled for assessment:

- Can the student demonstrate knowledge and skills, either fully or partially, on the **standard MCAS test under routine conditions**?
- Can the student demonstrate knowledge and skills, either fully or partially, on the **standard MCAS test with accommodations**? If so, which accommodations are necessary for the student to participate?
- If no to the above questions and the student has a significant cognitive disability, see the options below to determine whether the student qualifies to take the **alternate assessment** (MCAS-Alt). (**Note:** Alternate assessments are intended only for students with the most significant cognitive disabilities who are unable to take standard MCAS tests, even with accommodations. Students should not be identified for alternate assessments based solely on a particular disability, a placement in a specific classroom or program, previous low achievement on the tests, or EL status.)

The student's team must review the options provided in Figure 4-4. Additional guidance on MCAS-Alt participation is provided in the Commissioner's memo and attachments available at www.doe.mass.edu/mcas/alt/essa/.

Figure 4-4. Participation Guidelines

OPTION 1

Characteristics of Student's Instructional Program and Local Assessment	Recommended Participation in MCAS
If the student is a) generally able to demonstrate knowledge and skills on a computer- or paper-based test, either with or without test accommodations, ***and*** is b) working on learning standards **at, near, or somewhat below grade-level expectations,**	*Then* the student should take the computer- or paper-based **MCAS test**, either with or without accommodations.

OPTION 2

Characteristics of Student's Instructional Program and Local Assessment	Recommended Participation in MCAS
If the student has a significant cognitive disability and is a) **generally unable** to demonstrate knowledge and skills on a paper-and-pencil test, even with accommodations; ***and*** is b) working on learning standards that have been **substantially modified** due to the nature and severity of their disability; ***or*** is c) receiving **intensive, individualized instruction** in order to acquire, generalize, and demonstrate knowledge and skills,	*Then* the student should take the **MCAS Alternate Assessment** (MCAS-Alt) in this subject.

4.3.2.3 2022 MCAS-Alt Participation Rates

Across all content areas, a total of 6,186 students, or 1.3 percent of students who took standard MCAS assessments, participated in the 2022 MCAS-Alt in one or more subjects in grades 3–10. In ELA, 5,837 students took the MCAS-Alt (1.2 percent); in mathematics, 5,929 students took the MCAS-Alt (1.2 percent); and in STE, 2,458 students took the MCAS-Alt (1.2 percent).

Additional information about MCAS-Alt participation rates is provided in the 2022 MCAS-Alt State Summary, including the comparative rate of participation in each MCAS assessment format (i.e., routinely tested, tested with accommodations, or alternately assessed), available at: www.doe.mass.edu/mcas/alt/results.html.

4.3.3 Educator Training

During October 2021, a total of 1,860 educators and administrators received training on conducting the 2022 MCAS-Alt. Attendees had the option to participate in one of three sessions: an introduction to MCAS-Alt for educators new to the alternate assessment, an update for those with previous MCAS-Alt experience, or an overview for school and district administrators.

Topics for the introduction session included the following:

- decision-making regarding which students should take the MCAS-Alt
- alternate assessment requirements in each grade and content area
- developing measurable outcomes using the Resource Guide to the Massachusetts Curriculum Frameworks for Students with Disabilities and collecting data on student performance and progress based on measurable outcomes

Topics for the update session included the following:

- a summary of the previous year
- changes to the MCAS-Alt requirements for 2022
- requirements for next-generation STE
- MCAS-Alt Skills Survey
- interpreting MCAS-Alt scores

Topics for the administrators' overview session included the following:

- MCAS-Alt overview
- MCAS-Alt statewide results from previous year
- who should take the MCAS-Alt
- supporting teachers who conduct the MCAS-Alt, principal's role in MCAS-Alt

- the federally mandated cap on the percentage of students who may be assessed through an alternate assessment based on alternate academic achievement standards

In January–March 2022, a total of 1,290 educators attended virtual training and review sessions during which they were able to discuss their students' alternate assessments that were under development and have their questions answered by MCAS-Alt training specialists (i.e., expert teachers).

4.3.4 Support for Educators

A total of 62 MCAS-Alt training specialists were trained by DESE in the 2021–2022 school year to assist and support teachers conducting the MCAS-Alt in their districts, as well as to assist DESE at Department-sponsored assessment training and review sessions in January–April 2022. In addition, DESE staff provided ongoing technical assistance throughout the year via email and telephone to educators with specific questions about their students' alternate assessments.

The MCAS Service Center provided toll-free telephone support to district and school staff regarding test administration, reporting, training, materials, and other relevant operations and logistics. The Cognia project management team provided extensive training to the MCAS Service Center staff on the logistical, programmatic, and content-specific aspects of the MCAS-Alt, including web-based applications used by the districts and schools to order materials and schedule shipment pickups. Informative scripts were used by the Service Center coordinator to train Service Center staff in relevant areas such as web support, enrollment inquiries, and discrepancy follow-up and resolution procedures.

4.4 MCAS-Alt Scoring

The MCAS-Alt reflects the degree to which a student has learned and applied the knowledge and skills outlined in the Massachusetts curriculum frameworks. The MCAS-Alt measures progress over time, as well as the highest level of achievement attained by the student on the assessed skills, considering the degree to which cues, prompts, and other assistance were required by the student in learning each skill.

Scorers were rigorously trained and qualified based on the criteria outlined in the *Guidelines for Scoring 2022 MCAS-Alt,* available in Appendix S. The *MCAS-Alt Rubric for Scoring Each Strand* has been used as the basis for scoring the MCAS-Alt since 2001 when it was first developed with assistance from teachers and a statewide advisory committee.

4.4.1 Scoring Logistics

MCAS-Alt assessments were scored in Dover, New Hampshire, from April 11 through May 13. DESE and Cognia trained and closely monitored scorers to ensure that scores were accurate.

Each student's MCAS-Alt was reviewed and scored by trained scorers according to the procedures described in section 4.4. Scores were entered into a computer-based scoring system designed by Cognia and DESE, and scores were frequently monitored for accuracy and completeness.

Security was maintained at the scoring site by restricting access to unscored assessments to DESE and Cognia staff, and by locking assessments in a secure location before and after each scoring day.

MCAS-Alt scoring leadership staff included several floor managers (FMs) who monitored the scoring room. Each FM managed a group of tables at the elementary, middle, or secondary level. A Table Leader (TL) was responsible for managing a single table with four to five scorers. Communication and coordination among scorers were maintained through daily meetings between FMs, TLs, and scoring leadership to ensure that critical information and uniform scoring rules were implemented across all grade clusters.

4.4.2 Recruitment, Training, and Qualification of Scoring Personnel

4.4.2.1 Scorer Training Materials

The MCAS-Alt Project Leadership Team (PLT), including DESE and Cognia staff plus four contracted teacher consultants, met daily over the course of scoring in 2022 and periodically throughout the 2021–2022 school year to accomplish the following:

- nominate prospective MCAS-Alt training specialists to serve as scoring specialists for the 2022 scoring institute
- select sample strands to use to train, calibrate, and qualify scorers in 2022
- discuss which recurring issues and concerns to address during the following fall educator training sessions

All sample strands were scored using the *2022 Guidelines for Scoring MCAS-Alt*, noting any scoring concerns or discrepancies that arose during the review. Concerns were resolved by referring to guidelines and requirements in the *2022 Educator's Manual for MCAS-Alt* and by following additional scoring rules agreed upon by the PLT.

Of the alternate assessments reviewed the previous year, several sample strands were set aside as possible exemplars to train, qualify, and calibrate scorers for the current year. These strands consisted of solid examples of each score point on the scoring rubric.

Each of these samples was scored by all four MCAS-Alt Teacher Consultants. Of the scores, only scores in exact agreement in all five scoring dimensions—Level of Complexity, Demonstration of Skills and Concepts, Independence, Self-Evaluation, and Generalized Performance—were considered as possible exemplars.

4.4.2.2 Recruitment

Through multiple hiring agencies, Cognia recruited prospective scorers and TLs for the MCAS-Alt Scoring Center. All TLs and many scorers had previously worked on scoring projects for other states' test or alternate assessment administrations, and all had four-year college degrees.

Additionally, the PLT recruited MCAS-Alt training specialists, many of whom had previously served as scoring specialists, to assist DESE and Cognia. Eight MCAS-Alt training specialists were selected to participate in scoring and were designated as scoring specialists to assist in verifying that scores of "M" (indicating that evidence was missing or insufficient to determine a score) were accurate, and in the training/retraining of TLs.

4.4.2.3 Training

Scorers

Scorers were rigorously trained in all rubric dimensions. Scorers reviewed scoring rules and participated in the "mock scoring" of numerous sample portfolio strands selected to illustrate examples of each rubric score point. Scorers were given detailed instructions on how to review data charts and other primary evidence to tally the rubric area scores using a strand organizer. Trainers facilitated discussions and review among scorers to clarify the rationale for each score point and describe special scoring scenarios and exceptions to the general scoring rules.

Table Leaders and Floor Managers

In addition to the training received by scorers, TLs and FMs received training in logistical, managerial, and security procedures, as well as maintaining the accuracy, reliability, and consistency of scorers at tables under their supervision.

4.4.2.4 Qualification of Scorers

Before scoring actual student assessments, each potential scorer was required to take a qualifying assessment consisting of eight sample strands that contained a total of 173 score points. The threshold percentage for qualification on the 173 available score points was 85% (147 correct out of 173).

Scorers who did not achieve the required percentages were retrained using another qualifying assessment. Those who achieved the required percentages were authorized to begin scoring student assessments. If a scorer did not meet the required accuracy rate on the second qualifying assessment, he or she was released from scoring.

Table Leaders and Floor Managers

TLs and FMs were qualified by DESE using the same methods and criteria used to qualify scorers, except that they were required to achieve a score of 90% correct or higher on the qualifying test.

4.4.3 Scoring Methodology

Originally, a statewide task force comprised of DESE staff (from Special Education and Student Assessment offices), members of the contractor team (then Measured Progress and the University of Kentucky), and the Massachusetts Alternate Assessment Statewide Advisory Committee (a diverse stakeholder group) provided recommendations to DESE on how alternate assessments should be scored, including the criteria on which to base the scores. Some advised DESE to develop scoring criteria based only on student performance, since that is what the standard MCAS assessments measured, rather than assessing how well the student’s program provided opportunities to learn and demonstrate knowledge and skills. Others felt that student achievement could not be separated from program effectiveness. In the end, a scoring rubric was developed in which three of five categories are based on student performance; two reflect the effectiveness of the student’s program; and one on whether the evidence submitted was sufficient in scope and quantity to allow a score to be determined.

- Completeness: whether the submitted evidence was sufficient to allow a score to be determined
- Level of Complexity: the relative difficulty of academic tasks and knowledge attempted by the student (counts toward the final overall score)
- Demonstration of Skills and Concepts: the accuracy of the student’s performance (counts toward the final overall score)
- Independence: cues, prompts, and other assistance provided to the student during tasks and activities being assessed (counts toward the final overall score)
- Self-Evaluation: the extent to which opportunities were provided for the student to evaluate, reflect upon, self-correct, set goals, and select examples of the student’s own performance (context of the instruction; not counted toward the final overall score)

- Generalized Performance: the number of contexts and instructional approaches provided to and used by the student to perform tasks and demonstrate knowledge and skills (program quality; not counted toward the final overall score)

4.4.3.1 Scoring English Language Arts (except ELA–Writing), Mathematics, and Legacy Science and Technology/Engineering

Guided by a TL, scorers at each table reviewed and scored assessments from the same grade. Scorers were permitted to ask TLs questions as they reviewed assessments. In the event a TL could not answer a question, the FM provided assistance. In the event the FM was unable to answer a question, DESE staff members were available to provide clarification.

Scorers were randomly assigned an assessment to score by their TL. Scorers were required to ensure that the required strands for each grade were submitted and then to determine if each submitted strand was complete. A strand was considered complete if it included a data chart with at least eight different dates related to the same measurable outcome, and two additional pieces of evidence based on the same outcome.

Once the completeness of the assessment was verified, including the submission of a completed MCAS-Alt Skills Survey, each strand was scored in the following dimensions:

A. Level of Complexity (LOC)
B. Completeness
C. Demonstration of Skills and Concepts (DSC)
D. Independence (Ind)
E. Self-Evaluation (S-E)
F. Generalized Performance (GP)

The 2022 MCAS-Alt score distributions for all scoring dimensions are provided in Appendix J.

Scorers used an automated, customized scoring program called *AltScore* to score MCAS-Alt assessments. Scorers were guided through the scoring process by answering a series of yes/no and fill-in-the-blank questions onscreen which were used by the program to calculate the correct score and provide scorer comments to the school submitting the assessment. Use of the computer-based scoring application allowed scorers to 1) focus exclusively and sequentially on each assessment product and record the necessary information, rather than keeping track of products they had previously reviewed, and 2) automatically calculate the scores.

A. Level of Complexity

The score for Level of Complexity reflects at what level of difficulty (i.e., complexity) the student addressed curriculum framework learning standards and whether the measurable outcomes were aligned with assessment requirements and with descriptions of the activities documented in the assessment products. Using the *Resource Guide,* scorers determined whether the student's measurable outcomes were aligned with the intended learning standard, and if so, whether the evidence was addressed at grade-level performance expectations, was modified below grade-level expectations ("entry points") or was addressed through skills in the context of an academic instructional activity ("access skills").

Each strand was given a Level of Complexity score based on the scoring rubric for Level of Complexity (Table 4-2) that incorporated the criteria listed above.

Table 4-2. Scoring Rubric for Level of Complexity

Score Point				
1	2	3	4	5
The strand reflects little or no basis in, or is unmatched to, curriculum framework learning standard(s) required for assessment.	Student primarily addresses social, motor, and communication "access skills" during instruction based on curriculum framework learning standards in this strand.	Student addresses curriculum framework learning standards that have been modified below grade-level expectations in this strand.	Student addresses a narrow sample of curriculum framework learning standards (one or two) at grade-level expectations in this strand.	Student addresses a broad range of curriculum framework learning standards (three or more) at grade-level expectations in this strand.

B. Completeness

Scorers confirmed that a "core set of evidence" was submitted and that all evidence was correctly labeled with the following information:

- the student's name
- the date of performance
- a brief description of the activity
- the percentage of accuracy
- the percentage of independence

If evidence was not labeled correctly, or if pieces of evidence did not address the measurable outcome stated on the Strand Cover Sheet or work description, that evidence was not scorable.

Brief descriptions of each activity on the data chart were also considered in determining the completeness of a data chart. Educators had been instructed during educator training workshops and in the *2022 Educator's Manual for MCAS-Alt* that "each data chart must include a brief description beneath each data point that clearly illustrates how the task or activity relates to the measurable outcome being assessed." One- or two-word descriptions were not likely to be considered sufficient to document the relationship between the activity and the measurable outcome and therefore would result in the exclusion of those data points from being scored.

A score of M (i.e., evidence was missing or was insufficient to determine a score) was given in both Demonstration of Skills and Concepts and Independence if

- a completed data chart documenting the student's performance of the same skill on at least eight dates was not submitted; and/or
- at least two pieces of scorable primary evidence were not submitted.

A score of M was also given if any of the following was true:

- A completed MCAS-Alt Skills Survey was not submitted for the strand.
- The data chart listed the percentages of *both* accuracy and independence at or above 80 percent at the beginning of the data collection period, indicating that the student was not learning a challenging new skill in the strand and was instead addressing a skill he or she had already learned.
- The data chart did not document the measurable outcome on at least eight different dates; the measurable outcome was not based on a required learning standard or strand; and/or the evidence did not indicate the student's accuracy and independence on each task or trial.
- Two additional pieces of primary evidence did not address the same measurable outcome as the data chart or were not labeled with all required information.

C. Demonstration of Skills and Concepts

Each strand is given a score for Demonstration of Skills and Concepts based on the degree to which a student gave correct (accurate) responses in demonstrating the targeted skill.

If a “core set of evidence” was submitted in a strand, it was scored for Demonstration of Skills and Concepts by first identifying the “final-1/3 time frame” during which data were collected on the data chart (or the final three data points on the chart, if fewer than 12 points were listed). Then, an average percentage was calculated based on the percentage of accuracy for

- all data points in the final-1/3 time frame listed on the data chart, and
- all other primary evidence in the strand produced during or after the final-1/3 time frame (provided the piece was not already included and counted on the chart).

Based on the average percentage of accuracy in the data points and evidence in the final-1/3 time frame, the overall score in the strand was determined using the rubric shown in Table 4-3.

Table 4-3. Scoring Rubric for Demonstration of Skills and Concepts

		Score Point		
M	1	2	3	4
The strand contains insufficient information to determine a score.	Student’s performance is primarily inaccurate and demonstrates minimal understanding in this strand. (0%–25% accurate)	Student’s performance is limited and inconsistent with regard to accuracy and demonstrates limited understanding in this strand. (26%–50% accurate)	Student’s performance is mostly accurate and demonstrates some understanding in this strand. (51%–75% accurate)	Student’s performance is accurate and is of consistently high quality in this strand. (76%–100% accurate)

D. Independence

The score for Independence reflects the degree to which the student responded without cues or prompts during tasks or activities based on the measurable outcome being assessed. For strands that included a core set of evidence, Independence was scored by identifying the final-1/3 time frame listed on the data chart (or the final three data points, if fewer than 12 points were listed). Then, an average percentage was calculated based on the percentage of independence for

- all data points during the final-1/3 time frame listed on the data chart, and
- all other primary evidence in the strand produced during or after the final-1/3 time frame (provided the piece was not already included on the chart).

Based on the average percentage of Independence of the data points and evidence in the final-1/3 time frame, the overall score in the strand was determined using the rubric shown in Table 4-4.

A score of M was given both in Demonstration of Skills and Concepts and in Independence if any of the following was true:

- At least two pieces of scorable primary evidence and a completed data chart documenting the student’s performance of the same skill were not submitted.
- The data chart listed the percentages of both accuracy and independence at or above 80% at the beginning of the data collection period, indicating that the student did not learn a challenging new skill in the strand and was addressing a skill he or she had already learned.
- The data chart did not document a single measurable outcome based on the required learning standard or strand on at least eight different dates, and/or did not indicate the student’s accuracy and independence on each task or activity.

- Two additional pieces of primary evidence did not address the same measurable outcome as the data chart or were not labeled with all required information.

Table 4-4. Scoring Rubric for Independence

Score Point				
M	1	2	3	4
The strand contains insufficient information to determine a score.	Student requires extensive verbal, visual, and/or physical assistance to demonstrate skills and concepts in this strand. (0%–25% independent)	Student requires frequent verbal, visual, and/or physical assistance to demonstrate skills and concepts in this strand. (26%–50% independent)	Student requires some verbal, visual, and/or physical assistance to demonstrate skills and concepts in this strand. (51%–75% independent)	Student requires minimal verbal, visual, and/or physical assistance to demonstrate skills and concepts in this strand. (76%–100% independent)

E. Self-Evaluation

The score for Self-Evaluation indicates the frequency of activities in the strand that involve self-correction, task-monitoring, goal-setting, reflection, and overall awareness by the student of their own learning. Each strand was given a score of M, 1, or 2 based on the scoring rubric shown in Table 4-5.

Table 4-5. Scoring Rubric for Self-Evaluation, Individual Strand Score

Score Point		
M	1	2
Evidence of self-correction, task-monitoring, goal-setting, and reflection was **not found** in this strand.	Student infrequently self-corrects, monitors, sets goals, and reflects in this content area—only **one example of self-evaluation** was found in this strand.	Student frequently self-corrects, monitors, sets goals, and reflects in this content area—**multiple examples** of self-evaluation were found in this strand.

F. Generalized Performance

The score for Generalized Performance reflects the number of contexts and instructional approaches used by the student to demonstrate knowledge and skills in the strand. Each strand was given a score of either 1 or 2 based on the rubric shown in Table 4-6.

Table 4-6. Scoring Rubric for Generalized Performance

Score Point	
1	2
Student demonstrates knowledge and skills in **one** context or uses **one** approach and/or method of response and participation **in this strand**.	Student demonstrates knowledge and skills in **multiple** contexts or uses **multiple** approaches and/or methods of response and participation **in this strand**.

4.4.3.2 ELA–Writing

Prior to submission, teachers were asked to pre-score each of their student's three final writing samples using the state-provided Writing Scoring Rubric in Appendix T, according to the appropriate text type:

- Opinions/Arguments

- Informative/Explanatory texts
- Narrative (including Poetry)

MCAS-Alt scorers verified the completion of the MCAS-Alt Skill Survey for the strand and that the scores submitted by the teacher were based on the writing sample generated by the student, and not based on any text generated by the teacher. The rubric scores were lowered by scorers in cases where writing rubric scores did not accurately reflect the student's own work.

Writing samples were to be produced as independently as possible by the student. If teachers provided text for the student or applied their own revisions to the student's work, that must have been reflected in the rubric scores, particularly in the area of Independence. Teachers were expected to explain how edits and revisions were made and indicate the student's contribution to the creation of the sample.

Writing samples were required to be produced using the student's primary mode of communication; for example, dictated to a scribe, with the scribe assuming the use of capital letters and basic punctuation. Teachers were permitted to submit a student's constructed response to reading comprehension questions or other topics as the basis for their writing samples, even if those responses were already included in the evidence compiled for another strand.

4.4.3.3 Next-Generation Science and Technology/Engineering

The requirements for STE in grades 5 and 8 included teachers selecting any three (3) of the following STE disciplines:

- Earth and Space Science
- Life Science
- Physical Science
- Technology/Engineering

Teachers were required to create one STE strand within each of the three selected disciplines, each based on a different learning standard and core idea.

High school next-generation STE included a selection of either Biology or Introductory Physics. Teachers were required to create three strands within the one selected discipline, each based on a different learning standard and core idea.

For each strand submitted, the scorer confirmed the following using the *AltScore* program:

1. One MCAS-Alt Next-Generation STE Skills Survey was submitted for the entire content area.
2. The student's name, valid date, % of accuracy, and % independence were listed on at least three STE Summary Sheets.
3. The activities on the three STE Summary Sheets reflected the same core idea.
4. Three different science practices were represented from the selected entry points or access skills.
5. At least three STE Summary Sheets had primary evidence attached.

After verifying the above, the scorer used the *AltScore* program to rate complexity, accuracy, independence, and self-evaluation for the three STE Summary Sheets.

4.4.3.4 Monitoring Scoring Quality

The FM oversees the general workflow in the scoring room and monitors overall scoring consistency and accuracy, particularly among TLs. The TLs ensure that scorers at their table are consistent and accurate in their scoring. Scoring consistency and accuracy are maintained using two methods: double-blind scoring and resolution (i.e., read-behind) scoring.

4.4.3.5 Double-Blind Scoring

In double-blind scoring, two scorers independently score a response, without knowing either the identity of the other scorer or the score that was assigned. Neither scorer knows how responses will be (or have already been) scored by another randomly selected scorer. For each scored assessment, at least one was double-scored for each scorer each morning and afternoon or, at minimum, every fifth assessment each day (i.e., 20% of the total scored by a scorer).

Scorers were required to maintain a scoring accuracy rate of at least 80% exact agreement with the TL's score. The TL retrained any scorer whose interrater consistency fell below 80% agreement. The TL reviewed discrepant scores (those that differed by two or more points from the TL's score) with the responsible scorers and determined when or if they might resume scoring.

Table 4-10 in section 4.7.4 shows the percentages of interrater agreement for the 2022 MCAS-Alt.

4.4.3.6 Resolution Scoring

Resolution scoring refers to the rescoring of an assessment by a TL and a comparison of the TL's score with the score assigned by the previous scorer. If there was exact score agreement, the first score was retained as the score of record. If the scores differed, the TL's score became the score of record.

Resolution scoring was conducted on all assessments during the first full day of scoring. After that, a rescoring was performed at least once each morning, once each afternoon, and on every fifth subsequent assessment per scorer.

The required rate of agreement between a scorer and the TL's score was 80% exact agreement. A double score was performed on each subsequent assessment for any scorer whose previous scores fell below 80% exact agreement and who resumed scoring after being retrained, until 80% exact agreement with the TL's scores was established.

4.4.3.7 Tracking Scorer Performance

A real-time, cumulative data record was maintained digitally for each scorer. Each scorer's data record showed the number of strands and complete assessments scored, plus their interrater consistency in each rubric dimension.

In addition to maintaining a record of scorers' accuracy and consistency over time, leadership also monitored scorers for output, with slower scorers remediated to increase their production. The overall ratings were used to enhance the efficiency, accuracy, and productivity of scorers.

4.5 MCAS-Alt Classical Item Analyses

As noted in Brown (1983), "A test is only as good as the items it contains." A complete evaluation of a test's quality must therefore include an evaluation of each item. Both *Standards for Educational and Psychological Testing* (AERA et al., 2014) and the *Code of Fair Testing Practices in Education* (Joint Committee on Testing Practices, 2004) include standards for identifying high-quality items. While the specific statistical criteria identified in these publications were developed primarily for general assessments rather than alternate assessments, the principles and some of the techniques apply to the alternate assessment framework as well. Both qualitative and quantitative analyses are conducted to ensure that the MCAS-Alt meets these standards. Qualitative analyses are described in earlier sections of this chapter; this section focuses on quantitative evaluations.

Quantitative analyses presented here are based on the statewide administration of the 2022 MCAS-Alt and include three of the five-dimension scores on each task (Level of Complexity, Demonstration of Skills and Concepts, and Independence). Although the other two-dimension scores (Self-Evaluation and Generalized Performance) are reported, they do not contribute to a student's overall achievement level; therefore, they are not included in quantitative analyses.

For each MCAS-Alt subject and strand, dimensions are scored polytomously across tasks according to scoring rubrics described previously in this chapter. Specifically, a student can achieve a score of 1, 2, 3, 4, or 5 on the Level of Complexity dimension and a score of M, 1, 2, 3, or 4 for both the Demonstration of Skills and Concepts and the Independence dimensions. Dimensions within subjects and strands are treated as traditional test items, since they capture or represent student performance against the content of interest; therefore, dimension scores for each strand are treated as item scores for the purpose of conducting quantitative analyses.

Statistical evaluations of MCAS-Alt include difficulty and discrimination indices, structural relationships (correlations among the dimensions), and bias and fairness. Item-level classical statistics—item difficulty and discrimination values—are provided in Appendix I. Item-level score distributions for each item (i.e., the percentage of students who received each score point) are provided in Appendix J. Note that the Self-Evaluation and Generalized Performance dimension scores are also included in Appendix J.

4.5.1 Difficulty

Based on the definition of dimensions and dimension scores as similar to traditional test items and scores, all items are evaluated in terms of difficulty according to standard classical test theory practices. Difficulty is traditionally described according to an item's *p*-value, which is calculated as the average proportion of points achieved on the item. Dimension scores achieved by each student are divided by the maximum possible score to return the proportion of points achieved on each item; *p*-values are then calculated as the average of these proportions. Computing the difficulty index in this manner places items on a scale that ranges from 0.0 to 1.0. This statistic is properly interpreted as an "easiness index," because larger values indicate easier items. An index of 0.0 indicates that all students received no credit for the item, and an index of 1.0 indicates that all students received full credit for the item.

Items that have either a very high or very low difficulty index are considered potentially problematic, because they are either so difficult that few students get them right or so easy that nearly all students get them right. In either case, such items should be reviewed for appropriateness for inclusion on the assessment. If an assessment consisted entirely of very easy or very hard items, all students would receive nearly the same scores, and the assessment would not be able to differentiate high-ability students from low-ability students.

It is worth mentioning that using norm-referenced criteria such as *p*-values to evaluate test items is somewhat contradictory to the purpose of a criterion-referenced assessment like the MCAS-Alt. Criterion-referenced assessments are primarily intended to provide evidence of individual student progress relative to a standard rather than provide a comparison of one student's score with other students. In addition, the MCAS-Alt makes use of teacher-designed instructional activities, which serve as a proxy for test items to measure performance. For these reasons, the generally accepted criteria regarding classical item statistics should be cautiously applied to the MCAS-Alt.

A summary of item difficulty for each grade and content area is presented in Table 4-7. The mean difficulty values shown in the table indicate that, overall, students performed well on the items on the MCAS-Alt. In assessments designed for the general population, difficulty values tend to be in the 0.40 to 0.70 range for most items. Because the nature of alternate assessments is different from that of general assessments, and because few guidelines exist as to criteria for interpreting these values for alternate assessments, the values presented in Table 4-7 should not be interpreted to mean that the students performed better on the MCAS-Alt than the students who took general assessments performed on those tests.

4.5.2 Discrimination

Discrimination indices can be thought of as measures of how closely an item assesses the same knowledge and skills assessed by other items contributing to the criterion total score. That is, the discrimination index can be thought of as a measure of construct consistency. The correlation between student performance on a single item and total test score is a commonly used measure of this characteristic of an item. Within classical test theory, this item-test correlation is referred to as the item's discrimination because it indicates the extent to which successful performance on an item discriminates between high and low scores on the test. It is desirable for an item to be one on which higher-ability students perform better than lower-ability students or one that demonstrates strong, positive item-test correlation.

Considering this interpretation, the selection of an appropriate criterion total score is crucial to the interpretation of the discrimination index. For the MCAS-Alt, the sum of the three-dimension scores, excluding the item being evaluated, was used as the criterion score. For example, in grade 3 ELA, total test score corresponds to the sum of scores received on the three dimensions included in quantitative analyses (i.e., Level of Complexity, Demonstration of Skills and Concepts, and Independence) across both Language and Reading strands.

The discrimination index used to evaluate MCAS-Alt items was the Pearson product-moment correlation, which has a theoretical range of -1.00 to 1.00. A summary of the item discrimination statistics for each grade and content area is presented in Table 4-7. Because the nature of the MCAS-Alt is different from that of a general assessment, and because very few guidelines exist as to criteria for interpreting these values for alternate assessments, the statistics presented in Table 4-7 should be interpreted with caution.

Table 4-7. Summary of Item Difficulty and Discrimination Statistics by Content Area and Grade

Content Area	Grade	Number of Items	*p*-Value		Discrimination	
			Mean	Standard Deviation	Mean	Standard Deviation
ELA	3	9	0.76	0.20	0.39	0.09
	4	9	0.77	0.20	0.38	0.07
	5	9	0.77	0.20	0.40	0.07
	6	9	0.77	0.20	0.41	0.07
	7	9	0.77	0.20	0.39	0.07
	8	9	0.77	0.20	0.43	0.06
	10	9	0.78	0.19	0.37	0.07
Mathematics	3	6	0.83	0.19	0.56	0.15
	4	6	0.83	0.19	0.58	0.12
	5	6	0.83	0.19	0.62	0.06
	6	6	0.83	0.19	0.58	0.15
	7	6	0.83	0.19	0.54	0.15
	8	6	0.83	0.19	0.59	0.10
	10	15	0.83	0.18	0.34	0.10
STE	5	12	0.80	0.17	0.44	0.16
	8	12	0.80	0.17	0.43	0.13
Biology	HS	9	0.80	0.17	0.45	0.17
Chemistry	HS	9	0.85	0.19	0.29	0.06
Introductory Physics	HS	9	0.77	0.16	0.44	0.20
Technology/Engineering	HS	9	0.84	0.18	0.42	0.11

4.5.3 Structural Relationships Among Dimensions

By design, the achievement-level classification of the MCAS-Alt is based on three of the five scoring dimensions (Level of Complexity, Demonstration of Skills and Concepts, and Independence). As with any assessment, it is important that these dimensions be carefully examined. This was achieved by exploring the relationships among student dimension scores with Pearson correlation coefficients. A very low correlation (near zero) would indicate that the dimensions are not related; a low negative correlation (approaching -1.00) indicates that they are inversely related (i.e., that a student with a high score on one dimension had a low score on the other); and a high positive correlation (approaching 1.00) indicates that the information provided by one dimension is similar to that provided by the other dimension. The average correlations among the three dimensions by content area and grade level are shown in Table 4-8.

Table 4-8. Average Correlations Among the Three Dimensions by Content Area and Grade

Content Area	Grade	Number of Items Per Dimension	Average Correlation Between*:			Correlation Standard Deviation*		
			Comp/ Ind	Comp/ Sk	Ind/ Sk	Comp/ Ind	Comp/ Sk	Ind/ Sk
ELA	3	3	0.15	0.18	0.16	0.02	0.15	0.05
	4	3	0.09	0.20	0.13	0.03	0.12	0.04
	5	3	0.16	0.25	0.17	0.06	0.15	0.01
	6	3	0.15	0.19	0.11	0.06	0.14	0.08
	7	3	0.14	0.21	0.10	0.01	0.18	0.07
	8	3	0.23	0.22	0.16	0.03	0.12	0.09
	10	3	0.16	0.20	0.15	0.06	0.16	0.13
Mathematics	3	2	0.12	0.11	0.11	0.04	0.09	0.03
	4	2	0.11	0.22	0.11	0.02	0.01	0.03
	5	2	0.21	0.21	0.16	0.01	0.02	0.00
	6	2	0.24	0.08	0.11	0.02	0.05	0.06
	7	2	0.12	0.14	0.06	0.07	0.05	0.00
	8	2	0.18	0.15	0.14	0.04	0.02	0.02
	10	5	0.12	0.12	0.12	0.05	0.05	0.07
STE	5	4	0.19	0.13	-0.02	0.02	0.11	0.03
	8	4	0.10	0.17	-0.02	0.11	0.10	0.05
Biology	HS	3	0.13	0.16	-0.07	0.01	0.03	0.01
Chemistry	HS	3	0.09	0.41	0.05	0.11	0.03	0.12
Introductory Physics	HS	3	0.20	0.03	-0.16	0.19	0.08	0.04
Technology/ Engineering	HS	3	0.06	0.05	0.19	0.18	0.13	0.04

** Comp = Level of Complexity; Sk = Demonstration of Skills and Concepts; Ind = Independence*

The average correlations between every two dimensions range from very weak (absolute values between 0.00 and 0.20) to weak (absolute values between 0.20 and 0.40), except for one—the correlation in Chemistry. It is important to remember in interpreting the information in Table 4-8 that the correlations are based on small numbers of item scores and small numbers of students and should therefore be interpreted with caution.

4.5.4 Differential Item Functioning

The *Code of Fair Testing Practices in Education* (Joint Committee on Testing Practices, 2004) explicitly states that subgroup differences in performance should be examined when sample sizes permit and that actions should be taken to ensure that differences in performance are because of construct-relevant, rather than irrelevant, factors. *Standards for Educational and Psychological Testing* (AERA et al., 2014) includes similar guidelines.

When appropriate, the standardization differential item functioning (DIF) procedure (Dorans & Kulick, 1986) is employed to evaluate subgroup differences. The standardization DIF procedure is designed to identify items for which subgroups of interest perform differently, beyond the impact of differences in overall achievement. However, because of the small number of students who take the MCAS-Alt, and because those students take different combinations of tasks, it was not possible to conduct DIF analyses. Conducting DIF analyses using groups of fewer than 200 students would result in inflated type I error rates.

4.5.5 Measuring Intended Cognitive Processes

Tables W-1 to W-6 in Summary of Alt Score Frequencies (Appendix W) describe the frequency of scores in each strand's rubric area by grade and content area. Note that not all grades and content areas will use all strands and scores in the table. Where not applicable, the table cell is marked as blank. Although scores tend toward the center of the rubric, this is an expected outcome for the population taking the alternate assessment. There is still the expected frequency of scores at the highest or lowest ends of the rubric when a substantial population has taken the test, indicating that the tests elicit evidence across the full expected range of rubric areas and measure the full range of intended cognitive processes.

4.6 MCAS-Alt Bias/Fairness

Fairness is validated through the assessment development processes, and in the development of the standards themselves, which were thoroughly vetted for bias and sensitivity. The *Resource Guide to the Massachusetts Curriculum Frameworks for Students with Disabilities* provides instructional and assessment strategies for teaching students with disabilities the same learning standards (by grade level) as general education students. The *Resource Guide* is intended to promote access to the general curriculum, as required by law, and to assist educators in planning instruction and assessment for students with the most significant cognitive disabilities. *Resource Guides* were developed by diverse panels of education experts in each content area, including DESE staff, testing contractor staff, higher education faculty, MCAS Assessment Development Committee members, curriculum framework writers, and regular and special educators. Each section was written, reviewed, and validated by these panels to ensure that each modified standard (entry point) embodied the essence of the grade-level learning standard on which it was based and that entry points at varying levels of complexity were aligned with grade-level content standards.

Specific guidelines direct educators to conduct the MCAS-Alt based on academic outcomes in the content area and strand being assessed, while maintaining the flexibility necessary to meet the needs of diverse learners. The requirements for constructing alternate assessments necessitate teaching challenging skills based on grade-level content standards to all students. Thus, all students taking the MCAS-Alt are taught academic skills based on the standards at an appropriate level of complexity.

Issues of fairness are also addressed in the scoring procedures. Rigorous scoring procedures hold scorers to high standards of accuracy and consistency, using monitoring methods that include frequent double-scoring, monitoring, and recalibrating to verify and validate assessment scores. These procedures, along with DESE's review of each year's MCAS-Alt results, indicate that the MCAS-Alt is being successfully used for the purposes for which it was intended. Section 4.4 describes in greater detail the scoring rubrics used, selection and training of scorers, and scoring quality-control procedures. These processes ensure that bias due to differences in how individual scorers award scores is minimized.

4.7 MCAS-Alt Characterizing Errors Associated with Test Scores

As with the classical item statistics presented in section 4.5, three of the five-dimension scores on each task (Level of Complexity, Demonstration of Skills and Concepts, and Independence) were used as the item scores for purposes of calculating reliability estimates. Note that, due to the way in which student scores are awarded—that is, using an overall achievement level rather than a total raw score—it was not possible to run decision accuracy and consistency (DAC) analyses.

4.7.1 MCAS-Alt Overall Reliability

In section 4.5, individual item characteristics of the 2022 MCAS-Alt were presented. Although individual item performance is an important focus for evaluation, a complete evaluation of an assessment must also address the way in which items function together and complement one another. Any assessment includes some amount of measurement error; that is, no measurement is perfect. This is true of all academic assessments—some students will receive scores that underestimate their true ability, and others will receive scores that overestimate their true ability. When tests have a high amount of measurement error, student scores are very unstable. Students with high ability may get low scores and vice versa. Consequently, one cannot reliably measure a student's true level of ability with such a test. Assessments that have less measurement error (i.e., errors are small on average, and therefore students' scores on such tests will consistently represent their ability) are described as reliable.

There are several methods of estimating an assessment's reliability. One approach is to split the test in half and then correlate students' scores on the two half-tests; this in effect treats each half-test as a complete test. This is known as a "split-half estimate of reliability." If the two half-test scores correlate highly, items on the two half-tests must be measuring very similar knowledge or skills. This is evidence that the items complement one another and function well as a group. This also suggests that measurement error will be minimal.

The split-half method requires psychometricians to select items that contribute to each half-test score. This decision may have an impact on the resulting correlation since each different possible split of the test into halves will result in a different correlation. Another problem with the split-half method of calculating reliability is that it underestimates reliability, because test length is cut in half. All else being equal, a shorter test is less reliable than a longer test. Cronbach (1951) provided a statistic, alpha (α), that eliminates the problem of the split-half method by comparing individual item variances to total test variance. Cronbach's α was used to assess the reliability of the 2022 MCAS-Alt. The formula is as follows:

$$\alpha = \frac{n}{n-1}\left[1 - \frac{\sum_{i=1}^{n} \sigma^2_{(Y_i)}}{\sigma^2_x}\right],$$

where
i indexes the item,
n is the number of items,
$\sigma^2_{(Y_i)}$ represents individual item variance, and
σ^2_x represents the total test variance.

Table 4-9 presents Cronbach's α coefficient and raw score standard errors of measurement (SEMs) for each content area and grade.

Table 4-9. Cronbach's Alpha and SEMs by Content Area and Grade

Content Area	Grade	Number of Students	Raw Score			Alpha	SEM
			Maximum Score	Mean	Standard Deviation		
ELA	3	871	39	27.93	3.78	0.64	2.27
	4	836	39	28.28	3.72	0.63	2.27
	5	759	39	28.31	3.74	0.67	2.14
	6	742	39	28.26	3.69	0.64	2.21
	7	733	39	28.20	3.89	0.63	2.38
	8	757	39	28.43	3.58	0.68	2.01
	10	739	39	28.25	4.05	0.65	2.41
Mathematics	3	779	26	21.05	1.54	0.59	0.99
	4	741	26	21.14	1.41	0.61	0.88
	5	670	26	21.08	1.51	0.65	0.90
	6	692	26	21.03	1.64	0.61	1.02
	7	662	26	21.13	1.41	0.54	0.95
	8	686	26	20.95	1.68	0.64	1.00
	10	746	39	30.16	3.76	0.79	1.72
STE	5	702	39	29.81	3.60	0.76	1.77
	8	708	39	30.00	3.53	0.74	1.82
Biology	HS	432	39	29.85	3.65	0.69	2.02
Chemistry	HS	122	39	31.75	2.42	0.69	1.34
Introductory Physics*	HS	73	39	28.19	4.68	0.69	2.61
Technology/ Engineering	HS	119	39	31.29	2.84	0.72	1.51

**Due to the small sample size of the tested population, the calculations do not produce meaningful values.*

An alpha coefficient toward the high end (greater than 0.50) is taken to mean that the items are likely measuring very similar knowledge or skills; that is, they complement one another and suggest that the test is a reliable assessment. However, the interpretation of reliability estimate coefficient should consider the characteristics of the testing sample (such as the variability within the sample) and the test (such as the test length). For MCAS-Alt, considering the special population and the short test length, the range of the α coefficient in the 2022 assessments is reasonable.

4.7.2 Subgroup Reliability

The reliability coefficients discussed in the previous section were based on the overall population of students who participated in the 2022 MCAS-Alt. Appendix N presents reliabilities for various subgroups of interest taking MCAS-Alt. Subgroup Cronbach's α coefficients were calculated using the formula defined on the previous page, based only on the members of the subgroup in question in the computations; values are calculated only for subgroups with 10 or more students.

For several reasons, the results documented in this section should be interpreted with caution. First, inherent differences between grades and content areas preclude making valid inferences about the quality of a test based on statistical comparisons with other tests. Second, reliabilities are dependent not only on the measurement properties of a test but also on the statistical distribution of the studied subgroup. For example, it can be readily seen in Appendix N that subgroup sample sizes may vary considerably, which results in natural variation in reliability coefficients. Moreover α, which is a type of correlation coefficient, may be artificially depressed for subgroups with little variability (Draper & Smith, 1998). Third, there is no industry standard to interpret the strength of a reliability coefficient, and this is particularly true when the population of interest is a single subgroup.

4.7.3 Performance Level SEM

The SEM and reliability statistics discussed in section 4.7.1 were based on various groups of interest taking MCAS-Alt. Tables N-14 through N-20 in Appendix N present SEM for populations of students analyzed by performance level. These results show a range of SEM from 0.16–4.50, which is reasonable and relatively stable over each grade and performance category, demonstrating that the precision of the MCAS-Alt is consistent across the full performance continuum.

As above, and for the same reasons, the results documented in this section should be interpreted with caution. Limiting the analyses to individual performance levels will reduce the variability for each subgroup when compared to the whole, which would likely indicate greater measurement error estimates in comparison to the true measurement error within the group, if it were known.

4.7.4 Interrater Consistency

Section 4.4 of this chapter describes the processes that were implemented to monitor the quality of the hand-scoring of student responses. One of these processes was double-blind scoring of at least 20 percent of student responses in all strands. Results of the double-blind scoring, used during the scoring process to identify scorers who required retraining or other intervention, are presented here as evidence of the reliability of the MCAS-Alt. A third score was required for any score category in which there was not an exact agreement between scorer 1 and scorer 2. A third score was also required as a confirmation score when either scorer 1 and/or scorer 2 provided a score of M for Demonstration of Skills and Concepts and Independence or a score of 1 for Level of Complexity.

A summary of the interrater consistency results is presented in Table 4-10. Results in the table are aggregated across the tasks by content area, grade, and number of score categories (five for Level of Complexity and four for Demonstration of Skills and Concepts and Independence). The table shows the number of items, number of score categories, number of included scores, exact agreement percentage, adjacent agreement percentage, the correlation between the first two sets of scores, and the percentage of responses that required a third score. This information is also provided at the item level in Tables H-17 through H-23 of Appendix H.

Table 4-10. Summary of Interrater Consistency Statistics Aggregated across Items by Content Area and Grade

Content Area	Grade	Items	Number of Score Categories	Included Scores	Percentage Exact	Percentage Adjacent	Correlation	% Third Scores
ELA	3	6	4	1,014	98.42	1.08	0.98	3.06
		3	5	609	98.52	1.48	0.88	3.28
	4	6	4	1,052	98.76	1.05	0.99	2.19
		3	5	601	98.84	1.16	0.89	2.83
	5	6	4	984	98.88	1.02	0.99	1.83
		3	5	602	98.67	1.33	0.90	2.49
	6	6	4	922	98.70	1.30	0.99	2.93
		3	5	552	98.73	1.27	0.92	3.44
	7	6	4	3,048	98.03	1.84	0.98	3.31
		3	5	1,755	99.49	0.51	0.95	2.51
	8	6	4	1,118	98.03	1.61	0.98	3.40
		3	5	634	99.37	0.63	0.95	2.68
	HS	6	4	1,618	98.58	1.36	0.99	2.47
		3	5	977	98.87	1.13	0.90	2.15

continued

Content Area	Grade	Items	Number of Score Categories	Included Scores	Percentage Exact	Percentage Adjacent	Correlation	% Third Scores
Mathematics	3	4	4	680	99.12	0.88	0.98	1.91
		2	5	410	98.78	1.22	0.87	1.22
	4	4	4	672	99.26	0.74	0.98	1.49
		2	5	403	98.01	1.99	0.82	1.99
	5	4	4	634	97.95	2.05	0.96	2.84
		2	5	396	97.47	2.53	0.83	2.53
	6	4	4	642	98.91	1.09	0.98	2.02
		2	5	374	97.33	2.67	0.80	2.94
	7	4	4	2,058	98.30	1.70	0.96	2.53
		2	5	1,175	99.40	0.60	0.95	1.11
	8	4	4	738	97.97	2.03	0.96	4.07
		2	5	425	99.53	0.47	0.96	0.47
	HS	10	4	1,672	99.40	0.60	0.99	1.02
		5	5	980	99.69	0.31	0.97	0.61
STE	5	8	4	976	98.98	1.02	0.99	1.95
		4	5	567	96.47	3.53	0.81	3.53
	8	8	4	1,094	98.90	1.01	0.98	2.10
		4	5	615	97.72	2.28	0.87	2.28
Biology	HS	6	4	982	98.57	1.32	0.98	2.95
		3	5	578	96.89	3.11	0.75	3.46
Chemistry	HS	6	4	262	98.85	1.15	0.94	2.29
		3	5	148	99.32	0.68	--	1.35
Introductory Physics	HS	6	4	162	100.00	0.00	1.00	1.23
		3	5	87	96.55	3.45	0.86	3.45
Technology/ Engineering	HS	6	4	260	98.85	1.15	0.96	1.92
		3	5	150	98.67	1.33	0.95	0.00

4.8 MCAS-Alt Comparability Across Years

The issue of comparability across years is addressed in the progression of learning outlined in the *Resource Guide to the Massachusetts Curriculum Frameworks for Students with Disabilities*, which provides instructional and assessment strategies for teaching students with disabilities according to the same learning standards applied to students in general education.

Comparability is also addressed in the scoring procedures. Consistent scoring rubrics are used each year along with rigorous quality-control procedures that hold scorers to high standards of accuracy and consistency, as described in section 4.4. Scorers are trained using the same procedures, models, examples, and methods each year.

Finally, comparability across years is encouraged through the classification of students into achievement-level categories, using a look-up table that remains consistent each year. While MCAS has recently transitioned to next-generation achievement levels in grades 3–8, the description of each alternate academic achievement level (shown in Table 4-11) remains relatively consistent, because alternate academic achievement standards (i.e., levels) signify those students taking alternate assessments who perform well below the expectations of students taking the standard MCAS assessments. Therefore, this ensures that the meaning of students' alternate assessment scores is comparable from one year to the next. Names and descriptors for next-generation alternate and grade-level academic achievement standards are shown in Appendix X. Table 4-11 shows the achievement-level look-up table (i.e., the achievement level corresponding to each possible combination of dimension scores), which is used each year to combine and tally the overall content area achievement level from the individual strand scores. In addition, achievement-level distributions for each of the last three years are provided in Appendix O.

Table 4-11. MCAS-Alt Strand Achievement-Level Look-Up Table

Level of Complexity	Demonstration of Skills	Independence	Achievement Level
2	1	1	1
2	1	2	1
2	1	3	1
2	1	4	1
2	2	1	1
2	2	2	1
2	2	3	1
2	2	4	1
2	3	1	1
2	3	2	1
2	3	3	2
2	3	4	2
2	4	1	1
2	4	2	1
2	4	3	2
2	4	4	2
3	1	1	1
3	1	2	1
3	1	3	1
3	1	4	1
3	2	1	1
3	2	2	1
3	2	3	2
3	2	4	2
3	3	1	1
3	3	2	2
3	3	3	3
3	3	4	3
3	4	1	1
3	4	2	2
3	4	3	3
3	4	4	3
4	1	1	1
4	1	2	1
4	1	3	1
4	1	4	1
4	2	1	1
4	2	2	1
4	2	3	2
4	2	4	2
4	3	1	1
4	3	2	2
4	3	3	3
4	3	4	3
4	4	1	1
4	4	2	2
4	4	3	3
4	4	4	3
5	1	1	1
5	1	2	1
5	1	3	2
5	1	4	2
5	2	1	1
5	2	2	2
5	2	3	3
5	2	4	3
5	3	1	1
5	3	2	2
5	3	3	3
5	3	4	4
5	4	1	1
5	4	2	2
5	4	3	3
5	4	4	4

4.9 MCAS-Alt Reporting of Results

4.9.1 Primary Reports

Cognia created two primary reports for the MCAS-Alt: the *MCAS-Alt Feedback Form* and the *Parent/Guardian Report*.

4.9.2 Feedback Forms

One *Feedback Form* is produced for each student who submitted the MCAS-Alt and serves as a preliminary score report intended for the educator at the school that submitted the assessment. Content area achievement level(s), strand dimension scores, and comments relating to those scores are printed on the form.

4.9.3 Parent/Guardian Report

The *Parent/Guardian Report* provides the final scores (overall content area achievement level and rubric dimension scores in each strand) for each student who submitted the MCAS-Alt. It provides background information on the MCAS-Alt, participation requirements, the purposes of the assessment, an explanation of the scores, and contact information for further information. The student’s achievement level displayed for each content area is shown relative to all possible achievement levels. The student's dimension scores are displayed in relation to all possible dimension scores for the assessed strands.

Two printed copies of the report are provided: one for the parent/guardian and one to be kept in the student's school record. A sample report is provided in Appendix Y.

The *Parent/Guardian Report* was redesigned in 2012 with input from parents in two focus groups to include information that had previously been published in a separate interpretive guide that is no longer produced. The report was redesigned again in 2017 to parallel the layout and format of the next-generation MCAS *Parent/Guardian Report* based on next-generation MCAS tests.

4.9.4 Reporting Business Requirements

To ensure that reported results for the MCAS-Alt are accurate relative to the collected evidence, a document delineating analysis and reporting business requirements is prepared before each reporting cycle. The reporting business requirements are observed in the analyses of the MCAS-Alt data and in the reporting of results. They are included in Appendix Q.

4.9.5 Quality Assurance

Quality-assurance measures are implemented throughout the entire process of analysis and reporting at Cognia. The data processors and data analysts working with MCAS-Alt data perform quality-control checks of their respective computer programs. Moreover, when data are handed off to different units within the Reporting Services Department, the sending unit verifies that the data are accurate before handoff. Additionally, when a unit receives a data set, the first step performed is verification of the accuracy of the data.

Quality assurance is also practiced through parallel processing. One production data analyst is responsible for writing all programs required to populate the individual student and aggregate reporting tables for the administration. Each reporting table is also assigned to another quality-assurance data analyst, who uses the analysis and reporting business requirements to independently program the reporting table. The production and quality-assurance tables are compared; if there is 100% agreement, the tables are released for report generation.

A third aspect of quality control involves the procedures implemented by the quality-assurance group to check the accuracy of reported data. Using a sample of students, the quality-assurance group verifies that the reported information is correct. The selection of specific sampled students for this purpose may affect the success of the quality-control efforts.

The quality-assurance group uses a checklist to implement its procedures. Once the checklist is completed, sample reports are circulated for psychometric checks and review by program management. The appropriate sample reports are then sent to DESE for review and signoff.

4.10 MCAS-Alt Validity

One purpose of the *2022 Next-Generation MCAS and MCAS-Alt Technical Report* is to describe the technical aspects of the MCAS-Alt that contribute validity evidence in support of MCAS-Alt score interpretations. According to the *Standards for Educational and Psychological Testing* (AERA et al., 2014), considerations regarding establishment of intended uses and interpretations of test results and conformance to these uses are of paramount importance in relation to valid score interpretations. These considerations are addressed in this section.

Recall that the score interpretations for the MCAS-Alt include using the results to make inferences about student achievement on the ELA, mathematics, and STE content standards; to inform program and instructional improvement; and as a component of school accountability. Thus, as described below, each section of the report (development, administration, scoring, item analyses, reliability, performance levels, and reporting) contributes to the development of validity evidence and taken together, the sections form a comprehensive validity argument in support of MCAS-Alt score interpretations.

4.10.1 Test Content Validity Evidence

Test content validity is determined by identifying how well the assessment tasks represent the curriculum and standards for each content area and grade level. The primary evidence described in section 4.2.1 describes how the range and level of complexity of the standards being assessed have been modified to fit the needs of the MCAS-Alt testing population yet retain the essential components or meaning of the standards. The MCAS-Alt content areas and strands/domains required for the assessment of students in each grade are listed in Table 4-1, providing evidence the assessment is well aligned to the same content standards applied to all Massachusetts students.

4.10.2 Internal Structure Validity Evidence

Evidence based on internal structure is presented in detail in the discussions of item analyses and reliability in sections 4.5 and 4.7. Technical characteristics of the internal structure of the assessment are presented in terms of classical item statistics (item difficulty and item-test correlation), correlations among the dimensions (Level of Complexity; Demonstration of Skills and Concepts; and Independence), fairness/bias, and reliability, including alpha coefficients and interrater consistency.

4.10.3 Validity Based on Cognitive Processes

Evidence based on cognitive processes is presented in section 4.5.5 and in Appendix W. An examination of score frequencies by content area by grade by subject shows that student scores are most common in the expected ranges for the population and that the tests measure the full range of intended cognitive processes.

4.10.4 Adequate Precision Across the Full Performance Continuum

Evidence indicating precision across the full performance continuum is presented in section 4.7.3 and in Appendix N. Standard errors of measurement calculated over students at each performance level indicate that the tests provide an adequately precise estimate of student performance across the full performance continuum.

4.10.5 Validity Based on Relations to Other Variables

The *Resource Guides to the Massachusetts Curriculum Framework for Students with Disabilities* (described in sections 4.1.3, 4.2.1.1, and 4.6) are used by Massachusetts educators to identify standards-based instructional goals for students. The guides also serve as the basis for the selection of the specific knowledge and skills on which the student will be assessed on the MCAS-Alt. These *Resource Guides* are developed through extensive collaboration with educators and experts. In essence, the *Resource Guides* capture the judgments of educators and experts about the curricular expectations and as such, constitute a form of external criteria. By basing each student's assessment on the guides, the educator implementing the MCAS-Alt brings their skills survey results and evidence collection into alignment with these judgments.

4.10.6 Response Process Validity Evidence

Response process validity evidence pertains to information regarding the cognitive processes used by examinees as they respond to items on an assessment. The MCAS-Alt directs educators to identify measurable outcomes for students based on the state's curriculum frameworks and to collect data and work samples that document the extent to which the student engaged in the intended cognitive process(es) to meet the intended goal. The scoring process is intended to confirm the student's participation in instructional activities that were focused on meeting the measurable outcome, and to provide detailed feedback on whether the instructional activities were sufficient in duration and intensity for the student to meet the intended goal.

4.10.7 Efforts to Support the Valid Reporting and Use of MCAS-Alt Data

The assessment results of students who participate in the MCAS-Alt are included in all public reporting of MCAS results and in the state's accountability system. Annual state summaries of the participation and achievement of students on the MCAS-Alt are available at www.doe.mass.edu/mcas/alt/results.html.

To ensure that all students were provided access to the Massachusetts curriculum frameworks, federal and state laws and DESE policy require that all students in grades 3–8 and 10 are assessed each year on their academic achievement and that all students are included in the reports provided to parents, guardians, teachers, and the public. The alternate assessment ensures that students with the most intensive disabilities have an opportunity to "show what they know" and receive instruction at a level that is challenging and attainable based on the state's academic learning standards.

Aside from legal requirements, another important reason to include students with significant disabilities in standards-based instruction is to explore their capacity to learn standards-based knowledge and skills. While learning "daily living skills" is critical for those students to function as independently as possible, academic skills are important for all students in terms of post-secondary, career, and community success, and are the primary focus of teaching and learning in the state's public schools. Standards in the Massachusetts curriculum frameworks are defined as "valued outcomes for all students." Evidence indicates that students with significant disabilities learn more than anticipated when given opportunities to engage in challenging instruction with the necessary support.

As a result of taking the MCAS-Alt, students with significant disabilities have become more "visible" in their schools and have a greater chance of being considered when decisions are made to allocate staff and resources to improve their academic achievement.

Appendix Y shows the report provided to parents and guardians for students assessed on the MCAS-Alt. The achievement level descriptors provided on the first page of that report, as well as in Appendix X, describe the students' performance at each alternate academic achievement standard.

4.10.8 Summary

The *Standards for Educational and Psychological Testing* (2014) define validity as "the degree to which evidence and theory support the interpretations of test scores for proposed uses of tests" (p. 11). Elaborating on that definition, the *Standards* assert that "it is the interpretations of test scores for proposed uses that are evaluated, not the test itself" (p. 11) and that "validation logically begins with an explicit statement of the proposed interpretation of test scores, along with a rationale for the relevance of the interpretation to the proposed use” (p. 11). This definition applies specifically to intended interpretations and uses of test scores, rather than to the broader program of curriculum and instruction in which a testing program is embedded or to the surrounding education and school improvement policies and aspirations for student learning.

Further, the *Standards* state that “a sound validity argument integrates various strands of evidence into a coherent account of the degree to which existing evidence and theory support the intended interpretations of test scores for specific uses” (p. 21).

The evidence for validity and reliability presented in this chapter supports the use of the MCAS-Alt assessment to make inferences about the knowledge, skills, abilities, and achievement of students with significant disabilities based on the skills and content described in the Massachusetts curriculum frameworks for ELA, mathematics, and STE. As such, this evidence supports the use of MCAS-Alt results for the purposes of programmatic and instructional improvement and as a component of school accountability.

MCAS-Alt assessment results are sometimes aggregated with other MCAS results. Therefore, validity information with respect to reliability and content-related validity provided for MCAS also pertains, to some extent, to the MCAS-Alt. In addition, MCAS-Alt also includes reliability and dimensionality characteristics and other evidence specific to the alternate assessment, as described in Table 4-12.

Table 4-12. Summary of Validity Evidence for MCAS-Alt

Type of Validity Evidence	Section	Description of Information Provided
Content-related validity evidence	4.2.1 Appendix C	Assessment design (test blueprints aligned to MCAS blueprints but with modifications made for the range and complexity of standards); descriptions of primary evidence and supporting documentation
Cognitive processes	4.5.5 Appendix W	Distributions of score frequencies indicate that the tests elicit the expected range of cognitive processes for this population
Precision Over the Full Continuum	4.7.3 Appendix W	Measurement error calculated over respondent subgroups at each performance level indicate that the tests are sufficiently precise over the full performance continuum
Validity Based on Other Variables	4.10.5, 4.1.3, 4.2.1.1, and 4.6	Resource Guides capturing the judgments of educators and experts about the curricular expectations
Reliability and subgroup statistics and scoring consistency	4.4, 4.7.4, and 4.8 Appendices H, O, S, and T	Procedures to ensure consistent scoring; interrater scoring statistics
	4.5 Appendix I	Classical item statistics
	4.7.1 and 4.7.2 Appendix N	Overall and subgroup reliability statistics
Construct-related and structural validity evidence	4.5.3	Interrelations among scoring dimensions
	4.6	Item bias review and procedures

References

Allen, M. J., & Yen, W. M. (1979). *Introduction to measurement theory.* Wadsworth, Inc.

American Educational Research Association, American Psychological Association, & National Council on Measurement in Education. (2014). *Standards for educational and psychological testing*. https://www.testingstandards.net/uploads/7/6/6/4/76643089/standards_2014edition.pdf

Anastasi, A., & Urbina, S. (1997). *Psychological testing* (7th ed.). Prentice-Hall.

Baker, F. B., & Kim, S. H. (2004). *Item response theory: Parameter estimation techniques* (2nd ed.). Marcel Dekker, Inc.

Brown, F. G. (1983). *Principles of educational and psychological testing* (3rd ed.). Holt, Rinehart, and Winston.

Brown, W. (1910). Some experimental results in the correlation of mental abilities. *British Journal of Psychology 3*, 296–322.

Chicago Manual of Style (16th ed.). (2003). University of Chicago Press.

Cai, L. (2012). flexMIRT: Flexible multilevel item factor analysis and test scoring [Computer software]. Vector Psychometric Group, LLC.

Cohen, J. (1960). A coefficient of agreement for nominal scales. *Educational and Psychological Measurement 20*, 37–46.

Cohen, J. (1968). Weighted kappa: Nominal scale agreement with provision for scaled disagreement or partial credit. *Psychological Bulletin*, *70*, 213–220.

Cronbach, L. J. (1951). Coefficient alpha and the internal structure of tests. *Psychometrika 16*, 297–334.

Dorans, N. J., & Holland, P. W. (1993). DIF detection and description. In P. W. Holland & H. Wainer (Eds.), *Differential Item Functioning* (pp. 35–66). Lawrence Erlbaum Associates.

Dorans, N. J., & Kulick, E. (1986). Demonstrating the utility of the standardization approach to assessing unexpected differential item performance on the Scholastic Aptitude Test. *Journal of Educational Measurement 23*, 355–368.

Draper, N. R., & Smith, H. (1998). *Applied regression analysis* (3rd ed.). John Wiley and Sons, Inc.

Foltz, P. W., Streeter, L. A., Lochbaum, K. E., & Landauer, T. K (2013). Implementation and applications of the Intelligent Essay Assessor. *Handbook of Automated Essay Evaluation*, M. Shermis & J. Burstein, (Eds.). Pp. 68-88. Routledge, NY, NY.

Haertel, E. H. (2006). Reliability. In R.L. Brennan (Ed). *Educational measurement (pp. 65-110)*. Praeger Publishers.

Hambleton, R. K., & Swaminathan, H. (1985). *Item response theory: Principles and Applications*. Kluwer Academic Publishers.

Hambleton, R. K., Swaminathan, H., & Rogers, J. H. (1991). *Fundamentals of item response theory*. Sage Publications, Inc.

Hambleton, R. K., & van der Linden, W. J. (1997). *Handbook of modern item response theory*. Springer-Verlag.

Holland, P. W., & Wainer, H. (1993). *Differential item functioning.* Lawrence Erlbaum Associates.

Jiang, J., Roussos, L. A., & Yu, L. (2017, April). *An iterative procedure to detect item parameter drift in equating items* [Conference presentation]. National Council on Measurement in Education Conference, San Antonio, TX.

Joint Committee on Testing Practices. (2004). *Code of fair testing practices in education*. http://www.apa.org/science/programs/testing/fair-testing.pdf

Kim, S. (2006). A comparative study of IRT fixed parameter calibration methods. *Journal of Educational Measurement 43*(4), 355–381.

Kolen, M. J., & Brennan, R. L. (2014). *Test equating, scaling, and linking: Methods and practices* (3rd ed.). Springer-Verlag.

Livingston, S. A., & Lewis, C. (1995). Estimating the consistency and accuracy of classifications based on test scores. *Journal of Educational Measurement*, *32*, 179–197.

Lord, F. M. (1980). *Applications of item response theory to practical testing problems*. Lawrence Erlbaum Associates.

Lord, F. M., & Novick, M. R. (1968). *Statistical theories of mental test scores.* Addison-Wesley.

Nering, M., & Ostini, R. (2010). *Handbook of polytomous item response theory models*. Routledge.

Petersen, N. S., Kolen, M. J., & Hoover, H. D. (1989). Scaling, norming, and equating. In R. L. Linn (Ed.), *Educational Measurement* (3rd ed., pp. 221–262). Macmillan Publishing Company.

Roussos, L. A., & Ozbek, O. Y. (2006). Formulation of the DETECT population parameter and evaluation of DETECT estimator bias. *Journal of Educational Measurement 43,* 215–243.

Spearman, C. C. (1910). Correlation calculated from faulty data. *British Journal of Psychology 3*, 271–295.

Stocking, M. L. & Lord, F. M. (1983). Developing a common metric in item response theory. *Applied psychological measurement 7*, 201–210.

Stout, W. F. (1987). A nonparametric approach for assessing latent trait dimensionality. *Psychometrika 52,* 589–617.

Stout, W. F., Froelich, A. G., & Gao, F. (2001). Using resampling methods to produce an improved DIMTEST procedure. In A. Boomsma, M. A. J. van Duijn, & T. A. B. Snijders (Eds.), *Essays on Item Response Theory* (pp. 357–375). Springer-Verlag.

Stuart, A. (2010). Matching methods for causal inference: a review and a look forward. *Statistical Science*. *25*(1), 1–21.

van der Linden. (2016). *Handbook of item response theory, volume one*. Chapman and Hall/CRC.

Walker, M. E. (2014, May 13). Enhancing the Equating of Item Difficulty Metrics: Estimation of Reference Distribution. ETS Research Report Series. P. 1. Retrieved 1.10.20 from: https://onlinelibrary.wiley.com/doi/full/10.1002/ets2.12006

Wang, X., & Roussos, L. A. (2018, April). *A Simple Parametric Procedure for Detecting Drift in Anchor Items* [Conference presentation]. National Council on Measurement in Education Conference, New York, NY.

Zhang, J., & Stout, W. F. (1999). The theoretical DETECT index of dimensionality and its application to approximate simple structure. *Psychometrika 64,* 213–249.

Appendices

APPENDIX A

MODIFIED COMPETENCY DETERMINATION—FAQS

Modified Competency Determination–Frequently Asked Questions

The purpose of this document is to provide clarification on the process that the Massachusetts Department of Elementary and Secondary Education (DESE) will use to determine whether certain high school students meet modified competency determination requirements.

Background

In response to the suspension of in-person instruction and the cancellation of the spring 2020 MCAS assessments due to the COVID-19 emergency, the Board of Elementary and Secondary Education (BESE) voted to temporarily modify the competency determination (CD) requirement for certain high school students.[1] Under this change, certain students may earn their CD through successful completion of a relevant Department-identified high school course, according to the criteria below:

- **For students in grade 12 in the 2019-2020 school year** (at the time of the April 2020 BESE vote), as well as other actively enrolled students who were on track to graduate in the 2019-2020 school year, the CD will be awarded in each subject as follows:
    - *For English language arts and mathematics* – upon district certification that the student earned credit for a course aligned to the curriculum frameworks in the relevant subject matter and has demonstrated competency in that subject.
    - *For science and technology/engineering* – upon district certification that the student earned credit for a course aligned to the curriculum frameworks in the relevant subject matter and has demonstrated competency in one of the four tested disciplines (biology, chemistry, introductory physics, and technology/engineering) during their high school career.
- **For students in the classes of 2021 and 2022,** the CD will be awarded in each subject as follows:
    - *For English language arts and mathematics* – upon district certification that the student earned full credit for a relevant course aligned to the appropriate curriculum framework in that subject matter and has demonstrated competency in that subject.
    - *For science and technology/engineering* – upon demonstration that the student earned credit for a course in the relevant subject matter and demonstrated competency in one of the four tested disciplines (biology, chemistry, introductory physics, technology/engineering) during their high school career.
- **For students in the class of 2023**, the CD in science and technology/engineering shall be awarded upon demonstration that the student earned credit for a course in the relevant subject matter and demonstrated competency in one of the four tested disciplines (biology, chemistry, introductory physics, technology/engineering) during their high school career.

Frequently Asked Questions

Accessing the Competency Determination Tool

Is the modified CD process required?

Yes. All districts that will graduate students in 2022 have students who are eligible for the modified CD due to the cancellation of the 2020 MCAS assessments, and therefore must use this tool to submit information to DESE for review. Districts will not be able to issue diplomas to students who have not earned their CD via MCAS testing or this modified process.

[1] *The BESE voted to modify CD requirements on four occasions: April 2020 (in ELA, mathematics, and science for students in grade 12 and those who were on track to graduate in 2020); May 2020 (in science only for students in the classes of 2021-2023); January 2021 (in ELA and mathematics for students in the class of 2021); and April 2021 (in ELA and mathematics for students in the class of 2022).*

How do I report CD information to DESE?
The Department created the 'Competency Determination' application in the Security Portal, which districts must use to submit the required information.

Can I provide the required information to DESE in a different way (e.g., via email, in a dropbox, over the phone, etc.)?
No. Data must be submitted through the Security Portal's 'Competency Determination' tool, which includes a final certification by the district's Superintendent.

How do I access the 'Competency Determination' tool?
To access the 'Competency Determination' application in the Security Portal, each district must assign the *Competency Determination* security role to the individual(s) who will be responsible for submitting and certifying data. This role must be assigned in Directory Administration, by the district's Directory Administrator.

Who should be given access to the tool?
The *Competency Determination* security role should be assigned as follows:

- **For each school**, the role should be assigned to the individual(s) who will be responsible for reviewing and verifying course and credit information for each eligible student. Individuals assigned the *Competency Determination* security role for a school will only be able to see student-level information for students enrolled in that school. An individual may be assigned the role for more than one school, if appropriate.
- **For each district**, the role should be assigned to the Superintendent and any other individual(s) who require access to student-level data for eligible students in all district schools, including students educated in out-of-district settings. To formally submit the data to DESE, at least one person (the Superintendent) should be assigned the *Competency Determination* security role for the district. Only individuals with the district-level role will be able to submit the final certification for the entire district.

How does the *Competency Determination* security role work?
The role allows individuals to access the 'Competency Determination' application in the Security Portal. It can be assigned at the school level, the district level, or both. Depending on the level of access, users have different permissions:

- **When assigned at the school level**, users will only see data for the school(s) to which they have been granted access. School-level users can enter and confirm information for individual students but are not able to submit the final district-level certification to DESE. There is no overall school-level certification. An individual may be assigned the role for more than one school, and multiple individuals may be assigned the role for a single school.
- **When assigned at the district level**, users will see data for all district schools that have eligible students, as well as for any eligible out-of-district students. District-level users can enter information for any student or school. Only district-level users can submit the single, final certification for the district as a whole, and only if data has been entered completely for all schools. There is no overall school-level certification.

Student Eligibility

Which students are included in the tool?
The modified CD collection tool has been designed to collect data for two groups of students: those eligible for the modified CD in ELA, mathematics, and science (i.e., the classes of 2020-2022), and those

eligible for the modified CD in science only (i.e., the class of 2023). The Department identifies eligible students using Student Information Management System (SIMS) and Student Course Schedule (SCS) data which has been submitted to DESE by districts. For the May 2022 modified CD collection period, DESE is collecting course information for eligible students in the classes of 2020, 2021, and 2022 only, based on March 2022 SIMS. Information for students in the class of 2023 will be collected at a later time. See the Modified CD Eligibility table at the end of this document for details.

Is the modified CD an option for students with Individualized Education Programs (IEPs)?
Yes. Certain students with IEPs are eligible for the modified CD if they meet the eligibility criteria outlined in this document. Districts may graduate students with IEPs if those students: (1) have received a Free and Appropriate Public Education (FAPE), (2) have completed all local graduation requirements, and (3) have earned their CD. See *Administrative Advisory SPED 2018-2: Secondary Transition Services and Graduation with a High School Diploma* for further information on graduation requirements for students with IEPs. See the question below for specific information on students with IEPs enrolled beyond grade 12.

Excellent two-way communication with students and parents is particularly important when the student is about to exit from school. Districts should always communicate with families and confirm in writing via the IEP or the IEP Notice of Proposed School District Action (N1) that families are aware of the upcoming graduation or aging out date. Districts should contact parents to let them know that they have applied for the modified CD and to offer a Team meeting to discuss further. As described later in this document, IEP page 8 of the MA IEP forms (“Additional Information” and “Response” sections) or an N1 reflecting the student’s graduation date and the parent’s agreement must be submitted through the ‘Competency Determination’ tool during an open collection window. Districts are also reminded of their obligation to provide the student and/or parent(s) with a Summary of Student Performance (SOP) as required by 34 CFR 300.305(e)(3). Schools and districts must be prepared to provide the SOP to DESE upon request.

Are out-of-district students included?
Yes. All eligible students who are educated in out-of-district settings are included in the tool, under a single “Out of District” section that can be accessed by individuals with the district-level security role. Districts are responsible for submitting information for their out-of-district students and should communicate with their students’ outplacement settings to determine whether each eligible student has fulfilled the modified CD coursework requirements, in addition to following the guidelines stated in the previous question.

Are SP students (students with IEPs enrolled beyond grade 12) included?
Students reported as SP in SIMS may be eligible for the modified CD if they have an anticipated graduation date prior to October 1, 2022, as noted in their most recent signed IEP. A student reported as SP whose anticipated graduation date on their current, signed IEP is on or after October 1, 2022, is eligible for the modified CD only if the IEP Team reconvenes and agrees to change the graduation date to a new date prior to October 1, 2022.

Excellent two-way communication with students and parents is particularly important when the student is about to exit from school. Districts should always communicate with families and confirm in writing via the IEP or N1 that families are aware of the upcoming graduation or aging out date. Districts should contact parents to let them know that they have applied for the modified CD and to offer a Team meeting to discuss further. As described later in this document, IEP page 8 of the MA IEP forms (“Additional Information” and “Response” sections) or an N1 reflecting the new date and the parent’s agreement must be submitted through the Competency Determination tool during an open collection window. Districts are also reminded of their obligation to provide the student and/or parent(s) with a Summary of Student Performance (SOP) as required by 34 CFR 300.305(e)(3). Schools and districts must be prepared to provide the SOP to DESE upon request.

What about students who transferred in on or after March 1, 2022?
Eligible students who transferred into a Massachusetts public school on or after March 1, 2022 will be included in a future modified CD collection.

What about students who earned their certificate of attainment during the 2021-2022 school year, and were reported as such in March 2022 SIMS?
These students are included in the current modified CD collection.

What about students who finished high school without a diploma prior to the 2019-2020 school year, are no longer enrolled, but were planning on taking the MCAS tests this year?
In accordance with the BESE vote, these students are not eligible for the modified CD.

How are students with Educational Proficiency Plans (EPPs) considered this year? They did not have an opportunity to take the spring EPP test. Does completing local requirements satisfy EPP requirements?
The EPP is not required for students in the classes of 2020-2022, who are eligible for the modified CD. It will be required in school year 2021-2022 for subsequent classes.

Can I add or delete students to/from the tool?
No. The Department has prepopulated the student lists based on eligibility, which was determined using data that districts submitted to DESE in previous SIMS collection periods.

We believe a student should be on our list of eligible students, but they are not included in the 'Competency Determination' tool in the Security Portal. How can our district fix this?
Please review all student eligibility information provided in this document. If you still believe that a student was omitted from your eligibility list, contact DESE's Office of Data Analysis and Reporting at data@doe.mass.edu.

Changes to the Tool

The tool looks different from previous rounds. What has changed?
In each school's section and in the out-of-district section, students have been divided into the following three groups:

1. *Data review and bulk confirmation*: Students on this list have earned full credit in at least two eligible courses in each required subject, according to the district's SCS submission. Users should review the student-level data on this page and may confirm all students at once using the "Select All" checkbox. Course and credit information for individual students can be edited as needed.
2. *Data entry and individual confirmation:* Students on this list have earned full credit in only one eligible course in a required subject or are missing course and/or credit information. Users should review the student-level data on this page and update and/or provide course and credit information where needed. Data must be confirmed for each individual student; there is no "Select All" option.
3. *SP document upload and individual confirmation:* Students on this list are in grade SP (enrolled beyond grade 12). Users should review the student-level data on this page, update and/or provide course and credit information where needed and upload the required documentation for

students who are being submitted for the CD. Data must be confirmed for each individual student; there is no “Select All” option.

Data for all students in each of the three sections must be reviewed, and if necessary, updated or provided for each school and for the out-of-district section in order to submit the final certification to DESE.

Why did you make changes to the tool this year?
By adding students in the class of 2022 to the collection, each school's student list grew substantially. The tool was updated in an effort to streamline the confirmation and submission process.

Entering Data

What student-level information is included in the tool?
Where possible, DESE has prepopulated the tool using student-level information that has previously been submitted and certified by the district through the SIMS and SCS data collections. Prepopulated data include the name, date of birth, SASID, and class/graduation year for each student who has not yet earned the CD in one or more subjects; for each subject (ELA, mathematics, and science), an indication of whether the student has already earned the CD; and, for the subject(s) in which the student has not yet earned a CD, relevant course and credit information that DESE has on file (if any).

What information am I required to provide?
For the subject(s) in which a student has not yet earned a CD, the district must review and certify the prepopulated course and credit information, or make changes as needed. In some instances, the tool may display incorrect course and/or credit information for a student, based on inaccurate data that was previously submitted to DESE by the district. In these cases, the district should correct the information as needed. Alternatively, DESE may not have any course information for a student. In those cases, no course information is prepopulated, and the district must select the appropriate course from the dropdown menu and indicate whether full credit was earned. If a student did not complete or earn credit in any of the eligible courses (and therefore would not earn the CD in that subject), the district should choose “No Course Taken” from the dropdown menu.

Additionally, districts with special education students enrolled beyond grade 12 (reported as ‘SP’ in SIMS) must indicate whether each SP student in the tool has an anticipated graduation date before October 1, 2022. For each eligible SP student who will graduate before October 1, the district must provide all required course and credit information, and must also upload one of the following two documents into the ‘Competency Determination’ tool:

- Page 8 of the MA IEP forms (“Additional Information” and “Response” sections) of the student’s most recently signed IEP. This signed page of the IEP should include information about the student’s anticipated graduation date and indicate student and/or parent agreement **with a student and/or parent signature**. Please submit the signature page *as one document attached to Page 8* if the signature is not at the bottom of Page 8.
- IEP Notice of Proposed School District Action (N1). The N1 form may be submitted in lieu of Page 8 of the student’s IEP if it contains up-to-date information about the student’s anticipated graduation date and indicates student and/or parent agreement.

Which courses meet the modified CD requirements?
The Department has identified specific courses in ELA, mathematics, and science that fulfill the modified CD requirements. The list of courses was made available to districts in May 2020 and is also available in

the ‘Competency Determination’ application in the Security Portal. Districts should report course information in the tool based on NCES course codes, not local course codes or names.

If a student did not earn full credit in a prepopulated grade 12 course, can we use eligible course information from an earlier grade?
Yes. The subject-specific dropdowns include eligible courses from grades 9 through 12.

What if there are students in the tool that have not yet met CD coursework requirements?
You must submit information for all students included in the tool. If a student has not yet met CD coursework requirements, that should be indicated in the tool by selecting “No Course Taken” from the course dropdown menu, selecting “No” under *Full Credit Earned*, and checking the confirmation checkbox.

I entered data for my high school. Why can’t I certify and submit it to DESE?
To certify and submit the data to DESE, data must be confirmed and saved for each student in the school list(s) and for each student in the out-of-district list. The out-of-district list will only appear in the tool for users who have been assigned the *Competency Determination* security role for the district. Additionally, only users who have been assigned the role for the district are allowed to certify and submit the data to DESE.

Can I change data after it has been certified by the district?
Data may be saved (but not certified) at any time. However, once the final certification has been submitted by the district, data cannot be changed.

Modified Competency Determination Requirements and MCAS Appeals

Does this process replace the MCAS appeals process?
No. While many students are expected to be certified by their district through the modified CD process, MCAS appeals continue to be available for students who meet eligibility requirements who may not be eligible for certification by the district for the grade 12 CD modification. For example, appeals may be appropriate for students who were not enrolled in a course authorized by DESE to receive a CD; or students with disabilities in special programs and those in programs beyond grade 12.

If I already filed an MCAS appeal, should I disregard that application?
No. Both the appeals and modified CD processes may yield a CD. If an appeal was submitted and the student is also included in the modified CD process, DESE will accept whichever is the higher result. Please see above.

Timeline for Awarding the Competency Determination

What is the timeframe for submitting this information to DESE?
The Round 10 (May) modified CD collection window opens on May 4, 2022, and closes on May 24, 2022.

Will DESE implement a process to review compliance with the guidelines established for the modified competency determination?
Yes. The Department has established a process for reviewing documentation provided by districts for compliance with the guidelines of the modified CD. This process includes an examination of various factors such as the percentage of students a school or district submits for consideration. Additionally, relevant documentation for students with disabilities may be requested and reviewed.

When will DESE notify districts about final competency determination decisions?
For eligible students reported during the May 2022 modified CD collection window, DESE will begin reviewing the information submitted by districts after the application closes and intends to make final CD decisions in late May 2022.

Does submitting this information to DESE mean that a student will automatically be awarded the CD?
No. Providing this data to DESE does not constitute the awarding of the CD. The Department will notify districts about the award of the CD, and at that time the students will be eligible to receive a Massachusetts high school diploma if the school district determines they meet local graduation requirements and, in the case of students with IEPs, have been provided FAPE.

If DESE awards the CD to a student, does that mean the student automatically earns their diploma?
No. Diplomas are issued by the district, not by DESE. If DESE awards the CD to a student through this modified process, the student must still meet all other local graduation requirements and have been provided FAPE by the district before the district issues a diploma.

If DESE cannot issue CD determinations prior to my school's graduation, does this mean that these students cannot participate in the ceremonies?
This is a local decision. These students may be eligible to participate in graduation ceremonies (for example, as certificate of attainment earners) if the district determines that they have met local graduation requirements; however, they may not receive a diploma unless DESE awards the CD.

Should students who meet state and local graduation requirements after DESE has issued final CD decisions be reported as graduates in the next SIMS collection?
Yes. Students can be reported as graduates in the next SIMS collection if the district receives confirmation from DESE that the CD has been awarded in all three subjects and the student meets local graduation requirements.

Contact Information and Resources

Topic	Email	Resources
Modified CD	data@doe.mass.edu	• List of accepted courses: https://www.doe.mass.edu/mcas/accepted-courses.xlsx • Modified CD tool demonstration video: https://www.youtube.com/watch?v=6sbfC8Fbuac
MCAS testing	mcas@doe.mass.edu	https://www.doe.mass.edu/mcas/
MCAS performance appeals	mcasappeals@doe.mass.edu	https://www.doe.mass.edu/mcasappeals/
Graduation requirements	mcas@doe.mass.edu	https://www.doe.mass.edu/mcas/graduation.html

Modified Competency Determination (CD) Eligibility

Students in the Classes of 2020-2022

Students who were enrolled in grade 12 during the 2019-2020 school year, students who were on track to graduate in 2020, and students in the classes of 2021 and 2022 are eligible for the modified CD in ELA, mathematics, and science. See the MCAS Graduation Requirements website for more information.

Round (Collection period opens)	Class/ graduation year(s)	Subject(s)	Notes
Round 1 (June 2020)	2020	English language arts (ELA), mathematics, science	Students were included if they were on track to graduate at the end of the 2019-2020 school year
Round 2 (August 2020)	2020	ELA, mathematics, science	Students were included if: • They were not previously included in the June 2020 collection; • They were included in the June 2020 collection but had not yet met coursework requirements in one or more subjects; or • They were on track to graduate at the end of the 2019-2020 school year
Round 3 (December 2020)	2020	ELA, mathematics, science	Students were included if: • They were not previously included in the June or August 2020 collections; • They were included in the June or August 2020 collections but had not yet met coursework requirements in one or more subjects; or • They were on track to graduate at the end of the 2019-2020 school year
	2021	Science	Grade 12 students were included if they were not reported in grade 12 in a previous school year but had not yet met coursework requirements in science
Round 4 (March 2021)	2020	ELA, mathematics, science	SP students were included if they were included in the December 2020 collection but had not yet met coursework requirements in one or more subjects
	2021	ELA, mathematics, science	Students were included if: • They were included in the December 2020 collection but had not yet met coursework requirements in science; or • They became eligible for the modified CD in ELA and/or mathematics following the January 2021 BESE vote
Round 5 (May 2021)	2020 & 2021	ELA, mathematics, science	Grade 12 and SP students were included if they were included in the March 2021 collection but had not yet met coursework requirements in one or more subjects
Round 6 (June 2021)	2020 & 2021	ELA, mathematics, science	Grade 12 and SP students were included if they were included in the May 2021 collection but had not yet met coursework requirements in one or more subjects

Round (Collection period opens)	Class/ graduation year(s)	Subject(s)	Notes
Round 7 (August 2021)	2020 & 2021	ELA, mathematics, science	Grade 12 and SP students were included if they were included in the June 2021 collection but had not yet met coursework requirements in one or more subjects
Round 8 (October 2021)	2020, 2021, & 2022	ELA, mathematics, science	Students are included if: • They were included in the August 2021 collection, but had not yet met coursework requirements in one or more subjects; • They were reported as enrolled in grade 10 in 2020 end-of-year SIMS and were still enrolled as of 2021 end-of-year SIMS; • They were reported as enrolled in grade 11 in 2021 end-of-year SIMS; or • They were members of the graduation classes of 2020, 2021, or 2022, were still enrolled in 2021 end-of-year SIMS, and have not yet met coursework requirements in one or more subjects
Round 9 (January 2022)	2020, 2021, & 2022	ELA, mathematics, science	Students will be included if: • They were included in the October 2021 collection, but have not yet met coursework requirements in one or more subjects; or • They are enrolled in grade 12 or SP in October 2021 SIMS
Round 10 (May 2022)	2020, 2021, & 2022	ELA, mathematics, science	• They were included in the January 2022 collection and still enrolled in March 2022 SIMS, but have not yet met coursework requirements in one or more subjects; or • They are enrolled in grade 12 or SP in March 2022 SIMS

Students in the Class of 2023

Students in the class of 2023 are eligible for the modified CD in science only. See the MCAS Graduation Requirements website for more information.

Round (Collection period opens)	Class/ graduation year(s)	Subject	Notes
TBD	2023	Science	Students who remain enrolled at the time of data collection and are in the original 2023 graduation class will be eligible, even if retained while in high school.

APPENDIX B
GRADE-SPECIFIC ACHIEVEMENT LEVEL DESCRIPTORS

MCAS Next-Generation Achievement Level Descriptors
English Language Arts

Next-Generation Achievement Level Descriptors

Exceeding Expectations
A student who performed at this level exceeded grade-level expectations by demonstrating mastery of the subject matter.

Meeting Expectations
A student who performed at this level met grade-level expectations and is academically on track to succeed in the current grade in this subject.

Partially Meeting Expectations
A student who performed at this level partially met grade-level expectations in this subject. The school, in consultation with the student's parent/guardian, should consider whether the student needs additional academic assistance to succeed in this subject.

Not Meeting Expectations
A student who performed at this level did not meet grade-level expectations in this subject. The school, in consultation with the student's parent/guardian, should determine the coordinated academic assistance and/or additional instruction the student needs to succeed in this subject.

MCAS Next-Generation Achievement Level Descriptors
English Language Arts

General: All grades (grades 3–8 and 10)

Student results on the MCAS tests are reported according to four achievement levels: *Exceeding Expectations, Meeting Expectations, Partially Meeting Expectations,* and *Not Meeting Expectations.* The descriptors below illustrate the knowledge and skills students demonstrate on MCAS at each level. Knowledge and skills are cumulative at each level. No descriptors are provided for the *Not Meeting Expectations* achievement level because students' work at this level, by definition, does not meet the criteria of the *Partially Meeting Expectations* level.

ELA All Grades	Partially Meeting Expectations *On MCAS, a student at this level:*	Meeting Expectations *On MCAS, a student at this level:*	Exceeding Expectations *On MCAS, a student at this level:*
Reading	Demonstrates **partial** understanding of what a text implies and states explicitly; cites **limited** textual support for conclusions; **incompletely** summarizes key details and ideas; provides a **partial** analysis of a character, an event, or an idea in grade-appropriate texts Demonstrates **partial** understanding of words and phrases used in a text; provides **limited** understanding of how structural elements, point of view, or purpose affects the content and style in text(s) Makes **basic** comparisons between texts; shows **partial** understanding of content in diverse media; **partially** evaluates and analyzes claims and evidence in text(s)	Demonstrates **sufficient** understanding of what a text implies and states explicitly; cites **solid** textual support for conclusions; **appropriately** summarizes key details and ideas; provides a **mostly complete** analysis of a character, an event, or an idea in grade-appropriate texts Demonstrates **general** understanding of words and phrases used in a text; provides **general understanding** of how structural elements, point of view, or purpose affects the content and style in text(s) Makes **appropriate** comparisons between texts; shows **solid** understanding of content in diverse media; **appropriately** evaluates and analyzes claims and evidence in text(s)	Demonstrates **comprehensive** understanding of what a text implies and states explicitly; cites **in-depth** textual support for conclusions; **skillfully** summarizes key details and ideas; provides a **sophisticated** analysis of a character, an event, or an idea in grade-appropriate texts Demonstrates **in-depth** understanding of words and phrases used in a text; provides **sophisticated** understanding of how structural elements, point of view, or purpose affects the content and style in text(s) Makes **insightful** comparisons between texts; shows **sophisticated** understanding of content in diverse media; **insightfully** evaluates and analyzes claims and evidence in text(s)
Writing	Produces **basic** writing with **limited** selection and explanation of evidence and details related to grade-appropriate texts, topics, or subject areas Produces writing with **little** development of a central idea or sequenced events, **limited** organization, and **basic** expression of ideas Exhibits **partial** awareness of task, purpose, and audience	Produces **solid** writing with **appropriate** selection and explanation of evidence and details related to grade-appropriate texts, topics, or subject areas Produces writing with **appropriate** development of a central idea or sequenced events, **moderate** organization, and **adequate** expression of ideas Exhibits **sufficient** awareness of task, purpose, and audience	Produces **clear** writing with **skillful** selection and explanation of evidence and details related to grade-appropriate texts, topics, or subject areas Produces writing with **full** development of a central idea or sequenced events, **effective** organization, and **clear** expression of ideas Exhibits **full** awareness of task, purpose, and audience

ELA **All Grades**	**Partially Meeting Expectations** ***On MCAS, a student at this level:***	**Meeting Expectations** ***On MCAS, a student at this level:***	**Exceeding Expectations** ***On MCAS, a student at this level:***
Language	Demonstrates **limited** reading vocabulary of general academic and domain-specific words and phrases in grade-appropriate texts Demonstrates **limited** understanding of unfamiliar words in text and shows **partial** understanding of word parts and word relationships in word meanings Demonstrates **little** control of the standard English conventions of sentence structure, grammar, usage, and mechanics	Demonstrates **solid** reading vocabulary of general academic and domain-specific words and phrases in grade-appropriate texts Demonstrates **solid** understanding of unfamiliar words in text and shows **sufficient** understanding of word parts and word relationships in word meanings Demonstrates **mostly consistent** control of the standard English conventions of sentence structure, grammar, usage, and mechanics	Demonstrates **comprehensive** reading vocabulary of general academic and domain-specific words and phrases in grade-appropriate texts Demonstrates **comprehensive** understanding of unfamiliar words in text and shows **full** understanding of word parts and word relationships in word meanings Demonstrates **consistent** control of the standard English conventions of sentence structure, grammar, usage, and mechanics

MCAS Next-Generation Achievement Level Descriptors
English Language Arts

Next-Generation Achievement Level Descriptors

Exceeding Expectations
A student who performed at this level exceeded grade-level expectations by demonstrating mastery of the subject matter.

Meeting Expectations
A student who performed at this level met grade-level expectations and is academically on track to succeed in the current grade in this subject.

Partially Meeting Expectations
A student who performed at this level partially met grade-level expectations in this subject. The school, in consultation with the student's parent/guardian, should consider whether the student needs additional academic assistance to succeed in this subject.

Not Meeting Expectations
A student who performed at this level did not meet grade-level expectations in this subject. The school, in consultation with the student's parent/guardian, should determine the coordinated academic assistance and/or additional instruction the student needs to succeed in this subject.

MCAS Next-Generation Achievement Level Descriptors
English Language Arts

Grade 3

Student results on the MCAS tests are reported according to four achievement levels: *Exceeding Expectations, Meeting Expectations, Partially Meeting Expectations,* and *Not Meeting Expectations.* The descriptors below illustrate the knowledge and skills students demonstrate on MCAS at each level. Knowledge and skills are cumulative at each level. No descriptors are provided for the *Not Meeting Expectations* achievement level because students' work at this level, by definition, does not meet the criteria of the *Partially Meeting Expectations* level.

ELA Grade 3	**Partially Meeting Expectations** ***On MCAS, a student at this level:***	**Meeting Expectations** ***On MCAS, a student at this level:***	**Exceeding Expectations** ***On MCAS, a student at this level:***
Reading	Demonstrates **partial** understanding of what a text states explicitly; cites **limited** textual support; demonstrates **incomplete** understanding of key details and how they support the main idea; provides a **partial** description of a character, an event, or an idea in grade 3 texts Demonstrates **partial** understanding of words and phrases (e.g., figurative language); demonstrates a **limited** understanding of structural elements and different points of view Makes **basic** comparisons between texts; shows **partial** understanding of information presented in illustrations; **partially** compares and contrasts important points in text(s)	Demonstrates **sufficient** understanding of what a text states explicitly; cites **solid** textual support; demonstrates **appropriate** understanding of key details and how they support the main idea; provides a **mostly complete** description of a character, an event, or an idea in grade 3 texts Demonstrates **general** understanding of words and phrases (e.g., figurative language); demonstrates a **general** understanding of structural elements and different points of view Makes **appropriate** comparisons between texts; shows **solid** understanding of information presented in illustrations; **appropriately** compares and contrasts important points in text(s)	Demonstrates **comprehensive** understanding of what a text states explicitly; cites **in-depth** textual support; demonstrates **in-depth** understanding of key details and how they support the main idea; provides a **comprehensive** description of a character, an event, or an idea in grade 3 texts Demonstrates **in-depth** understanding of words and phrases (e.g., figurative language); demonstrates a **clear** understanding of structural elements and different points of view Makes **effective** comparisons between texts; shows **clear** understanding of information presented in illustrations; **effectively** compares and contrasts important points in text(s)

ELA Grade 3	**Partially Meeting Expectations** ***On MCAS, a student at this level:***	**Meeting Expectations** ***On MCAS, a student at this level:***	**Exceeding Expectations** ***On MCAS, a student at this level:***
Writing	Produces **basic** writing with **limited** selection and explanation of facts and details related to grade 3 texts, topics, or subject areas Produces writing with **little** development of a central idea or sequenced events, **limited** organization, and **basic** expression of ideas Exhibits **partial** awareness of task, purpose, and audience	Produces **solid** writing with **appropriate** selection and explanation of facts and details related to grade 3 texts, topics, or subject areas Produces writing with **appropriate** development of a central idea or sequenced events, **moderate** organization, and **adequate** expression of ideas Exhibits **sufficient** awareness of task, purpose, and audience	Produces **clear** writing with **effective** selection and explanation of facts and details related to grade 3 texts, topics, or subject areas Produces writing with **full** development of a central idea or sequenced events, **effective** organization, and **clear** expression of ideas Exhibits **full** awareness of task, purpose, and audience
Language	Demonstrates **limited** reading vocabulary of grade 3 academic and domain-specific words and phrases Demonstrates **limited** understanding of unfamiliar words in text; shows **partial** understanding of word parts and word relationships in word meanings Demonstrates **little** control of the standard English conventions of sentence structure, grammar, usage, and mechanics	Demonstrates **solid** reading vocabulary of grade 3 academic and domain-specific words and phrases Demonstrates **solid** understanding of unfamiliar words in text; shows **sufficient** understanding of word parts and word relationships in word meanings Demonstrates **mostly consistent** control of the standard English conventions of sentence structure, grammar, usage, and mechanics	Demonstrates **comprehensive** reading vocabulary of grade 3 academic and domain-specific words and phrases Demonstrates **comprehensive** understanding of unfamiliar words in text; shows **full** understanding of word parts and word relationships in word meanings Demonstrates **consistent** control of the standard English conventions of sentence structure, grammar, usage, and mechanics

MCAS Next-Generation Achievement Level Descriptors
English Language Arts

Grade 4

Student results on the MCAS tests are reported according to four achievement levels: *Exceeding Expectations, Meeting Expectations, Partially Meeting Expectations,* and *Not Meeting Expectations.* The descriptors below illustrate the knowledge and skills students demonstrate on MCAS at each level. Knowledge and skills are cumulative at each level. No descriptors are provided for the *Not Meeting Expectations* achievement level because students' work at this level, by definition, does not meet the criteria of the *Partially Meeting Expectations* level.

ELA Grade 4	Partially Meeting Expectations *On MCAS, a student at this level:*	Meeting Expectations *On MCAS, a student at this level:*	Exceeding Expectations *On MCAS, a student at this level:*
Reading	Demonstrates **partial** understanding of what a text implies and states explicitly; cites **limited** textual support; **incompletely summarizes** key details and main ideas; provides a **partial** description of a character, an event, or an idea in grade 4 texts Demonstrates **partial** understanding of words and phrases (e.g., figurative language); provides a **limited** understanding of structural elements and different points of view Makes **basic** comparisons between texts; shows **partial** understanding of information presented in media; **partially** explains important points and themes in text(s)	Demonstrates **sufficient** understanding of what a text implies and states explicitly; cites **solid** textual support; **appropriately** summarizes key details and main ideas; provides a **mostly complete** description of a character, an event, or an idea in grade 4 texts Demonstrates **general** understanding of words and phrases (e.g., figurative language); provides a **general** understanding of structural elements and different points of view Makes **appropriate** comparisons between texts; shows **solid** understanding of information present in media; **appropriately** explains important points and themes in text(s)	Demonstrates **comprehensive** understanding of what a text implies and states explicitly; cites **in-depth** textual support; **skillfully** summarizes key details and main ideas; provides a **comprehensive** description of a character, an event, or an idea in grade 4 texts Demonstrates **in-depth** understanding of words and phrases (e.g., figurative language); provides a **clear** understanding of structural elements and different points of view Makes **effective** comparisons between texts; shows **clear** understanding of information present in media; **effectively** explains important points and themes in text(s)

ELA Grade 4	Partially Meeting Expectations *On MCAS, a student at this level:*	Meeting Expectations *On MCAS, a student at this level:*	Exceeding Expectations *On MCAS, a student at this level:*
Writing	Produces **basic** writing with **limited** selection and explanation of facts and details related to grade 4 texts, topics, or subject areas Produces writing with **little** development of a central idea or sequenced events, **limited** organization, and **basic** expression of ideas Exhibits **partial** awareness of task, purpose, and audience	Produces **solid** writing with **appropriate** selection and explanation of facts and details related to grade 4 texts, topics, or subject areas Produces writing with **appropriate** development of a central idea or sequenced events, **moderate** organization, and **adequate** expression of ideas Exhibits **sufficient** awareness of task, purpose, and audience	Produces **clear** writing with **effective** selection and explanation of facts and details related to grade 4 texts, topics, or subject areas Produces writing with **full** development of a central idea or sequenced events, **effective** organization, and **clear** expression of ideas Exhibits **full** awareness of task, purpose, and audience
Language	Demonstrates **limited** reading vocabulary of grade 4 academic and domain-specific words and phrases Demonstrates **limited** understanding of unfamiliar words in text; shows **partial** understanding of word parts, word relationships, and nuances in word meanings Demonstrates **little** control of the standard English conventions of sentence structure, grammar, usage, and mechanics	Demonstrates **solid** reading vocabulary of grade 4 academic and domain-specific words and phrases Demonstrates **solid** understanding of unfamiliar words in text; shows **sufficient** understanding of word parts, word relationships, and nuances in word meanings Demonstrates **mostly consistent** control of the standard English conventions of sentence structure, grammar, usage, and mechanics	Demonstrates **comprehensive** reading vocabulary of grade 4 academic and domain-specific words and phrases Demonstrates **comprehensive** understanding of unfamiliar words in text; shows **full** understanding of word parts, word relationships, and nuances in word meanings Demonstrates **consistent** control of the standard English conventions of sentence structure, grammar, usage, and mechanics

MCAS Next-Generation Achievement Level Descriptors
English Language Arts

Grade 5

Student results on the MCAS tests are reported according to four achievement levels: *Exceeding Expectations, Meeting Expectations, Partially Meeting Expectations,* and *Not Meeting Expectations.* The descriptors below illustrate the knowledge and skills students demonstrate on MCAS at each level. Knowledge and skills are cumulative at each level. No descriptors are provided for the *Not Meeting Expectations* achievement level because students' work at this level, by definition, does not meet the criteria of the *Partially Meeting Expectations* level.

ELA **Grade 5**	**Partially Meeting Expectations** ***On MCAS, a student at this level:***	**Meeting Expectations** ***On MCAS, a student at this level:***	**Exceeding Expectations** ***On MCAS, a student at this level:***
Reading	Demonstrates **partial** understanding of what a text implies and states explicitly; provides **limited** textual support through the use of quotations or paraphrasing; **incompletely** summarizes key details and main ideas; provides a **partial** analysis of a character, an event, or an idea in grade 5 texts Demonstrates **partial** understanding of words and phrases (e.g., figurative language); provides a **limited** explanation of how structural elements or points of view influence text(s) Makes **basic** comparisons between texts; shows **partial** understanding of information present in multiple sources or media; **partially** analyzes important points and themes in text(s)	Demonstrates **sufficient** understanding of what a text implies and states explicitly; provides **solid** textual support through the use of quotations or paraphrasing; **appropriately** summarizes key details and main ideas; provides a **mostly complete** analysis of a character, an event, or an idea in grade 5 texts Demonstrates **general** understanding of words and phrases (e.g., figurative language); provides a **general** explanation of how structural elements or points of view influence text(s) Makes **appropriate** comparisons between texts; shows **solid** understanding of information present in multiple sources or media; **appropriately** analyzes important points and themes in text(s)	Demonstrates **comprehensive** understanding of what a text implies and states explicitly; provides **in-depth** textual support through the use of quotations or paraphrasing; **skillfully** summarizes key details and main ideas; provides a **comprehensive** analysis of a character, an event, or an idea in grade 5 texts Demonstrates **in-depth** understanding of words and phrases (e.g., figurative language); provides a **clear** explanation of how structural elements or points of view influence text(s) Makes **effective** comparisons between texts; shows **clear** understanding of information present in multiple sources or media; **effectively** analyzes important points and themes in text(s)

ELA Grade 5	**Partially Meeting Expectations** *On MCAS, a student at this level:*	**Meeting Expectations** *On MCAS, a student at this level:*	**Exceeding Expectations** *On MCAS, a student at this level:*
Writing	Produces **basic** writing with **limited** selection and explanation of facts and details related to grade 5 texts, topics, or subject areas Produces writing with **little** development of a central idea or sequenced events, **limited** organization, and **basic** expression of ideas Exhibits **partial** awareness of task, purpose, and audience	Produces **solid** writing with **appropriate** selection and explanation of facts and details related to grade 5 texts, topics, or subject areas Produces writing with **appropriate** development of a central idea or sequenced events, **moderate** organization, and **adequate** expression of ideas Exhibits **sufficient** awareness of task, purpose, and audience	Produces **clear** writing with **effective** selection and explanation of facts and details related to grade 5 texts, topics, or subject areas Produces writing with **full** development of a central idea or sequenced events, **effective** organization, and **clear** expression of ideas Exhibits **full** awareness of task, purpose, and audience
Language	Demonstrates **limited** reading vocabulary of grade 5 academic and domain-specific words and phrases Demonstrates **limited** understanding of unfamiliar words in text; shows **partial** understanding of word parts, word relationships, and nuances in word meanings Demonstrates **little** control of the standard English conventions of sentence structure, grammar, usage, and mechanics	Demonstrates **solid** reading vocabulary of grade 5 academic and domain-specific words and phrases Demonstrates **solid** understanding of unfamiliar words in text; shows **sufficient** understanding of word parts, word relationships, and nuances in word meanings Demonstrates **mostly consistent** control of the standard English conventions of sentence structure, grammar, usage, and mechanics	Demonstrates **comprehensive** reading vocabulary of grade 5 academic and domain-specific words and phrases Demonstrates **comprehensive** understanding of unfamiliar words in text; shows **full** understanding of word parts, word relationships, and nuances in word meanings Demonstrates **consistent** control of the standard English conventions of sentence structure, grammar, usage, and mechanics

MCAS Next-Generation Achievement Level Descriptors
English Language Arts

Grade 6

Student results on the MCAS tests are reported according to four achievement levels: *Exceeding Expectations, Meeting Expectations, Partially Meeting Expectations,* and *Not Meeting Expectations.* The descriptors below illustrate the knowledge and skills students demonstrate on MCAS at each level. Knowledge and skills are cumulative at each level. No descriptors are provided for the *Not Meeting Expectations* achievement level because students' work at this level, by definition, does not meet the criteria of the *Partially Meeting Expectations* level.

ELA Grade 6	**Partially Meeting Expectations** ***On MCAS, a student at this level:***	**Meeting Expectations** ***On MCAS, a student at this level:***	**Exceeding Expectations** ***On MCAS, a student at this level:***
Reading	Demonstrates **partial** understanding of what a text implies and states explicitly; uses quotations and paraphrases to **partially** support conclusions; **incompletely** summarizes text; provides a **partial** analysis of a character, an event, or an idea in grade 6 texts Demonstrates **partial** understanding of meanings (e.g., figurative, connotative, technical) and effects (e.g., on mood) of words and phrases; demonstrates **limited** understanding of how structural elements and point of view contribute to the development of ideas Makes **basic** comparisons between texts; **partially** integrates information in different media or formats; **partially** analyzes important claims, arguments, or themes in text(s)	Demonstrates **sufficient** understanding of what a text implies and states explicitly; uses quotations and paraphrases to **generally** support conclusions; **appropriately** summarizes text; provides a **mostly complete** analysis of a character, an event, or an idea in grade 6 texts Demonstrates **general** understanding of meanings (e.g., figurative, connotative, technical) and effects (e.g., on mood) of words and phrases; demonstrates **general** understanding of how structural elements and point of view contribute to the development of ideas Makes **appropriate** comparisons between texts; **solidly** integrates information in different media or formats; **appropriately** analyzes important claims, arguments, or themes in text(s)	Demonstrates **comprehensive** understanding of what a text implies and states explicitly; uses quotations and paraphrases to **insightfully** support conclusions; **skillfully** summarizes text; provides a **sophisticated** analysis of a character, an event, or an idea in grade 6 texts Demonstrates **in-depth** understanding of meanings (e.g., figurative, connotative, technical) and effects (e.g., on mood) of words and phrases; demonstrates **sophisticated** understanding of how structural elements and point of view contribute to the development of ideas Makes **insightful** comparisons between texts; **skillfully** integrates information in different media or formats; **insightfully** analyzes important claims, arguments, or themes in text(s)
Writing	Produces **basic** writing with **limited** selection and explanation of evidence and details related to grade 6 texts, topics, or subject areas Produces writing with **little** development of a central idea, a claim, or sequenced events; **limited** organization; and **basic** expression of ideas Exhibits **partial** awareness of task, purpose, and audience	Produces **solid** writing with **appropriate** selection and explanation of evidence and details related to grade 6 texts, topics, or subject areas Produces writing with **appropriate** development of a central idea, a claim, or sequenced events; **moderate** organization; and **adequate** expression of ideas Exhibits **sufficient** awareness of task, purpose, and audience	Produces **sophisticated** writing with **skillful** selection and explanation of evidence and details related to grade 6 texts, topics, or subject areas Produces writing with **full** development of a central idea, a claim, or sequenced events**; skillful** organization; and **rich** expression of ideas Exhibits **full** awareness of task, purpose, and audience

ELA Grade 6	**Partially Meeting Expectations** ***On MCAS, a student at this level:***	**Meeting Expectations** ***On MCAS, a student at this level:***	**Exceeding Expectations** ***On MCAS, a student at this level:***
Language	Demonstrates **limited** reading vocabulary of grade 6 academic and domain-specific words and phrases Demonstrates **limited** understanding of unfamiliar words in text and shows **partial** understanding of word parts, figurative language, word relationships, and nuances in word meanings Demonstrates **little** control of the standard English conventions of sentence structure, grammar, usage, and mechanics	Demonstrates **solid** reading vocabulary of grade 6 academic and domain-specific words and phrases Demonstrates **solid** understanding of unfamiliar words in text and shows **sufficient** understanding of word parts, figurative language, word relationships, and nuances in word meanings Demonstrates **mostly consistent** control of the standard English conventions of sentence structure, grammar, usage, and mechanics	Demonstrates **comprehensive** reading vocabulary of grade 6 academic and domain-specific words and phrases Demonstrates **comprehensive** understanding of unfamiliar words in text and shows **full** understanding of word parts, figurative language, word relationships, and nuances in word meanings Demonstrates **consistent** control of the standard English conventions of sentence structure, grammar, usage, and mechanics

MCAS Next-Generation Achievement Level Descriptors
English Language Arts

Grade 7

Student results on the MCAS tests are reported according to four achievement levels: *Exceeding Expectations, Meeting Expectations, Partially Meeting Expectations,* and *Not Meeting Expectations.* The descriptors below illustrate the knowledge and skills students demonstrate on MCAS at each level. Knowledge and skills are cumulative at each level. No descriptors are provided for the *Not Meeting Expectations* achievement level because students' work at this level, by definition, does not meet the criteria of the *Partially Meeting Expectations* level.

ELA **Grade 7**	**Partially Meeting Expectations** ***On MCAS, a student at this level:***	**Meeting Expectations** ***On MCAS, a student at this level:***	**Exceeding Expectations** ***On MCAS, a student at this level:***
Reading	Demonstrates **partial** understanding of what a text implies and states explicitly; uses quotations and paraphrases to **partially** support conclusions; incompletely summarizes text; provides a **partial** analysis of the interactions of characters, events, or ideas in grade 7 texts Demonstrates **partial** understanding of meanings (e.g., figurative, connotative, technical) and effects (e.g., on mood) of words and phrases; demonstrates **limited** understanding of how structural elements and point of view contribute to the development of ideas Makes **basic** comparisons between texts; **partially** integrates information in different media or formats; **partially** analyzes important claims, arguments, or themes in text(s)	Demonstrates **sufficient** understanding of what a text implies and states explicitly; uses quotations and paraphrases to **generally** support conclusions; **appropriately** summarizes text; provides a **mostly complete** analysis of the interactions of characters, events, or ideas in grade 7 texts Demonstrates **general** understanding of **meanings** (e.g., figurative, connotative, technical) and effects (e.g., on mood) of words and phrases; demonstrates **general** understanding of how structural elements and point of view contribute to the development of ideas Makes **appropriate** comparisons between texts; **solidly** integrates information in different media or formats; **appropriately** analyzes important claims, arguments, or themes in text(s)	Demonstrates **comprehensive** understanding of what a text implies and states explicitly; uses quotations and paraphrases to **insightfully** support conclusions; **skillfully** summarizes text; provides a **sophisticated** analysis of the interactions of characters, events, or ideas in grade 7 texts Demonstrates **in-depth** understanding of **meanings** (e.g., figurative, connotative, technical) and effects (e.g., on mood) of words and phrases; demonstrates **sophisticated** understanding of how structural elements and point of view contribute to the development of ideas Makes **insightful** comparisons between texts; **skillfully** integrates information in different media or formats; **insightfully** analyzes important claims, arguments, or themes in text(s)
Writing	Produces **basic** writing with **limited** selection and explanation of evidence and details related to grade 7 texts, topics, or subject areas Produces writing with **little** development of a central idea, a claim, or sequenced events; **limited** organization; and **basic** expression of ideas Exhibits **partial** awareness of task, purpose, and audience	Produces **solid** writing with **appropriate** selection and explanation of evidence and details related to grade 7 texts, topics, or subject areas Produces writing with **appropriate** development of a central idea, a claim, or sequenced events; **moderate** organization; and **adequate** expression of ideas Exhibits **sufficient** awareness of task, purpose, and audience	Produces **sophisticated** writing with **skillful** selection and explanation of evidence and details related to grade 7 texts, topics, or subject areas Produces writing with **full** development of a central idea, a claim, or sequenced events; **skillful** organization; and **rich** expression of ideas Exhibits **full** awareness of task, purpose, and audience

ELA Grade 7	**Partially Meeting Expectations** ***On MCAS, a student at this level:***	**Meeting Expectations** ***On MCAS, a student at this level:***	**Exceeding Expectations** ***On MCAS, a student at this level:***
Language	Demonstrates **limited** reading vocabulary of grade 7 academic and domain-specific words and phrases Demonstrates **limited** understanding of unfamiliar words in text and shows **partial** understanding of word parts, figurative language, word relationships, and nuances in word meanings Demonstrates **little** control of the standard English conventions of sentence structure, grammar, usage, and mechanics	Demonstrates **solid** reading vocabulary of grade 7 academic and domain-specific words and phrases Demonstrates **solid** understanding of unfamiliar words in text and shows **sufficient** understanding of word parts, figurative language, word relationships, and nuances in word meanings Demonstrates **mostly consistent** control of the standard English conventions of sentence structure, grammar, usage, and mechanics	Demonstrates **comprehensive** reading vocabulary of grade 7 academic and domain-specific words and phrases Demonstrates **comprehensive** understanding of unfamiliar words in text and shows **full** understanding of word parts, figurative language, word relationships, and nuances in word meanings Demonstrates **consistent** control of the standard English conventions of sentence structure, grammar, usage, and mechanics

MCAS Next-Generation Achievement Level Descriptors
English Language Arts

Grade 8

Student results on the MCAS tests are reported according to four achievement levels: *Exceeding Expectations, Meeting Expectations, Partially Meeting Expectations,* and *Not Meeting Expectations.* The descriptors below illustrate the knowledge and skills students demonstrate on MCAS at each level. Knowledge and skills are cumulative at each level. No descriptors are provided for the *Not Meeting Expectations* achievement level because students' work at this level, by definition, does not meet the criteria of the *Partially Meeting Expectations* level.

ELA Grade 8	Partially Meeting Expectations *On MCAS, a student at this level:*	Meeting Expectations *On MCAS, a student at this level:*	Exceeding Expectations *On MCAS, a student at this level:*
Reading	Demonstrates **partial** understanding of what a text implies and states explicitly; uses quotations and paraphrases to **partially** support conclusions; **incompletely** summarizes text; provides a **partial** analysis of connections among characters, events, or ideas in grade 8 texts Demonstrates **partial** understanding of meanings (e.g., figurative, ironic, allusive) and effects (e.g., on mood) of words and phrases; demonstrates **limited** understanding of how structural elements and point of view contribute to the development of ideas Provides a **basic** analysis between texts; **partially** integrates information from different media or formats; **partially** analyzes important claims, arguments, or themes in multiple texts	Demonstrates **sufficient** understanding of what a text implies and states explicitly; uses quotations and paraphrases to **generally** support conclusions; **appropriately** summarizes text; provides a **mostly complete** analysis of connections among characters, events, or ideas in grade 8 texts Demonstrates **general** understanding of meanings (e.g., figurative, ironic, allusive) and effects (e.g., on mood) of words and phrases; demonstrates **general** understanding of how structural elements and point of view contribute to the development of ideas Provides an **appropriate** analysis between texts; **solidly** integrates information from different media or formats; **appropriately** analyzes important claims, arguments, or themes in multiple texts	Demonstrates **comprehensive** understanding of what a text implies and states explicitly; uses quotations and paraphrases to **insightfully** support conclusions; **skillfully** summarizes text; provides a **sophisticated** analysis of connections among characters, events, or ideas in grade 8 texts Demonstrates **in-depth** understanding of meanings (e.g., figurative, ironic, allusive) and effects (e.g., on mood) of words and phrases; demonstrates **sophisticated** understanding of how structural elements and point of view contribute to the development of ideas Provides an **insightful** analysis between texts; skillfully integrates information from different media or formats; **insightfully** analyzes important claims, arguments, or themes in multiple texts
Writing	Produces **basic** writing with **limited** selection and explanation of evidence and details related to grade 8 texts, topics, or subject areas Produces writing with **little** development of a central idea, a claim, or sequenced events; **limited** organization; and **basic** expression of ideas Exhibits **partial** awareness of task, purpose, and audience	Produces **solid** writing with **appropriate** selection and explanation of evidence and details related to grade 8 texts, topics, or subject areas Produces writing with **appropriate** development of a central idea, a claim, or sequenced events; **moderate** organization; and **adequate** expression of ideas Exhibits **sufficient** awareness of task, purpose, and audience	Produces **sophisticated** writing with **skillful** selection and explanation of evidence and details related to grade 8 texts, topics, or subject areas Produces writing with **full** development of a central idea, a claim, or sequenced events; **skillful** organization; and **rich** expression of ideas Exhibits **full** awareness of task, purpose, and audience

ELA Grade 8	Partially Meeting Expectations *On MCAS, a student at this level:*	Meeting Expectations *On MCAS, a student at this level:*	Exceeding Expectations *On MCAS, a student at this level:*
Language	Demonstrates **limited** reading vocabulary of grade 8 academic and domain-specific words and phrases Demonstrates **limited** understanding of unfamiliar words in text and shows **partial** understanding of word parts, figurative language, word relationships, and nuances in word meanings Demonstrates **little** control of the standard English conventions of sentence structure, grammar, usage, and mechanics	Demonstrates **solid** reading vocabulary of grade 8 academic and domain-specific words and phrases Demonstrates **solid** understanding of unfamiliar words in text and shows **sufficient** understanding of word parts, figurative language, word relationships, and nuances in word meanings Demonstrates **mostly consistent** control of the standard English conventions of sentence structure, grammar, usage, and mechanics	Demonstrates **comprehensive** reading vocabulary of grade 8 academic and domain-specific words and phrases Demonstrates **comprehensive** understanding of unfamiliar words in text and shows **full** understanding of word parts, figurative language, word relationships, and nuances in word meanings Demonstrates **consistent** control of the standard English conventions of sentence structure, grammar, usage, and mechanics

MCAS Next-Generation Achievement Level Descriptors
English Language Arts

Next-Generation Achievement Level Descriptors

Exceeding Expectations
A student who performed at this level exceeded grade-level expectations by demonstrating mastery of the subject matter.

Meeting Expectations
A student who performed at this level met grade-level expectations and is academically on-track to succeed in the current grade in this subject.

Partially Meeting Expectations
A student who performed at this level partially met grade-level expectations in this subject. The school, in consultation with the student's parent/guardian, should consider whether the student needs additional academic assistance to succeed in this subject.

Not Meeting Expectations
A student who performed at this level did not meet grade-level expectations in this subject. The school, in consultation with the student's parent/guardian, should determine the coordinated academic assistance and/or additional instruction the student needs to succeed in this subject.

MCAS Next-Generation Achievement Level Descriptors
English Language Arts

Grade 10

Student results on the MCAS tests are reported according to four achievement levels: *Exceeding Expectations, Meeting Expectations, Partially Meeting Expectations,* and *Not Meeting Expectations.* The descriptors below illustrate the knowledge and skills students demonstrate on MCAS at each level. Knowledge and skills are cumulative at each level. No descriptors are provided for the *Not Meeting Expectations* achievement level because students' work at this level, by definition, does not meet the criteria of the *Partially Meeting Expectations* level.

ELA Grade 10	Partially Meeting Expectations *On MCAS, a student at this level:*	Meeting Expectations *On MCAS, a student at this level:*	Exceeding Expectations *On MCAS, a student at this level:*
Reading	**Partially** analyzes what a text implies and states explicitly; uses **little** evidence to support the analysis; **incompletely** identifies and analyzes the development of a central idea or theme of a text; provides a **limited** analysis of how characters, events or ideas are developed and interact across sufficiently complex texts **Partially** determines meanings (e.g., figurative, connotative, technical) of words and phrases and analyzes how they impact meaning and tone; demonstrates **limited** understanding of how structural elements and point of view contribute to the overall development of ideas or purpose Provides a **basic** analysis between texts; **partially** integrates information from different sources; **partially** analyzes and evaluates important claims, arguments, or themes in multiple texts	**Adequately** analyzes what a text implies and states explicitly; uses **sufficient** evidence to support the analysis; **appropriately** identifies and analyzes the development of a central idea or theme of a text; provides a **mostly complete** analysis of how characters, events or ideas are developed and interact across sufficiently complex texts **Appropriately** determines meanings (e.g., figurative, connotative, technical) of words and phrases and analyzes how they impact meaning and tone; demonstrates **general** understanding of how structural elements and point of view contribute to the overall development of ideas or purpose Provides an **appropriate** analysis between texts; **solidly** integrates information from different sources; **appropriately** analyzes and evaluates important claims, arguments, or themes in multiple texts	**Insightfully** analyzes what a text implies and states explicitly; uses **strong** and **thorough** evidence to support the analysis; **skillfully** identifies and analyzes the development of a central idea or theme of a text; provides a **sophisticated** analysis of how characters, events or ideas are developed and interact across sufficiently complex texts **Skillfully** determines meanings (e.g., figurative, connotative, technical) of words and phrases and analyzes how they impact meaning and tone; demonstrates **sophisticated** understanding of how structural elements and point of view contribute to the overall development of ideas or purpose Provides an **insightful** analysis between texts; **skillfully** integrates information from different sources; **insightfully** analyzes and evaluates important claims, arguments, or themes in multiple texts
Writing	Produces **basic** writing with **limited** selection and explanation of evidence and details related to sufficiently complex texts, topics, or subject areas Produces writing with **little** development of a **basic** central idea, thesis, or sequenced events; **limited** organization; and **basic** expression of ideas	Produces **solid** writing with **appropriate** selection and explanation of evidence and details related to sufficiently complex texts, topics, or subject areas Produces writing with **adequate** development of a **solid** central idea, thesis, or sequenced events; **moderate** organization; and **appropriate** expression of ideas	Produces **clear** and **sophisticated** writing with **skillful** selection and explanation of evidence and details related to sufficiently complex texts, topics, or subject areas

ELA Grade 10	Partially Meeting Expectations *On MCAS, a student at this level:*	Meeting Expectations *On MCAS, a student at this level:*	Exceeding Expectations *On MCAS, a student at this level:*
	Exhibits **partial** awareness of task, purpose, and audience	Exhibits **sufficient** awareness of task, purpose, and audience	Produces writing with **full** development of an **insightful** central idea, thesis, or sequenced events; **skillful** organization; and **rich** expression of ideas Exhibits **full** awareness of task, purpose, and audience
Language	Demonstrates **limited** reading vocabulary of sufficiently complex academic and domain-specific words and phrases **Partially** determines the meaning of unfamiliar words in text using a variety of strategies; shows **partial** understanding of various grammatical rules and literary devices in a text Demonstrates **little** control of the standard English conventions of sentence structure, grammar, usage, and mechanics	Demonstrates **solid** reading vocabulary of sufficiently complex academic and domain-specific words and phrases **Sufficiently** determines the meaning of unfamiliar words in text using a variety of strategies; shows **sufficient** understanding of various grammatical rules and literary devices in a text Demonstrates **mostly consistent** control of the standard English conventions of sentence structure, grammar, usage, and mechanics	Demonstrates **comprehensive** reading vocabulary of sufficiently complex academic and domain-specific words and phrases **Skillfully** determines the meaning of unfamiliar words in text using a variety of strategies; shows **full** understanding of various grammatical rules and literary devices in a text Demonstrates **consistent** control of the standard English conventions of sentence structure, grammar, usage, and mechanics

MCAS Next-Generation Achievement Level Descriptors
Mathematics

Next-Generation Achievement Level Descriptors

Exceeding Expectations
A student who performed at this level exceeded grade-level expectations by demonstrating mastery of the subject matter.

Meeting Expectations
A student who performed at this level met grade-level expectations and is academically on-track to succeed in the current grade in this subject.

Partially Meeting Expectations
A student who performed at this level partially met grade-level expectations in this subject. The school, in consultation with the student's parent/guardian, should consider whether the student needs additional academic assistance to succeed in this subject.

Not Meeting Expectations
A student who performed at this level did not meet grade-level expectations in this subject. The school, in consultation with the student's parent/guardian, should determine the coordinated academic assistance and/or additional instruction the student needs to succeed in this subject.

MCAS Achievement Level Descriptors

Mathematics: Grades 3 through 8 and 10

Student results on the MCAS tests are reported according to four achievement levels: *Exceeding Expectations, Meeting Expectations, Partially Meeting Expectations, and Not Meeting Expectations.* The descriptors below illustrate the knowledge and skills students demonstrate on MCAS at each level. Knowledge and skills are cumulative at each level. No descriptors are provided for the *Not Meeting Expectations* achievement level because students work at this level, by definition, does not meet the criteria of the *Partially Meeting Expectations* level.

Mathematics All Grades	Partially Meeting Expectations On MCAS, a student at this level:	Meeting Expectations On MCAS, a student at this level:	Exceeding Expectations On MCAS, a student at this level:
Conceptual Understanding and Procedural Knowledge	• Demonstrates partial understanding of the grade appropriate numeration system • Performs some calculations and estimations • Identifies examples of basic math facts or mathematical concepts • Mostly reads and sometimes constructs graphs, tables, and charts	• Applies understanding of the base-ten system and fractions to interpret numbers and solve problems • Performs most calculations and estimations • Describes mathematical concepts and generates examples and counterexamples of concepts • Represents data and mathematical relationships using equations, verbal descriptions, tables, and graphs	• Performs complex calculations and estimations • Selects the best representations for a given set of data • Explains relationships between models such as equations, verbal descriptions, tables, and graphs • Applies math facts and connects mathematical concepts from various areas of mathematics, and uses the concepts to develop generalizations • Recognizes and makes use of structure, discerning patterns by seeing complicated things as single objects
Problem Solving	• Applies learned procedures to solve routine problems • Uses concrete objects or pictures to help conceptualize and solve problems.	• Applies learned procedures and mathematical concepts to solve a variety of problems, including multi-step problems • Solves problems using multiple methods • Demonstrates the relationships between operations used to solve problems and the context of the problems	• Generates strategies and procedures to solve non-routine problems • Solves problems using multiple methods, evaluating reasonableness of intermediate steps leading to the standard algorithms • Draws connections between strategies • Analyzes givens, constraints, and relationships in problems, using multiple methods and appropriate tools
Mathematical Reasoning	• Applies some reasoning methods to solve routine problems	• Uses a variety of reasoning methods to solve routine and non-routine problems • Uses symbols to solve routine mathematical problems	• Reasons abstractly and quantitatively, using multiple reasoning methods to solve complex problems and provides justification for the reasoning • Decontextualizes situations and represents them symbolically
Mathematical Communication	• Identifies and uses basic terms	• Uses logical forms of representation (e.g., text, graphs, symbols) to illustrate steps to a solution	• Uses logical forms of representation (e.g., text, graphs, symbols) to justify solutions and solution strategies • Constructs viable arguments and critiques the reasoning of others, attending to precision

MCAS Next-Generation Achievement Level Descriptors
Mathematics

Next-Generation Achievement Level Descriptors

Exceeding Expectations
A student who performed at this level exceeded grade-level expectations by demonstrating mastery of the subject matter.

Meeting Expectations
A student who performed at this level met grade-level expectations and is academically on-track to succeed in the current grade in this subject.

Partially Meeting Expectations
A student who performed at this level partially met grade-level expectations in this subject. The school, in consultation with the student's parent/guardian, should consider whether the student needs additional academic assistance to succeed in this subject.

Not Meeting Expectations
A student who performed at this level did not meet grade-level expectations in this subject. The school, in consultation with the student's parent/guardian, should determine the coordinated academic assistance and/or additional instruction the student needs to succeed in this subject.

MCAS Achievement Level Descriptors
Mathematics: Grade 3

Student results on the MCAS tests are reported according to four achievement levels: *Exceeding Expectations, Meeting Expectations, Partially Meeting Expectations, and Not Meeting Expectations.* The descriptors below illustrate the knowledge and skills students demonstrate on MCAS at each level. Knowledge and skills are cumulative at each level. No descriptors are provided for the *Not Meeting Expectations* achievement level because students work at this level, by definition, does not meet the criteria of the *Partially Meeting Expectations* level.

Mathematics Grade 3	Partially Meeting Expectations On MCAS, a student at this level:	Meeting Expectations On MCAS, a student at this level:	Exceeding Expectations On MCAS, a student at this level:
Operation and Algebraic Thinking	• Determines products and quotients of whole numbers • Solves one-step word problems by multiplying and dividing within 100 with limited accuracy • Determines the unknown whole number in a multiplication or division equation • Recognizes simple arithmetic patterns	• Interprets products and quotients of whole numbers • Solves word problems by multiplying and dividing within 100 accurately • Solves two-step word problems with unknowns in equations involving all four operations • Applies the properties of multiplication • Recognizes arithmetic patterns • Recognizes products of two single-digit numbers • Uses equal groups and arrays to solve word problems involving multiplication and division within 100 • Consistently uses estimation strategies to assess the reasonableness of answers	• Creates and solves equations with unknown factors to solve word problems • Explains arithmetic patterns using the properties of operations • Uses area models to solve word problems involving multiplication and division within 100 • Recognizes products of two single-digit numbers and the related division facts
Number and Operations in Base Ten	• Uses place value to round two-digit numbers to the nearest 10 • Solves problems by adding and subtracting within 1000 using various strategies with limited accuracy	• Uses place value to round three-digit numbers to the nearest 10 • Fluently adds and subtracts within 1000 using various strategies • Solves problems involving multiplication of a one-digit whole number by multiples of 10 in the range 10-90	• Uses algorithms to add and subtract within 1000 and multiply one-digit whole numbers by multiples of 10 in the range 10-90, and explain why they work • Recognizes the relationship between addition and subtraction

Mathematics Grade 3	Partially Meeting Expectations On MCAS, a student at this level:	Meeting Expectations On MCAS, a student at this level:	Exceeding Expectations On MCAS, a student at this level:
Number and Operations – Fractions	• Visually identifies fractional parts of a whole • Recognizes equivalent fractions • Compares two fractions with like numerators or like denominators	• Identifies fractional parts of a whole • Identifies and represents fractions on number lines or other visual fraction models that are already created • Generates equivalent fractions • Represents whole numbers as fractions • Compares fractions with like numerators and denominators by reasoning about their size using visual fraction models that are already created, and symbols <, > and =	• Explains fraction equivalence • Recognizes and explains fractional equivalence of whole numbers • Creates visual fraction models to justify the size comparison made about two fractions that refer to the same whole.
Measurement and Data	• Tells, writes and measures time to the nearest minute • Identifies appropriate tools and units of measurement to solve problems • Uses line plots to solve problems • Uses scaled picture graphs and bar graphs to solve problems • Finds area by using non-standard units • Solves mathematical problems involving perimeters of polygons, including finding the perimeter given the side length	• Solves word problems involving addition and subtraction of time intervals in minutes • Selects and uses appropriate tools and units of measure to solve problems • Draws simple scaled picture graphs and bar graphs and uses them to solve one-step problems • Generates measurement data using rulers marked with halves and fourths of an inch • Creates line plots with whole numbers, halves and fourths to record and show data to solve problems • Finds area by using standard units • Relates multiplication and addition to area • Determines area by decomposing shapes into non-overlapping rectangles and adding the areas of the non-overlapping parts • Solves mathematical problems involving perimeters of polygons, including finding an unknown side length and identifies rectangles with the same perimeter and different area	• Uses estimation to solve word problems involving measurement • Draws scaled picture graphs and scaled bar graphs and uses them to solve two-step problems • Differentiates perimeter from area • Interprets scaled picture and bar graphs, and line plots • Solves mathematical and real-world problems involving perimeters of polygons, including finding an unknown side length and is able to reproduce rectangles with the same perimeter and different area
Geometry	• Identifies two-dimensional shapes based on their sides and angles • Partitions shapes into parts	• Describes two-dimensional shapes based their sides and angles • Partitions shapes into parts with equal areas and expresses the area as a unit fraction of the whole	• Compares and classifies two-dimensional shapes based on their sides and angles

MCAS Achievement Level Descriptors
Mathematics: Grade 4

Student results on the MCAS tests are reported according to four achievement levels: *Exceeding Expectations, Meeting Expectations, Partially Meeting Expectations, and Not Meeting Expectations.* The descriptors below illustrate the knowledge and skills students demonstrate on MCAS at each level. Knowledge and skills are cumulative at each level. No descriptors are provided for the *Not Meeting Expectations* achievement level because students work at this level, by definition, does not meet the criteria of the *Partially Meeting Expectations* level.

Mathematics Grade 4	Partially Meeting Expectations On MCAS, a student at this level:	Meeting Expectations On MCAS, a student at this level:	Exceeding Expectations On MCAS, a student at this level:
Operation and Algebraic Thinking	• Interprets a multiplication equation as a comparison • Solves multiplication and division word problems • Solves two-step word problems using the four operations with whole numbers, including problems where remainders must be interpreted • Identifies multiplication facts through 12 x 12 • Identifies factor pairs in the 1-100 range • Identifies a pattern that follows a rule	• Recognizes verbal statements of multiplicative comparisons as multiplication equations. • Represents multiplication and division word problems using drawings and equations • Uses the four operations to solve multi-step word problems and represents the problems by equations • Identifies related multiplication and division facts through 12 x 12 • Finds factor pairs in the 1-100 range and recognizes that a whole number is a multiple of each of its factors • Distinguishes between prime and composite numbers in the range 1-100 • Identifies a pattern that follows a rule and generates a pattern, given a rule	• Explains the difference between multiplicative and additive comparison • Uses equations to represent problems, and justifies solutions with estimation • Identifies multiples and their corresponding factors and distinguishes between prime and composite numbers. • Generates patterns not explicit to the rule • Uses estimation to assess the reasonableness of answers
Number and Operations in Base Ten	• Reads and writes whole numbers using base-ten number names and expanded form • Uses place value understanding to round whole numbers to the thousands place • Solves problems involving multiplication of four-digit numbers by a one-digit numbers • Solves problems involving quotients and remainders with up to three-digit dividends and one-digit divisors based on place value and properties of operations	• Uses place value to recognize that in a multi-digit number, a digit in any place represents 10 times as much as it represents in the place to its right • Compares two multi-digit numbers based on place value position using <, > and = • Uses place value understanding to round whole numbers to the ten thousands place • Adds and subtracts whole numbers using the standard algorithm • Solves problems involving multiplication of two-digit numbers by two-digit numbers • Solves problems involving quotients and remainders with up to four-digit dividends and one-digit divisors, using p the relationship between multiplication and division understanding	• Uses place value understanding to round whole numbers up to one million • Uses understanding of structure to explain the standard algorithm for addition and subtraction. • Solves problems involving multiplication of four-digit numbers by one-digit, and justifies solutions by using equations, rectangular arrays or area models. • Justifies solutions using equations, rectangular arrays, and/or area models

Mathematics Grade 4	Partially Meeting Expectations On MCAS, a student at this level:	Meeting Expectations On MCAS, a student at this level:	Exceeding Expectations On MCAS, a student at this level:
Number and Operations – Fractions	• Recognizes equivalency in fractions • Compares fractions with different numerators and different denominators by using common denominators or common numerators • Decomposes fractions into a sum of fractions and uses visual fraction models to solve problems • Multiplies a fraction by a whole number	• Explains why fractions are equivalent using visual fraction models • Consistently compares two fractions when the two fractions refer to the same whole • Consistently compares two decimals when the two decimals refer to the same whole • Compares fractions with different numerators and different denominators by comparing to a benchmark fraction • Adds and subtracts fractions with like denominators • Decomposes fractions into a sum of fractions and uses equations to solve problems • Adds and subtracts mixed numbers with like denominators by replacing with equivalent fraction and by using properties of operations or the relationship of addition and subtraction • Uses visual fraction models and equations to solve word problems involving multiplication of a fraction by a whole number • Uses decimal notation to represent fractions with denominators of 10 and 100 • Compares decimals to hundredths by reasoning about their size	• Generates equivalent fractions including fractions greater than 1 • Decomposes fractions into a sum of fractions and justifies solutions to problems with visual fraction models and equations • Justifies the conversion of a fraction with denominator of 10 to an equivalent fraction with a denominator of 100 and expresses it as a decimal
Measurement and Data	• Solves measurement problems involving whole numbers using all four operations • Solves measurement problems involving perimeter and area • Interprets data presented in line plots (dot plots) and uses addition and subtraction of fractions to solve problems involving line plots • Identifies concepts of angles and angle measurement	• Solves problems involving converting measurements from larger units to smaller units • Creates line plots (dot plots) in fractions of a unit (1/2, ¼, 1/8), to display given data, and uses addition and subtraction of fractions solve problems involving line plots • Uses a protractor to measure, sketch or interpret an angle • Finds unknown angles in diagrams • Justifies solutions to perimeter and area problems	• Reasons about relative sizes of measurement units within one system of units • Sketches an angle without a protractor

Mathematics Grade 4	Partially Meeting Expectations On MCAS, a student at this level:	Meeting Expectations On MCAS, a student at this level:	Exceeding Expectations On MCAS, a student at this level:
Geometry	• Identifies right triangles, points, lines, line segments, rays, angles, perpendicular and parallel lines, lines of symmetry	• Identifies right triangles and draws points, lines, line segments, rays, angles, perpendicular and parallel lines, in two dimensional shapes • Classifies two-dimensional shapes based on their attributes, including the presence and absence of parallel or perpendicular lines or angles of a specified size. • Recognizes lines of symmetry in two-dimensional figures and identifies line-symmetric figures	• Draws two-dimensional shapes based on attributes.

MCAS Achievement Level Descriptors
Mathematics: Grade 5

Student results on the MCAS tests are reported according to four achievement levels: *Exceeding Expectations, Meeting Expectations, Partially Meeting Expectations, and Not Meeting Expectations.* The descriptors below illustrate the knowledge and skills students demonstrate on MCAS at each level. Knowledge and skills are cumulative at each level. No descriptors are provided for the *Not Meeting Expectations* achievement level because students work at this level, by definition, does not meet the criteria of the *Partially Meeting Expectations* level.

Mathematics Grade 5	Partially Meeting Expectations On MCAS, a student at this level:	Meeting Expectations On MCAS, a student at this level:	Exceeding Expectations On MCAS, a student at this level:
Operation and Algebraic Thinking	• Recognizes when parentheses, brackets, or braces are appropriately used in numerical expressions • Given two rules, generates numerical patterns	• Uses parentheses, brackets, or braces to write, interpret and evaluate numerical expressions • Interprets numerical expressions without evaluating • Given two rules, identifies the relationship between corresponding terms	• Given two rules, forms and graphs ordered pairs and interprets the relationship between corresponding terms
Number and Operations in Base Ten	• Recognizes that in a multi-digit number, including a decimal, a digit in any place represents 10 times as much as it represents in the pace to its right or 1/10 of what it represents in the place to its left • Reads decimals to thousandths using base 10 numerals, number names, and expanded form • Identifies which comparison symbols to use when comparing decimals to hundredths • Uses various strategies to solve problems involving all operation with whole numbers including quotients with division limited to four-digit dividends and 2-digit divisors • Solves problems involving addition and subtraction with decimals to tenths • Identifies the quotient of whole numbers	• Uses whole number exponents to denote powers of 10 • Uses place value to round decimals to any place • Fluently multiplies multi-digit whole numbers • Writes decimals to thousandths using base ten numerals, number names, expanded form and comparison symbols • Compares decimals using base ten numerals, number names and comparison symbols <, > and = • Uses various strategies to solve problems involving all operation with whole numbers including quotients with division limited to four-digit dividends and 2-digit divisors and explains using rectangular arrays and/or area models • Applies understandings of models for decimals, place value, and properties of operations to add, subtract, multiply and divide decimals to hundredths • Solves mathematical and real-world problems involving multiplication of whole numbers and decimals to hundredths using the standard algorithm. • Uses models to find the quotients of whole numbers. • Solves problems involving all operations on decimals to hundredths.	• Uses place value understanding of multi-digit numbers including decimals to explain patterns in the number of zeros and the placement of the decimal point, when multiplying a number by powers of 10. • Compares decimals using expanded form • Makes reasonable estimates of decimal results • Explains understandings of models for decimals, decimal notation, and properties of operations to add, subtract, multiply and divide decimals to hundredths • Uses the relationship between decimals and fractions, as well as the relationship between finite decimals and whole numbers to understand and explain why the procedures for multiplying and dividing finite decimals make sense.

Mathematics Grade 5	Partially Meeting Expectations On MCAS, a student at this level:	Meeting Expectations On MCAS, a student at this level:	Exceeding Expectations On MCAS, a student at this level:
Number and Operations – Fractions	• Adds and subtracts fractions with like denominators (including mixed numbers) • Uses visual fraction models to multiply fractions or whole numbers by fractions • Finds areas or rectangles with fractional side lengths by tiling with unit squares • Recognizes multiplication as scaling by comparing the factors with computation	• Adds and subtracts fractions with unlike denominators (including mixed numbers) • Uses visual fraction models to solve real-world problems by multiplying fractions or whole numbers by fractions, and fractions by mixed numbers • Shows that the area of rectangles with fractional side lengths, found by tiling with unit squares, is the same as multiplying the side lengths • Recognizes multiplication as scaling by comparing the factors without computation • Interprets division of a unit fraction by a non-zero whole number and division of a whole number • Solves real-world and mathematical problems involving division of a unit fraction by a non-zero whole number and a whole number by a unit fraction	• Applies understanding of fractions and fraction models to represent the addition and subtraction of fractions with unlike denominators as equivalent calculations with like denominators in the context of solving word p problems. • Uses understanding of fraction equivalence to make sense of sums and differences of fractions and makes reasonable estimates of them. • Uses the relationship between multiplication and division of fractions to solve and explain mathematical and real-world problems including finding the area of rectangles with fractional side lengths, finding quotients of division of non-zero whole number by unit fractions
Measurement and Data	• Converts among different-sized measurement units within a given measurement system • Interprets and represents data presented in line plots (dot plots) to solve problems • Recognizes volume as an attribute of solid figures and calculates volume of right rectangular prisms by packing it with unit cubes, counting unit cubes, and with standard and non-standard units	• Applies conversion among different-sized measurement units within a given measurement system to solve multi-step real-world problems • Uses a line plot (dot plot) to represent data and uses operations on fractions to solve problems involving the line plots • Recognizes volume as additive and calculates volume by finding the total number of same-size units of volume required to fill a space without gaps or overlaps. • Decomposes three-dimensional shapes and finds volumes of right rectangular prisms by viewing them as decomposed into layers of arrays of cubes	• Uses appropriate units, strategies, and tools for solving problems that involve estimating and measuring volume with application of the volume formula • Decomposes three-dimensional shapes and finds volumes of right rectangular prisms by viewing them as decomposed into layers of arrays of cubes and relate to the volume formula • Solves real world application problems requiring the application of V =l wh and V=Bh
Geometry	• Represents mathematical and real-world problems by locating points in the first quadrant • Identifies two-dimensional figures based on properties	• Represents mathematical and real-world problems by locating and graphing in the first quadrant • Classifies two-dimensional figures in a hierarchy based on properties	• Solves mathematical and real-world problems by graphing in the first quadrant and interpreting the coordinate values of points based on the context of the situation • Applies knowledge of number and length to the order and distance relationships of a coordinate plane

MCAS Achievement Level Descriptors
Mathematics: Grade 6

Student results on the MCAS tests are reported according to four achievement levels: *Exceeding Expectations, Meeting Expectations, Partially Meeting Expectations, and Not Meeting Expectations.* The descriptors below illustrate the knowledge and skills students demonstrate on MCAS at each level. Knowledge and skills are cumulative at each level. No descriptors are provided for the *Not Meeting Expectations* achievement level because students work at this level, by definition, does not meet the criteria of the *Partially Meeting Expectations* level.

Mathematics Grade 6	Partially Meeting Expectations On MCAS, a student at this level:	Meeting Expectations On MCAS, a student at this level:	Exceeding Expectations On MCAS, a student at this level:
The Number System	• Interprets quotients of fractions to solve problems • Identifies greatest common factors or least common multiples • Uses positive and negative numbers to describe quantities having opposite directions or values • Solves mathematical problems by using all operations on multi-digit decimals • Graphs ordered pairs in all four quadrants to solve problems • Interprets statements of order for rational numbers	• Computes quotients of fractions to solve problems • Uses prime factorization to find the greatest common factors, least common multiples to solve problems • Represents quantities in real-world context on a number line, explaining the meaning of zero • Uses the understanding of structure to explain the standard algorithm to divide multi-digit numbers • Uses the standard algorithm to fluently operate on multi-digit decimals • Finds the absolute value of a rational number by recognizing its distance from zero on the number line • Uses the standard algorithm to divide multi-digit numbers • Computes all operations on multi-digit decimals • Solve problems by graphing in all four quadrants and finds distances between points with same first coordinate or same second coordinate • Interprets and writes statements of order for rational numbers	• Applies interpretation of quotients of fractions to solving word problems • Uses visual fraction models to solve word problems involving computing quotients of fractions • Applies number theory concepts to the solution of problems. • Solves problems involving order and absolute value of rational numbers

Mathematics Grade 6	Partially Meeting Expectations On MCAS, a student at this level:	Meeting Expectations On MCAS, a student at this level:	Exceeding Expectations On MCAS, a student at this level:
Ratios and Proportional Relationships	• Identifies part to part and part to whole relationships • Uses rate language in the context of a ratio relationship • Sometimes solves unit rate problems	• Solves problems requiring part to part ratios to be converted to part to whole ratios • Consistently solves unit rate problems • Uses rate reasoning to solve problems • Finds the percent of a quantity • Uses ratio reasoning to convert measurement units within measurement systems • Interprets and manipulates models with ratios such as tape diagrams, tables, and double number lines to compare ratios	• Determines what percent of a quantity is a given amount • Explains when to use part to part ratios, and when to use part to whole ratios to solve problems • Uses ratio reasoning to convert measurement units between measurement systems • Creates models with ratios such as tape diagrams, tables, and double number lines to compare ratios • Relates mass of an object to its volume to solve problems
Expressions and Equations	• Evaluates given expressions and equations involving whole-number exponents to solve problems • Identifies parts of an expression using mathematical terms (sum, term, product, factor, quotient, coefficient)	• Interprets, evaluates, and writes expressions and equations involving whole-number exponents • Views one or more parts of an expression as a single entity • Generate and identify equivalent expressions • Relates tables and graphs to equations • Writes and solves equations of the form $x + p = q$ and $px = q$ • Solves and graphs inequalities that represent a constraint or condition in a mathematical or real-world problem. • Analyzes the relationships between dependent and independent variables in real-world problems.	• Writes and graphs inequalities that represent a constraint or condition in a mathematical or real-world problem • Creates equations of the form $x + p = q$ and $px = q$ from a given situation • Uses equations to describe relationships between quantities

Mathematics Grade 6	Partially Meeting Expectations On MCAS, a student at this level:	Meeting Expectations On MCAS, a student at this level:	Exceeding Expectations On MCAS, a student at this level:
Geometry	• Solves mathematical problems involving areas of triangles, including right triangles and quadrilaterals • Solves mathematical problems involving volume of right rectangular prisms with whole number edge lengths • Represents three-dimensional figures using nets • Given coordinates of a polygon, draws the polygon on a coordinate plane	• Solves real-world problems involving areas of triangles, including right triangles and quadrilaterals by decomposing shapes, rearranging or removing pieces, and relating shapes to rectangles • Finds volume of right rectangular prisms with fractional edge lengths • Uses nets of three-dimensional figures to find the surface area • Given coordinates of a polygon on a coordinate plane, finds lengths of the sides of the polygon	• Reasons about geometric shapes and their measurements • Develops, and justifies formulas to solve mathematical and real-world problems that involve areas of triangles, including right triangles, and quadrilaterals • Applies the formula for volume of right rectangular prisms with fractional edge lengths • Applies knowledge of nets to solve mathematical and real-world problems involving surface area • Given coordinates of a polygon (without a coordinate plane), finds lengths of the sides of the polygon and applies these techniques to solve real-world problems
Statistics and Probability	• Recognizes a statistical question • Visually recognizes measures of center and variability • Interprets dot plots and histograms	• Solve problems involving finding the measures of center and variability • Constructs dot plots, histograms, box plots and circle graphs given real-world situations	• Recognizes that a data distribution may not have a definite center, and different ways to measure center can yield different values, and uses this understanding to interpret a situation • Describes and summarizes numerical data sets, identifying clusters, peaks, gaps, and symmetry in a real-world problem

MCAS Achievement Level Descriptors
Mathematics: Grade 7

Student results on the MCAS tests are reported according to four achievement levels: *Exceeding Expectations, Meeting Expectations, Partially Meeting Expectations, and Not Meeting Expectations.* The descriptors below illustrate the knowledge and skills students demonstrate on MCAS at each level. Knowledge and skills are cumulative at each level. No descriptors are provided for the *Not Meeting Expectations* achievement level because students work at this level, by definition, does not meet the criteria of the *Partially Meeting Expectations* level.

Mathematics Grade 7	Partially Meeting Expectations On MCAS, a student at this level:	Meeting Expectations On MCAS, a student at this level:	Exceeding Expectations On MCAS, a student at this level:
The Number System	• Represents addition and subtraction on a horizontal and vertical number line • Operates with rational numbers	• Recognizes situations in which opposite quantities combine to make zero • Operates with rational numbers in mathematical and real-world problems • Translates between rational numbers and decimals	• Translates from repeating decimal form of a rational number to fraction form • Interprets quotient and remainder of rational numbers • Applies properties of operations as strategies to add, subtract, multiply and divide
Ratios and Proportional Relationships	• Recognizes a proportional relationship • Uses ratios and proportionality to solve simple mathematical problems, including percent problems	• Represents a proportional relationship by equations • Sometimes uses ratios and proportionality to solve multi-step mathematical and real-world problems, including percent problems • Interprets the meaning of any point on a graph of a proportional relationship	• Consistently uses ratios and proportionality to solve multi-step mathematical and real-world problems, including percent problems
Expressions and Equations	• Uses properties of operations to add and subtract linear expressions • Solves simple mathematical problems using numerical and algebraic expressions and equations • Identifies simple arithmetic and geometric sequences from tables, graphs, words, and expressions. • Extends patterns in simple arithmetic and geometric sequences from tables, graphs, words, and expressions.	• Uses properties of operations to expand linear expressions • Uses properties of operations to factor linear expressions • Given a real-world problem, rewrites expressions in different forms to show understanding of the problem • Interprets the solution of an inequality in a real-world problem • Solves multi-step mathematical and real-world problems using numerical and algebraic expressions and equations • Fluently converts between different forms • Create equations and inequalities to solve problems • Graphs the solutions of an inequality	• Uses properties of operations to factor linear expressions and interprets the result in the context of a problem • Justifies solutions to multi-step problems • Analyzes patterns and determines expressions for simple arithmetic and geometric sequences using tables, graphs, words, and expressions

Mathematics Grade 7	Partially Meeting Expectations On MCAS, a student at this level:	Meeting Expectations On MCAS, a student at this level:	Exceeding Expectations On MCAS, a student at this level:
Geometry	• Draws triangles with given conditions • Applies the formulas to find the circumference of circles • Applies the formulas to find the area of two-dimensional figures, including circles • Recognizes attributes of angles (supplementary, complementary, vertical, adjacent)	• Constructs triangles with given conditions and describes some of their attributes • Describes the shape of the two-dimensional face of the figure that results from slicing three-dimensional figures. • Solves problems involving the relationship between area and circumference of circles • Solves problems involving the surface area and volume of three-dimensional shapes • Solves mathematical problems involving scale drawings • Solves multi-step problems using attributes of angles (supplementary, complementary, vertical, adjacent)	• Finds unknown supplementary, complementary, vertical, and adjacent angles by solving equations
Statistics and Probability	• Makes inferences about a population by examining the sample population • Visually compares two populations based on measures of center and variability • Differentiates between representative and non-representative samples • Identifies probability as a number between 0 and 1 • Finds probabilities of simple events	• Uses random sampling to draw inferences about a population • Recognizes the probabilities of 0 through 1 as likely, unlikely, or neither. • Develops probability models and uses it to find probabilities of events • Finds probabilities for compound events using organized lists, tables, and tree diagrams	• Evaluates probability models • Designs and uses a simulation to generate frequencies for compound events • Computes the differences of the centers as a multiple of the measure of variability for two populations

MCAS Achievement Level Descriptors
Mathematics: Grade 8

Student results on the MCAS tests are reported according to four achievement levels: *Exceeding Expectations, Meeting Expectations, Partially Meeting Expectations, and Not Meeting Expectations.* The descriptors below illustrate the knowledge and skills students demonstrate on MCAS at each level. Knowledge and skills are cumulative at each level. No descriptors are provided for the *Not Meeting Expectations* achievement level because students work at this level, by definition, does not meet the criteria of the *Partially Meeting Expectations* level.

Mathematics Grade 8	**Partially Meeting Expectations On MCAS, a student at this level:**	**Meeting Expectations On MCAS, a student at this level:**	**Exceeding Expectations On MCAS, a student at this level:**
The Number System	• Distinguishes between rational and irrational numbers	• Recognizes that rational and irrational numbers have decimal expansions • Uses rational approximations of irrational numbers to compare the size of irrational numbers • Finds approximate location of irrational numbers on the number line • Finds rational approximations of irrational numbers	• Estimates the values of expressions with irrational numbers • Converts a decimal expansion which repeats eventually to a rational number
Expressions and Equations	• Identifies the properties of integer exponents • Know that √2 is irrational • Uses and evaluates square root s of small squares • Graphs proportional relationships, and identifies the unit rate as the slope • Solves one-variable linear equations with one or many solutions • Recognizes that the point of intersection of two linear equations is the solution	• Applies the properties of integer exponents to generate equivalent expressions • Performs operations with decimals and scientific notation • Uses and evaluates cube roots of small cubes • Uses numbers in the form of a single digit times an integer power of 10 to estimate the magnitude and relationships of quantities • Uses scientific notation and chooses appropriate units of measurement for varying magnitudes • Uses linear equations and systems of linear equations to represent and solve problems. • Compares proportional relationships represented in different ways • Recognizes the difference between proportional and non-proportional in linear relationships • Solves one-variable linear equations with rational coefficients • Solves systems of two linear equations algebraically or graphically in real-world and mathematical problems	• Uses numbers in the form of a single digit times an integer power of 10 to estimate the magnitude and interpret relationships of quantities in word problems • Uses linear equations and systems of linear equations to represent, analyze, and solve problems. • Use similar triangles to explain why the slope is the same between any two distinct points on a non-vertical line in the coordinate plane • Derives the equation y=mx for a line through the origin and the equation y=mx + b for a line intercepting the vertical axis b • Estimates solutions to systems of two equations from a graph • Uses understanding of a proportional relationship and structure to interpret the meaning of b, the vertical axis intercept

Mathematics Grade 8	Partially Meeting Expectations On MCAS, a student at this level:	Meeting Expectations On MCAS, a student at this level:	Exceeding Expectations On MCAS, a student at this level:
Functions	• Identifies a relationship as a function • Interprets the equation of a linear function	• Determines the rate of change and initial value of a function from a table or graph • Compares the properties of functions represented in different ways • Writes a function to model a linear relationship • Determines the rate of change of a function from a table, graph, or description • Describes or sketches functional relationships represented graphically	• Identifies functions as linear and non-linear from graphs or equations • Interprets the rate of change of a function from a table, graph, equation, or description
Geometry	• Identifies the properties of rotations, reflections and translations • Uses the relationship among the sides of a right triangle to solve problems • Translates and reflects two dimensional figures • Uses Pythagorean theorem to find the hypotenuse	• Describes the congruence relationship between two congruent figures • Describes the effect of transformations on two-dimensional figures using coordinates • Describes the similarity relationship between two similar figures • Rotates two-dimensional figures around the origin • Finds angle sum and exterior angle of triangles, angles created when parallel lines are cut by a transversal, and angle-angle criterion for similarity of triangles • Applies the Pythagorean theorem to find distances between points on the coordinate plane • Applies the Pythagorean theorem to determine the unknown side lengths in right triangles in mathematical and real-world problems • Solves mathematical and real-world problems involving volume of cones, cylinders, and spheres	• Use informal arguments to establish facts about the angle sum and exterior angle of triangles, angles created when parallel lines are cut by a transversal, and angle-angle criterion for similarity of triangles • Justifies Pythagorean theorem and its converse • Given the volume of a cone, finds unknown dimensions of the cone • Given the volume of a cylinder, finds unknown dimensions of the cylinder • Given the volume of a sphere, finds unknown dimensions of the sphere
Statistics and Probability	• Describes the patterns associated with bivariate data • Identifies and constructs a line of best fit	• Constructs and interprets scatter plots • Constructs and interprets two-way tables • Uses the equation of a linear model to solve problems	• Interprets the slope and intercept of linear models • Analyzes scatter plots • Analyzes relative frequencies in two-way tables

MCAS Next-Generation Achievement Level Descriptors
Mathematics

Next-Generation Achievement Level Descriptors

Exceeding Expectations
A student who performed at this level exceeded grade-level expectations by demonstrating mastery of the subject matter.

Meeting Expectations
A student who performed at this level met grade-level expectations and is academically on-track to succeed in the current grade in this subject.

Partially Meeting Expectations
A student who performed at this level partially met grade-level expectations in this subject. The school, in consultation with the student's parent/guardian, should consider whether the student needs additional academic assistance to succeed in this subject.

Not Meeting Expectations
A student who performed at this level did not meet grade-level expectations in this subject. The school, in consultation with the student's parent/guardian, should determine the coordinated academic assistance and/or additional instruction the student needs to succeed in this subject.

MCAS Achievement Level Descriptors
Mathematics: Grade 10

Student results on the MCAS tests are reported according to four achievement levels: *Exceeding Expectations, Meeting Expectations, Partially Meeting Expectations, and Not Meeting Expectations.* The descriptors below illustrate the knowledge and skills students demonstrate on MCAS at each level. Knowledge and skills are cumulative at each level. No descriptors are provided for the *Not Meeting Expectations* achievement level because students work at this level, by definition, does not meet the criteria of the *Partially Meeting Expectations* level.

Mathematics Grade 10	Partially Meeting Expectations On MCAS, a student at this level:	Meeting Expectations On MCAS, a student at this level:	Exceeding Expectations On MCAS, a student at this level:
Number and Quantity	• Rewrites expressions involving integer exponents using the properties of exponents • Uses units as a way to understand problems and chooses units consistently in formulas • Chooses the scale and the origin in graphs and data displays • Identifies significant figures in recorded measures and computed values based on the context given and the precision of the tools used to measure • Identifies appropriate quantities for the purpose of descriptive modeling	• Rewrites expressions involving radical and rational exponents using the properties of exponents • Performs operations on rational and irrational numbers • Determines whether the solution of operations on two numbers would be rational or irrational • Interprets units consistently in formulas and uses units to solve multi-step problems. • Interprets the scale and the origin in graphs and data displays • Defines appropriate quantities for the purpose of descriptive modeling • Chooses a level of accuracy appropriate to limitations on measurement when reporting quantities • Describes the effects of approximate error in measurement and rounding on measurements and on computed values from measurements	• Explains how the definition of the meaning of rational exponents follows from extending the properties of integer exponents to those values, allowing for a notation for radicals in terms of radical exponents • Explains why the sum or product of two rational numbers is rational; that the sum of a rational number and an irrational number is irrational; and that the product of a nonzero rational number and an irrational number is irrational
Algebra	• Usually interprets parts and structures of linear expressions • Chooses an equivalent form of an expression to reveal properties of the quantity represented by the expression • Identifies, combines, and expands like terms when performing operations on polynomial expressions • Creates linear equations and inequalities in one variable and uses them to solve problems • Creates equations in two variables to represent relations between quantities	• Consistently interprets parts of an expression based on real-world context • Usually interprets the structure of quadratic and exponential expressions with integer exponents • Factors polynomial expressions • Creates quadratic and exponential equations in one variable and uses them to solve problems • Creates equations with more than two variables • Represents constraints by linear equations/ inequalities and by systems of linear equations/inequalities • Constructs viable arguments to justify or refute a solution method for linear equations/inequalities	• Interprets complicated expressions by viewing one or more of their parts as a single entity • Chooses and produces an equivalent form of an expression to explain properties of the quantity represented by the expression • Completes the square in a quadratic expression to reveal the maximum or minimum value of the function it defines • Recognizes that the system of polynomials is similar to the system of integers in that they are both closed under certain operations • Interprets solutions of linear equations or inequalities as viable or non-viable options in a modeling context

Mathematics Grade 10	Partially Meeting Expectations On MCAS, a student at this level:	Meeting Expectations On MCAS, a student at this level:	Exceeding Expectations On MCAS, a student at this level:
	• Graphs the equations on coordinate axes with labels and scales • Rearranges formulas to highlight a quantity of interest using the same reasoning as in solving equations • Solves and explains each step in solving linear equations and inequalities in one variable • Solves system of linear equations exactly and approximately • Knows that the graph of an equation in two variables is the set of all its solutions • Graphs the solutions of linear inequality in two variables	• Usually solves linear equation/inequalities in one variable involving absolute value • Solves a simple system consisting of a linear equation and a quadratic equation in two variables algebraically and graphically • Finds and is able to explain the solutions of linear equations y = f(x) and y = g(x) approximately, using technology to graph the functions and make tables of values • Graphs the solution set of a system of linear inequalities in two variables	• Uses the method of completing the square to transform any quadratic equation in *x* into an equation of the form $(x – p)^2 = q$ that has the same solutions • Derives the quadratic formula • Recognizes when solutions of a quadratic equation results in non-real solutions and write them as a ± b*i* for real numbers a and b • Proves that, given a system of equations in two variables, replacing one equation by the sum of that equation and a multiple of the other to produces a system with the same solutions
Functions	• Knows the structure of a function and uses function notation to evaluate and interpret functions • Distinguishes between an arithmetic and a geometric sequence • Interprets key features of graphs and tables for a function that models a relationship • Calculates and interprets the average rate of change of a function presented symbolically or as a table • Graphs linear functions to show intercepts • Compares properties of functions each represented algebraically, graphically, numerically in tables, or by verbal descriptions • Distinguishes between situations that model linear functions and exponential functions • Constructs linear functions given a graph, a description of a relationship, or input-output pairs • Draws comparisons between exponential and linear graphs	• Interprets symmetries of graphs and tables in terms of the quantities • Relates the domain of a function to its graph • Estimates the rate of change from a graph. • Graphs functions and uses the properties of functions to create equivalent functions • Interprets zeros, maximum/minimum values, and symmetry of the graph • Writes quadratic and exponential functions to describe relationship between quantities • Determines an explicit expression or steps for calculation from a context • Writes arithmetic and geometric sequences both recursively and with an explicit formula • Identifies the effect on a graph of a function by replacing $f(x)$ with $f(x) + k$, $kf(x)$, $f(kx)$, and $f(x + k)$ for specific values of k • Finds the inverse of a linear function • Constructs exponential functions given a graph, a description of a relationship, or input-output pairs • Draws comparisons between exponential and quadratic graphs • Interprets the parameters in a linear function	• Recognizes that sequences are functions that are sometimes defined recursively • Interprets relative maximums and minimums and end behavior of graphs and tables in terms of the quantities • Uses graphs to show relative maximums and minimums; symmetries; and end behavior • Graphs piecewise-defined functions, including step functions • Creates equivalent functions to explain different properties of the function • Uses process of completing the square in a quadratic function to show zeros, maximum/minimum values, and symmetry of the graph • Determines a recursive process, or steps for calculation from a context • Uses recursive and explicit formulas to model situations, and translates between the two forms • Utilizes technology to experiment with cases and illustrates an explanation of the effects on the graph of linear, quadratic, exponential, or absolute value functions • Interprets the parameters in an exponential function

Mathematics Grade 10	Partially Meeting Expectations On MCAS, a student at this level:	Meeting Expectations On MCAS, a student at this level:	Exceeding Expectations On MCAS, a student at this level:
Geometry	• Knows precise definitions of angle, circle, perpendicular line, parallel line, and line segment, based on the undefined notions of point, line, distance along a line, and distance around a circular arc • Represents rigid transformations in the plane • Compares transformations that preserve distance and angle to those that do not and identifies a sequence of transformations that will carry a given figure onto another • Finds angle sum and exterior angle of triangles, angles created when parallel lines are cut by a transversal, and angle-angle criterion for similarity of triangles • Uses congruence and similarity criteria for triangles to solve problems • Uses Pythagorean Theorem to solve right triangles • Uses coordinates to compute perimeters of polygons and areas of triangles and rectangles • Uses volume formulas for cylinders, cones, and spheres to solve problems	• Uses geometric descriptions of rigid motions to solve problems • Applies properties of polygons to the solutions of problems • Verifies experimentally the properties of dilations given by a center and a scale factor • Uses congruence and similarity criteria for triangles to prove relationships in geometric figures • Knows that by similarity, side ratios in right triangles are properties of the angles in the triangle, leading to definitions of trigonometric ratios for acute angles • Uses Pythagorean Theorem to solve right triangles in applied problems • Identifies relationships among inscribed angles, radii, and chords • Uses the fact that the length of the arc intercepted by an angle is proportional to the radius to solve problems • Uses the slope criteria for parallel and perpendicular lines to solve geometric problems • Finds the point on a directed line segment between two given points that partitions the segment in a given ratio • Uses volume formulas for pyramids to solve problems	• Develops definitions of rotations, reflections, and translations in terms of angles, circles, perpendicular lines, parallel lines, and line segments • Explains how the criteria for triangle congruence follow from the definition of congruence in terms of rigid motions • Makes formal geometric constructions • Proves theorems about: ○ triangles ○ parallelograms ○ circles ○ polygons • Proves the Pythagorean Theorem using triangle similarity • Explains the relationship between the sine and cosine of complementary angles. • Uses trigonometric ratios to solve right triangles in applied problems • Uses relationships among inscribed angles, radii, and chords to solve problems • Derives the formula for the area of a sector. • Derives the equation of a circle to find the center and the radius • Derives the equation of a parabola given a focus and directrix • Uses coordinates to prove simple geometric theorems algebraically, including the distance formula and its relationship to the Pythagorean Theorem • Proves the slope criteria for parallel and perpendicular lines • Uses dissection arguments, Cavalieri's principle, and informal limit arguments to give an informal argument for the formulas for the circumference of a circle, area of a circle, volume of a cylinder, pyramid, and cone

Mathematics Grade 10	Partially Meeting Expectations On MCAS, a student at this level:	Meeting Expectations On MCAS, a student at this level:	Exceeding Expectations On MCAS, a student at this level:
Statistics and Probability	• Represents data with plots on the real number line • Usually uses statistics appropriate to the shape of the data distribution to compare center and spread of two or more different data sets • Usually interprets differences in shape, center, and spread in the context of the data sets, accounting for possible effects of extreme data points (outliers) • Interprets relative frequencies in the context of the data • Represents data on two quantitative variables on a scatter plot and describes how the data are related • Fits a linear function for a scatter plot that suggests a linear association and interprets the slope and the intercept of the model • Informally assesses the fit of a function by plotting and analyzing residuals • Describes events as subsets of a sample space using characteristics of the outcomes, or as unions, intersections, or complements of other events • Constructs and interprets two-way frequency tables of data when two categories are associated with each object being classified	• Consistently uses statistics appropriate to the shape of the data distribution to compare center and spread of two or more different data sets • Consistently interprets differences in shape, center, and spread in the context of the data sets, accounting for possible effects of extreme data points (outliers) • Recognizes possible associations and trends in the data contained in a two-way frequency table • Fits a linear function to the data and uses the fitted function to solve problems in the context of the data • Computes and interprets the correlation coefficient of a linear fit • Distinguish between dependent and independent events • Uses a two-way table to approximate conditional probabilities • Recognizes the concepts of conditional probability and independence in everyday language and everyday situations • Applies the addition rule to calculate probabilities	• Applies the addition rule and interprets the answer in terms of the model • Distinguishes between correlation and causation • Knows that the conditional probability of A given B is P(A and B)/P(B) and uses it to solve problems • Explains the concepts of conditional probability and independence in everyday language and everyday situations

MCAS Next-Generation Achievement Level Descriptors
Science and Technology/Engineering

Next-Generation Achievement Level Descriptors

Exceeding Expectations
A student who performed at this level exceeded grade-level expectations by demonstrating mastery of the subject matter.

Meeting Expectations
A student who performed at this level met grade-level expectations and is academically on-track to succeed in the current grade in this subject.

Partially Meeting Expectations
A student who performed at this level partially met grade-level expectations in this subject. The school, in consultation with the student's parent/guardian, should consider whether the student needs additional academic assistance to succeed in this subject.

Not Meeting Expectations
A student who performed at this level did not meet grade-level expectations in this subject. The school, in consultation with the student's parent/guardian, should determine the coordinated academic assistance and/or additional instruction the student needs to succeed in this subject.

Grade 5 MCAS Next-Generation Achievement Level Descriptors
Science and Technology/Engineering

Student results on the MCAS tests are reported according to four achievement levels: *Exceeding Expectations, Meeting Expectations, Partially Meeting Expectations,* and *Not Meeting Expectations.* The descriptors below illustrate the knowledge and skills students demonstrate on MCAS at each level. Knowledge and skills are cumulative at each level. No descriptors are provided for the *Not Meeting Expectations* achievement level because students work at this level, by definition, does not meet the criteria of the *Partially Meeting Expectations* level.

STE Grade 5	Partially Meeting Expectations *On MCAS, a student at this level:*	Meeting Expectations *On MCAS, a student at this level:*	Exceeding Expectations *On MCAS, a student at this level:*
Understanding and Application of Disciplinary Core Ideas	Demonstrates a partial understanding of some scientific concepts and processes by identifying and sometimes describing or providing evidence for these concepts and processes. Uses some basic scientific terms in common scientific examples.	Demonstrates a solid understanding of many scientific concepts and processes by mostly describing, explaining, and providing evidence for these concepts and processes. Mostly applies appropriate scientific terms in a variety of applications, including common science examples and some novel situations.	Demonstrates a comprehensive, in-depth understanding of many scientific concepts and processes by consistently describing, explaining, and providing evidence for these concepts and processes. Consistently applies scientific terms in appropriate contexts in both common science examples and many novel situations.
Understanding and Application of Scientific and Engineering Practices	Identifies a testable, scientific question for an investigation. Completes a simple, commonly used model. Uses simple graphs or data to draw general conclusions about a familiar scientific investigation or phenomena. Identifies evidence to support a claim. Describes a benefit or drawback of simple design features given a familiar device or prototype.	Develops some testable, scientific questions for an investigation. Completes or uses a model and describes some strengths and weaknesses of the model. Analyzes multiple sources of data, including graphs and tables, to draw conclusions about a familiar scientific investigation or phenomena. Provides some evidence to support a claim and constructs basic explanations for scientific phenomena or results from an investigation. Analyzes design features of a familiar device or prototype and describes a benefit or drawback of the design.	Consistently develops testable, scientific questions for an investigation. Creates a model, consistently describes the strengths and weaknesses of the model, and provides information for how to improve the model. Analyzes multiple sources of data, including graphs and tables, to draw conclusions about a novel or complex scientific investigation or phenomena. Provides several pieces of evidence to support a claim and constructs thorough explanations for scientific phenomena or results from an investigation. Analyzes design features of a novel device or prototype and constructs an explanation for how the design features meet criteria for success or are limited by constraints.

Grade 5 MCAS Next-Generation Achievement Level Descriptors
Science and Technology/Engineering

Student results on the MCAS tests are reported according to four achievement levels: *Exceeding Expectations, Meeting Expectations, Partially Meeting Expectations,* and *Not Meeting Expectations.* The descriptors below illustrate the knowledge and skills students demonstrate on MCAS at each level. Knowledge and skills are cumulative at each level. No descriptors are provided for the *Not Meeting Expectations* achievement level because students work at this level, by definition, does not meet the criteria of the *Partially Meeting Expectations* level.

Earth and Space Science	**Partially Meeting Expectations** ***On MCAS, a student at this level:***	**Meeting Expectations** ***On MCAS, a student at this level:***	**Exceeding Expectations** ***On MCAS, a student at this level:***
ESS1. Earth's Place in the Universe	Identifies the Sun, the Moon, and Earth in a model. Recognizes that the Sun is a star. Recognizes that people at different locations on Earth may experience day and night at the same time. Given a pattern of moon phases, selects the Moon phase that completes the pattern. Recognizes that shadows change over the course of a day because of the apparent movement of the Sun. Supports a claim with evidence that an environment has changed over time, such as a forested area that was once covered by water. Classifies whether geologic structures were formed by erosion or deposition.	Completes a model of the Sun, the Moon, and Earth and mostly describes the movements of each. Recognizes that the Sun is the only star in our solar system. Constructs an explanation for why people on Earth experience day and night. Describes how the Moon reflects the Sun's light and makes a pattern over approximately one month. Uses a model to show the pattern of the Moon over a week or a month. Completes a model showing the relationship between a shadow's length and the position of the Sun in the sky. Generally, describes the processes of erosion or deposition. Identifies the relative age of rock layers based on the position of the rock layers.	Develops a model of the Sun, the Moon, and Earth and consistently describes the movements of each. Explains why the Sun appears brighter than other stars. Constructs an explanation with evidence for why people at one location on Earth are experiencing day while people at another location on Earth are experiencing night. Explains how the Moon's reflection of the Sun's light and the orbit of the Moon are responsible for the phases of the Moon. Constructs an explanation for why the length and direction of a shadow changes during a day. Constructs an explanation with evidence of how erosion and deposition can change geologic structures or an area over time.
ESS2. Earth's Systems	Uses weather data tables or simple graphs to describe one of the following: precipitation, wind speed, or temperature for an area. Differentiates between two different types of climates. Completes a simple model of the water cycle.	Analyzes simple weather data patterns to describe expected weather for an area. Analyzes climate data for several different regions and describes differences in weather patterns. Recognizes that different regions can have different climate types.	Analyzes and interprets graphs and tables to draw conclusions about various weather patterns. Explains the difference between weather and climate and uses climate data to draw conclusions about the expected weather patterns of different climate types (e.g., desert, tropical, tundra).

Earth and Space Science	Partially Meeting Expectations *On MCAS, a student at this level:*	Meeting Expectations *On MCAS, a student at this level:*	Exceeding Expectations *On MCAS, a student at this level:*
	Identifies on a map where a volcano or earthquake is likely to occur. Recognizes evidence of weathering or erosion in a diagram or simple description. Interprets simple graphs to draw general conclusions about the relative amounts of fresh and saltwater on Earth.	Completes a model of the water cycle and describes what is happening in most of the water cycle stages. Analyzes a map to locate where mountain ranges, ocean trenches, volcanoes, and earthquakes are likely to occur. Describes the processes of weathering and erosion and applies them to common examples, such as landslides, canyons, valleys, etc. Analyzes a map to identify water sources as fresh or saltwater, including fresh water stored in glaciers and polar ice caps.	Develops a model of the water cycle, including absorption and surface runoff, and describes how heat energy is needed for water to cycle. Explains why mountain ranges, ocean trenches, volcanoes, and earthquakes occur at plate boundaries. Explains how landscapes change due to weathering and erosion and provides examples of each process. Describes different sources of fresh water and saltwater and explains why it is important to understand the relative amounts of these types of water on Earth.
ESS3. Earth and Human Activity	Categorizes some common examples of renewable and nonrenewable energy resources. Identifies one way to reduce human impact on the environment for a given situation. Identifies one design solution to reduce the impact of a weather event, such as a hurricane, or other natural event, such as an earthquake, on humans. Identifies a testable question about a filter to determine how well the filter will work.	Explains why some sources of energy are considered renewable and others are not. Consistently categorizes energy sources as either renewable or nonrenewable. Describes different ways to reduce human impact on the environment for a given situation. Identifies multiple design solutions to reduce the impact of a weather event or other natural event on humans. Develops a testable question about how to improve the design of a filtering system and provides information about how to answer the question.	Explains how humans have impacted the environment in different ways and constructs explanations for how to reduce those impacts on the environment. Identifies multiple design solutions to reduce the impact of a weather event or other natural event on humans and explains how each design solution could reduce the impact. Develops testable questions about how to make several improvements to the design of a filtering system and provides evidence for how the improvements will better filter the water.

Grade 5 MCAS Next-Generation Achievement Level Descriptors
Science and Technology/Engineering

Student results on the MCAS tests are reported according to four achievement levels: *Exceeding Expectations, Meeting Expectations, Partially Meeting Expectations,* and *Not Meeting Expectations.* The descriptors below illustrate the knowledge and skills students demonstrate on MCAS at each level. Knowledge and skills are cumulative at each level. No descriptors are provided for the *Not Meeting Expectations* achievement level because students work at this level, by definition, does not meet the criteria of the *Partially Meeting Expectations* level.

Life Science	**Partially Meeting Expectations** ***On MCAS, a student at this level:***	**Meeting Expectations** ***On MCAS, a student at this level:***	**Exceeding Expectations** ***On MCAS, a student at this level:***
LS1. From Molecules to Organisms: Structures and Processes	Completes a model of an organism's life cycle and describes the importance of one stage of the life cycle. Supports a claim with evidence about how the function of an animal or plant structure helps it to survive. Recognizes that photosynthesis is important for the survival of a plant.	Compares the life cycles of two organisms and describes similarities between the two life cycles, including the importance of some of the stages. Supports claims with evidence about how different functions of animal or plant structures helps the animal or plant to survive. Completes a model showing some of the inputs (sunlight, air, water) or outputs (sugars) of photosynthesis.	Constructs an explanation for why each stage of the life cycle is important, using examples of both plants and animals. Supports claims with evidence about how several structures of animals and plants allow for the survival, growth, and reproduction of different organisms. Develops a model showing the inputs and outputs of photosynthesis and explains the importance of photosynthesis for the survival and growth of a plant.
LS2. Ecosystems: Interactions, Energy, and Dynamics	Analyzes a simple food web or other model and identifies the ecological role of some of the organisms. Recognizes that the energy organisms depend on originates from the Sun. Describes one way animals and plants use energy. Identifies the function of a composter and one design element of a composter. Identifies a type of organism (bacteria or fungi) that breaks down dead organisms.	Analyzes a food web or other model, identifies the ecological roles of several of the organisms, and describes some of the roles of the organisms. Analyzes a model and describes the flow of energy through a simple food web. Analyzes several composter designs and describes some advantages and disadvantages of each design. Describes the importance of decomposers in recycling matter back to the soil.	Analyzes food webs and other models and consistently describes the ecological roles of the organisms. Completes a model to show energy transfer through a food web and describes how energy is transferred from one organism to another. Analyzes several composter designs, describes several advantages and disadvantages of each, and explains which composter is best to use. Explains what would happen to an ecosystem without decomposers and explains how decomposers recycle matter back into both the soil and air.

Life Science	Partially Meeting Expectations *On MCAS, a student at this level:*	Meeting Expectations *On MCAS, a student at this level:*	Exceeding Expectations *On MCAS, a student at this level:*
LS3. Heredity: Inheritance and Variation of Traits	Provides observable evidence that traits are inherited from a parent. Recognizes that some basic characteristics are inherited, while others are a result of the environment.	Analyzes data and draws some conclusions about familiar traits that are inherited and characteristics that are a result of the environment.	Analyzes novel data and draws conclusions about traits that are inherited and characteristics that are a result of the environment.
LS4. Biological Evolution: Unity and Diversity	Identifies the type of environment where an organism once lived based on fossilized remains. Supports a claim with one piece of evidence for how some individuals within a population may have a survival advantage over other individuals in the population. Uses evidence, such as an organism's structure, to describe how an organism is well adapted to its environment. Recognizes what may happen to an organism if its environment changes and it is unable to move away.	Classifies fossils based on their physical characteristics, including the type of environment where the fossilized organism once lived. Supports a claim with several pieces of evidence for how some individuals within a population may have a survival advantage over other individuals in the population. Identifies an example of how an organism is well adapted to its environment. Describes what will happen to a population if individuals within that population are unable to reproduce.	Constructs an explanation for why the fossil record is incomplete due to many organisms not being fossilized. Given data about the characteristics of a novel organism, draws conclusions and explains how the organism is well adapted to its environment. Explains, with evidence, if an organism is likely to survive environmental changes. Explains why reproduction is critical to the survival of a species.

Grade 5 MCAS Next-Generation Achievement Level Descriptors
Science and Technology/Engineering

Student results on the MCAS tests are reported according to four achievement levels: *Exceeding Expectations, Meeting Expectations, Partially Meeting Expectations,* and *Not Meeting Expectations.* The descriptors below illustrate the knowledge and skills students demonstrate on MCAS at each level. Knowledge and skills are cumulative at each level. No descriptors are provided for the *Not Meeting Expectations* achievement level because students work at this level, by definition, does not meet the criteria of the *Partially Meeting Expectations* level.

Physical Science	**Partially Meeting Expectations** ***On MCAS, a student at this level:***	**Meeting Expectations** ***On MCAS, a student at this level:***	**Exceeding Expectations** ***On MCAS, a student at this level:***
PS1. Matter and Its Interactions	Analyzes a simple particle model of matter and identifies the phase of the substance. Completes a graph to show the masses of substances after a phase change or after a chemical reaction. Analyzes a simple set of data to determine the best material to use in a common situation, based on the material's characteristic properties. Determines if a chemical reaction occurred or if a mixture was formed during an investigation and provides one piece of evidence to support the claim.	Analyzes a particle model of a substance before and after a phase change to determine phases of the substance and the phase change that occurred. Constructs an explanation about how mass is conserved during a phase change or a chemical reaction. Analyzes a set of data about materials, identifies the best material to use in a given situation, and provides evidence for the reasoning. Develops a question to determine if a chemical reaction occurred or if a mixture was formed during an investigation and provides possible answers to the question with pieces of evidence to support the answers.	Analyzes particle models of substances before and after phase changes to determine the phase change that occurred and describes whether heat was added or removed. Describes an investigation that could be used to show that mass is conserved during a phase change or chemical reaction. Analyzes multiple sets of data to determine the best materials to use in a variety of different situations, based on the material's characteristic properties. Supports the conclusions with evidence from the data. Describes an investigation that could be used to determine if a chemical reaction will occur or if a mixture will be formed when two substances are combined and includes information about evidence that would be needed to make the determination.
PS2. Motion and Stability: Forces and Interactions	Interprets a diagram to determine if balanced forces are acting on an object. Labels a model showing the direction of the gravitational force on an object on Earth. Identifies if two magnets will be attracted to each other or repelled from each other based on the magnets' orientations. Recognizes that either an attractive or a repulsive force exists between two magnets.	Determines if the motion of an object will change, based on a diagram showing the forces acting on the object. Describes how friction affects the motion of an object. Completes a model showing the direction of the gravitational force on multiple objects that are on or near the surface of Earth. Completes a model of the poles on several magnets based on whether the magnets attract each other or repel each other.	Completes a diagram of the forces acting on an object based on whether the object is at rest, moving at a constant speed, or changing speed and explains the reasoning. Describes how different surface textures affect friction. Constructs an explanation about the gravitational force exerted by Earth on objects always being toward the center of Earth. Describes an investigation that could be used to determine the poles of magnets and explains what evidence could be used to make this determination.

Physical Science	Partially Meeting Expectations *On MCAS, a student at this level:*	Meeting Expectations *On MCAS, a student at this level:*	Exceeding Expectations *On MCAS, a student at this level:*
PS3. Energy	Interprets a graph that shows the relationship between speed and kinetic energy. Identifies one type of energy that is produced when a collision occurs. Describes one way that energy can be moved from one place to another. Interprets a familiar situation to describe one way that stored energy is converted to another type of energy.	Describes the relationship between the speed of an object and the kinetic energy of that object. Describes the energy conversions that take place when two objects collide. Interprets a given scenario and describe one way that energy is transferred in the scenario. Describes two energy conversions in a given situation including kinetic energy being converted to electrical energy and/or stored energy being converted into another type of energy.	Completes a graph showing the kinetic energy of object as the speed of the object changes and explains why the graph should be completed in that way. Constructs an explanation about the energy conversions that take place when two objects collide and supports the explanation with evidence. Analyzes a novel scenario and describes multiple ways that energy is transferred from place to place and how energy is converted in multiple ways.
PS4. Waves and Their Applications in Technologies for Information Transfer	Recognizes that waves can cause an object to move. Uses a simple model of a wave to show that the wave has a regular pattern. Recognizes that light must be reflected off an object and enter the eye for the object to be seen. Given a communication system, identifies one component (encoder, decoder, receiver, sender) of the system.	Generally, describes that waves carry energy and can cause objects to move. Completes a model showing that a wave has a regular pattern of motion. Develops a model to show how light reflects off an object and enters the eye so the object can be seen. Describes at least two components of a given communication system.	Constructs an explanation about how an object can be moved by the energy of a wave. Explains how objects are seen by the eye, using evidence from a given scenario. Consistently describes the components of a communication system for a given scenario.

Grade 5 MCAS Next-Generation Achievement Level Descriptors
Science and Technology/Engineering

Student results on the MCAS tests are reported according to four achievement levels: *Exceeding Expectations, Meeting Expectations, Partially Meeting Expectations,* and *Not Meeting Expectations.* The descriptors below illustrate the knowledge and skills students demonstrate on MCAS at each level. Knowledge and skills are cumulative at each level. No descriptors are provided for the *Not Meeting Expectations* achievement level because students work at this level, by definition, does not meet the criteria of the *Partially Meeting Expectations* level.

Technology/ Engineering	**Partially Meeting Expectations** ***On MCAS, a student at this level:***	**Meeting Expectations** ***On MCAS, a student at this level:***	**Exceeding Expectations** ***On MCAS, a student at this level:***
ETS1. Engineering Design **and** **ETS3. Technological Systems**	Identifies a criterion for success and a constraint when given a simple design problem. Identifies one solution to a simple engineering design problem. Analyzes different representations of a simple design solution and chooses the most appropriate one for a given situation. Identifies the importance of a prototype. Identifies the difference between an innovation and an invention.	Describes several criteria for success and constraints when given a design problem. Generates a solution to an engineering design problem and generally explains how the solution could be successful based on evidence. Analyzes different representations of a design solution, chooses the most appropriate representation for the given situation, and explains the reasoning. Identifies several design features of a prototype and explains how these features are important to the design of the prototype. Analyzes a design feature of a prototype and explains the importance of a prototype. Describes one innovation to an existing technology. Provides an example of an invention, including common examples and some novel examples.	Explains how certain criteria for success and constraints will impact the solution to a design problem. Generates two or more solutions to an engineering design problem and explains in detail how the solutions could be successful and identifies possible failure points for each solution. Describes an appropriate representation for a design solution and explains the reasoning. Describes several design features of prototypes and explains the benefits and possible limitations of each. Explains why prototypes are constructed and explains the importance of redesigning a prototype. Explains why a novel technology is an innovation or an invention, given a description of the technology.

MCAS Next-Generation Achievement Level Descriptors
Science and Technology/Engineering

Next-Generation Achievement Level Descriptors

Exceeding Expectations
A student who performed at this level exceeded grade-level expectations by demonstrating mastery of the subject matter.

Meeting Expectations
A student who performed at this level met grade-level expectations and is academically on-track to succeed in the current grade in this subject.

Partially Meeting Expectations
A student who performed at this level partially met grade-level expectations in this subject. The school, in consultation with the student's parent/guardian, should consider whether the student needs additional academic assistance to succeed in this subject.

Not Meeting Expectations
A student who performed at this level did not meet grade-level expectations in this subject. The school, in consultation with the student's parent/guardian, should determine the coordinated academic assistance and/or additional instruction the student needs to succeed in this subject.

Grade 8 MCAS Next-Generation Achievement Level Descriptors
Science and Technology/Engineering

Student results on the MCAS tests are reported according to four achievement levels: *Exceeding Expectations, Meeting Expectations, Partially Meeting Expectations,* and *Not Meeting Expectations.* The descriptors below illustrate the knowledge and skills students demonstrate on MCAS at each level. Knowledge and skills are cumulative at each level. No descriptors are provided for the *Not Meeting Expectations* achievement level because students work at this level, by definition, does not meet the criteria of the *Partially Meeting Expectations* level.

STE Grade 8	Partially Meeting Expectations *On MCAS, a student at this level:*	Meeting Expectations *On MCAS, a student at this level:*	Exceeding Expectations *On MCAS, a student at this level:*
Understanding and Application of Disciplinary Core Ideas	Demonstrates a partial understanding of some scientific concepts and processes by identifying and sometimes describing or providing evidence for these concepts and processes. Uses some basic scientific terms in common scientific examples.	Demonstrates a solid understanding of many scientific concepts and processes by mostly describing, explaining, and providing evidence for these concepts and processes. Mostly applies appropriate scientific terms in a variety of applications, including common science examples and some novel situations.	Demonstrates a comprehensive, in-depth understanding of many scientific concepts and processes by consistently describing, explaining, and providing evidence for these concepts and processes. Consistently applies scientific terms in appropriate contexts in both common science examples and many novel situations.
Understanding and Application of Scientific and Engineering Practices	Identifies a testable, scientific question for an investigation. Completes a simple, commonly used model. Uses simple graphs or data to draw general conclusions about a familiar scientific investigation or phenomena. Identifies evidence to support a claim. Describes a benefit or drawback of simple design features given a familiar device or prototype.	Develops some testable, scientific questions for an investigation. Completes or uses a model and describes some strengths and weaknesses of the model. Analyzes multiple sources of data, including graphs and tables, to draw conclusions about a familiar scientific investigation or phenomena. Provides some evidence to support a claim and constructs basic explanations for scientific phenomena or results from an investigation. Analyzes design features of a familiar device or prototype and describes a benefit or drawback of the design.	Consistently develops testable, scientific questions for an investigation. Creates a model, consistently describes the strengths and weaknesses of the model, and provides information for how to improve the model. Analyzes multiple sources of data, including graphs and tables, to draw conclusions about a novel or complex scientific investigation or phenomena. Provides several pieces of evidence to support a claim and constructs thorough explanations for scientific phenomena or results from an investigation. Analyzes design features of a novel device or prototype and constructs an explanation for how the design features meet criteria for success or are limited by constraints.

Grade 8 MCAS Next-Generation Achievement Level Descriptors
Science and Technology/Engineering

Student results on the MCAS tests are reported according to four achievement levels: *Exceeding Expectations, Meeting Expectations, Partially Meeting Expectations,* and *Not Meeting Expectations.* The descriptors below illustrate the knowledge and skills students demonstrate on MCAS at each level. Knowledge and skills are cumulative at each level. No descriptors are provided for the *Not Meeting Expectations* achievement level because students work at this level, by definition, does not meet the criteria of the *Partially Meeting Expectations* level.

Earth and Space Science	**Partially Meeting Expectations** ***On MCAS, a student at this level:***	**Meeting Expectations** ***On MCAS, a student at this level:***	**Exceeding Expectations** ***On MCAS, a student at this level:***
ESS1. Earth's Place in the Universe	Completes a model of the Earth-Sun-Moon system to show either a solar or a lunar eclipse. Identifies the basic pattern of the moon phases. Recognizes that the tilt of Earth's axis causes the seasons. Recognizes that gravity affects high and low tides, Earth's orbit, and the Moon's orbit. Recognizes that the Milky Way galaxy contains many solar systems, and that Earth is one planet within our solar system. Identifies the bottom layer of rock as the oldest and the top layer of rock as the youngest. Identifies some of the processes that play a role in the formation of rock.	Develops a model showing the positions of the Sun, the Moon, and Earth during a solar or a lunar eclipse. Completes a model of the moon phases. Compares the intensity of sunlight at different locations on Earth during different seasons of the year. Analyzes models to determine where high and low tides occur based on the position of the Moon. Describes the role that gravity plays in orbital motions. Orders the planets, our solar system, the Milky Way galaxy, and the universe by their relative sizes. Analyzes a model showing several layers of rock and draws conclusions about the relative ages of the fossils found in the rock layers. Uses rock layers and fossil evidence to describe how the geology of a particular area has changed over time, such as from a sea floor to a forest.	Constructs an explanation for why people see solar and lunar eclipses on Earth. Constructs an explanation for why people on Earth observe the phases of the Moon. Analyzes a graph to describe how changes in the duration and intensity of sunlight during a year determines the seasons. Supports conclusions with evidence from the graph. Completes models showing where high and low tides occur and explains why there are high and low tides in these locations. Compares and draws conclusions about the force of gravity on planets, moons, asteroids, comets, etc. in our solar system. Analyzes a model showing several layers of rock containing a fault to draw a conclusion about the relative age of the fault. Constructs an explanation for how rock layers and geologic structures, such as canyons, volcanoes, mountains, and beaches, are formed through weathering, erosion, heat, pressure, and/or deposition.

Earth and Space Science	**Partially Meeting Expectations** *On MCAS, a student at this level:*	**Meeting Expectations** *On MCAS, a student at this level:*	**Exceeding Expectations** *On MCAS, a student at this level:*
ESS2. Earth's Systems	Uses a model to show that geologic structures, such as volcanoes and mountain ranges, are formed where plates are pushed together. Recognizes that surface structures continue to change over time due to geologic processes, such as weathering, erosion, glaciation, and the movement of Earth's plates. Completes a model showing the primary steps of the water cycle. Analyzes weather data and draws simple conclusions about the precipitation and temperature of an area. Recognizes that temperatures near the ocean are more stable than temperatures of inland locations.	Uses a model to describe the role of convection currents in the movement of Earth's plates and identifies where convection currents occur. Describes how geologic processes form and shape geologic structures, such as mid-ocean ridges, mountains, and volcanoes, and cause geologic events, including earthquakes, landslides, and volcanic eruptions. Analyzes maps and other evidence to draw conclusions about the movement of Earth's plates. Describes the role of solar energy and gravity in the water cycle. Describes the weather conditions that typically occur when cool and warm air masses collide.	Constructs an explanation for how the movement of Earth's plates causes various geologic events, such as earthquakes, volcanic eruptions, and tsunamis. Uses data to explain the relative time scales different geologic structures form over. Supports a claim about the movement of Earth's plates using several pieces of evidence, such as the shapes of continents and the locations of specific fossils and types of rock. Describes evidence that glaciers were once present in an area. Constructs an explanation for how each stage of the water cycle is dependent upon energy from the Sun and/or the Earth's gravity. Describes how air masses move and how the movement of air masses affects the weather in an area.
ESS3. Earth and Human Activity	Analyzes a basic map to draw general conclusions about the distribution of minerals or fossil fuels on Earth. Identifies one way that humans can mitigate the impact of increases in human population on natural resources and the environment. Analyzes a simple graph or data table to draw conclusions about how climate change is affecting an area.	Provides a partial explanation for why some resources, such as fossil fuels, water, and mineral/ores, are unevenly distributed on Earth. Describes various ways that humans can mitigate the overuse of Earth's resources, such as using renewable energy sources, recycling, using public transportation, etc. Constructs an explanation that human activities, such as fossil fuel combustion, agriculture, and deforestation, have played a role in rising global temperatures.	Explains why natural resources are unevenly distributed on Earth. Analyzes data, including graphs and maps, to draw conclusions about how humans use natural resources and identifies some ways human can mitigate the overuse of these resources. Constructs an explanation using evidence that human activities, such as fossil fuel combustion, agriculture, and deforestation, have played a role in rising global temperatures over the past century. Describes several ways humans can mitigate the effects of climate change.

Grade 8 MCAS Next-Generation Achievement Level Descriptors
Science and Technology/Engineering

Student results on the MCAS tests are reported according to four achievement levels: *Exceeding Expectations, Meeting Expectations, Partially Meeting Expectations,* and *Not Meeting Expectations.* The descriptors below illustrate the knowledge and skills students demonstrate on MCAS at each level. Knowledge and skills are cumulative at each level. No descriptors are provided for the *Not Meeting Expectations* achievement level because students work at this level, by definition, does not meet the criteria of the *Partially Meeting Expectations* level.

Life Science	**Partially Meeting Expectations** ***On MCAS, a student at this level:***	**Meeting Expectations** ***On MCAS, a student at this level:***	**Exceeding Expectations** ***On MCAS, a student at this level:***
LS1. From Molecules to Organisms: Structures and Processes	Recognizes that animal, plant, and bacterial cells have some shared characteristics and some different characteristics. Recognizes some parts of a cell and the function of some cell parts. Describes two body systems and how they work together. Identifies some behaviors and structures of plants and animals that enables them to survive and successfully reproduce. Identifies a characteristic that is inherited and a characteristic that is mostly a result of the environment. Recognizes that all organisms need an energy source and nutrients to survive.	Uses the characteristics of cells to categorize an organism as an animal, plant, or bacteria. Given a diagram of a cell, identifies the cell parts and describes most functions of the cell parts. Generally, describes how different body systems work together. Provides evidence for how some organisms are able survive and reproduce more than other organisms. Analyzes information about an organism to determine which characteristics are inherited and which characteristics are mostly a result of the environment. Describes how carbohydrates, proteins, and fats are broken down to support cell growth and to release energy (cellular respiration).	Compares animal, plant, and bacterial cells and identifies both similarities and differences between them. Consistently describes the functions of cell parts. Describes how the interactions between body systems can be affected by a condition or disease based on the functions of the body systems. Explains how various structures and behaviors can provide survival and reproductive advantages to plants and animals. Uses evidence to explain why some characteristics are inherited and other characteristics are a result of both inheritance and the environment. Using a model, explains how food molecules are broken down and rearranged to provide nutrients for cell growth and energy for cellular processes.

Life Science	**Partially Meeting Expectations** *On MCAS, a student at this level:*	**Meeting Expectations** *On MCAS, a student at this level:*	**Exceeding Expectations** *On MCAS, a student at this level:*
LS2. Ecosystems: Interactions, Energy, and Dynamics	Interprets graphs to determine whether the size of a population increased, decreased, or stayed the same. Identifies one ecological relationship (competitive, predator-prey, parasitic, or mutually beneficial) when given a description of the interaction of two organisms. Recognizes that the biodiversity of a population is positively correlated with its size. Identifies how an ecosystem and how an organism living in the ecosystem can be helped by a human action.	Analyzes population data, including graphs, to describe changes in the size a particular population over time. Identifies several ecological relationships when given the interactions of organisms in an environment (including analyzing a food web). Completes models to show the cycling of matter through photosynthesis, cellular respiration, and decomposition. Uses a model of an ecosystem to describe how a disruption to the ecosystem can have an effect on an organism in the ecosystem. Describes multiple ways how the biodiversity of a population can be increased. Describes several ways an ecosystem and the organisms living in the ecosystem can be helped by human actions.	Constructs an explanation for the reasons why populations grow versus decline over time. Analyzes a complex food web and describes the ecological roles of the organisms. Consistently describes the roles of producers, primary, secondary, tertiary consumers, and decomposers in a model. Develops a model to show the cycling of matter and energy through an ecosystem, including the role of photosynthesis, cellular respiration, and decomposition. Uses a model of an ecosystem to construct an explanation with evidence for how a natural or manmade disruption to the environment can affect multiple populations in the ecosystem. Evaluates competing designs for protecting an ecosystem and its inhabitants from threats such as climate change, habitat loss, pollution, or overharvesting of resources.
LS3. Heredity: Inheritance and Variation of Traits	Uses a model to show that chromosomes are made up of genetic information. Identifies one benefit of sexual reproduction or one benefit of asexual reproduction. Recognizes that offspring from sexual reproduction inherit genes and characteristics from two parents. Analyzes a simple Punnett square to determine the expected percentage of offspring with a certain trait.	Completes a model to show that chromosomes hold genes and genes hold the instructions for proteins. Describes mutations as changes to genes. Identifies examples of mutations that are harmful, beneficial, or neutral to changes in traits of an organism. Describes some of the benefits and drawbacks of sexual versus asexual reproduction. Completes a Punnett square to determine the expected percentage of offspring that will inherit certain genotypes (allele pairs) and phenotypes (traits).	Develops a model to show that chromosomes are made up of genes and that genes contain the instructions for proteins, which determine the inherited characteristics of an organism. Describes how a mutation may be harmful, neutral, or beneficial to an organism depending on its interactions with the environment. Constructs an explanation for why some organisms benefit from asexual reproduction while other organisms benefit from sexual reproduction. Develops a model to show that sexual reproduction results in sets of chromosomes (found in the nucleus) from each parent, and therefore an allele for each gene is inherited from each parent.

Life Science	**Partially Meeting Expectations** ***On MCAS, a student at this level:***	**Meeting Expectations** ***On MCAS, a student at this level:***	**Exceeding Expectations** ***On MCAS, a student at this level:***
LS4. Biological Evolution: Unity and Diversity	Analyzes fossil evidence to draw conclusions about different organisms living at different times. Compares a structure in a living organism to a structure from a fossilized organism and draws a conclusion about their similarity. Recognizes that individuals with certain inherited characteristics have a higher probability of surviving than individuals without those characteristics. Identifies one difference between natural selection and artificial selection.	Analyzes fossil evidence to describe how the environment in an area has changed over geologic time. Explains how living and fossilized organisms can have similar body structures with similar or different functions. Identifies examples of natural selection and generally explains why they are examples of natural selection. Compares examples of natural selection and artificial selection.	Constructs an explanation using fossil evidence for how similar structures can be used to infer whether two types of organism share a recent common ancestor. Constructs an explanation for how a trait can become more common in a population over time due to natural selection. Describes advantages and disadvantages of both natural and artificial selection.

Grade 8 MCAS Next-Generation Achievement Level Descriptors
Science and Technology/Engineering

Student results on the MCAS tests are reported according to four achievement levels: *Exceeding Expectations, Meeting Expectations, Partially Meeting Expectations,* and *Not Meeting Expectations.* The descriptors below illustrate the knowledge and skills students demonstrate on MCAS at each level. Knowledge and skills are cumulative at each level. No descriptors are provided for the *Not Meeting Expectations* achievement level because students work at this level, by definition, does not meet the criteria of the *Partially Meeting Expectations* level.

Physical Science	**Partially Meeting Expectations** ***On MCAS, a student at this level:***	**Meeting Expectations** ***On MCAS, a student at this level:***	**Exceeding Expectations** ***On MCAS, a student at this level:***
PS1. Matter and Its Interactions	Identifies that all living and non-living things are made-up of atoms. Identifies that mixtures can be separated by physical means. Using data, identifies one piece of evidence that a chemical reaction or a physical change occurred. Interprets a particle model to determine the three states of matter shown in the model. Recognizes that a new substance is formed when a chemical reaction occurs. Given data, determines if energy is being absorbed or released in a chemical reaction. Calculates the density of an object given its mass and volume.	Completes a model showing how atoms form compounds and molecules. Describes how mixtures are made up of pure substances that can be separated by physical means. Using data, identifies multiple pieces of evidence that a chemical reaction or a physical change occurred. Partially describes how particle motion, spatial arrangement, or temperature of a substance change when thermal energy is added to or removed from the substance. Completes a bar graph to show the conservation of mass in a chemical reaction or a physical change. Given a chemical reaction, identifies if it is exothermic and endothermic based on whether or not thermal energy is released or absorbed. Describes, compares, and calculates the densities of different materials.	Analyzes a chemical formula to determine the number of each type of atom that makes up a given molecule. Analyzes data to determine which substances are pure substances. Explains the difference between a chemical reaction and a physical change and provides multiple pieces of evidence to support the explanation. Consistently describes how particle motion, spatial arrangement, and temperature of a substance change when thermal energy is added to or removed from the substance. Relates temperature to a measure of average kinetic energy and recognizes that temperature/kinetic energy does not change as a substance is changing state. Supports a claim that matter is not created or destroyed during a chemical reaction or a physical change, using evidence from an investigation. Describes the difference between an endothermic and exothermic reaction. Supports the description with evidence from a chemical reaction. Determines whether an object would float or sink in water due its density and supports the answer with evidence.

Physical Science	Partially Meeting Expectations *On MCAS, a student at this level:*	Meeting Expectations *On MCAS, a student at this level:*	Exceeding Expectations *On MCAS, a student at this level:*
PS2. Motion and Stability: Forces and Interactions	Given a model, recognizes that an object that applies a force to another object will also experience a force acting on it. Recognizes that the speed of an object will change if the mass of the object changes and the forces acting on the object are constant. Recognizes that the speed of an object will change if the forces acting on the object are not balanced. Recognizes that two positive charges or two negative charges will repel each other, and a negative charge and a positive charge will attract each other. Completes a model, to show that gravitational forces are always attractive. Using a model, describes how an object can exert forces on another object, even when the objects are not in contact with each other.	Analyzes models to draw conclusions about the forces acting on objects during a collision. Completes a graph to show how the change in speed of an object, with a constant net force acting on it, depends on the mass of the object. Completes a model to show whether the speed of an object will increase, decrease, or remain constant based on the forces acting on an object. Completes a model to show how the distance between two electric charges or the magnitudes of the charges affects the strength of the forces between the charges. Describes how the mass of objects affects the gravitational forces on the objects. Completes a model of the electric, magnetic, or gravitational field around an object.	Develops models to show the forces acting on objects before, during, and after a collision. Develops a model to show how the change in speed of an object depends on the mass of the object and the net force acting on the object. Uses data to construct an explanation about how the distance between two electric charges or the magnitudes of the charges affects the strength of the force between the charges. Develops a model showing the relative magnitudes of gravitational forces acting between two objects. Completes a model of the electric, magnetic, or gravitational field between two objects.
PS3. Energy	Interprets a graph to show how the kinetic energy of an object relates to the speed of the object, or vice versa. Interprets data to describe what will happen to an object's kinetic energy as its potential energy decreases. Identifies the flow of thermal energy from hot to cold. Identifies an example of conduction, radiation, or convection. Describes how it takes more time to heat an object that has more mass than an object (of the same material) with less mass. Using a graph, determines how an increase in average kinetic energy of an object results in an increase in temperature.	Completes a graph to show how the kinetic energy of an object relates to the speed of the object, or vice versa. Analyzes information, including graphics and data, and generally describes how the kinetic and potential energies of an object compare at different heights, when energy is conserved. Analyzes the conversions of different types of potential energy into kinetic energy and vice versa to draw conclusions about energy conservation. Generally, describes how thermal energy is transferred through conduction, radiation, and convection and generally describes ways this heat flow can be increased or decreased in a given situation.	Uses a graph to show how the kinetic energy of an object relates to the speed of the object, or vice versa, and explains the reasoning. Analyzes information, including graphics and data, and consistently describes how the kinetic and potential energies of an object compare at different heights, and is able to explain that energy is conserved. Explains how different types of potential energies are converted to kinetic energy and vice versa. Explains how thermal energy is transferred through conduction, radiation, and convection and fully describes ways the rate of this heat flow can be increased or decreased in a given situation. Constructs an explanation to show the relationships among the amount of energy transferred between

Physical Science	**Partially Meeting Expectations** ***On MCAS, a student at this level:***	**Meeting Expectations** ***On MCAS, a student at this level:***	**Exceeding Expectations** ***On MCAS, a student at this level:***
		Analyzes data and draws conclusions to describe how certain materials will better conduct thermal energy compared to others. Describes how average kinetic energy is related to temperature.	objects, how well materials of the objects retain or radiate heat, the masses of the objects, and the changes in the average kinetic energies of the object's materials.
PS4. Waves and Their Applications in Technologies for Information Transfer	Completes a model of a wave to show its frequency, amplitude, or wavelength. Given a model, sometimes identifies where waves are reflected, absorbed, or transmitted through a material. Identifies when a signal is either encoded or transmitted.	Compares two waves' frequencies, amplitudes, and wavelengths, and sometimes describes how these characteristics will affect the waves. Completes a model showing reflection, absorption, and transmission of a wave, including how waves are refracted. Describes the processes of encoding and transmitting.	Compares two or more waves' frequencies, amplitudes, and wavelengths, and consistently describes how these characteristics will affect the pattern of a wave. Develops a model to explain how waves are reflected, absorbed, or transmitted in a given situation, including how waves are refracted.

Grade 8 MCAS Next-Generation Achievement Level Descriptors
Science and Technology/Engineering

Student results on the MCAS tests are reported according to four achievement levels: *Exceeding Expectations, Meeting Expectations, Partially Meeting Expectations,* and *Not Meeting Expectations.* The descriptors below illustrate the knowledge and skills students demonstrate on MCAS at each level. Knowledge and skills are cumulative at each level. No descriptors are provided for the *Not Meeting Expectations* achievement level because students work at this level, by definition, does not meet the criteria of the *Partially Meeting Expectations* level.

Technology/ Engineering	Partially Meeting Expectations *On MCAS, a student at this level:*	Meeting Expectations *On MCAS, a student at this level:*	Exceeding Expectations *On MCAS, a student at this level:*
ETS1. Engineering Design	Identifies criteria and constraints of a design problem. Identifies one solution to a simple problem. Uses a simple design matrix to determine the best solution. Sometimes solves simple scale problems, given the actual measurement or the scaled measurement. Analyzes a design feature of a prototype and identifies the importance of a prototype.	Describes some criteria and constraints of a design problem. Describes a solution to a problem and explains how it could be successful based on evidence. Uses a design matrix to draw conclusions about possible solutions. Solves scale problems, given the actual measurement or the scaled measurement. Generally, describes appropriate design features of a prototype and describes the importance of a prototype.	Describes several criteria and constraints of a design problem. Describes several solutions to a problem and explains their limitations and benefits based on evidence. Uses a design matrix to draw conclusions about possible solutions and explains the reasoning. Explains when a scale drawing should be used and determines an appropriate scale for a given situation. Consistently describes appropriate design features of prototypes for a given situation.
ETS2. Materials, Tools, and Manufacturing	Recognizes basic properties of common materials (such as wood, metal, and plastic). Given data, chooses a material for a design problem given its characteristics. Given a set of tools, chooses the best tool for a given task. Identifies and describes some of the manufacturing processes (forming, separating, conditioning, assembling, finishing, quality control, and safety). Identifies an advantage or a disadvantage of using a computer or a human for a given task.	Describes properties (such as flexibility, ductility, hardness, thermal conductivity, electrical conductivity, and melting point) of common materials and generally uses the materials for appropriate design solutions. Describes the best tools to use for a given situation. Generally, describes a few steps of the manufacturing process in a given situation. Provides an advantage and a disadvantage of using a computer or a human for a given task.	Evaluates different materials and determines the best materials to use for a given design problem. Explains the reasoning, giving both drawbacks and benefits of the materials. Consistently describes several steps of the manufacturing process in a given situation. Provides multiple advantages and/or disadvantages of using a computer or a human for a given task.

Technology/ Engineering	**Partially Meeting Expectations** ***On MCAS, a student at this level:***	**Meeting Expectations** ***On MCAS, a student at this level:***	**Exceeding Expectations** ***On MCAS, a student at this level:***
ETS3. Technological Systems	Identifies and describes the functions of some components of a communication system (source, encoder, transmitter, receiver, decoder, and storage). Given a diagram, identifies and describes some of the functions of some components of a vehicle (structural, propulsion, guidance, suspension, and control subsystems). Given a diagram, identifies and describes some of the parts of a structural system (foundation, decking, wall, and roofing). Given a diagram, identifies a force (tension, torsion, compression, and shear) acting on a structure. Given a transportation, structural, or communication system, identifies some of the components of an engineering system: inputs, processes, outputs, and feedback.	Completes a model and describes the functions of several components of a communication system. Completes a model and describes most of the functions of some components of a vehicle. Identifies and describes most of the parts of a given structural system. Identifies and describes two forces acting on a shown structure. Identifies live and dead loads for a given scenario. Given a transportation, structural, or communication system, identifies and describes several components of an engineering system.	Develops a model and describes the functions of the components of a communication system. Develops a model and describes most of the functions of the components of a transportation system. Consistently identifies and describes the parts of a given structural system. Consistently identifies and describes forces acting on a shown structure. Describes live and dead loads for a given scenario. Given a transportation, structural, or communication system, consistently identifies and describes components of an engineering system.

High School Biology MCAS Next-Generation Achievement Level Descriptors

Next-Generation Achievement Level Descriptors

Exceeding Expectations
A student who performed at this level exceeded grade-level expectations by demonstrating mastery of the subject matter.

Meeting Expectations
A student who performed at this level met grade-level expectations and is academically on-track to succeed in the current grade in this subject.

Partially Meeting Expectations
A student who performed at this level partially met grade-level expectations in this subject. The school, in consultation with the student's parent/guardian, should consider whether the student needs additional academic assistance to succeed in this subject.

Not Meeting Expectations
A student who performed at this level did not meet grade-level expectations in this subject. The school, in consultation with the student's parent/guardian, should determine the coordinated academic assistance and/or additional instruction the student needs to succeed in this subject.

High School Biology
MCAS Next-Generation Achievement Level Descriptors

Student results on the MCAS tests are reported according to four achievement levels: *Exceeding Expectations, Meeting Expectations, Partially Meeting Expectations,* and *Not Meeting Expectations.* The descriptors below illustrate the knowledge and skills students demonstrate on MCAS at each level. Knowledge and skills are cumulative at each level. No descriptors are provided for the *Not Meeting Expectations* achievement level because students work at this level, by definition, does not meet the criteria of the *Partially Meeting Expectations* level.

HS Biology	**Partially Meeting Expectations** ***On MCAS, a student at this level:***	**Meeting Expectations** ***On MCAS, a student at this level:***	**Exceeding Expectations** ***On MCAS, a student at this level:***
Understanding and Application of Disciplinary Core Ideas	Demonstrates a partial understanding of some scientific concepts and processes by identifying and sometimes describing or providing evidence for these concepts and processes. Uses some basic scientific terms in common scientific examples.	Demonstrates a solid understanding of many scientific concepts and processes by mostly describing, explaining, and providing evidence for these concepts and processes. Mostly applies appropriate scientific terms in a variety of applications, including common science examples and some novel situations.	Demonstrates a comprehensive, in-depth understanding of many scientific concepts and processes by consistently describing, explaining, and providing evidence for these concepts and processes. Consistently applies scientific terms in appropriate contexts in both common science examples and many novel situations.
Understanding and Application of Scientific and Engineering Practices	Identifies a testable, scientific question for an investigation. Completes a simple, commonly used model. Uses simple graphs or data to draw general conclusions about a familiar scientific investigation or phenomena. Identifies evidence to support a claim. Describes a benefit or drawback of simple design features given a familiar device or prototype.	Develops some testable, scientific questions for an investigation. Completes or uses a model and describes some strengths and weaknesses of the model. Analyzes multiple sources of data, including graphs and tables, to draw conclusions about a familiar scientific investigation or phenomena. Provides some evidence to support a claim and constructs basic explanations for scientific phenomena or results from an investigation. Analyzes design features of a familiar device or prototype and describes a benefit or drawback of the design.	Consistently develops testable, scientific questions for an investigation. Creates a model, consistently describes the strengths and weaknesses of the model, and provides information for how to improve the model. Analyzes multiple sources of data, including graphs and tables, to draw conclusions about a novel or complex scientific investigation or phenomena. Provides several pieces of evidence to support a claim and constructs thorough explanations for scientific phenomena or results from an investigation. Analyzes design features of a novel device or prototype and constructs an explanation for how the design features meet criteria for success or are limited by constraints.

HS Biology	**Partially Meeting Expectations** *On MCAS, a student at this level:*	**Meeting Expectations** *On MCAS, a student at this level:*	**Exceeding Expectations** *On MCAS, a student at this level:*
LS1. From Molecules to Organisms: Structures and Processes	Identifies some of the most common elements that make up organic macromolecules. Describes a basic function of a type of organic macromolecule (carbohydrate, lipid, nucleic acid, or protein). Identifies the source of energy and the major reactants and products of photosynthesis by their names or chemical formulas. Describes ATP as a source of usable energy and that it is produced in mitochondria. Describes some major events of the cell cycle (including interphase, mitosis, cytokinesis) and their purposes. Identifies complementary base pairs for a DNA sequence and for an mRNA sequence. Identifies that a gene codes for a protein and describes one function of a protein. Completes a basic model to generally describe how a body system works. Describes one way the body maintains homeostasis.	Analyzes models to classify most organic macromolecules and identifies all common elements for a given example. Analyzes models of monomers to determine some types of organic macromolecules and describes some basic functions of these macromolecules. Constructs or completes models of photosynthesis using the names or chemical formulas of reactants and products and describes the importance of photosynthesis. Constructs or completes models of cellular respiration using the names or chemical formulas of reactants and products and describes the importance of cellular respiration. Completes a model to describe how major events of the cell cycle, including DNA replication, allow a cell to grow and survive. Describes the structure of DNA and how its structure affects its function. Describes how genes code for proteins through transcription and translation and describes several functions of proteins. Recognizes that all cells within the same organism have the same genes. Describes several functions of proteins. Describes the functions of structures and organs of body systems. Interprets models to draw a conclusion about the way the human body maintains homeostasis.	Analyzes models of monomers to consistently identify their organic macromolecules and describes the functions of these molecules. Constructs an explanation about the important uses of the products of photosynthesis for both plants and animals. Analyzes data to determine the relative amount of ATP that is generated by organisms under different conditions. Explains how ATP is used in a variety of ways by both animal and plant cells. Constructs an explanation about how the sequence of events of the cell cycle allows organisms to grow and survive. Describes specific functions of several proteins, including enzymes, hormones, and structural proteins. Calculates the percentage of one type of nitrogenous base for a DNA molecule using complementary base pairs. Analyzes and creates models of DNA, RNA, and amino acid chains to describe the products of replication, transcription, or translation. Analyzes data to determine when a gene is expressed and to determine whether replication, transcription, or translation occurs. Constructs an explanation about why different types of cells express different genes, which results in different cell functions. Analyzes data to draw conclusions about how body systems work together to support life functions. Constructs explanations about how body systems work to restore homeostasis when conditions change.

HS Biology	**Partially Meeting Expectations** ***On MCAS, a student at this level:***	**Meeting Expectations** ***On MCAS, a student at this level:***	**Exceeding Expectations** ***On MCAS, a student at this level:***
LS2. Ecosystems: Interactions, Energy, and Dynamics	Describes birth and immigration as factors that increase population size, and death and emigration as factors that decrease population size. Identifies some basic ecological relationships (such as predation, competition, mutualism), when given an example. Interprets a basic food web to identify simple ecological relationships. Analyzes a food web to identify the trophic level of a species. Recognizes that less energy is available at higher tropic levels in an energy pyramid. Identifies some carbon cycle processes and recognizes that carbon is released or stored in the environment depending on the process. Recognizes that the biodiversity of an ecosystem is affected by the number of species in the ecosystem. Describes one-way invasive species can impact other species in an ecosystem. Identifies human impacts (climate change, pollution, habitat destruction) on an ecosystem and describes some ways to address them.	Describes how various biotic and abiotic factors affect a population's birth rate, death rate, immigration rate, or emigration rate. Describes several ecological relationships and determines evidence that supports claims about ecological relationships. Analyzes a food web to describe changes to populations resulting from an increase or decrease of another population. Uses an energy pyramid to calculate the amount of energy that is expected to be stored in different trophic levels. Completes a carbon cycle model showing how carbon is moved through both biotic and abiotic parts of an ecosystem. Describes how the biodiversity of an ecosystem is affected by the number of individuals within a species (genetic diversity is lower in smaller populations). Describes some characteristics of invasive species and how these characteristics can affect other species in an ecosystem. Analyzes data to determine the human impact on an ecosystem and describes several ways to reduce the impact of human activity on the ecosystem.	Analyzes multiple factors (such as species interactions, human activities, and natural phenomena) to solve problems relating to population size and carrying capacity of an ecosystem. Analyzes complex food webs and constructs explanations about various interactions in the food web as the sizes of populations change. Constructs an explanation for why only about 10% of the energy stored in one trophic level will be available to the next higher trophic level and how having less energy available reduces the number of organisms that can be supported at higher trophic levels. Constructs an explanation for how several carbon cycle processes interact within an ecosystem and how changes in the environment can disrupt the cycle. Explains how biodiversity of an ecosystem can be impacted by both the number of species in that ecosystem as well as the number of individuals within a species. Constructs thorough explanations for how and why invasive species can affect an ecosystem. Evaluates several solutions for either reducing the impact of human activity on an ecosystem or restoring an ecosystem and explains the benefits and drawbacks of these solutions.
LS3. Heredity	Identifies the general purpose of meiosis, that gametes come from two parents, and that egg and sperm combine to produce offspring.	Analyzes and completes a basic model of meiosis.	Constructs an explanation of why meiosis is important for maintaining the number of chromosomes from one generation to the next.

HS Biology	**Partially Meeting Expectations** ***On MCAS, a student at this level:***	**Meeting Expectations** ***On MCAS, a student at this level:***	**Exceeding Expectations** ***On MCAS, a student at this level:***
	Recognizes that inherited traits are encoded in an organism's DNA and RNA. Completes a simple model to show how a mutation in a DNA sequence can change an mRNA codon. Identifies that only mutations in a gamete can be passed from parent to offspring and that mutations can be a source of genetic diversity. Identifies simple inheritance patterns for a given trait. Identifies genotypes for a certain trait, completes a Punnett square for a given cross, and calculates the expected percentage of offspring for a given genotype or phenotype. Identifies the genotype of an individual in a basic pedigree when the inheritance pattern is given.	Describes the product of fertilization as a zygote (a diploid cell) containing genetic information from both parents. Describes how mutations in DNA can lead to the production of different amino acids and therefore different proteins. Interprets a model of crossing over and concludes that genetic variability increases as a result of crossing over. Interprets information to consistently determine inheritance patterns. Constructs and completes Punnett squares and calculates the expected percentages of genotypes and phenotypes of crosses for a given scenario. Analyzes a pedigree to determine the inheritance pattern of a trait. Describes how polygenic traits are influenced by the expression of multiple genes. Describes how environmental factors can influence the expression of some inherited traits.	Explains how crossing over, independent assortment, and random pairing of gametes contribute to the genetic diversity of offspring. Constructs an explanation for how a mutation in a DNA code may or may not result in a phenotypic (trait) change. Analyzes Punnett squares to determine the expected genotype and phenotype percentages for sex-linked traits. Analyzes a complex pedigree to determine genotypes and phenotypes of individuals and to make predictions about future offspring of parents in the pedigree. Uses data to explain the likelihood that a certain trait will be more influenced by genetics or by the environment.
LS4. Evolution	Identifies some types of evidence (genomes, amino acids, fossils, homologous structures) that support the process of evolution. Recognizes that individuals with certain traits survive and produce more offspring than individuals without those traits.	Explains how evolution can be supported by evidence that demonstrates common ancestry. Completes a cladogram to show the evolutionary relationships among several species. Describes how an advantageous heritable trait allows individuals in a population to survive and reproduce more than individuals without that trait.	Constructs an explanation based on a model, such as a cladogram, to support a claim about the evolutionary relatedness of species and explains why comparing genomes provides the best evidence that two species are closely related. Constructs a thorough explanation about evolution, including conditions (heritable variation, differential fitness) that need to be met for evolution to occur and how there will be changes in the frequency of alleles (or traits) within a population over time.

HS Biology	Partially Meeting Expectations *On MCAS, a student at this level:*	Meeting Expectations *On MCAS, a student at this level:*	Exceeding Expectations *On MCAS, a student at this level:*
	Describes that, in general, two organisms from the same species are able to mate and produce offspring. Recognizes that isolated populations generally have a smaller gene pool than larger populations. Recognizes that viruses are unable to reproduce outside of a host cell and that bacteria reproduce through asexual reproduction.	Describes how to determine whether two organisms are closely related and/or from the same species. Describes the role of genetic drift or gene flow in the speciation or extinction of a population. Describes how bacteria and viruses adapt quickly to changing environments due to their high mutation rate and the ability to quickly reproduce.	Analyzes a situation to determine evidence of selection pressures that could influence the evolution of a population. Constructs explanations based on data for how genetic drift, gene flow, mutations, and natural selection can play a role in the speciation or extinction of a population. Analyzes the results of an investigation to determine conditions that will support the growth of bacteria or viruses.

High School Introductory Physics MCAS Next-Generation Achievement Level Descriptors

Next-Generation Achievement Level Descriptors

Exceeding Expectations
A student who performed at this level exceeded grade-level expectations by demonstrating mastery of the subject matter.

Meeting Expectations
A student who performed at this level met grade-level expectations and is academically on-track to succeed in the current grade in this subject.

Partially Meeting Expectations
A student who performed at this level partially met grade-level expectations in this subject. The school, in consultation with the student's parent/guardian, should consider whether the student needs additional academic assistance to succeed in this subject.

Not Meeting Expectations
A student who performed at this level did not meet grade-level expectations in this subject. The school, in consultation with the student's parent/guardian, should determine the coordinated academic assistance and/or additional instruction the student needs to succeed in this subject.

High School Introductory Physics
MCAS Next-Generation Achievement Level Descriptors

Student results on the MCAS tests are reported according to four achievement levels: *Exceeding Expectations, Meeting Expectations, Partially Meeting Expectations,* and *Not Meeting Expectations.* The descriptors below illustrate the knowledge and skills students demonstrate on MCAS at each level. Knowledge and skills are cumulative at each level. No descriptors are provided for the *Not Meeting Expectations* achievement level because students work at this level, by definition, does not meet the criteria of the *Partially Meeting Expectations* level.

HS Physics	**Partially Meeting Expectations** ***On MCAS, a student at this level:***	**Meeting Expectations** ***On MCAS, a student at this level:***	**Exceeding Expectations** ***On MCAS, a student at this level:***
Understanding and Application of Disciplinary Core Ideas	Demonstrates a partial understanding of some scientific concepts and processes by identifying and sometimes describing or providing evidence for these concepts and processes. Uses some basic scientific terms in common scientific examples.	Demonstrates a solid understanding of many scientific concepts and processes by mostly describing, explaining, and providing evidence for these concepts and processes. Mostly applies appropriate scientific terms in a variety of applications, including common science examples and some novel situations.	Demonstrates a comprehensive, in-depth understanding of many scientific concepts and processes by consistently describing, explaining, and providing evidence for these concepts and processes. Consistently applies scientific terms in appropriate contexts in both common science examples and many novel situations.
Understanding and Application of Scientific and Engineering Practices	Identifies a testable, scientific question for an investigation. Completes a simple, commonly used model. Uses simple graphs or data to draw general conclusions about a familiar scientific investigation or phenomena. Identifies evidence to support a claim. Describes a benefit or drawback of simple design features given a familiar device or prototype.	Develops some testable, scientific questions for an investigation. Completes or uses a model and describes some strengths and weaknesses of the model. Analyzes multiple sources of data, including graphs and tables, to draw conclusions about a familiar scientific investigation or phenomena. Provides some evidence to support a claim and constructs basic explanations for scientific phenomena or results from an investigation. Analyzes design features of a familiar device or prototype and describes a benefit or drawback of the design.	Consistently develops testable, scientific questions for an investigation. Creates a model, consistently describes the strengths and weaknesses of the model, and provides information for how to improve the model. Analyzes multiple sources of data, including graphs and tables, to draw conclusions about a novel or complex scientific investigation or phenomena. Provides several pieces of evidence to support a claim and constructs thorough explanations for scientific phenomena or results from an investigation. Analyzes design features of a novel device or prototype and constructs an explanation for how the design features meet criteria for success or are limited by constraints.

HS Physics	**Partially Meeting Expectations** *On MCAS, a student at this level:*	**Meeting Expectations** *On MCAS, a student at this level:*	**Exceeding Expectations** *On MCAS, a student at this level:*
PS1. Matter and Its Interactions	Interprets a model to determine that energy is released during the processes of fission, fusion, and radioactive decay.	Analyzes a model to determine whether fission, fusion, or a radioactive decay (alpha, beta, or gamma) process occurred.	Analyzes incomplete models of fission, fusion, and radioactive decay and describes the results of each in terms of energy and products.
PS2. Motion and Stability: Forces and Interactions	Solves simple problems involving average speed, velocity, and acceleration. Interprets a motion graph to determine how the graphed variable changes over time. Interprets a scenario to determine the relative magnitude of a force. Determines a net force using Newton's 2nd law or by interpreting a free-body force diagram with two colinear forces. Solves simple momentum and change in momentum (impulse) problems. Interprets a model to determine whether two charges will attract or repel. Describes how the magnitude of charges or the distance between charges affects electrostatic forces. Describes how the masses of objects or the distance between objects affect gravitational forces. Solves simple problems using Ohm's Law when given two of the three variables (current, voltage, or resistance). Identifies a schematic symbol for a simple circuit element and generally explains its role.	Solves problems involving acceleration, velocity, and change in position for a given time. Analyzes motion graphs and their slopes to solve for and compare speeds, velocities, accelerations, and net forces. Analyzes free-body force diagrams to determine which diagram represents a given system. Solves for an unknown force by interpreting a model with two or more colinear forces when also given the net force. Solves for the total momentum or change in momentum of a system. Interprets a model to determine the direction an object will move after a collision. Compares the magnitude and the direction of the forces that two objects exert on each other when they collide. Compares models of pairs of masses or charges to order the magnitude of the gravitational or electrostatic forces. Completes a model to represent electrostatic forces between charges. Interprets a model to support a claim that an electric current produces a magnetic field or a claim that a changing magnetic field produces an electric current.	Solves a motion problem by analyzing a model and then applying information from the model to solve for velocity or acceleration. Explains how changing a system would affect an object's velocity or acceleration. Solves force problems by analyzing motion graphs and then models the forces involved using free-body force diagrams. Analyzes a motion graph and then applies information from the graph to solve a momentum problem. Describes that the total momentum of a system stays the same during a collision and solves for velocity or mass by applying conservation of momentum. Explains how forces involved in a collision can be minimized. Applies proportional reasoning to solve for how changing the distance between a pair of masses or a pair of charges affects the forces between the pair. Applies proportional reasoning when multiple variables are changed to determine the forces between a pair of masses or charges.

HS Physics	**Partially Meeting Expectations** *On MCAS, a student at this level:*	**Meeting Expectations** *On MCAS, a student at this level:*	**Exceeding Expectations** *On MCAS, a student at this level:*
		Describes how a change to a circuit affects current, voltage, or resistance. Interprets a series circuit diagram with several circuit elements and solves for current, resistance, or voltage. Interprets simple series or parallel circuit diagrams and explains which circuit elements will have the same current through them and which elements will have the same voltage drop across them.	Describes the effect of a gravitational or electrostatic force between two objects by solving for the force using either Newton's law of gravitation or Coulomb's law. Explains that the interplay of electric and magnetic forces is the basis for electric motors and generators. Analyzes series and parallel circuit diagrams with multiple circuit elements to compare and solve for current, voltage, and resistance.
PS3. Energy	Solves for gravitational potential energy when given the height and mass of an object. Describes an example of energy being converted from one form to another. Interprets a model to determine a location where gravitational potential energy or kinetic energy is either the greatest or the least. Solves simple problems for work when given the force and distance. Solves efficiency problems when given energy in and energy out. Interprets a simple graph to determine when thermal equilibrium is reached. Recognizes that heat flows from a substance with a higher temperature to a substance with a lower temperature. Recognizes the relationship between average molecular motion and temperature.	Analyzes a model of a system and then uses information from the model to calculate kinetic energy or gravitational potential energy. Describes that energy cannot be created or destroyed, but energy may enter or leave a system. Compares an object's kinetic energy at two positions or an object's potential energy at two positions when mechanical energy is conserved. Analyzes data to solve mechanical energy problems. Interprets a model of a device and explains how to increase the efficiency of the device. Explains how the temperatures in two substances change as the substances reach thermal equilibrium. Describes how changing the mass of a substance affects the energy required to cause a temperature change. Analyzes electric field diagrams and determines the direction and relative strength of the electric field around two charges.	Constructs an explanation for how kinetic energy and potential energy change over time in a given model. Explains how the mechanical energy of a system can change, due to work being done on the system by a force, while maintaining the law of conservation of energy. Solves complex work problems, including first solving for initial and final mechanical energy. Analyzes a graph to compare the energy efficiency of multiple devices. Explains how the average molecular motion of molecules in two substances changes as the substances reach thermal equilibrium, and how energy is conserved in a system as thermal equilibrium is reached. Analyzes a model and solves problems for the amount of heat transferred in a system, the specific heat of a substance, or the initial or final temperature of a substance.

HS Physics	**Partially Meeting Expectations** ***On MCAS, a student at this level:***	**Meeting Expectations** ***On MCAS, a student at this level:***	**Exceeding Expectations** ***On MCAS, a student at this level:***
	Describes the relative amount of force between two magnets as they are moved closer together or farther apart.	Explains how the energy stored in a field between two magnets or two charges changes when they are moved different distances apart.	Interprets a model to describe the motion of a freely moving charged particle and the energy stored in the field between two charged particles.
PS4. Waves and Their Applications in Technologies for Information Transfer	Solves simple wave problems for velocity/speed, wavelength, or frequency when given two of these three variables. Identifies the wavelength of a wave on a model. Solves simple wave problems involving period and frequency when given one of the variables. Identifies differences between mechanical waves and electromagnetic waves. Recognizes the relationships between frequency and pitch of a sound wave as well as between frequency and energy of a light wave. Identifies evidence of light behaving like a wave or light behaving like a particle. Interprets simple models of the photoelectric effect. Interprets simple models of common wave behaviors, including resonance, diffraction, refraction, and interference.	Analyzes data to determine additional information needed to solve wave problems. Describes how the particles in a medium move when a longitudinal or transverse wave travels through the medium. Describes several properties of mechanical waves and electromagnetic waves. Compares multiple electromagnetic waves in terms of frequency, energy, and wavelength. Analyzes a model and explains the causes of resonance and refraction. Analyzes a model of a technology or device and describes how wave behaviors or the photoelectric effect are used in the technology or device.	Analyzes models of waves and uses information from the models to solve problems. Interprets a graph with relative speeds of mechanical waves to determine the states of matter of various media. Constructs an explanation with evidence about how light can behave like a wave and how it can behave like a particle. Explains the relationship between photon energy and the electrons ejected by the photoelectric effect. Analyzes a model of constructive and destructive interference and determines the amplitude of a wave pulse that results from the interference. Analyzes how a technology or device uses waves and describes how changing the properties of the waves would influence the device.

Appendix C

Test Design and Blueprint Specifications

2022 Grades 3 & 4—ELA

Common		Session 1		Session 2		Total	
		Number	Tot Pts	Number	Tot Pts	Number	Tot Pts
	SR1	7	13	17	21	24	34
	SR2	3		2		5	
	CR	0	0	1	3	1	3
	ES	1	7	0	0	1	7
	Total Items	11	20	20	24	31	44

Item Types: 1 SR1 = MC; 2 SR2 = 2-pt MC or TE, EBSR; 3 CR (hand scored); 7 ES (hand scored)

Reporting Categories	G3/4	
Reading	65%	+/-5%
Language	25%	+/-5%
Writing	10%	+/-5%
Totals	**100%**	

2022 Grade 5—ELA

Common		Session 1		Session 2		Total	
		Number	Tot Pts	Number	Tot Pts	Number	Tot Pts
	SR1	9	13	15	21	24	34
	SR2	2		3		5	
	CR	0	0	0	0	0	0
	ES	1	7	1	7	2	14
	Total Items	12	20	19	28	31	48

Item Types: 1 SR1 = MC; 2 SR2 = 2-pt MC or TE; 7 ES (hand scored)

Reporting Categories	G5	
Reading	55%	+/-5%
Language	25%	+/-5%
Writing	20%	+/-5%
Totals	**100%**	

2022 Grades 6–8—ELA

Common		Session 1		Session 2		Total	
		Number	Tot Pts	Number	Tot Pts	Number	Tot Pts
	SR1	9	13	15	21	24	34
	SR2	2		3		5	
	CR	0	0	0	0	0	0
	ES	1	8	1	8	2	16
	Total Items	12	21	19	29	31	50

Item Types: 1 SR1 = MC; 2 SR2 = 2-pt MC or TE; 8 ES (hand scored) / For grade 7 session 1, the breakdown was SR1: 11, SR2: 1, ES: 1

Reporting Categories	G6-8	
Reading	55%	+/-5%
Language	25%	+/-5%
Writing	20%	+/-5%
Totals	**100%**	

2022 Grade 10—ELA

Common		Session 1		Session 2		Total	
		Number	Tot Pts	Number	Tot Pts	Number	Tot Pts
	SR1	9	15	12	20	21	35
	SR2	3	6	4		7	
	CR	0	0	0	0	0	0
	ES	1	8	1	8	2	16
	Total Items	13	23	17	28	25	51

Item Types: 1 SR1 = MC; 2 SR2 = 2-pt MC or TE; 8 ES (hand scored)

Reporting Categories	G10	
Reading	55%	+/-5%
Language	25%	+/-5%
Writing	20%	+/-5%
Totals	100%	

2022 Grade 3—Mathematics

Common	Session 1		Session 2		Total	
	Number	Tot Pts	Number	Tot Pts	Number	Tot Pts
MS1	18	18	18	18	36	36
HS3	2	6	2	6	4	12
Total Items	20	24	20	24	40	48
Matrix (Equating and/or Field Test) per form	Session 1		Session 2		Total	
	Number	Tot Pts	Number	Tot Pts	Number	Tot Pts
Total Items	2	2	2	4	4	6
Total Student Experience	Number	Tot Pts	Number	Tot Pts	Number	Tot Pts
	22	26	22	28	44	54

	Max Points	Scored	
Item Types:	1	MS1	SA/SR
	3	HS3	CR

Reporting Category		G3	
		Percents	Points
OA	Operations & Algebraic Thinking	30%	14–15
NBT	Number & Operations in Base Ten	15%	7–8
NF	Number & Operations-Fractions	20%	9–10
MD	Measurement & Data	25%	12
G	Geometry	10%	4–5

2022 Grade 4–5—Mathematics

Common	Session 1		Session 2		Total	
	Number	Tot Pts	Number	Tot Pts	Number	Tot Pts
MS1	17	17	17	17	34	34
MS2	1	2	1	2	2	4
HS4	2	8	2	8	4	16
Total Items	20	27	20	27	40	54
Matrix (Equating and/or Field Test) per form	**Session 1**		**Session 2**		**Total**	
	Number	**Tot Pts**	**Number**	**Tot Pts**	**Number**	**Tot Pts**
Total Items	2	2–3	2	5–6	4	7–8
Total Student Experience	**Number**	**Tot Pts**	**Number**	**Tot Pts**	**Number**	**Tot Pts**
	22	29–30	22	32–33	44	61–62

	Max Points	Scored	
Item Types:	1	MS1	SA/SR
	2	MS2	SA/SR
	4	HS4	CR

Reporting Category		G4		G5	
		Percents	Points	Percents	Points
OA	Operations & Algebraic Thinking	20%	10–11	15%	8
NBT	Number & Operations in Base Ten	20%	10–11	30%	16
NF	Number & Operations-Fractions	30%	16	25%	13–14
MD	Measurement & Data	20%	10–11	20%	10–11
G	Geometry	10%	5–6	10%	5–6

2022 Grade 6—Mathematics

Common	Session 1		Session 2		Total	
	Number	Tot Pts	Number	Tot Pts	Number	Tot Pts
MS1	17	17	17	17	34	34
MS2	1	2	1	2	2	4
HS4	2	8	2	8	4	16
Total Items	20	27	20	27	40	54
Matrix (Equating and/or Field Test) per form	**Session 1**		**Session 2**		**Total**	
	Number	**Tot Pts**	**Number**	**Tot Pts**	**Number**	**Tot Pts**
Total Items	2	2–3	2	5–6	4	7–8
Total Student Experience	**Number**	**Tot Pts**	**Number**	**Tot Pts**	**Number**	**Tot Pts**
	22	29–30	22	32–33	44	61–62

	Max Points	Scored	
Item Types:	1	MS1	SA/SR
	2	MS2	SA/SR
	4	HS4	CR

Reporting Category		G6	
		Percents	Points
G	Geometry	15%	8
RP	Ratios & Proportional Relationships	20%	10–11
NS	The Number System	20%	10–11
EE	Expressions & Equations	30%	16
SP	Statistics & Probability	15%	8

2022 Grade 7—Mathematics

Common	Session 1		Session 2		Total	
	Number	Tot Pts	Number	Tot Pts	Number	Tot Pts
MS1	17	17	17	17	34	34
MS2	1	2	1	2	2	4
HS4	2	8	2	8	4	16
Total Items	20	27	20	27	40	54
Matrix (Equating and/or Field Test) per form	**Session 1**		**Session 2**		**Total**	
	Number	**Tot Pts**	**Number**	**Tot Pts**	**Number**	**Tot Pts**
Total Items	3	6–7	3	6–7	6	12–14
Total Student Experience	**Number**	**Tot Pts**	**Number**	**Tot Pts**	**Number**	**Tot Pts**
	23	33–34	23	33–34	46	66–68

	Max Points	Scored	
Item Types:	1	MS1	SA/SR
	2	MS2	SA/SR
	4	HS4	CR

Reporting Category		G7	
		Percents	Points
G	Geometry	15%	8
RP	Ratios & Proportional Relationships	20%	10–11
NS	The Number System	20%	10–11
EE	Expressions & Equations	25%	13–14
SP	Statistics & Probability	20%	10–11

2022 Grade 8—Mathematics

Common	Session 1		Session 2		Total	
	Number	Tot Pts	Number	Tot Pts	Number	Tot Pts
MS1	17	17	17	17	34	34
MS2	1	2	1	2	2	4
HS4	2	8	2	8	4	16
Total Items	20	27	20	27	40	54
Matrix (Equating and/or Field Test) per form	Session 1		Session 2		Total	
	Number	Tot Pts	Number	Tot Pts	Number	Tot Pts
Total Items	3	6–7	3	6–7	6	12–14
Total Student Experience	Number	Tot Pts	Number	Tot Pts	Number	Tot Pts
	23	33–34	23	33–34	46	66–68

	Max Points	Scored	
Item Types:	1	MS1	SA/SR
	2	MS2	SA/SR
	4	HS4	OR

Reporting Category		G8	
		Percents	Points
G	Geometry	30%	16
F	Functions	20%	10–11
NSEE	The Number System and Expressions & Equations	40%	21–22
SP	Statistics & Probability	10%	5–6

2022 Grade 10—Mathematics

Common	Session 1		Session 2		Total	
	Number	Tot Pts	Number	Tot Pts	Number	Tot Pts
MS1	16	16	16	16	32	32
MS2	3	6	3	6	6	12
HS4-OR	2	8	2	8	4	16
Total Items	21	30	21	30	42	60
Matrix (Equating and/or Field Test) per form	Session 1		Session 2		Total	
	Number	Tot Pts	Number	Tot Pts	Number	Tot Pts
Total Items	6	10	6	10	12	20
Total Student Experience	Number	Tot Pts	Number	Tot Pts	Number	Tot Pts
	27	40	27	40	54	80

	Max Points	Scored	
Item Types:	1	MS1	SA/SR
	2	MS2	SA/SR
	4	HS4	CR

Reporting Categories		G10	
		Percents	Points
NQ	Number & Quantity	15%	9
AF	Algebra & Functions	35%	21
G	Geometry	35%	21
SP	Statistics & Probability	15%	9

2022 Grades 5 & 8—STE

	Session 1			Session 2			Total		
		Quantity	Total points		Quantity	Total points		Quantity	Total points
Common	**Module (stimulus)**	1	0	**Module (stimulus)**	1	0	**Module (stimulus)**	2	0
	MS1	3	3	MS1	3	3	MS1	6	6
	HS3	1	3	HS3	1	3	HS3	2	6
	Discrete			**Discrete**			**Discrete**		
	MS1	12	12	MS1	14	14	MS1	26	26
	MS2	2	4	MS2	1	2	MS2	3	6
	HS2	1	2	HS2	1	2	HS2	2	4
	HS3	1	3	HS3	1	3	HS3	2	6
	Total Items	20	27	**Total Items**	21	27	**Total Items**	41	54
Matrix (Equating and/or Field Test) per form	**Session 1**			**Session 2**					
		Number of Items	Total points		Number of Items	Total points			
	Total	4	6	**Total**	3	4			
Total Student Experience		Number of Items	Total points		Number of Items	Total points		Number	Total points
	Session 1	24	33	**Session 2**	24	31	**Total Items**	48	64

Item types: machine scored 1 or 2 points (MS1 or MS2); human scored 3 or 4 points (HS3 or HS4). A module is a stimulus with three MS1, one MS2 (or 2 additional MS1) and one HS3, totaling 6 points.

		Grade 5		Grade 8	
Code	**Reporting Category**	**%**	**Points**	**%**	**Points**
ES	Earth and Space Science	26	14	25	13–14
LS	Life Science	26	14	25	13–14
PS	Physical Science	26	14	25	13–14
TE	Technology/Engineering	2	12	25	13–14

Code	**Practice Category**
A	Investigations and Questioning
B	Mathematics and Data
C	Evidence, Reasoning, and Modeling

2022 Biology—STE

	Session 1			Session 2			Total		
		Quantity	Total points		Quantity	Total points		Quantity	Total points
Common	**Module (stimulus)**	1	0	**Module (stimulus)**	1	0	**Module (stimulus)**	2	0
	MS1	3	3	MS1	3	3	MS1	6	6
	MS2 (or 2 MS1)	1	2	MS2 (or 2 MS1)	1	2	MS2 (or 2 MS1)	2	4
	HS3	1	3	HS3	1	3	HS3	2	6
	Discrete			**Discrete**			**Discrete**		
	MS1	13	13	MS1	13	13	MS1	26	26
	MS2	1	2	MS2	2	4	MS2	3	6
	HS4	2	8	HS4	1	4	HS4	3	12
	Total Items	21	31	**Total Items**	21	29	**Total Items**	42	60
Matrix (Equating and/or Field Test) per form	**Session 1**			**Session 2**					
		Number of Items	Total points		Number of Items	Total points			
	Total	8	12	**Total**	8	12			
Total Student Experience		Number of Items	Total points		Number of Items	Total points		Number	Total points
	Session 1	29	43	**Session 2**	29	41	**Total Items**	58	84

Item types: machine scored 1 or 2 points (MS1 or MS2); human scored 3 or 4 points (HS3 or HS4). A module is a stimulus with three MS1, one MS2 (or 2 additional MS1) and one HS3, totaling 8 points.

Code	Reporting Category	%	Points
MO	Molecules to Organisms	35	21
HE	Heredity	25	15
EV	Evolution	20	12
EC	Ecology	20	12

Code	Practice Category
A	Investigations and Questioning
B	Mathematics and Data
C	Evidence, Reasoning, and Modeling

2022 Introductory Physics—STE

	Session 1			Session 2			Total		
		Quantity	Total points		Quantity	Total points		Quantity	Total points
Common	**Module (stimulus)**	1	0	**Module (stimulus)**	1	0	**Module (stimulus)**	2	0
	MS1	3	3	MS1	3	3	MS1	6	6
	MS2 (or 2 MS1)	1	2	MS2 (or 2 MS1)	1	2	MS2 (or 2 MS1)	2	4
	HS3	1	3	HS3	1	3	HS3	2	6
	Discrete			**Discrete**			**Discrete**		
	MS1	13	13	MS1	13	13	MS1	26	26
	MS2	1	2	MS2	2	4	MS2	3	6
	HS4	2	8	HS4	1	4	HS4	3	12
	Total Items	21	31	**Total Items**	21	29	**Total Items**	42	60
Matrix (Equating and/or Field Test) per form	**Session 1**			**Session 2**					
		Number of Items	Total points		Number of Items	Total points			
	Total	8	12	**Total**	8	12			
Total Student Experience		Number of Items	Total points		Number of Items	Total points		Number	Total points
	Session 1	29	43	**Session 2**	29	41	**Total Items**	58	84

Item types: machine scored 1 or 2 points (MS1 or MS2); human scored 3 or 4 points (HS3 or HS4). A module is a stimulus with three MS1, one MS2 (or 2 additional MS1) and one HS3, totaling 8 points.

Code	Reporting Category	%	Points
MF	Motion, Forces, and Interactions	50	30
EN	Energy	30	18
WA	Waves	20	12

Code	Practice Category
A	Investigations and Questioning
B	Mathematics and Data
C	Evidence, Reasoning, and Modeling

Quantitative
35–50% of the test (by points) should be quantitative (21-30 points).

APPENDIX D

NEXT-GENERATION MCAS COMMITTEE MEMBERSHIP

English Language Arts

2021–22 Assessment Development Committee Members

Grade	Name		School Name	School District/Affiliation
	Last	First		
3/4	Benedetto	MaryBeth	Madeline English School	Everett
3	Huber	Dana	Abraham Lincoln Elementary School	Lowell
3	Maucione	Lisa	DeMello Elementary School	Dartmouth
3	McCarty	Chaitra	Hyannis West Elementary	Barnstable
3	Merrill	Corey	John F. Kennedy School	Somerville
3	Mulholland	Stacey	Abbot Elementary School	Westford
3/5	Olson	Cindy	Parkview School	Easton
3/4	Peritz-Smith	Ivy	Swift River Elementary School	Belchertown
3	Swintak	Brenda	Attleboro	Attleboro
3	Verdolino	Nancy	Memorial Elementary	Hopedale
3	Walsh	Meghan	John A. Crisafulli School	Westford
4	Bilodeau	Michelle	Gerena Community School	Springfield
4	Gallant	Mary	Morse Elementary School	Cambridge
4	Hyde	Kimberly	Mary O. Pottenger	Springfield
4	Merlino	Michele	Murphy K-8	Boston
4	Murphy	Karen	Lincoln-Thomson Elementary	Lynn
4	Newell	Melissa	Lowell Public Schools	Lowell
4	Primiano	Karen	Mary Rowlandson Elementary School	Nashoba Regional School District
4	Traverso	Jenn	Westford Public Schools	Westford
4	White	Lisa	Plymouth Public Schools	Plymouth
5	Byrd	Brandon	Barnstable United Elementary School	Barnstable
5	Devine	Lisa	Hill School	Revere
5	Hogan	Erin	Westford Public Schools	Westford
5	James	Julie	Wamsutta Middle School	Attleboro
5	Kelty	Megan	Public Schools of Northborough and Southborough	Northborough and Southborough
5	Krasowski	Sarah	Lincoln-Thomson Elementary	Lynn
5	Messer	Marsha	White Brook Middle School	Easthampton
5	Murray	Elizabeth	Nash Primary School and Hamilton Primary School	Weymouth
5	Pollard	Cheryl	Kathryn P. Stoklosa Middle School	Lowell
5	Rumbelow	Alison	Mary Rowlandson Elementary School	Nashoba Regional School District
5	Wright	Molly	Marblehead Charter School	Marblehead Charter School
6	Barney	Sara	Robert J. Coelho Middle School	Attleboro
6	Campbell	Brian	Wellesley Middle School	Wellesley
6	DiSarcina	Jennifer	Eliot K-8 Innovation School	Boston Public
6	Franty	Olivio (Lee)	Richard J. Murphy K-8 School	Boston

continued

Grade	Name		School Name	School District/Affiliation
	Last	First		
6	Jacob-Dolan	Peter	John Glenn Middle School	Bedford
6	Lavoie	Elizabeth	Richardson Middle School	Dracut
6	Martinsen	Robyn	Douglas Middle School	Douglas
6	McPartland	Jennifer	East Bridgewater Public Schools	East Bridgewater
6	Moroso	Taylor	W.L. Chenery Middle School	Belmont
6/7	Pettengill	Alecia	Williams Middle School	Longmeadow Public Schools
6	Sayles	Julia	Prospect Hill Academy Charter School	Prospect Hill Academy Charter School
6	Vowels	Heather	Lynnfield Middle School	Lynnfield Public School
7	Angell	Elizabeth	Richard J. Murphy K-8	Boston
7	Bettano	Judith	Higgins Middle School	Peabody
7	Cangemi	Pamela	Williams Middle School	Longmeadow
7	DeLisle	Kimberly	Point Webster Middle School	Quincy
7	DeMoura	Lincoln	Coelho Middle School	Attleboro
7	Doiley	Pamela	BCLA/ McCormack	Boston
7	Gervais	Jacklyn	Plymouth Community Intermediate School (PCIS)	Plymouth
7	Jordan	Colleen	Silver Lake Regional Middle School	Silver Lake Regional School District
7	Quinn	Anita	Agawam Junior High School	Agawam
7	Stanton	Jessica	Littleton Middle School	Littleton
7	Weigle	Katharine	Winter Hill Community Innovation School	Somerville
8	Blanchard	Deborah	Athol-Royalston Middle School	Athol-Royalston Regional School District
8	Byers	Kathleen	Somerset Middle	Somerset
8	Costello	Terry	Community Day Charter Public School	Community Day Charter Public School
8	Dickey	Brian	Central Office	Springfield
8	Griswold	Andrea	Mohawk Trail Regional School	Mohawk Trail Regional School District
8	Kehrl	Brian	Mashpee Middle High School	Mashpee
8	Looby	Emily	Oxford High School	Oxford Public Schools
8	Palladino	Kathryn	Greater Lowell Technical High School	Greater Lowell
8	Plosky	Carolyn	Winchester High School	Winchester
8	Testa-Adams	Kathleen	Coelho Middle School	Attleboro
8	Whitaker	Mary	Lunenburg Middle High School	Lunenburg
10	Cangemi	Charles	Ludlow High School	Ludlow
10	Cunningham	Eamon	Milford High School	Milford
10	DeFelice	Mary	International High School	Lawrence
10	Egan	Aleisha	Ashland High School	Ashland
10	Fialho	Luis	Springfield Central High School	Springfield
10	Galligan	Mark	N/A	Pembroke
10	Hayes Frohock	Kristin	Dracut High School	Dracut
10	Hebert	Cheryl	Greater New Bedford Regional Vocational Technical High School	Greater New Bedford

continued

Grade	Name		School Name	School District/Affiliation
	Last	First		
10	Hill	Andrew	Upper Cape Cod Regional Technical School	Upper Cape Cod Regional Technical School
10	Mulcahy	Kerry	Doherty High School	Worcester
10	Porter (Starnes)	Dr. Paula	Roger L. Putnam	Springfield
10	Trinh	Courtney	Southeastern Regional Vocational Technical High School	Southeastern Regional School District

Mathematics

2021–22 Assessment Development Committee Members

Grade	Name		School Name	School District/Affiliation
	Last	First		
3	Bille	Jessica	Lincoln-Thomson Elementary School	Lynn
3	Edwards	Kathleen	William A. Berkowitz Elementary School	Chelsea
3	Hopson	Sarah	Agawam Public School	Agawam
3	Johnson	Winnie	Codman Academy Public Charter School	Boston
3	Larocque	Kathleen	McAuliffe School	Lowell
3	Larssen	Monica	Brightwood Elementary School	Springfield
3	LeBlanc	Katelyn	Leicester Elementary School	Leicester
3	Manning	Adam	Woodland Elementary School	Milford
3	Norvin	Daphne	Eliot K-8 Innovation School	Boston
3	O'Brien	Taylor	Station Avenue Elementary School	South Yarmouth
3	Powers	Jennifer	Plymouth Public Schools	Plymouth
3	Vanderpoel	Deborah	Mosier School	Hadley
4	Allen	Heather	Scituate Public Schools	Scituate
4	Cleaves	Wendy	Quabbin Regional School District	Barre
4	Gilmartin	Deborah	Thomson School	North Andover
4	Johnson	Samantha	Renaissance Community Innovation School	New Bedford
4	Joseph	Tracy	Martin Luther King, Jr. K-8 School	Boston
4	LaPointe	Cynthia	Staff Sergeant James J. Hill Elementary School	Revere
4	Marchesiani	Jennifer	Plymouth Public School	Plymouth
4	Massa	Michelle	Salemwood School	Peabody
4	O'Gorman	Mary	Westford Public Schools	Westford
5	Campbell	Joanne	Captain Samuel Brown School	Peabody
5	Carlson	Kara	Nantucket Intermediate School	Nantucket
5	DeSimone	Stacey	Tobin Montessori School	Cambridge

continued

Grade	Name		School Name	School District/Affiliation
	Last	First		
5	Gogoi	Elizabeth	Memorial-Spaulding Elementary	Boston
5	Hanafin	Megan	Locke and Marshall Middle Schools	Billerica
5	Jackson	Shane	Woodland Elementary School	Milford
5	Johnston	Christine	Roberta G. Doering School	Agawam
5	LaFleur	Tami	Attleboro Public Schools	Attleboro
5	O'Neil-Hopkins	Bridget	Hoosac Valley Middle School	Cheshire
5	Raposa	Laura	Russell Street Elementary School	Littleton
5	Varney	Alison	Grace F. Cole School	Norwell
6	Andrews	Jessica	Wareham Middle School	Wareham
6	Buchanan	Susan	JFK Middle School	Northhampton
6	Cross	Karen	Richard J. Murphy School	Boston
6	Duffy	Mark	Pembroke Public Schools	Pembroke
6	Dunn	Suzanne	Hopedale Memorial Elementary School	Hopedale
6	Edmonds	Margaret	Memorial Middle School	Fitchburg
6	Jurgiel	Jamie	Hale Middle School	Nashoba Regional
6	Lorusso	Melissa	Somerset Middle School	Somerset
6	Murray	Lisa	Plymouth Community Intermediate School	Plymouth
6	Torkomian	Michele	Coelho Middle School	Attleboro
7	Anusauskas	Cathy	Hopkinton Middle School	Hopkinton
7	Benotti	Julie	Plymouth South Middle School	Plymouth
7	Brown	Anne	Dartmouth Middle School	Dartmouth
7	Gwiazda	Jeff	Lowell Public Schools	Lowell
7	Holden	Seth	Grafton Middle School	Grafton
7	Lito	Irgena	Worcester East Middle School	Worcester
7	Mazzone	Monique	Auburn Middle School	Auburn
7	Olmstead	Chantele	Hawthorne Brook Middle School	Townsend
7	O'Rourke	Megan	Medway Middle School	Medway
7	Schlegel	Joanna	William Diamond Middle School	Lexington
7	Tarallo	Susan	Leominster Public Schools	Leominster
8	Agruso	Cynthia	Agawam Junior High	Agawam
8	Banks	Lorie	Sullivan School	Holyoke
8	Bowman	Adrienne	William H. Ohrenberger School	Boston
8	Carpenter	Michele	Auburn Middle School	Auburn
8	Fedora	Robin	Hampden-Wilbraham Public Schools	Hampden-Wilbraham
8	Ferko	Ana	Up Academy Boston	Up Academy Boston
8	Gardner-Thomas	Carolyn	Harvard University	Harvard University
8	Johnston	Mark	Lynn Classical High School	Lynn
8	McGuire	Shannon	Greater New Bedford Regional Vocational Technical High School	New Bedford

continued

Grade	Name		School Name	School District/Affiliation
	Last	First		
8	Perez	Kate	Westfield Public Schools	Westfield
8	Santiago-Lizardi	Filiberto	James P. Timilty Middle School	Boston
8	Wooley	Stephanie	John T. Nichols Middle School	Middleboro
10	Collins	Andrea	Greater Lowell Technical High School	Greater Lowell
10	Hebert	Kim	Agawam High School	Agawam
10	Johnson	Deatrice	Springfield Public Schools	Springfield
10	Lacombe	Lisa	Bristol-Plymouth Regional Technical School	Taunton
10	Macomb	Elizabeth	Dennis-Yarmouth Regional High School	South Yarmouth
10	Marini	Audra	Worcester Technical High School	Worcester
10	Miles	Victoria	Greenfield Virtual Commonwealth School	Virtual School
10	Pillai	Jay	Natick High School	Natick
10	Pires	Aderito	Ludlow High School and Westfield State University	Ludlow
10	Pollard	Stephanie	Mount Wachusett Community College	Mount Wachusett Community College
10	Reynolds	Colleen	Mystic Valley Charter School	Mystic Valley Charter School
10	Szymaszek	Kathryn	Whittier Regional Vocational Technical High School	Haverhill
10	Yun	Yujuan	Boston Adult Technical Academy	Boston

Science and Technology/Engineering (STE)

2021–22 Assessment Development Committee Members

Grade	Name		School Name	School District/Affiliation
	Last	First		
5	Callahan	Judy	Egremont School	Pittsfield
5	Collins	Carolyn	Wellesley Public Schools	Wellesley
5	Goncalves	Jodi	Springfield Public Schools	Springfield
5	Larose	Evelyn	Winship Elementary Schools	Boston
5	Lynch	Janet	Boston Public Schools	Boston
5	MacNeil	Janet	Cambridge Public Schools	Cambridge
5	Maynard-Gonzalez	Rochelle	Rebecca Johnson Elementary School	Springfield
5	Riordan	Alison	Plymouth Public Schools	Plymouth
5	Rodriguez	Angela	Albert F. Argenziano School	Somerville
5	Styckiewicz	Taylor	Bellamy Middle School	Chicopee
5	Turmel	Kathryn	Comprehensive Grammar School	Methuen
8	Bonnar	Roslyn	McCarthy Middle School	Chelmsford
8	Borges	Amy	Hopkinton Middle School	Hopkinton

continued

Grade	Name		School Name	School District/Affiliation
	Last	First		
8	Bromley	Nikki	Bridgewater Middle School	Bridgewater Raynham Regional School District
8	Cummiskey	William	Community Day Charter School, Lawrence	Community Day Charter School, Lawrence
8	Facques	Karen	Hawthorne Brook Middle School	North Middlesex Regional School District
8	Franz	Mary	Holten Richmond Middle School	Danvers
8	Hickey	Charles	Weymouth Middle School, Adams Campus	Weymouth
8	Jean-Baptiste	Vanessa	Tech Boston Academy	Boston
8	Kaur	Rupinderpal	Everett Public Schools	Everett
8	Phillips-Ramos	Tammy	Wamsutta Middle School	Attleboro
8	Slatkavitz	Aimee	Bridge Boston Charter School	Bridge Boston Charter School
Biology	Adamiak	Michael	Keefe Technical High School	South Middlesex Reg. Voc. Tech.
Biology	Davidson	Tom	West Springfield High School	West Springfield
Biology	Dube	Jennifer	Greater Lawrence Technical School	Greater Lawrence Regional Technical School
Biology	Genovese	Elizabeth	Chelsea High School	Chelsea
Biology	Hernando Cupido	Miguel Angel	Chelsea High	Chelsea
Biology	Hogan	Janet	Mansfield High School	Mansfield
Biology	Madsen	Heather	Greater New Bedford Regional Vocational Technical High School	Greater New Bedford Regional Vocational Technical High School
Biology	Menice	Constance	Westford Academy	Westford
Biology	Mitchell	Mary	Lynn English High School	Lynn
Biology	O'Donnell	Pamela	Upper Cape Cod Regional Technical School	Upper Cape Cod Regional Technical School
Biology	St. Amand	Ronald	Springfield Public Schools	Springfield
Intro Physics	DiBiasio	Kenneth	Tantasqua Regional High School	Tantasqua and Union 61
Intro Physics	Foster	Gita	Weston High School	Weston
Intro Physics	Lui	Kevin	Boston Adult Technical Academy	Boston
Intro Physics	McKay	Keith	Hull High School	Hull
Intro Physics	Morey	Shannon	Abbott Lawrence Academy at Lawrence High	Lawrence
Intro Physics	Newton	Kristin	Cambridge Rindge and Latin School	Cambridge
Intro Physics	Pourmand	Mahshid	Wellesley High School	Wellesley
Intro Physics	Reid	Stacy-Michelle	Madison Park Technical Vocational High School	Boston
Intro Physics	Sears	Russell	Cohasset Middle High School	Cohasset

continued

Grade	Name		School Name	School District/Affiliation
	Last	First		
Intro Physics	Shapiro	David	Natick High School	Natick
Intro Physics	Tsan	Florence	Brighton High School	Boston
Intro Physics	Valentine	Adriel	Community Charter School of Cambridge	Cambridge

Bias Committee Members

2021–22

Committee	Name		School Name	School District/Affiliation
	Last	First		
BSC	Alvarez	Jaime	Brayton Elementary School	North Adams
	Buggy	Ryan	Pittsfield Public Schools	Pittsfield
	Callahan	Judy	Egremont School	Pittsfield
	Charbonneau	Nichole	Old Rochester Regional Junior High School	Old Rochester Regional
	Galewski	Jake	Kingston Elementary School	Silver Lake Regional
	Goldner	Daniel	Acton-Boxborough Regional High School	Acton-Boxborough Regional
	Gould	Michelle	High School of Commerce	Springfield Public Schools
	Guttenberg	Nicole	Boston Public Schools	Boston
	Johnson	Rachel	Assabet Valley Regional Technical High School	Assabet Valley Regional Technical
	Lataille	Michelle	Happy Hollow Elementary School	Wayland
	Lipton-O'Connor	Jennifer	Public Schools of Northborough and Southborough	Northborough-Southborough Regional
	Mahmud	Amatul	N/A	Cambridge, Retired
	Marino	Monica	Whittier Tech	Whittier Regional Vocational Technical
	Martin	Dr. Paula S.	Quinsigamond Community College	Quinsigamond Community College, Worcester
	Miller	Tammi	Hurley Middle School, Seekonk	Seekonk
	Minot-Seabrook	Jill	Fletcher Maynard Academy	Cambridge
	Nguyen	Thao	Atlantic Middle School	Quincy
	O'Kane	Meredith	Furnace Brook Middle School	Marshfield
	Parker	Andrea	N/A	Federation for Children with Special Needs, Boston
	Strus	Jinnee	Gardner Middle School	Gardner
	Wolfson	Karen	Sudbury Public Schools	Sudbury
	Woods	Brenna	Thomas Ditson Elementary	Billerica
	Wright	Brittany	Kane Elementary	Marlborough

APPENDIX E
ACCESSIBILITY FEATURES AND TEST ACCOMMODATIONS

Accessibility and Accommodations Manual for the 2021–2022 MCAS Tests and Retests

Including Participation Requirements for Students with Disabilities and English Learners

---

August 2021

This document was prepared by the
Massachusetts Department of Elementary and Secondary Education
Jeffrey C. Riley
Commissioner

The Massachusetts Department of Elementary and Secondary Education, an affirmative action employer, is committed to ensuring that all of its programs and facilities are accessible to all members of the public. We do not discriminate on the basis of age, color, disability, national origin, race, religion, sex, gender identity, or sexual orientation.
Inquiries regarding the Department's compliance with Title IX and other civil rights laws may be directed to the Human Resources Director, 75 Pleasant St., Malden, MA 02148-4906. Phone: 781-338-6105.

Massachusetts Department of Elementary and Secondary Education
75 Pleasant Street, Malden, MA 02148-4906
Phone 781-338-3000 TTY: N.E.T. Relay 800-439-2370
www.doe.mass.edu

Purpose of This Manual

The Massachusetts Department of Elementary and Secondary Education is providing you with the *Accessibility and Accommodations Manual for the 2021–2022 MCAS Tests and Retests.* The accessibility and accommodations policies in this manual will apply to students taking all MCAS tests and retests.

Educators will need to become familiar with the MCAS accessibility and accommodations policies since they provide guidance on the use of individualized supports for student participation in MCAS. Test coordinators and administrators should also review this manual to determine those accessibility features and accommodations that must be documented for each student in the Student Registration/Personal Needs Profile (SR/PNP) (the procedure used by schools to register students for MCAS testing), and to receive the necessary accommodated test editions.

This manual provides guidance and information about:

- MCAS participation requirements for students with disabilities, students who are English learners (ELs), and ELs with disabilities; and which students with disabilities should be considered for an alternate assessment; and
- the availability, selection, and use of
    - *universal accessibility features*, which provide tools and supports for *all* students;
    - *designated accessibility features* intended for *all* students, but which must be authorized by the principal; and
    - *test accommodations* for students with disabilities and students who are ELs.

Schools may request guidance from the Department throughout the year as they plan for the use of test accommodations and other supports for the students who need them. Please contact Student Assessment Services at mcas@doe.mass.edu or 781-338-3625 with any questions.

TABLE OF CONTENTS

I. Overview of MCAS Accessibility and Accommodations

A. Introduction

All students, including students with disabilities and ELs, will be required to participate in all MCAS assessments that are scheduled for students in their grade, including

- students enrolled in public schools
- students enrolled in charter schools
- students enrolled in innovation schools, including virtual schools
- students enrolled in educational collaboratives
- students enrolled in approved and unapproved private special education schools and programs within and outside Massachusetts
- students receiving educational services in institutional settings
- students in the custody of the Department of Children and Families (DCF)
- students in the custody of the Department of Youth Services (DYS)

Students must participate in grade-level tests that correspond with the grade in which they are reported to the Department's Student Information Management System (SIMS).

Selection of accessibility features and accommodations should proceed according to the test format (computer or paper) to be used by the student. The assessment options indicated on the following pages are based upon (a) accommodations research; (b) generally accepted practices and procedures currently in use for statewide assessments; (c) previous versions of "legacy" MCAS accommodations policies; and (d) the recommendations of Massachusetts stakeholders who were members of the MCAS Accessibility and Accommodations Work Group.

The application of universal design principles to the MCAS assessments, in conjunction with the accessibility and accommodations policies described in this manual, are intended to reduce barriers to participation in the MCAS assessments for *all* students, not just students with disabilities and English learners. While many computer-based accessibility features are unique to online testing, others can be applied to paper-based testing for students who are unable to take tests on a computer. In addition, increased flexibility for local administrators has been incorporated in test administration procedures in response to input and requests from local educators for greater autonomy in determining the testing conditions within their schools.

To assist schools in providing and tracking the use of accessibility features and accommodations during testing, the Department recommends that test coordinators develop a table or spreadsheet prior to test administration that lists **where**, **when**, and **with whom** students will be testing, and which accessibility features and accommodations each student will need, to ensure that students receive all accessibility features and/or accommodations to which they are entitled.

B. What's New and Notable for School Year 2021–2022?

- "Next-Generation" November and March high school **retests** will be available as computer-based tests, with accommodated forms that include: text-to-speech, web extensions (for speech-to-text and word prediction), screen reader, Spanish-English, and compatible assistive technology. Paper-based accommodated forms will include Braille, large-print, and Spanish-English.
- The Department will offer paper-based "legacy" and "next-generation" ELA and Mathematics retests in November, and plans to offer only "next-generation" retests in March 2022.
- Computer-based "next-generation" STE high school Biology and Introductory Physics tests will be administered in spring 2022 and will include **American Sign Language (ASL) video** and bilingual **Spanish-English** versions, as well as all accommodated forms listed above.
- High school Chemistry and Technology/Engineering tests will continue to be administered only as "legacy"

paper-based tests.

- Computer-based "web extensions" are available for students who use the **speech-to-text** and/or **word prediction** accommodations, if either are listed in their IEP or 504 plan. Web extensions are described on pages 20, 24, 25, and 29 of this manual and in greater detail in the Department' *Guidelines for Using Assistive Technology as an MCAS Test Accommodation*.
- An **alternative cursor/mouse pointer** will be available for selection by all students on computer-based tests. See page 4 for details.
- Appendix A describes the ***Procedures for Scribing and Transcribing Student Responses**.*
- An updated *MCAS Grade-Level and Competency Portfolio Manual* has been developed for students who will participate in MCAS through this option.
- Updated computer- and paper-based MCAS practice tests are available, including accommodated editions. Particularly those students using accommodated forms, including text-to-speech and the new "web extensions," should become familiar with these features and the basic functionality of the computer-based testing platform (TestNav) prior to testing. The Department encourages each student to take online practice tests and also view the student tutorial prior to actual test administration. Narrated training modules are also available.
- Annual decisions about test participation for each student with a disability (including ELs with disabilities) must be made by the IEP team and listed in the student's IEP, or be included in a 504 plan, for each content area test. Decisions include:
  - Which **accommodations** the student needs to participate in MCAS testing, according to the policies outlined in this manual.
  - Whether the student with a disability (or recently-arrived EL) requires a **paper- rather than a computer-based test**, and if so, in which subjects.
  - The **EL accommodations** listed in Section VI of this manual must be considered for all English learners (ELs) with or without disabilities. Accommodations decisions must be made by the student's language-based team, an informal team of adults familiar with the EL student and documented in writing using the sample (or similar) form provided in Appendix B.
  - If **accessibility features** are needed by a student with a disability, the Department encourages listing these in the student's plan to guarantee that they will be provided on the test.
- The following must be provided to *all* students on MCAS tests, including students with disabilities and ELs:
  - Untimed test sessions until the end of the school day, as needed
  - Blank scratch paper (including blank, lined, or graph paper)
  - Assistance as needed from a test administrator in using the computer-based testing platform

Accessibility features and accommodations for MCAS tests are listed in the following categories:

- **Universal Accessibility Features** (UF): Tools and supports that are available to *all* students, either on the computer-based tests or their paper-based equivalents (see pp. 4–5).
- **Designated Accessibility Features** (DF): Flexible test administration procedures that may be used with *any* student at the discretion of the principal (or designee). These include changes in the location of test settings, group size, seating of students, and scheduling of test administrations (see p. 5–6).
- **Accommodations** (A): Specific supports available only to students with disabilities and English learners. Team members and educators responsible for developing IEPs and 504 plans must make decisions regarding which accommodations to provide and list these in the plan of each student (see pp. 16–22). We encourage districts to list accommodations for EL students using the sample form entitled Documentation of MCAS Accommodations for an EL Student (in Appendix B) which must be kept on file at the school.
- **"Special Access" Accommodations** (SAs): Formerly called *nonstandard accommodations*, these may be provided to students who meet certain guidelines and criteria (see pp. 22–25).
- **English Learner Accommodations** (EL): Several accommodations are available to ELs who do not have disabilities. See pp. 28–31 for details and a description of the relative suitability of each accommodation for

students at beginning, intermediate, and advanced levels of English proficiency.

Accessibility and accommodations policies will also be described in the *MCAS Principal's Administration Manual* (PAM), available this winter.

II. Accessibility Features for All Students

A. Universal Accessibility Features (UFs)

Universal Accessibility Features are tools and supports that are available to *all* students on the MCAS tests that are either built into the MCAS computer-based test platform or provided by a test administrator on the computer- or paper-based test. Although most universal accessibility features will be available on the day of the test to *any* student who wishes to use them, some *must* be **requested in advance** in the Student Registration/Personal Needs Profile (SR/PNP), the student registration system located in PearsonAccess^{next} (PAN). The "*(SR/PNP)*" designation in Table 1 below refers to an accessibility feature or accommodation that must be documented and/or requested in the SR/PNP prior to the start of testing.

Table 1. *Universal Accessibility Features* Available to All Students

#	Computer-Based Testing	Paper-Based Testing
UF1	**Highlighter tool** Four highlighter colors are offered: blue, pink, green, and orange	**Highlighter** Colored highlighters and/or colored pencils may be used by students taking paper-based tests. See *Principal's Administration Manual* for details.
UF2 *(SR/PNP)*	**Alternative background and font color** The student can select a color combination for text and background. 	**Colored overlays or tinted lens(es)**
UF3	**Magnifier or Zoom tool** Magnifier tool enlarges part of the screen; Zoom tool enlarges or reduces the entire screen by pressing Ctrl + or Ctrl -	**Magnification tool/device** or low-vision aid

#	Computer-Based Testing	Paper-Based Testing
UF4 *(SR/PNP)*	**Alternate Cursor/Mouse Pointer tool** The student can select an enlarged and colored cursor.  **Medium Sized White**  **Large Sized White**  **Extra-Large Sized White**  **Extra-Large Green**  **Extra-Large Yellow**  **Extra-Large Sized Black** **Note:** Pointers are not shown in actual size which will differ according to the size of the student's computer screen.	**Enlarged pencil/modified writing instrument**
UF5	**Line reader tool** Masks text so only part of the text can be viewed at one time	**Tracking device**, such as a straight edge or similar tool
UF6 *(SR/PNP)*	**Answer masking** Student selects which answer choices will be shown on the screen	**Mask text or answer(s)** using a blank card or cutout
UF7	**Answer eliminator** Student marks an "X" through each answer option he or she believes is incorrect	**Use a pencil to eliminate answer choices** in test booklet (not answer bubbles)
UF8	**Item flag/bookmark**	**Use a blank place marker** to mark a question for later review (Note: post-its are *not* allowed)
UF9	**Audio aid** (e.g., amplification device) (**Note**: smartphones may not be used)	**Audio aid** (e.g., amplification device) (Note: smartphones may not be used)
UF10	**Notepad** for notes or calculations	**Scratch paper** is required for all students
UF11	**Test administrator reads aloud selected words** (or **signs selected words**, in the case of a student who is Deaf or Hard-of-Hearing) on the Mathematics and/or Science and Technology/Engineering (STE) tests, as requested by the student.	The student may point to a **word or phrase** that he or she needs read aloud or signed. Test administrator quietly reads aloud or signs the selected word to the student. Students using this feature may be tested alongside other students in groups of any size.
UF12	**Test administrator redirects student's attention to the test** without coaching or assisting the student to answer any questions (e.g., test administrator reminds	student to stay focused; it is not permissible to say, "Add more to your response" or "Make sure to answer all questions.")
UF13	**Test administrator reads aloud, repeats, or clarifies *general test administration directions***	**from the Test Administration Manual scripts** to student, as needed.

B. Designated Accessibility Features (DFs)

Although most students will be tested in their regular classrooms according to the guidelines and schedule intended for all students, principals have the flexibility to test *any* student, including non-disabled and non-EL students, using the designated accessibility features described in Table 2, as long as all requirements for testing conditions, test security, and staffing are met.

It is advisable, although not required, to include designated accessibility features in the Individualized Education Plan (IEP) or 504 plan of a student with a disability who requires them.

Table 2.
***Designated Accessibility Features* available to any student, at the principal's discretion**

#	Designated Accessibility Feature
DF1	**Small group test administration** (May include up to a total of 10 students.)
DF2	**Individual (one-to-one) test administration** (Student must be tested in a separate setting.)
DF3	**Frequent brief supervised breaks**
DF4	**Separate or alternate test location**
DF5	**Seating in a specified area** of the testing room, including the use of a study carrel
DF6	**Adaptive or specialized furniture** (e.g., seating, desk, or lighting)
DF7	**Noise buffer,** such as noise-canceling earmuffs/headphones or white noise (**Note:** music or other recordings may *not* be played, unless granted as a *unique accommodation* by the Department. See pp. 14-15)
DF8	**Familiar test administrator**
DF9	**Student reads test aloud to self**: Student must be tested in a separate setting, unless a low-volume device (e.g., a Whisperphone™) is used.
DF10	**Specific time of day**
DF11	**"Stop Testing" policy**: The student should be given the opportunity to attempt each test session). If the student does not appear to be responding to test questions after a period of 15–20 minutes, the test administrator may ask if the student is finished. If so, the test administrator may collect the student's test materials and the student can either sit quietly or be excused from the test setting.

III. MCAS Participation Requirements for Students with Disabilities

A. Background

The information in this manual is intended to guide decision-making by Individualized Education Program (IEP) teams and 504 plan coordinators as to *how* a student with a disability will participate in MCAS. Students with disabilities are required to participate in all MCAS assessments scheduled for students in their grade. Students with significant cognitive disabilities who are unable to take the standard tests, even with accommodations, must take the MCAS Alternate Assessment (MCAS-Alt).

B. Definition of a Student with a Disability

For the purpose of MCAS participation, a student with a disability is defined as a student with an approved Individualized Education Program (IEP) provided under the Individuals with Disabilities Education Improvement Act of 2004 and the Massachusetts General Laws, Chapter 71B; or a plan provided under Section 504 of the Rehabilitation Act of 1973 (i.e., a “504 plan”).

C. Participation Requirements for Students with Disabilities

State and federal education laws mandate that *all* students with disabilities who are educated with Massachusetts public funds participate in annual statewide assessments, including students enrolled in public schools, educational collaboratives, and approved and unapproved private special education schools, and students in the custody of the Department of Children and Families (DCF) or the Department of Youth Services (DYS).

Students with disabilities must participate in grade-level tests that correspond with the grade in which they are reported in the Department’s Student Information Management System (SIMS).

Only a student's IEP team can make decisions about which test accommodations are appropriate for the student and whether the student should take the standard or alternate assessment. Assessment decisions for students with disabilities are made on an annual basis in each content area for each student and must be listed in the IEP. If the student has a 504 plan rather than an IEP, then the 504 plan must also include this information. The principal is responsible for ensuring that each student is assessed using the test format and accommodations listed in the student’s IEP or 504 plan.

English Learners (ELs) with Disabilities

EL students, both with and without disabilities, must participate in all MCAS assessments required for students in their grade, regardless of the number of years they have been enrolled in U.S. schools, with one exception: **EL students who first enrolled in a U.S. school after March 1, 2021**, are *not required* to take the spring 2022 MCAS ELA tests, although schools have the *option* to assess first-year EL students in ELA.

EL students with disabilities are entitled to receive test accommodations and to participate in the MCAS Alternate Assessment (MCAS-Alt), as determined by their IEP team or 504 plan. See additional information on the participation of EL students in MCAS beginning on page 26

Students Diagnosed with Concussions

The Department has issued guidelines and MCAS testing policies for students who are returning to school after being diagnosed with a concussion. Please refer to this information before making decisions about MCAS testing for a student who has had a concussion.

D. Decision-Making Guidelines for MCAS Participation

This section provides guidelines for IEP team members and staff who develop 504 plans to determine how each student with a disability will participate in MCAS.

The student's IEP team or 504 plan coordinator should address the questions below and consider options 1, 2, and 3 in the chart on pages 8-10:

- Can the student demonstrate knowledge and skills, either fully or partially, on the **standard MCAS test under routine conditions**?
- Can the student demonstrate knowledge and skills, either fully or partially, on the **standard MCAS test with accommodations**? If so, which accommodations are necessary for the student to participate?
- If no to the above questions, see the options below to determine whether the student should be assessed with the **alternate assessment** (MCAS-Alt) or should submit a "**grade-level"** or "**competency" portfolio**.

  (**Note: Alternate assessments** are intended only for students with significant cognitive disabilities who are unable to participate in standard MCAS tests, even with accommodations.

The student's IEP team or 504 plan coordinator must make a separate decision for each subject scheduled for assessment. A student may take the standard test in one subject and the alternate assessment in another. These decisions may be revised each time the team convenes.

Characteristics of Student's Instructional Program and Local Assessment	Recommended Participation in MCAS
OPTION 1 ***If the student is*** a) generally able to demonstrate knowledge and skills on a computer- or paper-based test, either with or without test accommodations, ***and*** is b) working on learning standards **at or near grade-level expectations,** ***or*** is c) working on learning standards that have been modified and are **somewhat below grade-level expectations** due to the nature of the student's disability,	***Then*** the student should take the computer- or paper-based **MCAS test**, either with or without accommodations.

Characteristics of Student's Instructional Program and Local Assessment	Recommended Participation in MCAS
OPTION 2 ***If the student is*** a) an individual with a **significant cognitive disability**, ***and*** is b) **generally unable** to demonstrate knowledge and skills on a computer- or paper-based test, even with accommodations, ***and*** is c) working on learning standards that have been **substantially modified** due to a *significant cognitive disability*, ***and*** is d) receiving **intensive, individualized instruction** in order to acquire, generalize, and demonstrate knowledge and skills,	***Then*** the student should take the **MCAS Alternate Assessment (MCAS-Alt)** in this subject**.**

E. Further Guidance on Designating Students for the MCAS-Alt (Option 2)

IEP teams should **not** designate a student for an alternate assessment solely because he/she:

- is frequently absent from school;
- has not received instruction in the general curriculum;
- has a particular disability (e.g., all students with intellectual disabilities should not automatically be designated for the MCAS-Alt);
- is placed in a program or classroom where it is expected that students will take the MCAS-Alt;
- has taken an alternate assessment in the past (since this is an annual decision);
- has previously failed the MCAS test;
- is an English learner;
- is economically disadvantaged ;
- is a child in foster care;
- requires assistive technology or an augmentative communication system that has not been provided;
- attends a school in which the IEP team may have been influenced to designate the student for an alternate assessment in order to receive disproportionate credit toward the school's accountability rating.

Please refer to the Commissioner's memorandum regarding MCAS-Alt eligibility criteria.

OPTION 3

Characteristics of Student's Instructional Program and Local Assessment	Recommended Participation in MCAS
If the student is a) working on learning standards **at or near grade-level expectations** ***and*** is b) **sometimes able** to take a computer- or paper-based test, either without or with one or more test accommodation(s) ***but*** c) has a **complex and significant disability*** that does not allow the student to fully demonstrate knowledge and skills on a computer- or paper-based test of this duration, * See Section F for examples of complex and significant disabilities for which the student may require an alternate assessment.	***Then*** the student should take the computer- or paper-based **MCAS test**, if possible, with necessary accommodations. ***However*** the team may recommend that the student submit a "grade-level" or "competency" portfolio when the severity and complexity of the disability prevent the student from demonstrating knowledge and skills on the computer- or paper-based MCAS test, even with the use of accommodations.

F. Students with Complex and Significant Disabilities Who May Require a "Grade-Level" or "Competency" Portfolio (Option 3)

When the nature and complexity of a student's disability present significant barriers or challenges to standardized computer- or paper-based testing, even with the use of accommodations; and the student is working at or close to grade-level expectations, the student's IEP team or 504 plan coordinator may determine that the student should participate either in the "grade-level" (grades 3–8) or "competency" (high school) portfolio in one or more subjects. More information on "grade-level" and "competency" portfolios is available in the MCAS Grade-Level and Competency Manual.

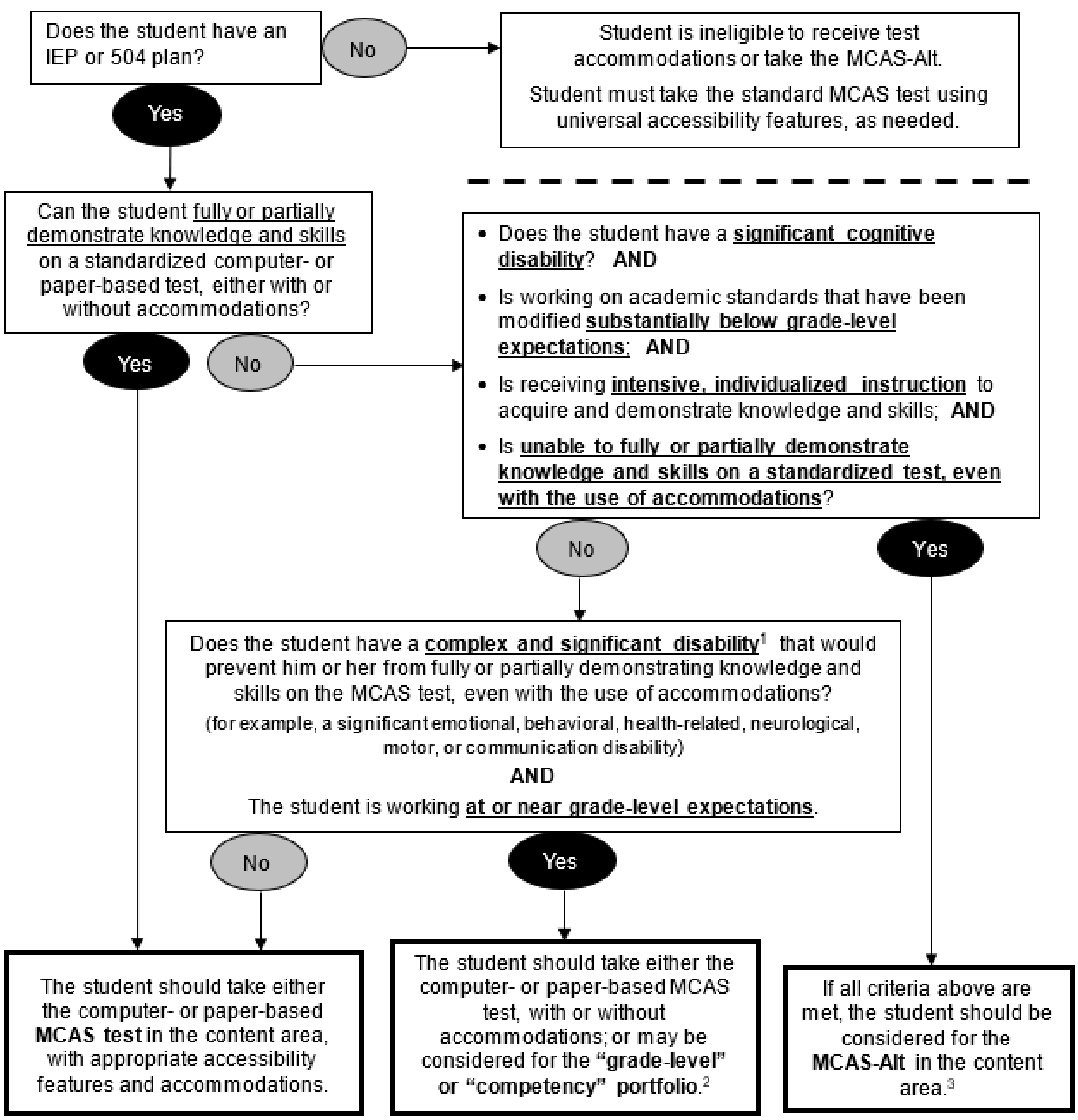
The following examples are provided to expand the team's understanding of students who may be appropriate for the "grade-level" or "competency" portfolios in unique circumstances:

- a student with a significant emotional, behavioral, or other disability, who is unable to maintain sufficient concentration to participate in standard MCAS testing, even with accommodations;

- a student with a significant health-related disability, neurological disorder, or other complex disability, who cannot meet the demands of a prolonged test administration;
- a student with a significant motor, communication, or other disability, who requires more time than is reasonable or available for testing, even with the allowance of extended time (i.e., the student is unable to complete a test session in a single school day).

G. Decision-Making Tool for MCAS Participation by Students with Disabilities

The decision chart shown below may be used by IEP teams and 504 plan coordinators to make annual decisions regarding appropriate student participation in MCAS. Make separate decisions in *each content area* being assessed: ELA, mathematics, and science and technology/engineering.



[1] See page 10 of this manual for additional details on "complex and significant disabilities."
[2] See the *MCAS Grade-Level and Competency Portfolio Manual* for details on submission of "grade-level" and "competency" portfolios.
[3] Students who take the MCAS-Alt in high school will not earn a Competency Determination in the assessed subject and therefore will not be eligible to earn a high school diploma.

IV. MCAS Accommodations for Students with Disabilities

A. Background and Purpose

The information in this section is intended to guide decision-making regarding the selection, use, and evaluation of accommodations for MCAS testing. As required by 34 CFR 300.160, the state is providing districts with these guidelines for the provision of appropriate accommodations on the MCAS tests, and stipulating that IEP teams and 504 plan coordinators carefully identify and select only those accommodations for each assessment that are needed by the student and do not invalidate the score. IEP teams should be trained annually on these guidelines. Please read the following information carefully.

B. Accommodations for Students with Disabilities

1. Purpose of Test Accommodations

A test accommodation is a change in the way a test is administered or the way in which a student responds to test questions. Test accommodations are intended to accomplish the following:

- offset the effects of the student's disability and remove barriers to participation in the assessment
- provide the necessary conditions for a student to demonstrate knowledge and skills effectively on statewide assessments
- provide the opportunity to report test results for students who require accommodations
- provide test results that are comparable to those of students who did not receive accommodations
- yield results that do not affect the validity or reliability of the interpretation of scores for their intended purposes

Based on the information and guidance found on the following pages, the IEP or 504 plan for each student with a disability must be reviewed and revised as needed, either during routinely scheduled meetings prior to testing or through the IEP amendment process. The principal is responsible for ensuring that each student is provided with the test accommodations listed in his or her IEP or 504 plan during testing. It is also advisable (though not required) to list the *designated accessibility features* (see Table 2) in the plans of students to ensure these will be provided.

Use of test accommodations should never replace appropriate and rigorous instruction based on grade-level standards in the subject being tested.

2. Eligibility for Test Accommodations

ELIGIBLE: students with disabilities served by an IEP or 504 plan

The right of a student with a disability to receive allowable accommodations on MCAS tests is protected by both federal and state laws. The student's IEP or 504 plan must specify which MCAS accommodation(s) a student will receive, and the IEP must be approved by the parent/guardian (or student over 18) before an accommodation may be used by the student. Similarly, a student's 504 plan must already be in place or under development. In cases where a 504 plan is under development, the school personnel responsible for writing the plan must have already met and agreed upon the necessary MCAS accommodation(s) before the accommodation may be provided.

NOT ELIGIBLE: students without identified disabilities and students who are not served by an IEP or 504 plan

A student who does not have a documented disability and is not served by either an IEP or 504 plan is not eligible to receive accommodations on MCAS tests, regardless of whether the student already receives support or accommodations during classroom instruction.

3. General Requirements for Use of Test Accommodations

The use of accommodations is based on the individual needs of a student with a disability and may only be provided when all of the following conditions have been met:

a) The student **has a disability** that is documented in an IEP or 504 plan and **requires the use of one or more accommodations** to participate in MCAS testing.

AND

b) The accommodation is listed in this manual (or prior written approval has been obtained from the Department for a unique accommodation); the **accommodation is listed** in the student's IEP under "State- and District-Wide Assessment;" and the **IEP has been signed** by the student's parent(s)/guardian(s) prior to the date of test administration; or is listed as an MCAS accommodation in a 504 plan developed for the student.

AND

c) The student **uses the accommodation routinely** (with rare exceptions) during classroom instruction and assessment in the subject, both before and after the MCAS test is administered, and the student is **comfortable and familiar** with its use. Use of an accommodation during routine instruction does not *necessarily* qualify a student to receive the same accommodation during MCAS testing; for example, the student must meet additional criteria to receive a ***special access*** **accommodation** on an MCAS test.

AND

d) If a ***special access*** **accommodation** will be provided, the student meets all of the criteria to receive the accommodation, as shown in Table 5.

IEP teams must reconvene at least annually and determine which accommodations will be needed for state- and district-wide assessments.

Accommodations may **not**

- alter, explain, simplify, paraphrase, or eliminate any test question, reading passage, writing prompt, or multiple-choice answer option;
- provide verbal or nonverbal clues or suggestions that hint at or give away the correct response to the student;
- contradict test administration requirements or result in a violation of test security; for example:
  - test questions may not be modified, reordered, or reformatted in any way for any student;
  - paper-based tests may not be photocopied, photographed, scanned, altered, or duplicated;
  - screen shots of computer-based tests may not be taken or reproduced;
  - English-language dictionaries are allowed **only** for legacy ELA Composition retest sessions. English-language dictionaries are **not** permitted for any student on next-generation MCAS tests.

If the above conditions have been met and the accommodation is listed in the IEP or 504 plan, the accommodation(s) **must be provided** to the student during MCAS testing. If an accommodation is provided that does not meet the conditions stated above or that is not listed in a student's plan, the student's test score may be **invalidated**.

In the event a student was provided a test accommodation that was *not* listed in his or her IEP or 504 plan, or if a student was *not* provided a test accommodation listed in his or her plan, the school should immediately contact the Department at 781-338-3625 or by email at mcas@doe.mass.edu.

4. Updating IEPs and 504 Plans

IEPs and 504 plans should be updated as needed for all students with disabilities prior to the spring 2022, and other test and retest, MCAS administrations throughout the year to reflect the most current needs of each student, and policies and accommodations described in this manual. Proper notation of accommodations in students' IEPs and 504 plans will ensure that students receive all the necessary supports to which they are entitled.

Virtually all students are expected to take the next-generation MCAS tests using the computer-based testing platform (TestNav) and be given an opportunity to view the tutorial and take online practice tests prior to test administration.

5. If a Student Refuses an Accommodation

If a student refuses to use an accommodation listed in his or her plan during testing, the school should document in writing that the student refused the accommodation and keep the documentation on file at the school. The student should be told that the accommodation will remain available during testing should they need it. The student should *not* be asked to sign an agreement acknowledging that they have refused an accommodation, nor should they be asked to waive their right to receive an accommodation that is listed in their IEP or 504 plan. A sample form (optional) for documenting a student's refusal of an accommodation is available in Appendix C.

If a student refuses an accommodation, and the IEP team agrees that the listed accommodation is no longer needed by the student, the accommodation should be removed from the plan at the next scheduled meeting (or listed in the plan "as requested by the student"). Written approval must be obtained from the parent/guardian (or student over 18 years of age) for new or amended IEPs before a change in accommodations can go into effect.

Similarly, 504 plans must reflect only those accommodations that are required by the student as determined by the educators familiar with the student. Consent by the parent/guardian is *not* required for a new or amended 504 plan, although the parent/guardian must be notified of any changes.

6. Unique Accommodations Requests

If a student with a disability or an English learner requires an accommodation that is not listed in Tables 1–6, the school may request approval from the Department for the use of the unique accommodation.

Unique accommodations may **not**:

- fundamentally change the test or the construct being measured by the test,
  OR
- assist the student to obtain the answers to test questions,
  OR
- violate test security requirements.

The school may request approval (via email) for use of a unique accommodation by submitting the request to mcas@doe.mass.edu at least two weeks prior to testing. If approved by the Department, the IEP or 504 plan of the student must be amended.

7. Process for Selecting and Evaluating MCAS Accessibility Features and Accommodations for Students with Disabilities

Accommodations are intended to offset the effects of a disability to allow a student to participate effectively in MCAS testing. When selecting testing accommodations, educators should consider the following:

- ***Determine the learning challenges*** *the student is experiencing.*
  - *Look at the student's classroom performance, not just the nature or type of disability.*
- ***Brainstorm the use of various accommodations and universal and designated accessibility features*** *with IEP team members and other adults familiar with the student.*
  - *What supports were used successfully with students who have similar learning profiles?*
- ***Try out the accessibility features and accommodation(s)*** *in different instructional and assessment settings and make adjustments as needed.*
  - *Be sure the student is comfortable using the accessibility feature or accommodation and becomes familiar with its use.*
- ***Evaluate whether the accessibility feature or accommodation addresses the student's need.***
  - *If not, revise the plan to provide accommodation(s) and supports accordingly.*
- ***If the accessibility feature or accommodation addresses the challenge****,*
  - *determine whether the accessibility feature or accommodation is allowed for MCAS testing in the subject (see Tables 1–5 elsewhere in this manual); and*

- *develop or amend the IEP or 504 plan accordingly, listing each accommodation (required) or accessibility feature (optional) for the specific MCAS test(s).*

8. Description of MCAS Accommodations

Tables 3–5 list the MCAS accommodations available to students with disabilities on the computer-based test, and where applicable, the comparable accommodation on the paper-based test. **Note:** the paper-based accommodations described below also apply to legacy MCAS retests. MCAS accommodations are grouped into the following categories:

- **Test Presentation:** allowable changes to the format in which the test is presented to the student (Table 3);
- **Response:** allowable changes to the procedures, supports, or devices used to facilitate a student's response to test questions (Table 4); and
- **Special Access:** accommodations intended for a small number of students to offset the effects of a disability that would otherwise severely limit or prevent their participation in the assessment, and that may somewhat impact the interpretation of the test results (Table 5); and
- **EL accommodations:** available to all ELs with and without disabilities on MCAS tests (Table 6)

Note: Accommodations listed with the "*(SR/PNP)*" designation in the tables below must be identified in the Student Registration/Personal Needs Profile for each student in PearsonAccess^{next}.

Table 3. *Test Presentation Accommodations* for Students with Disabilities

Test Presentation Accommodations		
#	Computer-Based Test	Paper-Based Test
A1 *(SR/PNP)*	**Paper-based edition** of the MCAS test may be administered as an accommodation to a student who is unable to use a computer or take the computer-based test due to a disability. (**Note:** This must be listed as an accommodation in the student's IEP or 504 plan)	N/A
A2 *(SR/PNP)*	N/A (See UF3 and UF4 on page 4 for information on screen magnification and alternate cursor/mouse.)	**Large print** (approximately 18-point font size on 11x17-inch paper) • All responses in the large-print booklet **must be transcribed** verbatim from the large-print booklet to the student's combined test & answer booklet (or standard answer booklet for legacy tests) and returned according to instructions in the PAM, so student will receive credit for his or her work. • Large-print special instructions will accompany the large-print test. • Students may either use the **large-print booklet** to respond to test questions, in which case the answers will need to be transcribed, either by the student (at the time of testing) or a test administrator (anytime during the test window); **OR** the student may write answers directly in the **test & answer booklet**. IEPs and 504 plans should indicate how students taking the large-print test will record their answers.

<table>
<tr><th colspan="3">Test Presentation Accommodations</th></tr>
<tr><th>#</th><th>Computer-Based Test</th><th>Paper-Based Test</th></tr>
<tr><td rowspan="2">A3.1
(SR/PNP)

A3.2
(SR/PNP)</td><td>A3.1 – **Screen reader:** ONLY for a student who is blind or visually impaired and uses the assistive technology program JAWS or NVDA
• If the student will use a screen reader, a separate hard-copy Braille edition test with the appropriate Braille graphics must also be ordered for the student.
• All answers must be entered onscreen, either by the student or test administrator.</td><td>A3.2 – **Braille edition** (hard copy)
• All answers must be either **scribed** or **transcribed** verbatim into the student's test & answer booklet and returned according to instructions in the PAM so the student will receive credit for his or her work.
• Braille special instructions will accompany the Braille test.
• See Appendix D for a schedule of the transition to Unified English Braille (UEB).</td></tr>
<tr><td colspan="2">**Previewing Braille test content by test administrators**: Under secure conditions supervised by the principal, Braille test administrators may review Braille test materials up to four days prior to testing once they are received by the school for the purpose of preparing to orient the student. Test materials may not be removed from the school. Braille test administrators who review the test prior to testing will be asked to sign non-disclosure agreements.</td></tr>
<tr><td>A4.1
(SR/PNP)
and
A4.2
(SR/PNP)</td><td>A4.1 – **Text-to-speech (TTS)** digital text read aloud on the computer-based MCAS Mathematics and Science and Technology/ Engineering tests
• TTS may be used either with or without headphones.
• If a TTS-enabled version of the computer-based test is used with **headphones**, the student may be tested in a typical-size group. If student will not use headphones, student must be tested individually in a separate setting.
• Students should view the tutorial and take an **online TTS practice test** prior to testing. If the student is unable to use the TTS feature, but has this accommodation listed in his or her plan, a human reader may be substituted.
• TTS for ELA is a special access accommodation (SA 1.1). See Table 5 for guidelines and criteria to receive this accommodation.</td><td>A4.2 – **Kurzweil 3000** electronic text reader
• Kurzweil 3000 test editions are available for the following tests:
  o **High school legacy STE tests (Chemistry and Technology/Engineering)**
  o February 2022 **high school legacy Biology test**
  o Legacy **ELA Composition retest**
  o Legacy **ELA Reading Comprehension retest** (special access accommodation SA 1.3 – see Table 5)
  o Legacy **Mathematics retest**
• Kurzweil 3000 tests are in read-only format. Responses must be recorded in the student's test & answer booklet.
• Kurzweil 3000 special instructions will be sent to the school with the test.</td></tr>
<tr><td>A5
(SR/PNP)</td><td colspan="2">**Human read-aloud** for the Mathematics and Science and Technology/Engineering computer- or paper-based tests
• A human reader may either read aloud 1) the **computer-based test** logged in to a nearby computer or sitting next to the student; or 2) the **paper-based test**.
• The test must be administered in a **separate setting**, either **individually** or to a **small group of 2–5 students** (or up to 10 students for the legacy ELA Composition retest), all of whom are being provided the human read-aloud accommodation.
• **For students who require that text be read aloud, IEP teams should consider whether TTS is preferable to a human reader (or vice versa) and list this in each student's IEP or 504 plan (e.g., "text-to-speech is preferable, but human reader is acceptable").**
• The entire test must be read word-for-word, exactly as it appears. The test administrator may not provide assistance to the student regarding the meanings of words, intent of any test item, or responses to test items. The test administrator should read with emphasis only when indicated by bold or italicized text.
(Note: Reading aloud **selected words** on the Mathematics and/or Science and Technology/Engineering</td></tr>
</table>

Test Presentation Accommodations		
#	Computer-Based Test	Paper-Based Test
	(STE) tests, as requested by the student, is UF10.) • Test administrators who review the test, including human readers, will be asked to sign non-disclosure agreements. • **Note: Reading aloud the ELA tests or legacy ELA Reading Comprehension retest** is a *special access* accommodation (SA1). See Table 5 for guidelines and criteria to receive this accommodation.	
A6.1 *(SR/PNP)*	**Human signer** for the Mathematics, Science and Technology/Engineering tests, and ELA test questions (but NOT reading passages) • The test must be signed exactly as it appears. The signer may not provide assistance to the student regarding the meaning of words, intent of any test item, or responding to test questions. The signer may finger-spell key words in addition to providing the sign for a term. The signer may sign emphasis only when indicated by bold or italicized text. • The test must be administered in a **separate setting**, either **individually** or to a **small group of 2–5 students**, all of whom are receiving the human signer accommodation. • **Signing the ELA reading passages and legacy ELA Reading Comprehension retest passages** is a special access accommodation (SA2). See Table 5 for guidelines and criteria to receive this accommodation. • **Previewing test content by human signers**: Under secure conditions supervised by the principal, interpreters may review test materials up to four days prior to testing once they become available, either online or shipped to the school, for the purpose of preparing to sign the test. Test materials may not be removed from the school nor accessed online outside of the school. Test administrators and interpreters who review the test prior to testing will be asked to sign non-disclosure agreements.	
A6.2 *(SR/PNP)*	**ASL video** editions of the computer-based spring 2022 MCAS grade 10 Mathematics and high school Introductory Physics and Biology tests An embedded ASL video is built into these computer-based tests. • Students may turn on, off, pause, and control the signing speed of the ASL video. The size of the ASL video may be adjusted (using the "control + or -" keys) and it may be moved around on the computer screen. • Students should view the tutorial and take **online ASL practice tests** prior to testing to become familiar with all of the features of the ASL video player. If the student is unable to use the ASL video, but has this accommodation listed in his or her plan, a human signer may be substituted.	N/A (See A6.1 for Human Signer)
A7	**Human signer for <u>test directions only</u>** for a student who is Deaf or Hard-of-Hearing	
A8	**Track test items** by assisting the student to move from one test question to the next	

Table 4. *Response Accommodations* for Students with Disabilities

<table>
<tr><th colspan="3">Response Accommodations</th></tr>
<tr><th>#</th><th>Computer-Based Test</th><th>Paper-Based Test</th></tr>
<tr><td>A9
(SR/PNP)</td><td colspan="2">

Use a Department approved graphic organizer, checklist, or supplemental reference sheet for ELA, Mathematics, and/or Science and Technology/Engineering tests

Only the approved ELA organizers and supplemental mathematics reference sheets made available by the Department may be used as accommodations on ELA and Mathematics tests. Graphic organizers *without* text may also be used without Department approval by students who have this accommodation listed in their IEP or 504 plan.

Notes:

- Approved graphic organizers and supplemental reference sheets are available on the Department's website. These have been developed for use on next-generation MCAS tests based on: the most current versions of the curriculum framework standards measured by the tests; the MCAS test design; expectations for how student essays and text-based responses will be scored; and previously approved versions and proposed changes submitted by schools.
- A student may use no more than **three** different approved graphic organizers or **two** supplemental reference sheets per test session.
- For **Science and Technology/Engineering** tests in grades 5, 8, and high school, a student may use a sample reference sheet, if available, or submit a customized reference sheet for Department approval (see Appendix E)
- Individualized graphic organizers and reference sheets **for the following tests ONLY** may be submitted to the Department for approval according to the schedule below.

<table>
<tr><th>Test Administration Date</th><th>MCAS Test</th><th>Reference Sheet Submission Deadline</th></tr>
<tr><td>November 2021</td><td>ELA and Mathematics Retests</td><td>**October 14, 2021**</td></tr>
<tr><td>February 2022</td><td>February Biology</td><td>**January 7, 2022**</td></tr>
<tr><td>April 2022</td><td>Grades 5 and 8 STE</td><td>**March 4, 2022**</td></tr>
<tr><td>June 2022</td><td>High School STE</td><td>**April 28, 2022**</td></tr>
</table>

For the tests/retests listed in the table above:

- Students may continue to use individualized ELA graphic organizers, supplemental mathematics reference sheets and checklists, and individualized STE reference sheets provided they have been submitted and approved by the Department prior to testing.
- All individualized organizers, checklists, and reference sheets submitted for approval must be accompanied by a completed cover sheet (see Appendix E).
- Individualizedreference sheets approved prior to the 2019–20202 school year **must be resubmitted for approval** for use on the 2021–2022 retests and STE tests.

Notes on the use of graphic organizers for ELA legacy retests:

- The student may use no more than **three** different graphic organizers per test session.
- Graphic organizers and checklists may *not* include definitions, specific examples, or sentence starters.

Notes on the use of individualized reference sheets for Mathematics legacy retests:

- The reference sheet must:
  - be developed in response to the student's specific learning needs;
  - be no more than 3 pages in length; and
  - conform to the Approval Guide for Individualized Mathematics Reference Sheets.

</td></tr>
</table>

<table>
<tr><th colspan="3">Response Accommodations</th></tr>
<tr><th>#</th><th>Computer-Based Test</th><th>Paper-Based Test</th></tr>
<tr><td>A10.1
(SR/PNP)
and A10.2
(SR/PNP)</td><td colspan="2">**Scribe responses** for the Mathematics, Science and Technology/Engineering tests, and/or legacy ELA *Reading Comprehension* retest using either:
• **human scribe** (A10.1) who will record the student's responses verbatim (i.e., as dictated by the student) *at the time of testing*, either onscreen (computer-based test) or in the student's test & answer booklet (paper-based test). The student must be tested in a separate setting. Test administrators (and/or sign interpreters) who review the test will be asked to sign non-disclosure agreements. (See Appendix A for specific guidance on providing the scribe accommodation)

If a student is unable to use his or her hand to respond to test questions due to a **recent injury or recovery from surgery**, the scribe accommodation may be provided, if:
○ this is listed in a 504 plan or an approved IEP (Department approval is not required);
OR
○ if a 504 plan is under development, and the staff responsible for writing the plan have already met and agreed upon the need for the scribe accommodation before providing it to the student.

• **speech-to-text** (A10.2); a speech recognition program or device that converts speech into text (other than a smartphone) used to generate responses to test questions.

Students using the speech-to-text accommodation for grades 5 and 8 STE tests, or high school Biology test, will be able to use a speech-to-text "web extension" that functions within TestNav. This embedded assistive technology will allow students to dictate their responses directly into the computer-based test without using a separate, adjacent (external) device.
The web extension for speech-to-text will function only on the computer-based grades 5 and 8 STE tests; the high school Biology test; and (if listed in a student's IEP or 504 plan as *special access* accommodation SA3.2) the ELA tests. **The web extension for speech-to-text does not function on mathematics or Introductory Physics computer-based tests** due to its incompatibility with the Equation Editor answer box used for open responses. Refer to the *Guidelines for Using Assistive Technology as an MCAS Test Accommodation* for a step-by-step guide to accessing and using this feature.</td></tr>
<tr><td>A11</td><td>N/A</td><td>**Responses recorded by student on special paper**, rather than in the test & answer booklet.
• Responses **must be transcribed** into the student's test & answer booklet by a test administrator *anytime during the test window*.
• If the **student transcribes** his or her own responses, then transcription must occur *during the test session* and be completed on the day in which the test session began.</td></tr>
<tr><td>A12
(SR/PNP)</td><td>N/A</td><td>**Typed responses**
• Responses must be printed out, one per page, and inserted in the student's test & answer booklet with all required information on each page (see the Principal's Administration Manual).
• Transcription of typed responses into the test & answer booklet is NOT required.
• After printing out, responses must be deleted from the word processor or device.</td></tr>
<tr><td>A13</td><td colspan="2">**Student records responses on a recording device** (other than a smartphone) for the purpose of playing back and transcribing recorded segment(s). Student may use text-to-speech software or an audio recording device. Responses must be deleted from any external devices once they have been transcribed into the student's test & answer booklet.</td></tr>
<tr><td>A14</td><td colspan="2">**Responses signed onto video (for a student who is Deaf or Hard-of Hearing)**, then transcribed by the student onscreen or into the answer booklet during playback. The video must be deleted after transcription.</td></tr>
</table>

Response Accommodations		
#	Computer-Based Test	Paper-Based Test
A15	**Monitor placement of responses** in the appropriate area onscreen or in the test & answer booklet by the test administrator	
A16	**Refreshable Braille Display/Braille note-taker** (specific external device used in conjunction with screen reader for student who is blind or has a vision impairment). A hard-copy edition of the Braille test must also be ordered.	**Braille note-taker** (specific external device used in conjunction with hard-copy Braille test) Note: Braille notes should be returned with the school's nonscorable shipment.
A17	**Braille writer** (specific external device used in conjunction with screen reader and hard-copy Braille test)	**Braille writer** (specific external device used in conjunction with the hard-copy Braille test). A printout of each response may be generated and inserted in the student's test & answer booklet, with all required information on each page (also see the Principal's Administration Manual).

A note regarding the transcription of student responses: The process of transcribing a student's responses onscreen or into his or her test & answer booklet by a test administrator (e.g., from the large print answer booklet) may occur at any time during the testing window, and must be monitored and supervised by the principal, test coordinator, or another test administrator. Details on transcribing responses are provided in Appendix A.

9. *Special Access Accommodations* for Students with Disabilities

Special access (formerly called "nonstandard") accommodations are intended for use by a *very small number of students* who would not otherwise be able to access the test because a disability severely limits or prevents them from performing the skill in question. Teams must exercise caution when considering whether a student requires a special access accommodation, since these accommodations may alter part of what the test is designed to measure. Teams must carefully review the guidelines and criteria described for each special access accommodation listed in Table 5.

Test results for students who took the test using special access accommodations should be interpreted with caution by parents and schools who should not infer that the student has expertise in the skill being accommodated. A notation will accompany the results of students who use a *special access* accommodation.

The Department will review each district's rate of use of special access accommodations. To ensure that IEP teams and 504 plan coordinators carefully review and apply appropriate criteria for use of special access accommodations, districts must do the following:

- train members of IEP teams and 504 plan coordinators on the guidelines for the selection and use of accommodations, including *special access* accommodations, listed in Table 5; and
- revise the IEPs and 504 plans of students with disabilities as needed.

Although test accommodations should generally be consistent with accommodations used for instruction, **the use of a *special access* accommodation during instruction does not automatically qualify a student to receive the same accommodation on an MCAS test**, unless the student meets the guidelines and criteria described on the following pages.

IEP and 504 teams are encouraged to make consistent, appropriate, and defensible decisions regarding the use of *special access* accommodations for each student based on locally administered diagnostic assessments, and to amend the IEPs and 504 plans of students who have been previously designated for special access accommodations, but who do not meet the criteria listed in Table 5.

Table 5. *Special Access Accommodations* for Students with Disabilities

Special Access Accommodations	
#	**Computer- and Paper-Based Tests**
SA1.1 *(SR/PNP)* and SA1.2 *(SR/PNP)* and SA1.3 *(SR/PNP)*	**Text-to-speech** (SA1.1) **or Human read-aloud** (SA1.2) **for next-generation ELA tests; or Kurzweil 3000** (SA1.3) **electronic text reader or Human read-aloud** (SA1.2) **for the legacy ELA Reading Comprehension retest**, including oral presentation of test questions, response options, and passages. • text-to-speech may be used either with or without headphones; • a human reader may either read aloud 1) the **computer-based test** logged in to a nearby computer or sitting next to the student; or 2) the **paper-based test**. This accommodation is intended for a small number of students with disabilities that **severely limit or prevent them from reading**, as documented in locally administered diagnostic evaluations. The student must meet all of the following criteria: • be **virtually unable to read**, even after varied and repeated attempts to teach the student to do so (i.e., the student is at the very beginning stages of learning to read, and not simply reading below grade level), as determined by locally administered diagnostic evaluations; and • receive **ongoing intervention** to learn the skill of reading; and • use this accommodation routinely (except during instruction in learning to read). The human read aloud (SA1.2) may also be provided to a student who is blind or has a visual impairment and uses a screen reader and/or has not yet learned (or is unable to use) Braille on the tests and retests listed above. If the student will use a screen reader, a separate hard copy Braille test edition will be sent to the school to allow the student to access the appropriate Braille graphics (see accommodation A3.1). The student • may be tested in a typical-sized group if using text-to-speech *with* headphones; • must be tested individually in a separate setting if text-to-speech will be used *without* headphones; and • may be tested in a group of up to five students if a human reader will be used.
SA2 *(SR/PNP)*	**Human Signer for next-generation ELA tests or legacy ELA Reading Comprehension retest**, including reading passages, questions, and answer options, for a student who is Deaf or Hard-of-Hearing This accommodation is intended for students who are Deaf or Hard-of-Hearing, and who are **severely limited or prevented from reading**, as documented in locally administered diagnostic evaluations. The student must meet all of the following criteria: • be **virtually unable to read** (i.e., decode text), even after varied and repeated attempts to teach the student to do so (i.e., the student is at the very beginning stages of learning to read, and not simply reading below grade level), due to a documented disability and/or history of early and prolonged lack of exposure to and use of language; and • uses this accommodation routinely, except during reading instruction; and • receives ongoing intervention to learn the skill. The student must be tested in a group of no more than five students, unless approval is obtained from the Department to increase the group size in rare circumstances.
SA3.1 *(SR/PNP)* and SA3.2 *(SR/PNP)*	**Scribe responses on the ELA test or ELA Composition retest**, administered individually and in a separate setting to a student using either: • **a human scribe** (SA3.1) who records the student's responses verbatim during testing (See Appendix A for guidelines on scribing student responses) OR • **speech-to-text** (SA3.2), a speech recognition program that converts spoken language to written text, used under the direct supervision of a test administrator to generate responses to test questions Students using the speech-to-text *special access* accommodation for the CBT ELA test will be able to use an embedded speech-to-text "web extension" that functions within TestNav. This embedded assistive technology will allow students to dictate their responses directly into the computer-based test without using a separate adjacent

<table>
<tr><th colspan="2">Special Access Accommodations</th></tr>
<tr><th>#</th><th>Computer- and Paper-Based Tests</th></tr>
<tr><td></td><td>(external) device. Refer to <u>Guidelines for Using Assistive Technology as an MCAS Test Accommodation</u> for a step-by-step guide on accessing and using this feature.

These accommodation are intended for a student who either:
1. has a language-processing (or other) disability and requires the dictation of virtually all written responses to a scribe or an electronic speech-to-text conversion device to generate responses.
OR
2. who is unable to use his or her hand or arm at the time of testing due to a fracture, severe injury, or recovery from surgery. In this case, the accommodation must either be
a. listed in a 504 plan or an approved IEP (additional approval by the Department is not required); OR
b. in cases where a 504 plan is under development, school personnel responsible for writing the plan must have already met and agreed upon the necessary MCAS accommodation(s) before a student may be provided the accommodation(s).</td></tr>
<tr><td>SA4
(SR/PNP)</td><td>Calculation device or other mathematics tool (including addition/subtraction or multiplication/division tables; or manipulatives) on the non-calculator session of the Mathematics test or retest

This accommodation is intended for a small number of students with documented disabilities that severely limit or prevent them from performing basic calculations without a calculation device or other mathematics tool, as documented in locally administered diagnostic evaluations, even after varied and repeated attempts to teach the student to do so.

The student must meet all of the following criteria:
• be virtually unable to calculate (i.e., unable to perform single-digit addition, subtraction, multiplication, or division without a calculation device or other mathematics tool); and
• uses the calculation device or tool during routine instruction in mathematics; and
• receives ongoing intervention to learn the skill.

The student's IEP or 504 plan must specify which calculation device or tool will be used (e.g., calculator or multiplication table).

Manipulatives and other mathematics tools (excluding calculators and arithmetic tables) must be approved by the Department prior to their use on MCAS tests. Please contact Student Assessment Services at 781-338-3625 or <u>mcas@doe.mass.edu</u> to request approval.</td></tr>
<tr><td>SA5
(SR/PNP)</td><td>Spell-checker for the ELA test or ELA Composition retest, including an external spell-checking device for the paper-based test; or in conjunction with the typed response accommodation for the paper-based test

This accommodation is intended for a small number of students with disabilities that severely limit or prevent them from spelling correctly, even after varied and repeated attempts to teach the student to do so.

The student must meet all of the following criteria:
• be virtually unable to spell simple words (i.e., at the beginning stages of learning how to spell), as documented by locally-administered diagnostic evaluations; and
• produces understandable written work only when provided this accommodation, which the student uses during routine instruction; and
• receives ongoing intervention to learn the skill.
The student may not use grammar check or access the internet during the test.</td></tr>
</table>

Special Access Accommodations	
#	Computer- and Paper-Based Tests
SA6 *(SR/PNP)*	**Word prediction for the ELA test and ELA Composition retest**: Word prediction provides a student with a bank of frequently or recently used words after the student keyboards the first few letters of a word. Students using the word prediction *special access* accommodation for the ELA test will be able to use an embedded word prediction "web extension" that functions within TestNav. This embedded assistive technology will allow students to use word prediction assistive technology within TestNav without using a separate, adjacent (external) device. Refer to the *Guidelines for Using Assistive Technology as an MCAS Test Accommodation* for a step-by-step guide on accessing and using this feature. For paper-based tests, a word prediction application must be used at a separate external computer station and a test administrator or the student must transcribe the selected word(s) on the student's onscreen test or into the student's answer booklet. (See Appendix A for information and guidelines on transcribing student responses.) This accommodation is intended for a small number of students who: 1. have a disability that **severely limits or prevents them from recalling and processing language** in order to generate written responses; AND 2. can access written expression only through the use of word prediction software, application, or device during routine instruction in order to generate written responses. Test administrators who review the test will be asked to sign non-disclosure agreements. During testing, internet access must be turned off/restricted; and functions that *automatically* select words for the student must be turned off.

V. MCAS Participation Requirements for Students Who Are English Learners (ELs)

EL students must participate in all MCAS tests scheduled for their grades, regardless of the language program and/or services they are receiving or the amount of time they have been in the United States, with one exception: Spring 2022 ELA testing is *optional* for EL students who enrolled in U.S. schools **after March 1, 2021** and who were not reported in the March 2021 SIMS report. ELA testing is also optional for EL students from Puerto Rico who are in their first year of enrollment in a Massachusetts school. District staff should refer to the *Graduation Requirements for Displaced Puerto Rico High School Students* who may wish to obtain a diploma from Puerto Rico.

Schools may elect to administer the MCAS ELA tests to first-year ELs and *must* administer the ACCESS for ELLs test to first-year and all other EL students, even those who have opted out of English language programs and services. **First-year EL students *must* also participate in MCAS Mathematics and Science and Technology/Engineering tests**, although results will be reported for diagnostic purposes only and students' results will not be included in school and district summary results or in state accountability reporting. For first-year ELs who participate in ELA testing, results will be provided at the school level and will be used for Competency Determination purposes for grade 10 students.

EL Participation Requirements for Spring 2022 MCAS Tests

	Content Area Test		
	ELA	Mathematics	Science and Tech/Eng
First-Year EL Students[1]	*Optional*[2]	Required	Required
All Other Students	Required	Required	Required

[1] Results for first-year EL students are **not** included in MCAS school and district summary results.
[2] Optional, provided that the student has participated in ACCESS for ELLs testing.

Questions regarding the **identification screening, placement, and reclassification of EL students** should be directed to the Office of English Language Acquisition and Academic Achievement at 781-338-3584 or via email at el@doe.mass.edu. For additional details, refer to the Guidance on Identification, Assessment, Placement, and Reclassification of English Learners.

Foreign Exchange Students

Foreign exchange students who are coded in SIMS as #11 under “Reason for Enrollment” in grades 3–8 and 10, regardless of whether they are determined to be English learners, are required to participate in the MCAS tests specified for the grade in which they are reported. These students are also required to participate in ACCESS for ELLs testing if they are reported in SIMS as English learners.

VI. MCAS Accessibility and Accommodations for EL Students

In addition to the accessibility features listed elsewhere in this manual that are available to English learners, several accommodations are also available to ELs, as described in Table 6. Table 7 describes the relative suitability of each accommodation for students who are at beginning, intermediate, and advanced levels of English proficiency.

A. Individuals Involved in Selecting Accessibility Features and Accommodations for EL Students

Decisions about which universal and designated accessibility features, and which accommodations, are appropriate for an EL student should be made by a group of educators familiar with the student. The decisions of the decision-making team must be documented using either the sample form for **Documentation of MCAS Accommodations for an EL Student** provided in Appendix B, or using a similar, locally designed form.

Individuals involved in the decision-making process may include any of the following:

- the student
- the student’s English as a Second Language (ESL) educator
- school administrator (principal/assistant principal)
- general educator (content area teacher)
- special educator (if appropriate)
- parent or guardian

Decision-making teams are encouraged to determine appropriate accessibility features and accommodations for EL students as early as possible in the school year to ensure that the student is familiar with their use. The student should not be introduced to an accessibility feature or accommodation on the day of the assessment. Accessibility features and accommodations are intended to remove barriers and allow EL students to demonstrate their knowledge and skills more effectively.

B. Guidelines for Selecting and Evaluating Accessibility Features and Accommodations for EL Students

Because a student’s level of English language proficiency is transitional and the student’s linguistic needs will differ from one year to the next, universal and designated accessibility features and accommodations should be examined and revised annually as the EL student makes progress toward attaining English proficiency.

1. Decision-Making Procedures

The following procedures may be used to make appropriate decisions regarding the selection of accessibility features and accommodations for EL students:

- After examining the range of supports allowed on MCAS tests that may help the EL student access the curriculum and take assessments more effectively, the student's classroom teacher should consider the following:
  - *Has a particular accessibility feature and/or accommodation been used successfully in the past to assist students in similar situations and at similar English proficiency levels?*
- After trying out the selected supports during routine instruction to determine whether they meet the student's needs, the teacher should consider the following questions:
  - *Does the feature and/or accommodation help the student overcome the barriers posed by developing English language proficiency?*
  - *Is the student comfortable using the feature or accommodation?*
- The teacher should observe the student using the accessibility feature or accommodation in the classroom (or if possible, across different classrooms and school settings) and inform members of the decision-making team which accessibility features or accommodations seem appropriate and effective.
- Based on the accessibility feature(s) and/or accommodations listed in this manual that were used successfully in the classroom, the teacher can select the appropriate features and/or accommodations for use on the MCAS tests.
- The teacher should document the final decisions on the use of specific accessibility features or accommodations, either on the sample form provided in Appendix B or using a similar locally developed form and maintain this information in the student's file.

2. Involving Students in Selecting and Using Accommodations

The more an EL student is involved in the accommodation selection process, the more likely the accommodations are to be accepted and used by the student. As students' English proficiency increases, and especially as students reach adolescence and the desire to be more independent increases, students can help determine when the support is no longer useful. Students are likely to increase their self-advocacy abilities over time and ensure that they receive the selected supports during testing. Teachers and other adults should play a role in assisting students to advocate on their own behalf regarding their need for and use of accessibility features and accommodations.

It is important to introduce the use of selected features and accommodations as early as possible in the school year to familiarize students with their use and determine their effectiveness. Accommodations should not be introduced for the first time on a statewide assessment.

C. Accommodations for Students Who Are English Learners (ELs)

In addition to universal features and designated features available to all students, the accommodations listed in Table 6 are available to all ELs, with and without disabilities, on MCAS tests.

Note that *some* EL accommodations must be **requested in advance** in the Student Registration/Personal Needs Profile (SR/PNP) in PearsonAccess^{next}. The names of accommodations and the process for their selection in the SR/PNP are identical to accommodations for students with disabilities, although the EL accommodations have unique codes (e.g., EL1.).

Table 6. Accommodations for Students Who Are ELs

#	Accommodations for EL Students
EL1 *(SR/PNP)*	**Paper-based editions** of the next-generation tests may be administered to a first-year EL student (i.e., a student in his or her first calendar year of enrollment in a U.S. school) with a low level of English proficiency, or an EL who has little or no familiarity with technology. (Note: Administering the ELA test to a first-year EL student is *optional*)
EL2	**Approved Bilingual Word-to-Word Dictionary and Glossary** (English/Native language) (Note: this accommodation is also available to former ELs)
EL3.1 *(SR/PNP)* and EL3.2 *(SR/PNP)* and EL3.3 *(SR/PNP)*	**Text-to-speech (TTS)** (EL3.1) for next-generation computer-based Mathematics, grades 5 and 8 Science and Technology/Engineering, and/or high school Biology or Introductory Physics (STE); or **Human read-aloud** (EL 3.2) for next-generation computer-based or paper-based Mathematics; Science and Technology/Engineering tests; legacy Mathematics or ELA *Composition* retests; or **Kurzweil 3000** (EL3.3) for legacy paper-based Mathematics retests, ELA Composition retests, and/or legacy high school Science and Technology/Engineering tests • If administering the paper-based test with a human reader, the test must be read word for word in English, exactly as written. The test administrator may not provide assistance to the student regarding the translation or meaning of words. The test administrator should read with emphasis only when indicated by bold or italicized text. • If a human reader is used, the test must be administered in a separate setting either **individually** or to a **group of 2–5 students** all of whom are receiving the human reader accommodation. • A student using the TTS-enabled English-only edition of the computer-based test with **headphones** may be tested in a typical-size group. If *not* using headphones, then student must be tested in a separate setting. **Note:** Reading aloud **selected words** on the Mathematics and/or Science and Technology/ Engineering tests is UF10. (See Table 1.)
EL4.1 *(SR/PNP)* and EL4.2 *(SR/PNP)*	**Scribe or speech-to-text** for Mathematics test responses, STE test responses, and/or legacy ELA *Reading Comprehension* retest responses, consisting either of: • **human scribe** (EL4.1), who records student's responses verbatim *at the time of testing*. See Appendix A for specific guidance on providing the scribe accommodation; or • a **speech-to-text** (EL4.2) program that converts spoken language to written text, used under the direct supervision of a test administrator to generate responses to test questions. Students using the speech-to-text accommodation for the grade 5 and 8 STE tests, and high school Biology, will be able to use an embedded speech-to-text "web extension" that functions within TestNav. This assistive technology is compatible with TestNav and will allow students to dictate their responses directly into the computer-based test without using a separate adjacent (external) device. The embedded web extension **is not available to ELs on the ELA tests; nor does the speech-to-text web extension function on the mathematics and Introductory Physics computer-based tests** due to incompatibility with the Equation Editor answer box used for open responses on those tests. Refer to the *Guidelines for Using Assistive Technology as an MCAS Test Accommodation* for a step-by-step guide to accessing and using this feature.
EL5	**Test administrator reads aloud/repeats/clarifies general administration directions in English** (from the Test Administration Manual scripts)
EL6	**Test administrator reads aloud/repeats/clarifies general administration directions** (from the Test Administration Manual scripts) **in student's native language**, if native language speaker is available
EL7	**NEW for Spring 2022** **Spanish-English** version of the Grade 10 Mathematics test or retest and **High School Biology** and **Introductory Physics** tests • Spanish-English tests are available in computer- and paper-based formats; legacy retests are paper-based only. Paper-based tests consist of Spanish and English on facing pages (side-by-side); computer-based tests consist of "stacked"

#	Accommodations for EL Students
	Spanish text above English text. • Intended for Spanish-speaking EL students who have been in the U.S. less than 3 years. • Students may respond either in Spanish or English. (Note that for all other MCAS test versions, students may respond only in English.)

Table 7 provides guidance regarding the suitability of EL accommodations based on the English language proficiency (ELP) level of the student.

Table 7. Guidance on Selecting Accommodations for English Learners

KEY for Table 7:

● **Highly recommended** for use by English learners at this ELP level
⦿ **Recommended** for use by English learners at this ELP level
○ **May not be appropriate** for students at this ELP level

#	Accommodation	Most Likely to Benefit English Language Learners at the Following English Proficiency Levels		
		Beginning	Intermediate	Advanced
EL1	**Paper-based editions** of the next-generation tests may be administered to a first-year EL student (i.e., in the first calendar year of enrollment in a U.S. school) with a low level of English proficiency and/or no familiarity with technology.	⦿	○	○
EL2	Approved **bilingual word-to-word dictionary** and glossary (English/Native Language)	○	●	●
EL3.1 and EL3.2	**Text-to-speech** (EL3.1) for the next-generation computer-based Mathematics or Science Technology/Engineering (STE) tests (in English *only);* OR **Human read-aloud** (EL3.2) for Mathematics, STE, or legacy ELA Composition retest	●	⦿	○
EL4.1 and EL4.2	**Human scribe** (EL4.1) or **speech-to-text** (EL4.2) for Mathematics and/or Science and Technology/ Engineering test responses, or legacy ELA Reading Comprehension retest	●	⦿	○
EL5	Test administrator reads aloud/repeats/clarifies general administration **directions in English**	●	⦿	○
EL6	Test administrator reads aloud/repeats/clarifies general administration **directions in student's native language**	●	⦿	○
EL7	**Spanish-English** version of the Grade 10 Math test/retest, June High School Biology or Introductory Physics	●	⦿	○

APPENDIX A

Procedures for Scribing and Transcribing Student Responses

A human scribe (A10.1, EL4.1, SA3.1) or speech-to-text (A10.2, EL4.2, SA3.2) are accommodations that allow students to either provide their responses orally to a test administrator who will write or keyboard the responses directly onscreen (or into the student's test booklet) or into a speech recognition device that converts spoken words into text. Students who receive this accommodation may respond to test questions either through:

- verbal dictation to a human scribe
- a speech-to-text device or other augmentative/assistive communication device (e.g., picture/word board)
- signing (e.g., American Sign Language, signed English, Cued Speech),
- gesturing or pointing
- eye-gazing

Guidelines for Administering the <u>Human Scribe</u> Accommodation (A10.1, EL4.1, SA3.1)

- A scribe may administer this accommodation only to **one student at a time** during a test session. The student must be tested in a separate setting.
- If scribing responses into a paper-based test booklet, the scribe must produce legible text. For computer-based tests, the scribe will type directly into the student's computer-based test.
- The scribe must transcribe the student's responses verbatim and may not prompt, correct, or question the student regarding the content of the responses.
- The scribe may request that the student restate (or sign) words, phrases, or sentences, as needed. The scribe may not edit or alter the student's dictated response in any way.
- A student using a scribe must be given the same opportunities as other students to plan and draft a written response. The scribe may write an outline, plan, or draft as directed by the student, and must record the draft response or outline exactly as dictated.

Additional guidance for scribing next-generation ELA tests and legacy ELA composition retests (SA3.1):

- When scribing, the scribe may assume that each sentence begins with an upper-case letter and ends with a period. All other capitalization, punctuation, and paragraph breaks are the responsibility of the student.
- After the student has finished dictating his or her response(s), the scribe must:
  - ask the student to review the draft and make any necessary edits, including capitalization, punctuation, and paragraph breaks.
  - either allow the student to make edits independently or direct the scribe to make the edits.
  - not assist the student in making decisions during the editing process.

Guidelines for <u>Transcribing</u> Student Responses

Circumstances may occur during test administration that may require a test administrator to **transcribe** a student's responses into a test & answer booklet or onscreen. Transcribing responses by a test administrator may occur at any time until the end of the test window under secure conditions supervised by the principal (or designee). These situations may include:

- answers recorded in the wrong section of, or in an incorrect test & answer booklet or computer-based test.
- a student took the test using a special test format requiring that answers be transcribed; e.g., Braille, large print. (Braille responses must be transcribed by persons fluent in Braille).
- a student uses speech-to-text software, or augmentative communication, or an assistive technology device (**that is not compatible with TestNav**) and prints responses for transcription by a test

administrator.

- A student recorded answers on blank paper, instead of in the required test & answer booklet or computer-based test, as an accommodation.
- The test & answer booklet or document becomes unusable; e.g., torn, wrinkled, or contaminated.

In cases where a student's responses must be transcribed *after* test administration is completed, the following steps must be followed:

- at least two persons must be present during any transcription of a student's responses. At least one of the individuals must be an authorized test administrator; the other a principal or designee.
- the student's response must be transcribed verbatim into the combined test & answer booklet (or separate answer booklet for legacy tests) or computer-based test.
- the student's original printed responses must either be securely shredded or returned with the school's nonscorable materials.

APPENDIX B

Sample Form

Documentation of MCAS Accommodations for an EL Student

Use this form or a locally developed form to document the selection of **MCAS accessibility features and accommodations** for each EL student. Available accessibility features and accommodations are listed in the *Accessibility and Accommodations Manual for the 2021–2022 MCAS Tests/Retests*. This form or the locally developed form should be completed within 60 days of the start of school year or student's date of enrollment and must be **updated annually**. If the EL is a student with a disability, accommodations decisions for EL students with disabilities must also be documented in the student's IEP or 504 plan.

Student Name: ____School Year: _____________

Grade: ___________ SASID: ____

School: _______________________________________District: ______________________________

Name of staff and others who determined the test accommodations and features for the student:

Teacher(s) ____

Others (including student and/or parent)____

____

If the **parent** and/or **student** were not part of the decision-making process, then they should be notified of the features and accommodations the student will receive on the tests.

Directions: Indicate below the **accessibility features and accommodations** that will be provided to the student on MCAS tests.

Accessibility Feature or Accommodation Needed by the EL Student for Testing	Notes/Comments
(Continue on additional pages as needed.)	

APPENDIX C

Sample Form (Optional)

Student Accommodation Refusal

If a student refuses an accommodation listed in his or her IEP or 504 plan, the school should document in writing that the student refused the accommodation, and the accommodation must be offered and remain available to the student during testing.

This form can be completed and placed in the student's file, and a copy sent to the parent. IEP teams, 504 plan coordinators, and educators making MCAS accommodations decisions for ELs should consider this information when making future accommodations decisions for the student. Use of this form is encouraged, but not required.

Student Name: ____**Date**: ________________

Grade: ______________________ **SASID**: ______________________________________

School: ____

District: ____

MCAS Test:____

Test Administrator:____

Accommodation(s) refused by student____

____

Reason for refusal:____

____

____

Comments:

____

____

Keep this form on file at the school.
Do *not* submit this form with your school's test materials.

APPENDIX D

Timeline for the Transition of MCAS tests to Unified English Braille (UEB)

The state's transition to Unified English Braille (full UEB/UEB Technical) from English Braille American Edition (EBAE) and Nemeth Code will continue according to the calendar shown below for school years 2021–2022 and 2022–2023. UEB symbol sheets will be provided with MCAS UEB Braille test materials. All tests listed below are "next generation" unless noted as "legacy."

<table>
<tr><th colspan="2">School Year</th></tr>
<tr><th>Fall 2021–Spring 2022</th><th>Fall 2022–Spring 2023</th></tr>
<tr><td>EBAE with Nemeth Code:
• November 2021 ELA and Mathematics Retests (legacy)
• March 2022 ELA and Mathematics Retests (legacy, if offered)
• No EBAE tests in Spring 2022

UEB Technical (full UEB):
• November 2021 ELA and Mathematics Retests (next-generation)
• February 2022 Biology (legacy)
• March 2022 ELA and Mathematics Retests (next-generation)
• All grades 3–8 and grade 10 spring MCAS tests, including:
  o ELA and Mathematics (next-generation)
  o Biology and Intro Physics (next-generation)
  o Chemistry and Technology/Engineering (legacy)</td><td>EBAE with Nemeth Code:
• No EBAE tests or retests

UEB Technical (full) UEB:
• November 2022 ELA and Mathematics Retests (next-generation)
• February 2023 Biology and Introductory Physics (next-generation)
• March 2023 ELA and Mathematics Retests (next-generation)
• Spring 2023: All grades 3–8 and grade 10 MCAS tests, including:
  o ELA and Mathematics (next-generation)
  o Biology and Introductory Physics (next-generation)
  o Chemistry and Technology/Engineering (legacy, if offered)</td></tr>
</table>

APPENDIX E

<table>
<tr><td colspan="2">Submitting Customized Materials for Approval
for MCAS Science and Technology/Engineering Tests and ELA and Mathematics Retests</td></tr>
<tr><td colspan="2">Instructions: This cover sheet must accompany all requests for approval to use customized materials for accommodation A9. Customized material may only be used on MCAS STE tests in grades 5, 8, and high school; and legacy mathematics and ELA retests. Please complete and submit this form to the Department's Student Assessment Services Office by email to mcas@doe.mass.edu.
Please submit a separate cover sheet for each content area (English Language Arts, Mathematics, or Science and Technology/ Engineering).
Materials submitted after the deadline(s) shown below may not be reviewed before the testing window begins.
Responses will be sent approximately ten school days after a request is received. Please contact the Student Assessment Services Unit at 781-338-3625 with any questions. Retain documentation on file for three years.</td></tr>
<tr><td colspan="2">Contact Information</td></tr>
<tr><td>Name:</td><td>Date:</td></tr>
<tr><td>School Name:</td><td>District Name:</td></tr>
<tr><td>Telephone Number:</td><td>Fax Number:</td></tr>
<tr><td>Email:</td><td>Resubmittal (Check one): ☐ Yes ☐ No</td></tr>
<tr><td colspan="2">Accommodation A9 Customized Materials Submitted</td></tr>
<tr><td colspan="2">Place a check mark next to each material being submitted for approval.</td></tr>
<tr><td>☐ Legacy ELA Graphic Organizer</td><td>☐ Legacy Math Reference Sheet</td></tr>
<tr><td>☐ Legacy STE or Other Checklist</td><td>☐ STE Reference Sheet</td></tr>
<tr><td colspan="2">MCAS TEST ADMINISTRATION</td></tr>
<tr><td colspan="2">Place a check mark next to each test administration for which the material will be used. (Submission deadline in parentheses)</td></tr>
<tr><td>☐ November legacy retests (10/14/2021)</td><td>☐ February Biology (1/7/2022)</td></tr>
<tr><td>☐ High School STE (4/28/2022)</td><td>☐ Grades 5 and 8 STE (3/4/2022)</td></tr>
<tr><td colspan="2">Principal or Designee Statement
The principal or designee of the school must sign below to acknowledge the following:
I have reviewed the Department's policy for administering customized materials for accommodation A9 .</td></tr>
<tr><td colspan="2">Name: Signature (or Electronic Signature): Date:</td></tr>
<tr><td colspan="2">Approval/Denial of Request – For Department Use Only</td></tr>
<tr><td colspan="2">Database number: Date Received Date of Response ☐ Email ☐ Fax</td></tr>
<tr><td colspan="2">☐ Approved ☐ Approved with Changes ☐ Denied Date Reviewed</td></tr>
</table>

APPENDIX F

ACCOMMODATION FREQUENCIES

Table F-1. Numbers of Students with IEPs/504 Plans Tested with and without Accommodations by Content Area and Grade*

Content Area	Grade	Total Number of Students Tested	Total Number of Students with IEPs/504 Plans Tested with Accommodations	Total Number of Students with IEPs/504 Plans Tested without Accommodations
ELA	3	64,040	7,889	7,201
	4	64,511	10,294	6,027
	5	65,784	11,344	5,874
	6	65,941	11,961	5,445
	7	67,614	12,184	5,614
	8	69,916	12,204	5,996
	10	67,437	10,586	6,356
	Total	**465,243**	**76,462**	**42,513**
Mathematics	3	64,988	9,138	5,982
	4	65,380	11,087	5,228
	5	66,669	12,090	5,157
	6	66,644	12,277	5,079
	7	68,145	12,393	5,337
	8	70,452	12,439	5,676
	10	67,351	10,737	6,030
	Total	469,629	**80,161**	**38,489**
STE	5	66,436	11,700	5,466
	8	70,022	12,055	5,904
	Total	136,458	**23,755**	**11,370**
Biology	HS	57,172	8,820	5,474
Introductory Physics	HS	14,162	2,180	1,270

**Includes English Learners with IEP/504 Plans.*

Table F-2. Numbers of English Learners (ELs) without Disabilities Tested with and without EL Accommodations by Content Area and Grade

Content Area	Grade	Total Number of Students Tested	Total Number of ELs Tested with EL Accommodations	Total Number of ELs Tested without EL Accommodations
ELA	3	64,040	99	7,498
	4	64,511	109	6,166
	5	65,784	103	4,358
	6	65,941	96	3,314
	7	67,614	121	3,271
	8	69,916	82	3,507
	10	67,437	92	3,642
	Total	465,243	**702**	**31,756**
Mathematics	3	64,988	5,046	3,445
	4	65,380	4,517	2,614
	5	66,669	3,389	1,928
	6	66,644	2,582	1,585
	7	68,145	2,259	1,760
	8	70,452	2,320	1,955
	10	67,351	1,913	2,059
	Total	469,629	**22,026**	**15,346**
STE	5	66,436	3,368	1,935
	8	70,022	2,313	1,937
	Total	136,458	**5,681**	**3,872**
Biology	HS	57,172	2,424	2,481
Introductory Physics	HS	14,162	435	498

Table F-3. Numbers of Students with IEPs/504 Plans Tested with Accommodations by Accommodation Type and Grade—ELA

Accommodation Description	Grade 3	Grade 4	Grade 5	Grade 6	Grade 7	Grade 8	Grade 10
Paper-Based Test Edition	203	215	223	198	169	167	306
Large Print Test Edition	10	13	11	198	18	21	22
Screen Reader Edition	1	3	0	4	8	11	2
Compatible Assistive Technology	5	19	9	8	9	5	6
Braille Test Edition	0	1	2	3	3	4	2
Human Read-Aloud as a Special Access Accommodation	1,077	1,050	862	579	537	457	463
Human Signer as a Special Access Accommodation	9	14	21	8	17	15	16
Text-to-Speech as a Special Access Accommodation	1,146	1,265	1,228	1,337	1,366	1,378	1,047
Human Scribe as a Special Access Accommodation	881	999	916	688	536	424	274
Speech-to-Text as a Special Access Accommodation	385	545	553	478	424	351	177
Typed Responses	1	7	16	18	20	11	39
Spell-checker as a Special Access Accommodation	269	424	540	656	680	799	710
Word Prediction as a Special Access Accommodation	119	206	257	284	294	338	229
Graphic Organizer / Supplemental Reference Sheet	7,297	9,821	10,984	11,538	11,870	11,944	10,298
Web Extension	324	475	505	431	335	308	117
Total*	**11,727**	**15,057**	**16,127**	**16,428**	**16,286**	**16,233**	**13,708**

** The totals may differ from those in Table F-1 because individual students may have more than one accommodation.*

Table F-4. Numbers of Students with IEPs/504 Plans Tested with Accommodations by Accommodation Type and Grade—Mathematics

Accommodation Description	Grade 3	Grade 4	Grade 5	Grade 6	Grade 7	Grade 8	Grade 10
Paper-Based Test Edition	190	216	230	205	183	177	370
Large Print Test Edition	9	14	10	14	15	18	18
Screen Reader Edition	2	2	0	3	5	6	7
Compatible Assistive Technology	6	10	10	14	11	1	5
Braille Test Edition	0	1	1	2	2	4	3
Human Read-Aloud	1,990	2,107	1,832	1,272	1,063	915	935
Human Signer	8	20	25	11	24	25	5
Text-to-Speech	4,533	5,243	5,778	5,553	5,250	4,700	2,411
ASL Video Edition	N/A	N/A	N/A	N/A	N/A	N/A	17
Human Scribe	897	991	974	708	562	453	294
Speech-to-Text	315	400	502	468	423	311	178
Typed Responses	1	6	12	10	7	4	2
Calculation Device as a Special Access Accommodation	484	812	1,042	1,365	1,615	1,958	2,254
Spanish-English Edition	0	0	0	0	0	0	37
Graphic Organizer / Supplemental Reference Sheet	7,386	9,669	11,019	11,422	11,673	11,824	10,230
Total*	**15,821**	**19,491**	**21,435**	**21,047**	**20,833**	**20,396**	**16,712**

** The totals may differ from those in Table F-1 because individual students may have more than one accommodation.*

Table F-5. Numbers of Students with IEPs/504 Plans Tested with Accommodations by Accommodation Type and Grade—STE

Accommodation Description	Grade 5	Grade 8
Paper-Based Test Edition	214	149
Large Print Test Edition	9	23
Screen Reader Edition	0	7
Compatible Assistive Technology	8	2
Braille Test Edition	0	4
Human Read-Aloud	1,767	884
Human Signer	22	25
Text-to-Speech	5,564	4,508
Human Scribe	914	417
Speech-to-Text	592	385
Typed Responses	12	5
Calculation Device	99	333
Spell-checker	2	2
Graphic Organizer / Supplemental Reference Sheet	10,583	11,425
Web Extension	308	124
Total*	**20,094**	**18,293**

** The totals may differ from those in Table F-1 because individual students may have more than one accommodation.*

Table F-6. Numbers of Students with IEPs/504 Plans Tested with Accommodations by Accommodation Type and Grade—Biology

Accommodation Description	Grade 9	Grade 10
Paper-Based Test Edition	175	65
Large Print Test Edition	10	0
Screen Reader Edition	2	1
Compatible Assistive Technology	3	3
Braille Test Edition	0	0
Human Read-Aloud	484	178
Human Signer	4	5
Text-to-Speech	1,799	602
ASL Video Edition	12	1
Human Scribe	150	60
Speech-to-Text	140	40
Typed Responses	12	2
Word Prediction	17	14
Spanish-English Edition	27	14
Graphic Organizer / Supplemental Reference Sheet	6,035	2,446
Web Extension	57	16
Total*	**8,927**	**3,447**

** The totals may differ from those in Table F-1 because individual students may have more than one accommodation.*

Table F-7. Numbers of Students with IEPs/504 Plans Tested with Accommodations by Accommodation Type and Grade—Introductory Physics

Accommodation Description	Grade 9	Grade 10
Paper-Based Test Edition	18	8
Large Print Test Edition	6	0
Screen Reader Edition	2	0
Compatible Assistive Technology	0	0
Braille Test Edition	0	0
Human Read-Aloud	140	14
Text-to-Speech	563	44
ASL Video Edition	3	1
Human Scribe	56	2
Speech-to-Text	52	2
Word Prediction	12	0
Spanish-English Edition	5	2
Graphic Organizer / Supplemental Reference Sheet	1,920	150
Web Extension	28	0
Total*	**2,805**	**223**

** The totals may differ from those in Table F-1 because individual students may have more than one accommodation.*

Table F-8. Numbers of English Learners without Disabilities Tested with EL Accommodations by Accommodation Type and Grade—ELA[1]

Accommodation Description	Grade 3	Grade 4	Grade 5	Grade 6	Grade 7	Grade 8	Grade 10
Paper-Based Test Edition[2]	1	0	1	1	0	2	49
Human Read-Aloud as a Special Access Accommodation	9	8	4	3	2	3	3
Text-to-Speech	32	41	45	54	86	50	41
Human Scribe as a Special Access Accommodation	8	4	2	6	0	1	1
Speech-to-Text as a Special Access Accommodation	1	8	2	4	6	10	1
Total	**51**	**61**	**54**	**68**	**94**	**66**	**95**

1 DESE does not collect data on three EL accommodations available for the next-generation ELA tests (Approved Bilingual Word-to-Word Dictionaries, Test Administrator Clarifies General Directions in English, and Test Administrator Clarifies General Directions in Native Language).

2 The Paper-Based Test Edition accommodation is only available to first-year English learners.

Table F-9. Numbers of English Learners without Disabilities Tested with EL Accommodations by Accommodation Type and Grade—Mathematics

Accommodation Description	Grade 3	Grade 4	Grade 5	Grade 6	Grade 7	Grade 8	Grade 10
Paper-Based Test Edition[1]	27	10	7	9	12	5	88
Human Read-Aloud	365	303	137	69	47	50	37
Text-to-Speech	4,657	4,196	3,229	2,488	2,191	2,250	702
Human Scribe	54	51	31	18	17	22	13
Speech-to-Text	38	54	39	53	40	15	28
Spanish-English Edition[2]	N/A	N/A	N/A	N/A	N/A	N/A	1,009
Total	**5,141**	**4,614**	**3,443**	**2,637**	**2,307**	**2,342**	**1,877**

1 The Paper-Based Test Edition accommodation is only available to first-year English learners.
2 The Spanish-English Edition is only available for grade 10.

Table F-10. Numbers of English Learners without Disabilities Tested with EL Accommodations by Accommodation Type and Grade—STE

Accommodation Description	Grade 5	Grade 8
Paper-Based Test Edition[1]	5	2
Human Read-Aloud	142	50
Text-to-Speech	3,204	2,244
Human Scribe	32	20
Speech-to-Text	60	29
Total	**3,443**	**2,345**

1 The Paper-Based Test Edition accommodation is only available to first-year English learners.

Table F-11. Numbers of English Learners without Disabilities Tested with EL Accommodations by Accommodation Type and Grade—Biology

Accommodation Description	Grade 9	Grade 10
Paper-Based Test Edition[1]	44	47
Human Read-Aloud	30	10
Text-to-Speech	605	170
Human Scribe	3	1
Speech-to-Text	13	1
Spanish-English Edition	1,053	527
Total	**695**	**229**

1 The Paper-Based Test Edition accommodation is only available to first-year English learners.

Table F-12. Numbers of English Learners without Disabilities Tested with EL Accommodations by Accommodation Type and Grade—Introductory Physics

Accommodation Description	Grade 9	Grade 10
Paper-Based Test Edition[1]	25	11
Human Read-Aloud	14	0
Text-to-Speech	159	28
Human Scribe	11	0
Speech-to-Text	7	4
Spanish-English Edition	150	87
Total	**216**	**43**

1 The Paper-Based Test Edition accommodation is only available to first-year English learners.

APPENDIX G
NEXT-GENERATION SCORING SPECIFICATIONS

MCAS
Next Generation
2021-2022

MASSACHUSETTS DEPARTMENT OF
ELEMENTARY AND SECONDARY
EDUCATION

Scoring Specifications

Part A:

Client-Specific Scoring Specifications

Part B:

General Scoring Guidelines & Best Practices

Contract Name:	**MCAS Next Gen Gr3-8 and HS** **Year: 2021-2022**		
Contract Code:	**1636**		
Contact Information:	**Program Managers:** Chris Clough, John Miller, Dezarae Blossomgame, Mark Peters		
	Scoring Services at Cognia: • ELA: Sandy Sinclair, Vince McGroary, Meredith Newbould • Math: Andrea Kuegel, Janice Knox • Science: Rozanna Gaines, Sarah Juhlin **Scoring Services at Pearson:** • ELA: Stephen Hoffelt • Math: Tracey Benvin **Project Management:** • Cognia: Aaron Wozmak (on temporary leave), Karin Evans (acting), Elizabeth Etienne (in transition) • Pearson: Paula Schwartz		
Admin Name:	**ELA and Math Gr 3-8 and Gr 10, Sci Gr 5 & 8, Bio & Physics HS, Civics Gr 8**		
Scoring Plan:	This scoring plan summarizes the approach to the scoring of MCAS Next Gen administrations for all contents and grades: • All scoring will be conducted applying a virtual/synchronous scoring model maintaining the same stringent quality control measures that were applied in a center-based, regional scoring environment. • Prior to the start of the scoring project, scorers will attend connectivity sessions to support their readiness and to answer any technology-related questions. • Scorers will evaluate student work on a fixed daily schedule under constant supervision of leadership. • Scorers will work in a non-public setting and will be required to be on camera during training and scoring. Scorers may blur their backgrounds. • Training and all interaction between leadership and scorers will occur live via Zoom (Cognia) or Teams (Pearson) and/or via pre-recorded training module or a recording of live training. • Breakout rooms may be used to facilitate scorer training and individualized coaching. • DESE will have remote access to the scoring system and Zoom/Teams links will be provided to observe training sessions and scoring. • A post-scoring survey will be sent out to all MCAS scoring associates to elicit feedback on their scoring experience. The results will be shared with DESE.		
Testing Platform:	**☒TestNav**		
Scoring Platform:	**☒iScore:** OP & FT Gr 10 ELA & Math, Gr 5 & 8 Science, HS Bio & Physics, Gr 8 Civics **☒ePEN:** OP Gr 3-8 ELA-Math		
Admin Type:	**☒ Operational**	**☒ Field Test:** ☒ Standalone ☒ Embedded	**Note:** Standalone: Civics (Pilot) Embedded: Math, ELA, and Science
Required Client Meetings:	**Benchmarking**	**Note:** Benchmarking meetings will be scheduled at mutually agreeable dates and times in Spring/Summer 2022 to determine the scoring rules for all FT items.	

Table 1 - Estimated Student Count per Grade

Content	3	4	5	6	7	8	HS
Math	Total 70,000 PBT 2% CBT 98%	Total 70,000 PBT 2% CBT 98%	Total 70,000 PBT 2% CBT 98%	Total 70,000 PBT 1% CBT 99%	Total 70,000 PBT 1% CBT 99%	Total 70,000 PBT 1% CBT 99%	Total 72,000 PBT 10% CBT 90%
ELA	Total 70,000 PBT 2% CBT 98%	Total 70,000 PBT 2% CBT 98%	Total 70,000 PBT 2% CBT 98%	Total 70,000 PBT 1% CBT 99%	Total 70,000 PBT 1% CBT 99%	Total 70,000 PBT 1% CBT 99%	Total 72,000 PBT 10% CBT 90%
Science			Total 70,000 PBT 2% CBT 98%			Total 70,000 PBT 1% CBT 99%	Biology: 40,000 Physics: 15,000 PBT 10% /CBT 90%
Civics						State Task: Total 11,000 CBT 100%	

Alternative Language: HS only **-** Spanish Math (est.500 students), Biology, and Physics (no estimates)
Note: Students who choose the Spanish test version can answer in Spanish, English, or any combination of the two languages. Bilingual scorers will assess these responses regardless of language.

The 2021-2022 MCAS consists of both operational and matrix field test items.
Cognia is responsible for all aspects of scoring with Pearson serving as sub-contractor for the operational scoring of Gr 3-8 ELA and Math. Pearson recruits scoring associates for their assigned scoring activities.

Table 2 - Scope of Work by Number and Type of Item per Grade

	Grade 3	Grade 4	Grade 5	Grade 6	Grade 7	Grade 8	Grade HS
ELA	1 OP ES 4-3 1 OP CR3 2 EQ CR3 1 EQ ES4-3 4 FT ES 4-3 8 FT CR3	1 OP ES 4-3 1 OP CR3 2 EQ CR3 1 EQ ES4-3 4 FT ES 4-3 8 FT CR3	2 OP ES 4-3 2 EQ ES 4-3 8 FT ES 4-3	2 OP ES 5-3 2 EQ ES 5-3 8 FT ES 5-3	2 OP ES 5-3 2 EQ ES 5-3 6 FT ES 5-3	2 OP ES 5-3 2 EQ ES 5-3 8 FT ES 5-3	2 OP ES 5-3 1 EQ ES 5-3 20 FT ES 5-3
Math	4 OP CR3 2 EQ CR3 10 FT CR3	4 OP CR4 2 EQ CR4 7 FT CR4	4 OP CR4 2 EQ CR4 7 FT CR4	4 OP CR4 2 EQ CR4 7 FT CR4	4 OP CR4 2 EQ CR4 7 FT CR4	4 OP CR4 2 EQ CR4 7 FT CR4	4 OP CR4 2 EQ CR4 24 FT CR4
Science			2 OP CR2 4 OP CR3 1 EQ CR2 2 EQ CR3 5 FT CR2 17 FT CR3			2 OP CR2 4 OP CR3 1 EQ CR2 2 EQ CR3 5 FT CR2 17 FT CR3	Biology: 2 OP CR3 3 OP CR4 12 FT CR3 12 FT CR4 Physics: 2OP CR3 3 OP CR4 12 FT CR3 12 FT CR4
Civics (Pilot)						State Task 1 3 FT CR1 5 FT CR2 2 FT CR4 State Task 3 2 FT CR1 4 FT CR2 2 FT CR4 State Task 5 7 FT CR1 2 FT CR2 2 FT CR4	
	OP = Operational FT = Field Test CR# = #-point Constructed Response			ET# = #-point Extended Text item ES = 2 trait Essay - GR 3-5: 0-4 & 0-3 points, Gr 6-HS: 0-5 & 0-3 points EQ = Equating item			

Table 3 - Quality Control Tools

Qualifying Sets	☒ **OP**	**QTY:** 2 sets w/ 10 responses each	**Notes:** Scorers are required to take Qualification Set 2 if the threshold is not met on Qualification Set 1.
	☒ **FT**	**QTY:** 1 set w/10 responses	**Notes:**
	Other: Civics PT	**QTY:** 1 set	**Notes:**
Qualification Threshold (%)	**Leadership:** **Exact:** 80% **Exact + Adjacent:** 90%, 1 Discrepant allowed		**Scorers:** **Exact:** 70% **Exact + Adjacent:** 90%, 1 Discrepant allowed
	Clarification notes: For multi-trait ELA items, the passing thresholds must be met on each individual trait.		
Read-Behind Rate	**Minimum daily requirement per Scorer:** All Grades and Content Areas: 10 responses minimum for a full day. This number will be proportionate for shifts that do not last an entire day.		
Double-Blind Rate	**Minimum (%):** Operational scoring Grades 3-8 ELA & Math: 10% Operational scoring Sci 5 & 8: 10% Operational HS: 100%		Field Test 3-8 ELA: 20% Field Test 3-8 Math: 10% Field Test 5 & 8 Sci: 10% Field Test HS ELA, Math, Sci: 10% Pilot Test 8 Civics: 500-600 responses: 100%
Recalibration Sets	☒**Standalone** ☐ **Embedded** ☐ **N/A**	**Number of recalibration sets:**	1 set daily
		Number of responses per set:	5 responses
	When Administered?	Beginning on the second day of operational scoring for each item and each day until scoring of each item is complete	
	Notes:	Please refer to comparison chart of scoring terminology and practices as applied by Cognia and by Pearson	
Embedded Responses	**When Administered?**	Grades 5, 8 Science, HS Bio & Physics & Grade 10 ELA, Math: 10 responses deployed during the first 100 responses scored by a scorer	
Validity Responses	**Required?** ☒**Yes** ☐ **N/A**	**Preset percentage:** Operational Grades 3-8 ELA: 6% days 1 & 2, 4% day 3 Operational Grades 3-8 Math: 3% days 1 & 2, 2% day 3	
	Items requiring validity	Operational Grades 3-8 ELA & Math	
	Notes:	Please refer to comparison chart of scoring terminology and practices as applied by Cognia and by Pearson	
Voiding	**Threshold:**	Grade HS ELA and Math, Grades 5 & 8 Sci: <70% based on daily Compilation Report Grades 3-8 ELA and Math: <70% based on cumulative validity performance	
	Frequency:	Daily	
	Threshold for scorer removal:	At the discretion of Scoring Leadership	
Equating Items	☒**Yes** Operational Grades 3-8 and HS		
	Note: To ensure scorer consistency, seeded papers will be inserted for all equating items that are polytomous.		

Table 4 - Staffing Requirements:

Staffing Level:	Minimum Education Requirements:	Specific Degree Requirements:
Scorer	Grades 3-8: • 48 college credits AND • passed at least 2 college classes related to the content area being scored High School: • 4-year college degree AND • A degree related to the content area being scored OR • 2 classes related to the content area being scored and demonstrated scoring experience in the content area	• Must be at least 18 years of age • Cannot be under contract to Massachusetts schools, including as teachers, administrations, and para-professionals
Scoring Team Leader	Grades 3-8: • 4-year college degree AND • Passed at least 2 college classes related to the content area being scored High School: • 4-year college degree AND • At least 4 classes related to the content area being scored OR • 2 classes related to the content area being scored and demonstrated scoring experience in the content area	• Must be at least 18 years of age • Cannot be under contract to Massachusetts schools, including as teachers, administrations, and para-professionals
Scoring Supervisor	Grades 3-8: • 4-year college degree AND • Passed at least 2 college classes related to the content area being scored High School: • 4-year college degree AND • At least 4 classes related to the content area being scored OR • Fewer than 4 classes in the content area with approval from the DESE	• Must be at least 18 years of age • Cannot be under contract to Massachusetts schools, including as teachers, administrations, and para-professionals

Table 5 - Scoring Platform Additional Set-up

AI Scoring	☐ **Yes (1st score)** ☒ **Yes (2nd score)** ☐ **N/A**	**Notes:** Use of Pearson's Intelligent Essay Assessor (IEA) as the 10% read-behind score on those essays in grades 3-8 whose performance is approved by DESE.
Arbitration Rules	☐ **Adjacent** ☒ **Discrepant**	**Notes:** Whenever there is a discrepancy between two scores assigned to the same student response (i.e., the two scores are more than one point apart), the response is automatically routed to scoring leadership who evaluates the response and provides an arbitration score.
Practice Set within iScore/ePen	☐ **Yes** ☒ **N/A**	**Notes:** Scoring of MCAS practice sets are an integral part of scorer training and will include a discussion of each practice response, revealing the actual score and explaining the scoring rationale.
Score-of-Record Rules	• Arbitration score and read-behind • score both provided	• Latest read-behind score is the score-of-record
	• Arbitration score (no read-behind • performed)	• Arbitration score is the score-of-record
	• Two read-behind scores (no • arbitration performed)	• If Read-behind score is provided by 2 STLs, the later read-behind score is the score-of-record
	• One read-behind score	• Read-Behind score is the score-of-record
	• Two Scores	• If the first score and second score differ by 1 point, the first score shall be used as the final score (Cognia setting)

Table 6 – Condition Codes

Flag Codes			
☒ Crisis (41)			
Reject Codes			
☒ Blank (B-21)	☒ Unreadable (U-51)	☒ Wrong Location (W-52)	☒ Non-English (F-53)
☒ Off Topic (O-54)	☐ Illegible (I-55)	☐ Quarantine (Q-56)	☐ Insufficient Amount to Score (A-57)
☐ Refusal to Score (R-58)	☒ Repeats the Prompt (P-59)	☐ Typed Sheet/NSR (T-60)	☐ Escalate (61)
☐ No Score (N-62)	☐	☐	☐

Defining information of flag and reject codes can be found in Part B, Section 5.2

Images = Examples of iScore Reports

Read-Behind Summary

Choose Response Code: RDCC025 Choose Time Frame: 08/27/2018

Submit Export To Excel

Contract: --------
Grade: --------
Content: ---------

Name	ID#	Scored	Read Behind							
			Total RB	% RB	Exact	% Exact	Adj	% Adj	Disc	% Disc
	17112	227	19	8.4	14	73.7	5	26.3	0	0
	19537	163	16	9.8	14	87.5	2	12.5	0	0
	18034	266	15	5.6	12	80	3	20	0	0
	21212	163	15	9.2	12	80	3	20	0	0
	20855	365	19	5.2	18	94.7	1	5.3	0	0
	21239	443	18	4.1	15	83.3	3	16.7	0	0
	21343	426	18	4.2	15	83.3	3	16.7	0	0
	19556	213	16	7.5	15	93.8	1	6.3	0	0
	19832	341	18	5.3	16	88.9	1	5.6	1	5.6
	18104	305	15	4.9	13	86.7	2	13.3	0	0
	19545	385	20	5.2	16	80	3	15	1	5
	19419	255	17	6.7	16	94.1	1	5.9	0	0
	15836	379	19	5	18	94.7	1	5.3	0	0
	Total	3931	225	5.7	194	86.2	29	12.9	2	0.9

Double-Blind Summary

Reader Double Behind Summary **Contract: ------------** **Grade: --------** **Content: --**

Choose Response Code: RDCC025 Choose Time Frame: 08/27/2018

Submit Export To Excel

Name	ID#	Scored	Double Blind							
			Total DB	% DB	Exact	% Exact	Adj	% Adj	Disc	% Disc
	17112	227	22	9.7	17	77.3	5	22.7	0	0
	19537	163	15	9.2	15	100	0	0	0	0
	18034	266	25	9.4	19	76	6	24	0	0
	21212	163	15	9.2	11	73.3	4	26.7	0	0
	20855	365	29	7.9	23	79.3	6	20.7	0	0
	21239	443	35	7.9	29	82.9	6	17.1	0	0
	21343	426	49	11.5	43	87.8	5	10.2	1	2
	19556	213	24	11.3	24	100	0	0	0	0
	19832	341	31	9.1	23	74.2	8	25.8	0	0
	18104	305	32	10.5	28	87.5	3	9.4	1	3.1
	19545	385	37	9.6	33	89.2	4	10.8	0	0
	19419	255	17	6.7	12	70.6	5	29.4	0	0
	15836	379	30	7.9	26	86.7	4	13.3	0	0
ZZ Total	999999	3931	361	5.3	303	83.9	56	15.5	2	0.6

Scorer/Item Qualification Summary

Reader/Item Qualification Summary Contract: ------------

Grade: -------- Content: -----------

Choose Qualification Type [Qual1] ☑ Display Reader Names

Submit Export To Excel

Name	ID#	RDCC025	RDCC026	RDCC027	RDCC028	RDCC029	RDCC030	RDCC031	Total Completed CRRs	# Pass	# Fail	% Pass
	Total Passed	15	4	17	18	4	4	12	74			
	Total Failed	2	0	1	0	0	0	1	4			
	Total Number	17	4	18	18	4	4	13	78			
	59806	P/9	P/10	P/10	P/10	P/10	P/8	P/8	7	7	0	100
	18498			P/7	P/10				2	2	0	100
	21056							P/8	1	1	0	100
	20904			F/3	P/9				2	1	1	50
	17112	P/9							1	1	0	100
	17030							P/8	1	1	0	100
	15567			P/10	P/9				2	2	0	100
	21185							P/7	1	1	0	100
	15555			P/9	P/10				2	2	0	100
	17411	P/9	P/10				P/10		3	3	0	100
	19537	P/10							1	1	0	100
	16827							F/6	1	0	1	0
	17130							P/10	1	1	0	100
	17099			P/8	P/9	P/10			3	3	0	100
	22028							P/8	1	1	0	100
	21401			P/10	P/10				2	2	0	100
	20031			P/7	P/10				2	2	0	100
	18034	P/9							1	1	0	100
	20867			P/9	P/10				2	2	0	100

Compilation Report

Compilation Report Contract: 1225 ReadBK2 Grade: 06 Content: Reading

Choose Response Code: RDCC045 Choose Date: 9/26/2017 Location: All

Message:

Submit Export To Excel

Void	Reader Name	MPID	Scored	Recal	Exact Recal	Read Behind	Compilation	Exact	%Exact	Adj	%Adj	Disc	%Disc	%Exact + %Adj
Review		67571	0	5	1.0	0	5	1.0	20.0	4.0	80.0	0.0	0.0	100.0
Review		65166	147	5	4.0	10	15	10.0	67.0	5.0	33.0	0.0	0.0	100.0
Retrain		60890	113	5	3.0	12	17	12.0	71.0	5.0	29.0	0.0	0.0	100.0
Retrain		66826	120	5	3.0	12	17	12.0	71.0	5.0	29.0	0.0	0.0	100.0
Retrain		65793	188	5	3.0	11	16	13.0	81.0	3.0	19.0	0.0	0.0	100.0
		65532	111	5	4.0	12	17	14.0	82.0	3.0	18.0	0.0	0.0	100.0
		60751	244	5	5.0	12	17	14.0	82.0	2.0	12.0	1.0	6.0	94.0
		80231	149	5	5.0	12	17	14.0	82.0	2.0	12.0	1.0	6.0	94.0
		80264	145	5	5.0	13	18	15.0	83.0	3.0	17.0	0.0	0.0	100.0
		64851	139	5	5.0	13	18	15.0	83.0	3.0	17.0	0.0	0.0	100.0
		66712	125	5	5.0	13	18	15.0	83.0	3.0	17.0	0.0	0.0	100.0
		66311	297	5	5.0	15	20	17.0	85.0	3.0	15.0	0.0	0.0	100.0
		60737	114	5	4.0	10	15	13.0	87.0	2.0	13.0	0.0	0.0	100.0
		66051	181	5	5.0	12	17	15.0	88.0	2.0	12.0	0.0	0.0	100.0
		80082	151	5	5.0	11	16	14.0	88.0	2.0	13.0	0.0	0.0	101.0

Pearson AI Scoring Process

Use IEA as the 10% read behind score on those essays in grades 3-8 whose performance is approved by DESE. Performance will be evaluated based on the industry-standard criteria for automated scoring shown in the table below.

Table 7 —Criteria for Automated Scoring

Measure	Threshold
Pearson R QWK	>=0.70
Kappa	>=0.40
Exact Agreement	>=65% (or greater than Human-Human)
By Score Point Agreement	>=50% (or greater than Human-Human)
SMD	Within |0.15|

Pearson Recruiting Process

Pearson Human Resource Recruitment Overview

Pearson will recruit diverse professional individuals with experience and educational backgrounds that meet all contractual requirements. The Pearson School Assessments Human Resource business partners will ensure hiring of qualified and diverse individuals to fill scoring positions so that the workplace is equally represented with various experiences and skills.

All employees must undergo degree verification and criminal background checks. Pearson prioritizes previous hires to receive offers.

All employees will complete onboarding tasks including the latest Pearson Code of Conduct, Employee Handbook, and the technical requirements of their project. Candidates will be asked to sign and complete a confidentiality form. Employees must sign and agree to the terms as a requirement of employment.

Pearson will ensure completion of all onboarding tasks for each employee prior to their project start date. Notifications will be sent from Human Resources to remind individuals of any open tasks. Hiring records that display a candidate's status in the project will be provided to stakeholders on a regular basis.

Personal Information Guidelines are managed through a controlled document. Data is stored within the Human Resource system and requires secure access.

This table provides a comparative overview of the scoring terminology and scoring practices as applied by Cognia and by Pearson.

Table 8 —Scoring Terminology & Practices

<table>
<tr><th></th><th>Cognia</th><th>Pearson</th></tr>
<tr><th colspan="3">Staffing Hierarchy</th></tr>
<tr><td>Differences</td><td>Scoring Content
Specialist
Scoring
Supervisor
Scoring Team
Leader Scorer</td><td>Scoring Content
Specialist Scoring
Director
Scoring
Supervisor
Scorer</td></tr>
<tr><th></th><th>Read-Behinds</th><th>Backreads</th></tr>
<tr><td>Differences</td><td>> Scoring Supervisors and Scoring Team Leaders do not know the score that was assigned by the scorer prior to their own evaluation of the student response.</td><td>> Scoring Directors and Scoring Supervisors know the score that was assigned by the scorer prior to their own evaluation of the student response.
> Scoring Directors and Scoring Supervisors can select specific responses to backread based on scorer performance.</td></tr>
<tr><td>Similarities</td><td colspan="2">> Conducted throughout the course of scoring, by Scoring Leadership.
> Scorers are not aware of which responses are designated/selected for read-behinds or backreading.
> It provides an immediate real-time snapshot of a scorer's accuracy and the opportunity to provide individualized counseling as needed.
>Scoring Supervisors/Scoring Directors have access to all responses that were reviewed and may compare scores to verify the accuracy and consistency of scoring.
> Scoring management has the ability to conduct a review of all read-behind and backreading work.</td></tr>
<tr><th></th><th>Double-Blind Scoring</th><th>Second Scoring</th></tr>
<tr><td>Similarities</td><td colspan="2">> Double-blind Scoring/Second Scoring provides statistics on scorer-to-scorer agreement.
> Double-blind Scoring/Second Scoring is the practice that refers to a method where the same response is routed to two scorers.
> The response is independently and anonymously reviewed by each scorer.
> In Double-blind Scoring/Second Scoring, neither scorer knows which response will be (or already has been) scored by another randomly selected scorer.</td></tr>
<tr><th></th><th>Arbitration</th><th>Resolution</th></tr>
<tr><td>Similarities</td><td colspan="2">> Scoring Leadership does not know the identity of the two scorers who caused the discrepancy prior to adjudication/resolution.
> Scoring Leadership does not know the scores that were assigned by the two scorers prior to adjudication/resolution.
> Any double-blind/second score response with discrepant scores greater than one point (for items with three or more score points) is sent to the arbitration/resolution queue.
> The response is evaluated by scoring leadership and the expert score is used to resolve the scoring discrepancy.</td></tr>
<tr><th></th><th>Embedded Responses</th><th>Validity Responses</th></tr>
<tr><td>Differences</td><td>> Embedded Responses are used to monitor the scorer's accuracy of scoring.
> Responses are approved by the Scoring Content Specialist and loaded into iScore for blind distribution to scorers at random points during the scoring the first two days of scoring an item.
> Scorers who fall below the 70% exact and 90% exact-plus-adjacent accuracy standard are provided counseling and additional read-behind monitoring.</td><td>> Validity papers are used to monitor the scorer's accuracy of scoring.
> Responses are approved by scoring leadership and distributed to scorers based on a percentage of their total number of responses scored.
> For the first two days, validity responses routed to scorers comprise 6% of their responses for ELA and 3% for mathematics.
> Starting with the third day of live scoring, these rates are reduced to 4% for ELA and 2% for mathematics.
> Alert messages are issued to scorers who do not meet minimum validity metrics after 10 validity responses. If after an additional five validity responses, the scorer does not improve, ePEN automatically blocks that scorer, and launches a 10-response targeted calibration set.</td></tr>
</table>

Table 9 – Scoring Terminology & Practices (cont'd)

	Cognia	Pearson
	Seeded Responses	
Similarities	> Seeded responses are used to evaluate the consistency of scoring across years. > It is a step in the equating process that compares OE equating scores from the previous year with those of the current year using the same set of student responses with a new set of scorers. > 200 random seeded papers are pulled from the 2,500 representative-sample of OE equating items from the previous year. > The responses are placed in the queue among other operational responses for the item and scored by qualified scorers. > Any equating items that show significant scoring differences between years will be flagged for review.	
	Compilation Report	
Differences	> The Compilation Report shows, for each scorer, the total number of responses scored, the number of read-behind responses, and the Daily Recalibration Set. > The Compilation Report shows the percentage of exact, adjacent, and discrepant scores across Read-Behinds and Daily Recalibration Sets. > Scorers below standard are highlighted in red at the top of the report.	> The Compilation Report shows, for each scorer, the combined scorer performance on Validity papers, backreads, and second scoring.
	Voiding Scorer Work	
Differences	> The Compilation Report is the primary tool used to determine if work should be voided. > Scorers who do not meet a 70% exact/90% exact plus adjacent on the Compilation Report are voided and responses are returned to the queue to be rescored by qualified scorers.	> Validity papers are the primary tool used to determine if work should be voided. > Scorers are required to attain at least 70% exact agreement and 90% exact-plus- adjacent agreement on this calibration set to continue scoring that item. If the scorer passes the targeted calibration, ePEN is unblocked and the scorer regains admission to operational responses. > Scorers are required to continue maintaining scoring standards for validity, as validity statistics continue to be checked every 10 validity responses. If validity falls below scoring standards at any of these subsequent intervals, scorers are released from the project and scores are reset.
Similarities	***Scoring management reserves the right to void any scorer's work at any time during the scoring process when deemed necessary.***	

MCAS Scoring Survey

Name (optional) ____

Scoring Project ________________ **Content area scored** ____________________ **Grade(s)** _______

Interview Process (Scheduling, prescreening, confirmation, etc.)	strongly disagree				strongly agree
1. The onboarding process was professional and informative.	1	2	3	4	5
2. The job requirements and expectations were clearly articulated.	1	2	3	4	5
3. The onboarding experience left me with a favorable impression of the company.	1	2	3	4	5
4. The information I received about the upcoming project was accurate.	1	2	3	4	5
5. Project-specific information (start and end date, daily schedule, etc.) was timely.	1	2	3	4	5
6. The equipment requirements were clearly communicated.	1	2	3	4	5
Training and Orientation					
7. The technology connectivity session was helpful.	1	2	3	4	5
8. I felt comfortable with all technology being utilized.	1	2	3	4	5
9. The training prepared me to score accurately.	1	2	3	4	5
Scoring					
10. I believe that my scoring work was meaningful.	1	2	3	4	5
11. I was comfortable leaving my webcam on during training sessions.	1	2	3	4	5
12. I was comfortable leaving my webcam on during scoring.	1	2	3	4	5
13. I prefer working from home versus in a Cognia/Pearson facility.	1	2	3	4	5
14. My overall scoring experience was positive.	1	2	3	4	5

Future Work

15. I am interested in returning for the next scoring project. yes______ no______
(If yes, please be sure to provide your name.)
16. I am interested in learning about leadership opportunities. yes______ no______
(If yes, please be sure to provide your name.)
17. Would you recommend Cognia/Pearson as a desirable place to work? yes______ no______

18. Do you have any additional comments or suggestions that would improve the scoring experience with Cognia/Pearson?

____

____

____

____

____

____

Note: When administering the survey, Cognia will delete references to Pearson and vice versa.

Confidentiality and Acknowledgement

In return for employment and wages from Pearson, I agree to the following Terms and Employee Conduct Requirements.

TERM of EMPLOYMENT

I understand that Pearson has not guaranteed me any duration of employment. I may voluntarily leave Pearson, and Pearson may terminate my employment at any time for any reason or for no reason at all.

I have not made any verbal or written agreements which in any way limit my ability to work for Pearson or which require fees or other compensation for my gaining employment at Pearson, except:

I understand and acknowledge that as a Temporary Employee I am not eligible for any company-provided benefits other than as required by statute, regulation, or contract.

The Handbook

I understand that the Pearson Temporary Employee Handbook (also, simply called "the handbook") supersedes all prior oral or written statements by Pearson on its employment policies, guidelines, and benefits.

I understand that the policies in the handbook govern my employment with Pearson and I am responsible for understanding all the information it contains.

I understand that Pearson has the right to revise, supplement or rescind the policies described in the handbook or to change or deviate from them at any time without notice, in its sole discretion.

I agree to conduct myself according to the guidelines set forth in the handbook.

I understand the handbook is neither an employment contract nor an agreement guaranteeing employment for any specified period of time.

SEXUAL HARASSMENT PREVENTION

I have read the Pearson Equal Employment Opportunity Policy and completed the Pearson Sexual Harassment training.

I understand that I have the right to work in an environment free from sexual harassment. If I feel I am being harassed, I have the right and responsibility to communicate this directly to the harasser or to a non-involved supervisor.

I understand these policies and will adhere to them.

CONFIDENTIALITY

Both during and after my employment with Pearson, I agree not to use or reveal to others any information about Pearson's products or business except as required by employment to Pearson. This includes information I learn while working for Pearson, which I have been told or reasonably know to be information which is confidential, or which is the subject of reasonable efforts to preserve its confidentiality.

I will not reveal to anyone: 1) training instructions and or procedures; 2) scoring trends; 3) any details about the scoring system; 4) any results of scoring either before or after completion of the scoring.

I agree not to use or reveal any proprietary or confidential information from any customer or other third-party that is made available to me during my employment.

MEDIA and PUBLICITY

Pearson Public Relations, the Corporate Marketing Committee and Corporate Marketing Communications subcommittee, maintain and oversee all media relations and news release policies used within all Pearson business units. The media relations and news release policies cover all interactions with the news media and distribution of news releases. Therefore, employees are not authorized to talk with members of the news media about Pearson's business. I agree to tell any reporter, journalist, or freelance writer that he or she will need to speak to the appointed corporate media contact.

I understand that reporters, television crews and photographers are not allowed in Pearson buildings or on Pearson property without prior approval from Pearson's public relations department. If Pearson grants permission, all media personnel must sign a confidentiality form and must also be escorted by a Pearson employee at all times.

I agree not to speak to the media in any manner, or answer any questions about Pearson's products, services, or business, or the nature, duration and. scope of the work I do for Pearson. I will not discuss any information that is not generally known or readily accessible outside Pearson. This includes but is not limited to: information about computer hardware, software or components, services, customers, suppliers, internal methods and techniques, or marketing and distribution plans and activities. These obligations will exist even after I leave Pearson's employment regardless of how or why my employment ends.

BUILDING SECURITY
(if applicable)

I understand that I must always wear my badge In unobstructed view (the front upper part of the body, chest area, on my outer clothing).

I agree to not lend my badge to anyone, even other Pearson employees. Because my badge is the property of Pearson, I agree to return it at the end of my employment.

I agree to report the loss or misplacement of my badge to the Supervisor/Site Manager as soon as possible. Badges may only be replaced with written permission from the Site Manager.

I agree not to allow anyone into or out of a secured area without a badge; I will escort such an individual to the security or reception area to receive a badge.

PUBLIC COMPUTERS and WIRELESS NETWORKING

I agree that I will not access Pearson's secure web site or scoring system via a public computer. I understand that a ·public computer" is defined as a computer used by multiple users in a public venue including but not limited to a public library, Internet Cafe, copy shop, coffee shop or other public area.

I further agree that I will not access Pearson's secure web site or scoring system via a public wireless network. A "wireless public network" is defined as an unsecured wireless network utilized by multiple users.

I understand that the prohibition on wireless public networks includes but is not limited to the following locations; a library, Internet Cafe, airport, copy shop, coffee shop or other public venue.

Additionally, I agree that in the event I connect to the Internet using a wireless network in my residence I will secure the wireless network through either Wired Equivalency Privacy (WEP) or Wi-Fi Protected Access (WPA) encryption.

I further agree that I will enable the highest level of encryption that is supported by my wireless networking device.

PROPERTY of PEARSON

I agree that any of Pearson's equipment, materials or information must remain the property of Pearson. I must not use or remove such property unless required by my job duties. I understand that immediately upon the termination of my employment with Pearson, I must return all Pearson-owned property. This includes, but is not limited to, confidential or proprietary business information of Pearson, computer files, diskettes, documents (paper or electronic), computer databases, manuals, computer equipment, computer software, files, money, securities, keys, credit cards, handbooks, financial and other reports, notes and all other information or property held or used by me during my employment.

If I am working at a location other than the scoring facility, I will follow procedures developed by Pearson for receiving and returning or destroying confidential information that I have received.

RETURN and DESTRUCT/ON

I agree to promptly return to Pearson, at any time, upon the request of Pearson, all written materials containing or reflecting any Proprietary Information (including all copies or reproductions) and I agree to destroy in a secure manner all documents, memoranda, notes, and other writing whatsoever (including copies, extracts, or other reproductions) prepared by me based on the information contained in the Proprietary Information. If so, requested by Pearson, I agree to provide written confirmation to Pearson of my compliance with the terms of this Section.

CREATIVE WORKS

If I invent, write, develop, create or design (including software) any work for Pearson's business or expected research, that creative work becomes the sole property of Pearson.

I therefore give Pearson ownership rights, including all copyrights, patents or trade secret rights resulting from such work and agree to sign whatever papers are necessary to record Pearson's ownership rights in those works. I recognize that Pearson has not promised, nor have I accepted, any monetary payment except for my normal wages and benefits as an employee.

SATISFACTION of DEBTS

I agree to adhere strictly to the procedures established by Pearson for handling any debts or expenses I may incur related to my employment for which Pearson may be liable (that is, business expenses).

CONFLICT of INTEREST

I agree not to accept work directly or indirectly (through a third party), make a contract, or engage in any activities incompatible with the duties or scope of my employment for Pearson for one year. Such conflict of interest includes working for a commercial test preparation organization unless such specifically formed by a school or school district which does not involve a third-party test preparation company or organization. These obligations will exist even after I leave Pearson's employment regardless of how or why my employment ends.

DRUG TESTING POLICY-Applies only to Employees in Iowa City, IA, Cedar Rapids, IA and Austin, TX

I hereby certify that Pearson has provided me with a copy of its Drug Testing policy. I have read and do understand the policy and agree to fully comply with the terms and conditions of the policy.

Code of Conduct

I have read Pearson's Code of Conduct contained in the Temporary Employee Handbook and understand it.

LEGAL TERMS

I understand that any actions I take that are contrary to these acknowledgments could result in legal actions by Pearson to protect its interests in its intellectual property rights and the integrity and security of Pearson's assessment processes.

I understand that if any part of this Agreement is determined to be invalid or unenforceable for any reason, in whole or in part, the remaining provisions of this Agreement will remain in full effect to the fullest extent allowed by applicable law.

Sample	Sample	2021-04-24
Employee Name (please type or print)	Employee Signature	Date

Part B:
Cognia General Scoring Guidelines & Best Practices

Contents

1 Preface

This document represents Cognisa's comprehensive best practices and standard operating procedures for evaluating and scoring student work. Procedures will be implemented depending on the specific requirements of each client. All client-related details and applicable contractual requirements are specified in Part A of this document: Client-Specific Scoring Guidelines.

2 Scoring Services Staffing

The following table summarizes key positions held by members of Scoring Services and describes their general responsibilities.

Table 10 – Scoring Services Responsibilities

Position	Description
Senior Vice President of Operations for Assessment Services	Oversees all aspects of operational and scoring-related activities within the division of Assessment Services.
Project Managers – Scoring	Manage scoring-related activities, deliverables, and scheduling of tasks.
Director, Scoring Content & Quality	Oversees the all content-related deliverables of the Scoring Content Specialists and their respective Scoring Content Group Manager.
Director, Scoring Operations & Logistics	Oversees and coordinates the operations and logistics of all scoring activities, creates budgets, and establishes scoring schedules.
iScore Operations Manager	Maintains Cognia's scoring platform (iScore), manages other scoring systems as needed, and coordinates data deliverables between Scoring Services and Reporting team.
Scoring Operations Managers	Oversee scoring logistics, recruitment of contingent workforce, facility requirements and security.
Scoring Content Group Managers	Manage Scoring Content Specialists within content areas of ELA/Social Studies and Science/Math, oversee workflow processes, and ensure quality and production of scoring.
Scoring Content Specialists	Supervise the scoring of their respective content areas within their assigned contracts. Responsibilities include finalizing the selection of all scoring training materials and facilitating benchmarking and rangefinding meetings. They also train and supervise scoring leadership and monitor the training and scoring of items for their assigned projects. Scoring Content Specialists have the overall responsibility of ensuring accurate and consistent scoring according to the approved client guidelines for their content area and contracts.
Scoring Supervisors	Scoring Supervisors work under the guidance of a Scoring Content Specialist. They are responsible for training assessment items and ensuring consistency across assigned grades, content, and assessment administrations. They also respond to questions during scorer training and throughout scoring and monitor the quality and production of ongoing scoring.
Scoring Team Leader (STL)	Scoring Team Leaders work under the supervision of Scoring Supervisors and lead a small group of scorers. STLs are responsible for quality control by performing read-behinds and providing coaching as needed.
Scorers	Scorers review, evaluate, and assign scores to student work based on client- specific scoring standards.

3 Pre-Scoring Logistics

3.1 Employee Recruitment

Cognia HR and its staffing partners are responsible for the recruitment of all scoring personnel. Cognia seeks to employ scoring staff with a wide range of educational backgrounds and professional experience. Cognia will recruit individuals who meet or exceed the contract-specific requirements to fill scorer and scoring leadership positions. All scoring associates are vetted for appropriate educational requirements through collection and review of their post-secondary transcripts. Candidates with backgrounds in education are also noted during this process. Depending on client preferences, Cognia will seek to customize the recruitment effort by including some or excluding all scoring associates from the client state. Potential associates must submit documentation, including transcripts and resumes, to verify employment eligibility. Prior to hiring, all associates are advised of the scoring systems' minimum technical requirements.

If hired, all scoring associates will be required to sign and abide by a non-disclosure/confidentiality agreement which emphasizes the confidential and proprietary nature of all work and materials associated with all scoring activities. (see Attachment)

After hiring and before the onset of each scoring event, information on demographics and educational background will be collected again as an additional employment verification measure. Further contractual specifics related to scoring associates' educational backgrounds are detailed in Part A of this document: Client-Specific Scoring Guidelines.

3.2 The Benchmarking Process

3.2.1 Operational Benchmarking

This activity occurs after operational administration of an assessment and prior to scoring it. It typically involves identifying additional suitable student responses (either from the pool of FT responses or from the pool of available OP responses to an item) in order to supplement existing scoring materials or to populate additional training or quality control materials.

3.2.2 Field Test Benchmarking

The activity of benchmarking occurs after administration of a Field Test and prior to scoring a Field Test. To prepare for benchmarking, scoring leadership review the assessment item and any associated stimuli, the scoring rubric, and scoring notes (when available). All students completed the assessment, their responses are loaded into the scoring system. Scoring leadership will log into the scoring system and start viewing student responses. After becoming familiar with both the assessment item and the student responses, scoring leadership will start assigning preliminary scores to appropriate responses and submit them to a separate folder in the scoring system. Within that folder, benchmarking staff can designate responses to specific sets of responses depending on the most appropriate use, e.g., anchor set, practice set, qualification set(s), or an extra set which stores responses for potential substitutions or for the assembly of supplemental training materials. Once the sets are created and reviewed, the benchmarking process for each field test item is completed and the item is ready for either benchmarking meetings or rangefinding meetings.

3.3 Benchmarking vs. Rangefinding Meetings

A difference between benchmarking and rangefinding meetings are the participating key stakeholders and the associated meeting facilitation. Key stakeholders in benchmarking meetings are representatives from Scoring Services, Content Development, and State Education Agency (SEA) content staff. In addition, rangefinding meetings also include participation by educators.

In a benchmarking meeting, it is the SEA content staff who define the scoring parameters for an item and they sign off on core training materials. The meeting itself is an open-forum discussion during which all meeting participants discuss how responses fare against the scoring rubric. While the goal is that all meeting participants agree on the scores after thorough discussions, it is the SEA content staff who have the final say and give final approval of the scores for all reviewed student responses.

In a rangefinding meeting, educators are the ones who provide the interpretive framework of the scoring standards. While the entire group (Scoring Services, Content Development, SEA, educators) reviews a body of student work, it is the educators who are tasked with reaching consensus on the score(s) they assign to each reviewed response. In doing so, educators interpret the scoring rubric and thereby define the range of each score point level of the scoring rubric by consensus-scoring student work associated with an item.

The details as provided in Part A: Client-Specific Scoring Guidelines will outline the applicable meeting forum.

4 Scorer Training

4.1 Process and Materials

Scorer training will begin with an introduction to scoring and an overview of the assessment program. This could include the purpose and goal of the assessment program, any specific characteristics of the test and/or the testing population. There will also be a general discussion about the security, confidentiality, and proprietary nature of the assessment, all scoring materials, and Cognia’s scoring procedures.

Training materials will be available to scorers during scoring and may include:

- Student prompt and associated stimuli
- Scoring rubric
- Item sample response and training notes (when provided by content development team)
- Anchor Set
  - Clear examples that include mid-range student responses at each score point (when available)
  - Presented in score point order
- Practice Set
  - May include student work that demonstrates the cut-points between adjacent score points and/or atypical responses
  - May include examples of all score points (when available)
  - Presented in random order
  - Scorer accuracy can be captured and reported
  - Scoring Supervisor will review each practice set response (if required)

4.2 Training Sequence

A Scoring Content Specialist or Scoring Supervisor will lead the training for each item. Training may occur through a recorded, interactive training module, or through an online training system. Regardless of the method of training, the approach will follow this sequence:

1. Review of the student prompt, associated stimuli, the scoring rubric, associated sample responses, and training notes
2. Review of the anchor set
3. Analysis and discussion of each anchor response, its assigned score and associated, detailed scoring rationale
4. Scoring of responses in the practice set(s) to be scored independently to replicate the actual scoring process
5. Discussion of each practice response, revealing the actual score assigned to the student response and explaining the scoring rationale
6. Methodical review of all scoring criteria while paying particular attention to the fine lines that determine the cut-points between adjacent score points
7. Question and answer segment addressing any remaining scorer questions
8. Administration of a client-specific number of qualification sets, each consisting of 10 pre-scored responses, scored independently, and deployed randomly to each scorer
9. Review of qualification results after each set before scorers are admitted to subsequent qualification set(s)
10. Start scoring live student responses

4.3 The Qualification Process

Qualification sets are used to ensure that scorers have successfully internalized the scoring standards before they begin scoring each item. General qualification guidelines for operational items are:

- Each qualification set will contain 10 responses.
- The number of qualification sets administered are client-specific. Typically, operational items contain two qualifying sets to provide a second opportunity after re-training.
- Qualification sets are administered through Cognia's proprietary iScore system or another compatible scoring system. Responses are distributed to the scorers unscored and in random order.
- In order to qualify, scorers are required to meet the passing threshold as determined by the client and as specified in Part A: Client-Specific Scoring Guidelines
- Scorers who do not pass qualification will not be allowed to score the item. They will either be trained on a different item or dismissed from the scoring project.
- Responses included in the qualification set must be approved for use by the Scoring Content Specialist or Assistant Scoring Content Specialist. Depending on client-specifications, responses may also have to be approved by the client and/or be part of materials approved in a range-finding or benchmarking meeting.

Note:
Scoring Team Leaders receive the same training and undergo the same qualification process as scorers. However, STLs may be trained on some or all items in advance during a separate leadership training. This provides an additional opportunity to absorb the training materials and it prepares them to fulfill their role during scorer qualification.

4.4 Consensus Scoring Approach

When the total number of student responses received is small, Cognia may recommend applying the consensus scoring approach. In this approach, a select group of highly experienced scorers will train and qualify on each item and then proceed by scoring the small number of student responses together in pairs, working side-by-side, and discussing each response to reach a consensus score. Using this approach, scorers are constantly calibrating with each other to provide accurate and consistent scoring for the small number of student responses. When the consensus scoring approach is used, quality control tools designed for high n-counts of student responses are not applicable.

5 Scoring System

5.1 Overview

The scoring of student responses will be conducted through Cognia's iScore or another compatible scoring system which displays images that are received through data transfer from the online computer-based testing platform or through scanned images of paper-based tests. In instances of rendering issues with any paper-based test books, scoring will occur by referring to the actual test book and the scores will be manually entered into the scoring system.

The scoring system does not display any student or school identifiable information. Security is maintained during scoring through a highly secure server-to-server interface. It ensures that images are only accessible to those who will be scoring each item or to scoring management. All responses are tracked through a unique booklet code that is matched to the student records during data processing.

Each scoring day scorers are asked to review the anchor materials and the rubric of an ongoing item. There will also be a broader group refresher upon resumption of scoring following a recess (e.g., a weekend or disruption of delivery). Each scoring day typically concludes with a debrief meeting with the Scoring Content Specialist, the Scoring Supervisors, and, if desired, client staff members to recap the day and address any issues that may need resolution.

During the course of scoring, scorers may encounter student responses that indicate the possibility of cheating or some type of testing irregularity. Scorers will score this type of student response based on its own merits and then refer it to the Scoring Content Specialist and Project Manager for further processing and client notification. Any potential score change request by the client can be made prior to final reporting.

5.2 Condition Codes

Scoring Services makes every attempt to score each student response. However, when a response does not conform to the score point parameters as defined in the scoring rubric, condition codes can be employed. Responses that are flagged will receive a numeric score but will undergo supervisory review. Responses that are rejected will not receive a numeric score but will receive a second read.

Flags:

- **Crisis:** Response indicates that a student may present a danger to themselves or others, the student or another child is in danger, there are indications of sexual or physical abuse, or other specific criteria as specified by the client. (Please refer to section 7 for the handling process)
- **Off Topic**: A response that is not related to the task/prompt administered or is also not a valid attempt at responding to any task/prompt on the assessment.

Rejects:

- **Blank:** No deliberate marks in the answer space
- **Unreadable:** A rendering issue or obstructed student response
- **Wrong Location**: A clearly legitimate response to another item on the assessment

- **Insufficient Amount to Score**: The response contains an insufficient amount of student work to score
- **Illegible**: Tiny or poor handwriting (for PBT), spelling that cannot be deciphered, or other conditions that render the student work indecipherable
- **Refusal**: The response clearly indicates a refusal on the part of the student to address the prompt or participate in the assessment
- **Repeats the Prompt**: The response copies the prompt or portions of it and offers no attempt to respond to the task/prompt
- **No Score**: Any other circumstance (as defined by the client) that prevents the assignment of a numeric score
- **Non-English**: The response is written in a language other than English (or in a Spanish assessment in a language other than Spanish) or is a mix of English (Spanish) and another language but lacks sufficient English (Spanish) to provide a score.

Responses that are identified as Unreadable or Wrong Location undergo a separate resolution process. They will be routed to the Scoring Content Specialist or Scoring Supervisor. Responses will be reviewed, and the appropriate score assigned. Furthermore:

- **Unreadable** responses (PBT only) will be reviewed by consulting the student's original test booklet or by requesting a re-scan of the student work. If the response can be read through either method, the appropriate score will be assigned. Completely unreadable responses will not receive a numeric score.
- **Wrong Location** responses (PBT only) will be reviewed by a Scoring Supervisor or Scoring Content Specialist. Their broader access to the scoring system allows them to review all student work and assign the appropriate score for each response. Wrong locations can only be scored when the student was evidently attempting to respond to another item on the assessment.

6 Quality Control

Note: not all quality control measures listed in this section are applicable to every client contract.

While all scorers must first train and qualify to gain access to scoring student work, they must also maintain acceptable levels of accuracy to continue scoring. The scoring system provides the opportunity to employ multiple quality control tools in order to monitor accuracy and consistency throughout scoring.

Depending on client specifications, STLs may also score responses each day. In doing so, they are also subject to all quality control tools and statistics. While in a scoring capacity, the Scoring Supervisor or Scoring Content Specialist will conduct read-behinds on STLs. STLs may also encounter validity papers during their course of scoring.

6.1 Read-Behind Scoring

Read-behind scoring allows the STLs and Scoring Supervisors to monitor the performance of each scorer. It provides an immediate real-time snapshot of a scorer's accuracy and the opportunity to provide individualized coaching or re-training as needed.

Read-behinds are generated in the scoring system at the request of the STL. Scorers are not aware which responses are designated for read-behinds. Cognia's scoring platform allows for blind scoring of read-behinds. The STL conducts each read-behind without prior knowledge of the assigned score. After the STLs submit their score, they can reveal the score assigned by the scorer and provide counseling as needed.

The number of read-behinds conducted per scorer will vary and STLs will focus their attention on scorers as needed. Conducting read-behinds is an ongoing process throughout the day. STLs will conduct more read-behinds on scorers who are at the lower threshold of accuracy and require counseling. Cognia will adhere to contract requirements as outlined in Part A.

To further ensure the accuracy of the STLs, scoring leadership has the ability to review their read-behind work. The Scoring Supervisor has access to all responses that were reviewed and may compare scores to verify the accuracy and consistency of scoring.

6.2 Double-Blind Scoring

While read-behinds measure scorer accuracy in relationship to leadership, double-blind scoring provides statistics on scorer-to-scorer agreement, or inter-rater reliability. Double-blind scoring is the practice that refers to a method whereby the same response is routed to two scorers. The response is independently and anonymously reviewed by each scorer. In double-blind scoring, scorers do not know which response will be (or already has been) scored by another randomly selected scorer.

6.3 Validity Responses

The deployment of validity responses can provide an additional opportunity to compare and monitor the quality of scoring. The process is set up to meet the following criteria:

- Validity responses are identified from a pool of responses and pre-scored according to the scoring standards as expressed in the anchor set and the scoring rubric
- Pre-scored validity responses are loaded into the live scoring queue
- Validity responses look identical to live student responses such that scorers can't tell the difference between the two
- Validity responses can be launched at any time during the scoring project
- The insertion rate of validity responses is fully customizable in the scoring platform. Please refer to the Client-Specific Scoring Guidelines in Part A of this document.

Scoring leadership may select validity responses either from recently scored responses, unscored responses, rangefinding meeting materials, or they may use previously administered validity responses for the item. In order to qualify as a validity response, it must be approved for use by the Scoring Content Specialist or other designated leadership staff. Depending on contract specifics, validity papers may also either be part of the approved rangefinding set or be approved by the client.

6.4 Recalibration Sets

Another option in Cognia's suite of quality control measures is the administration of recalibration sets. Beginning on the second day of scoring an item, scorers will take a recalibration set prior to starting scoring to ensure they remain calibrated to the scoring standards. Recalibration sets consist of pre-scored responses. Recalibration sets will include a variety of score points, but they will not always include an example of each score point.

Recalibration sets reinforce the scoring decisions of the training materials and prevents scorer drift throughout the project. Scorers who demonstrate continued understanding of the scoring standard will be allowed to start scoring for the day. Scorers who struggle with the recalibration responses will review them with scoring leadership, comparing the responses to the Anchor Set responses and the scoring rubric. Once the review is complete, scoring leadership will determine whether the scorer may begin scoring the item for that day.

Scoring leadership may select recalibration responses from recently scored responses, unscored responses, rangefinding meeting materials, or they may use previously administered recalibration responses for the item. In order to qualify as a recalibration response, it must be approved for use by the Scoring Content Specialist or other designated leadership staff.
Depending on contract specifics, recalibration papers may also either be part of the approved rangefinding set or be approved by the client.

6.5 Voiding Scorer Work

When scorers meet or exceed accuracy standards, they will continue to have access to student responses and may continue to score. If scorers fall below the established accuracy threshold, they will be retrained and Scoring leadership will determine whether a scorer is allowed to resume scoring.

The scoring system allows Cognia to void a scorer's work. If a scorer fails to maintain accuracy standards, his or her work for the impacted time frame will be invalidated, and the affected student responses will be routed to other qualified scorers for re-scoring.

7 Crisis and Alert Responses

Scorers are trained to identify crisis or alert responses. These include responses which indicate that a student may present a danger to themselves or others, the student or another child is in danger, there are indications of sexual or physical abuse, and/or other criteria as specified by the client.

As soon as a crisis or alert response is identified, the Scoring Content Specialist will notify the Scoring Project Manager who may reach out to the Program Manager. Student demographic information and copies of the student response are posted to designated client staff members.

8 Scorer Monitoring Reports

To monitor the accuracy, consistency, and pace of scoring, the scoring system generates a variety of reports to allow scoring leadership to monitor all aspects of a complex assessment program. These reports show both the overall performance of the scoring project as well as immediate and real-time scorer level data and provide the opportunity to monitor an individual, the group, and the overall project.

STLs and Scoring Supervisors have access to a select number of reports which aids them in monitoring and ensuring quality scoring. Scoring Content Specialists and scoring management have access to all quality and production reports in the scoring system. Clients will also have access to a variety of quality and production reports in the scoring system, including interpretive guides, when applicable.

The following is a summary of the most commonly used reports in iScore, Cognia's proprietary scoring system:

- The **Read-Behind Summary Report** shows the total number of read-behind responses conducted per scorer and shows the number and percentage of responses that were in exact, adjacent, and discrepant agreement between the scorer and the STL. The report also provides an overall statistical summary of all scorers working on the item. The report has both a daily and a cumulative option.
- The **Double-Blind Summary Report** shows the total number of double-blind responses read by a scorer and will note the number and percentages of exact, adjacent, and discrepant scores. The report also provides an overall statistical summary of all scorers working on the item. The report has both a daily and cumulative option.
- The **Daily Embedded Summary Report** shows the total number of validity responses read by a scorer and will note the number and percentages of exact, adjacent, and discrepant scores.
- The **Qualification Statistics Report** lists each scorer by name and ID#, identifies which qualification sets each scorer has taken and the respective pass or fail status for each set.
- The **Summary Report** shows each item and the total number of student responses to be scored for each item. During ongoing scoring, it also shows the number of responses that have already been scored for each item and the number of double-blind scores provided.
- The **Score Point Distribution Report** shows the total number of student responses per assigned score point. The report offers both a daily and a cumulative option.
- The **Compilation Report** shows, for each scorer, the total number of responses scored, the number of read-behind responses and the number of scored recalibration responses (both individually and combined), and the percentage of exact, adjacent, and discrepant scores assigned in comparison to read-behinds

and recalibration responses.

9 Distributed Scoring

Cognia has implemented a distributed scoring model that provides our clients with accurate, reliable, and timely results. Our distributed scoring model adheres to the same requirements as Cognia's center- based scoring model. The following security features are implemented to support the secure nature of distributed scoring:

- Two-Factor Authentication login protocol which prevents unauthorized users from gaining access to the scoring system and materials.
- The scoring system and materials are housed within a secure scoring kiosk which disables any print and download functions.

The communication process between scoring leadership and scorers is managed via a communication tool (e.g., Zoom, MS Teams, Skype) to support regular face-to-face check-ins. All scoring associates are required to utilize a webcam to maintain direct communication and facilitate positive identification.

10 Cognia Facilities

Cognia currently maintains facilities in Dover, NH, and Alpharetta, GA. Cognia reserves the right to decide on the appropriateness of their utilization depending on any potentially existing health risks to its employees and/or the suitability for use of these facilities.

These facilities are locked, and admission is limited to authorized staff. Access is monitored by a security system that only admits staff with an electronic access card. This card also serves as Cognia identification card which must be worn at all times while in the building.

Addendum

Non-Mutual Non-Disclosure Agreement

This Confidentiality and Non-Disclosure (“Agreement”) is made on **«Effective_Date»,** by and between Cognia™, Inc., with a physical address of 9115 Westside Parkway, Alpharetta, Georgia 30009, a 501(c)(3) non-profit organization incorporated under the laws of the State of Georgia, United States of America, and **«Name»,** with a principal address **of «Address1», «City», «State» «PostalCode»,** and taken together, known as (“the Parties”).

WHEREAS, “Name” intends to offer services such as but not limited to; scoring and/or distributed scoring for Cognia through a temporary agency service arrangement with such services performed either in facilities arranged by Cognia or location(s) identified by temporary agency agreement with “Name” (the "Transaction"); and

WHEREAS, the Parties may disclose certain confidential and proprietary information to each other for the purpose of evaluating the Transaction, and the Parties mutually agree to enter into a confidential relationship with respect to the disclosure by one or each (the "Disclosing Party") to the other (the "Recipient") of such proprietary and confidential information; and

NOW, THEREFORE, the Parties, intending to be legally bound, agree as follows:

Definition of Confidential Information. For purposes of this Agreement, “Confidential Information” means (1) any and all information, data, design, memoranda, models, prototypes, equipment and/or other material, of a confidential, non-public or proprietary nature, including, without limitation, information relating to or regarding the products or services developed or being developed by the Disclosing Party, information regarding intellectual property (including ideas that may be subject to patent, trade mark, service mark or trade secret protection) and other rights, techniques, research, development, samples, marketing, sales, know-how, operations, distribution, strategy, services, applications, promotions, advertising, costs, prices, business plans, financial statements, software, source code, and firmware and process information and such information relating to the Disclosing Party’s existing and prospective invention, business partners, and customers, (2) documents and information that are marked or designated with a word or symbol indicating that the document or information should be considered confidential, such as “Confidential”, “Proprietary”, or “Privileged”, (3) documents and information that the Disclosing Party informs the Recipient, either in writing or orally, are confidential, and (4) information that is a trade secret or the confidential or proprietary information of a third party, which is obtained from the Disclosing Party, irrespective of whether it is in tangible or intangible form, irrespective of whether it was communicated orally, in writing or on any other record bearing media and irrespective of whether it was marked or designated as confidential in connection with the disclosure.

Notwithstanding the foregoing, the term “Confidential Information” does not include information which: was in the public domain prior to the Recipient’s receipt of same from the Disclosing Party, or which subsequently becomes part of the public domain by publication or otherwise, other than by the wrongful act of the Recipient; information which the Recipient can show by reasonable proof was in its possession prior to the Recipient’s receipt of same from the Disclosing Party and which was not acquired directly or indirectly from the Disclosing Party; information which is independently developed by the Recipient without reference to or reliance upon the Confidential Information of the disclosing party and without breach of this Agreement; or that the Parties agree in writing is not proprietary or confidential.

Confidentiality. Recipient agrees to treat as confidential all Confidential Information provided to it by Disclosing Party or Disclosing Party's representatives, whether disclosed before or after the date of this Agreement. In no event, including the breach of this Agreement or any other agreement between the Parties, shall either Party allow the disclosure of any Confidential Information disclosed to it by the Disclosing Party except as permitted under the terms of this Agreement or with the prior written consent of the Disclosing Party. The Parties shall take commercially reasonable steps to prevent the unauthorized disclosure, use, dissemination, or publication of the Confidential Information and shall protect such Confidential Information to the same extent that it protects its own confidential and proprietary information, but in no event using less than a reasonable standard of care. This Agreement shall be binding on all directors, officers, stockholders, members, managers, employees, agents, representatives, successors and assigns of the Recipient (collectively, "Agents"), and Recipient shall take commercially reasonable steps to assure that its Agents to whom Confidential Information is disclosed maintain the confidential nature of the Confidential Information. Recipient shall immediately notify the Disclosing Party upon discovery of any loss or unauthorized disclosure of the Confidential Information of the Disclosing Party.

Use. Recipient agrees that the Confidential Information shall be used solely for purposes of the Transaction and in connection with any transaction entered into by the Parties. Recipient shall not disclose any Confidential Information to any other party. Recipient further agrees that it is prohibited from using the Confidential Information for its competitive advantage, or to further its own business, professional or economic position. Neither the execution of this Agreement nor the transmission of any Confidential Information by the Disclosing Party to the Recipient shall constitute a conveyance or transfer to the Recipient of any right, title, interest or license in the Confidential Information.

Term. This Agreement shall be in effect for a period of three (3) years from the latter-dated signature below. The obligations contained herein shall survive until the earlier of (a) an exception to what is Confidential Information set forth in Section 1 is met, or (b) one (1) year after the expiration of this Agreement; provided, however, each Party's trade secrets shall be subject to those obligations herein and survive until they are no longer a trade secret.

Remedies. Because of the unique nature of the Confidential Information, Recipient agrees that breach of this Agreement will result in the irreparable harm to the Disclosing Party. Therefore, in addition to any and all other remedies available at law or in equity, the Disclosing Party shall be entitled to injunctive or equivalent relief enjoining the breach of this Agreement, without the necessity of posting bond or other surety. In the event of a breach of this Agreement by the Recipient, the Recipient agrees to pay reasonable fees incurred by the Disclosing Party to protect its rights under this Agreement including, without limitation, attorneys' fees and other costs to bring any lawsuit, action, or proceeding necessary to protect the Disclosing Party's rights. These remedies in addition to any rights by temporary agency related to employment law or dismissal for cause.

Governing Law; Venue. This Agreement shall be governed, interpreted, and/or construed in accordance with the laws of the State of Georgia without giving effect to choice of laws principles that require the application of the law, regulation or rule of a different state. Recipient and Disclosing Party hereby agree that any legal proceeding involving a dispute between Disclosing Party and Recipient concerning any aspect of this Agreement shall be brought solely in a State court located within the State of Georgia or the United States District Court for Georgia.

<u>Return or Destruction of Confidential Information</u>. After the performance of the services relating to the Transaction, Recipient agrees to destroy all Confidential Information and all documents containing Confidential Information Securely or Return to Cognia all Confidential Information held in the party's possession immediately (including any copies, notes, or abstracts, in any media).

<u>Amendment and Assignment</u>. This Agreement may be amended only upon mutual written agreement by the Disclosing Party and the Recipient. This Agreement and the rights and obligations contained herein are not assignable. Nothing in this Agreement obligates the parties to enter into the Transaction.

<u>Severability</u>. In case any provisions (or portions thereof) contained in this Agreement shall, for any reason, be held invalid, illegal or unenforceable in any respect, such invalidity, illegality or unenforceability shall not affect the other provisions of this Agreement, and this Agreement shall be construed as if such invalid, illegal or unenforceable provision had never been contained herein. If, moreover, any one or more of the provisions contained in this Agreement shall for any reason be held to be excessively broad as to duration, geographical scope, activity or subject, it shall be construed by limiting and reducing it, so as to be enforceable to the extent compatible with the applicable law as it shall then appear.

<u>Notices</u>. All notices or reports or secure return of materials permitted or required under this Agreement will be in writing and will be delivered by electronic mail or by certified or registered mail, return receipt requested, and will be deemed given upon personal delivery, five (5) days after deposit in the mail, or upon acknowledgment of receipt of electronic transmission.
Notices will be sent to the addresses set forth at the end of this Agreement or such other address as either Party may specify in writing.

<u>Entire Agreemen</u>t. This Agreement is the final, complete, and exclusive agreement of the Parties with respect to the subject matters hereof and supersedes and merges all prior discussions between the Parties with respect to such matters.

<u>Counterparts; Signatures</u>. This Agreement may be executed by one party as identified in the first paragraph, which shall be deemed an original for all purposes and all of which will constitute a single instrument. Facsimile signatures shall be deemed original and binding signatures.

<u>Survival</u>. All duties and obligations with regard to the protection of Confidential Information shall survive any termination of the discussions relating to the Transaction.

Parties hereby accept the terms and obligations set forth in this Agreement.

IN WITNESS WHEREOF, the parties, intending to be legally bound, hereto have executed this Agreement made effective as of the day and year set forth above.

By:	«Name»
Signature:	
Print Name:	Click or tap here to enter text.
Title:	Click or tap here to enter text.
Date:	Click or tap here to enter text.

[Non-Mutual Confidentiality and Non-Disclosure Agreement – Signature Page]

Email Legal@cognia.org

ADDRESS FOR RETURN OF MATERIALS:
Cognia
9115 Westside Parkway
Alpharetta, GA 30009

APPENDIX H
INTERRATER CONSISTENCY

Table H-1. Item-Level Interrater Consistency Statistics by Grade—ELA

Grade	Item	Number of Score Categories	Number of Responses Scored Twice	Percent Exact	Percent Adjacent	Correlation	LW Kappa
3	EL308855	4	240	75.00	23.75	0.77	0.69
	EL308857	4	241	72.61	27.39	0.79	0.68
	EL626052459#SCORE_TRAIT_Conv	4	236	66.10	32.63	0.59	0.48
	EL626052459#SCORE_TRAIT_Ideadev	5	236	77.97	19.07	0.70	0.65
	EL835251909	4	6,173	73.16	25.61	0.69	0.60
	EL912362165#SCORE_TRAIT_Conv	4	5,697	74.32	25.14	0.79	0.68
	EL912362165#SCORE_TRAIT_Ideadev	5	5,697	75.13	23.26	0.86	0.74
4	EL307728	4	248	77.02	22.58	0.78	0.70
	EL307729	4	247	71.66	27.13	0.73	0.63
	EL624655949#SCORE_TRAIT_Conv	4	248	67.34	31.05	0.78	0.65
	EL624655949#SCORE_TRAIT_Ideadev	5	248	74.19	21.77	0.84	0.73
	EL800957624	4	6,409	70.40	28.54	0.79	0.68
	EL909132428#SCORE_TRAIT_Conv	4	6,227	73.37	26.05	0.83	0.72
	EL909132428#SCORE_TRAIT_Ideadev	5	6,227	70.11	28.55	0.86	0.74
5	EL626356806#SCORE_TRAIT_Conv	4	237	68.35	29.11	0.73	0.63
	EL626356806#SCORE_TRAIT_Ideadev	5	237	63.71	35.02	0.74	0.59
	EL711854812#SCORE_TRAIT_Conv	4	242	73.14	25.62	0.83	0.72
	EL711854812#SCORE_TRAIT_Ideadev	5	242	72.31	25.62	0.88	0.77
	EL806746086#SCORE_TRAIT_Conv	4	6,449	68.48	30.66	0.76	0.64
	EL806746086#SCORE_TRAIT_Ideadev	5	6,449	66.30	31.71	0.74	0.62
	EL834856783#SCORE_TRAIT_Conv	4	6,495	75.03	24.17	0.85	0.75
	EL834856783#SCORE_TRAIT_Ideadev	5	6,495	77.92	20.34	0.91	0.82
6	EL303519#SCORE_TRAIT_Conv	4	243	68.31	31.28	0.83	0.70
	EL303519#SCORE_TRAIT_Ideadev	6	243	75.31	24.69	0.88	0.78
	EL626869132#SCORE_TRAIT_Conv	4	247	68.83	30.36	0.83	0.71
	EL626869132#SCORE_TRAIT_Ideadev	6	247	82.59	16.60	0.91	0.84
	EL911525969#SCORE_TRAIT_Conv	4	6,454	70.76	28.70	0.83	0.72
	EL911525969#SCORE_TRAIT_Ideadev	6	6,454	73.75	24.99	0.87	0.76
	EL913132900#SCORE_TRAIT_Conv	4	6,502	72.25	27.22	0.85	0.74
	EL913132900#SCORE_TRAIT_Ideadev	6	6,502	67.35	31.16	0.84	0.70
7	EL292181#SCORE_TRAIT_Conv	4	246	67.07	32.93	0.83	0.69
	EL292181#SCORE_TRAIT_Ideadev	6	246	69.11	30.89	0.86	0.73
	EL628749729#SCORE_TRAIT_Conv	4	247	72.87	25.51	0.83	0.73

continued

Grade	Item	Number of Score Categories	Number of Responses Scored Twice	Percent Exact	Percent Adjacent	Correlation	LW Kappa
7	EL628749729#SCORE_TRAIT_Ideadev	6	247	66.80	27.53	0.82	0.69
	EL811753816#SCORE_TRAIT_Conv	4	6,646	72.42	27.05	0.85	0.74
	EL811753816#SCORE_TRAIT_Ideadev	6	6,646	66.43	31.55	0.85	0.71
	EL909750218#SCORE_TRAIT_Conv	4	6,659	73.18	26.58	0.85	0.74
	EL909750218#SCORE_TRAIT_Ideadev	6	6,659	68.31	29.99	0.84	0.72
8	EL290818#SCORE_TRAIT_Conv	4	245	70.61	29.39	0.86	0.74
	EL290818#SCORE_TRAIT_Ideadev	6	245	66.12	33.06	0.83	0.69
	EL623953378#SCORE_TRAIT_Conv	4	244	81.56	18.44	0.91	0.83
	EL623953378#SCORE_TRAIT_Ideadev	6	244	74.18	25.41	0.88	0.77
	EL836248600#SCORE_TRAIT_Conv	4	6,860	74.43	25.00	0.87	0.77
	EL836248600#SCORE_TRAIT_Ideadev	6	6,860	67.17	30.85	0.88	0.74
	EL911774388#SCORE_TRAIT_Conv	4	6,902	79.72	20.07	0.90	0.82
	EL911774388#SCORE_TRAIT_Ideadev	6	6,902	70.72	28.40	0.91	0.79
10	EL013138637	9	65,131	63.02	18.66	0.88	0.75
	EL013138637#SCORE_TRAIT_Conv	4	65,131	78.35	21.30	0.87	0.77
	EL013138637#SCORE_TRAIT_Ideadev	6	65,131	66.31	32.25	0.87	0.74
	EL811561885	9	5,742	64.84	15.69	0.87	0.75
	EL811561885#SCORE_TRAIT_Conv	4	5,742	78.79	20.92	0.86	0.77
	EL811561885#SCORE_TRAIT_Ideadev	6	5,742	66.93	31.92	0.86	0.73
	EL910467723	9	65,847	61.20	18.89	0.85	0.71
	EL910467723#SCORE_TRAIT_Conv	4	65,847	78.46	20.96	0.84	0.74
	EL910467723#SCORE_TRAIT_Ideadev	6	65,847	63.13	35.18	0.83	0.69

**Caution should be used when interpreting the sums of exact and adjacent percentages for ELA items. This is because resolutions are done by item in ELA, and it is entirely possible that only one trait (either idea development or conventions) on a writing item has a non-adjacent score. For instance, if the idea development score for an item were non-adjacent, the item would also receive a third score for conventions, even if it initially received an exact or adjacent score for conventions.*

Table H-2. Item-Level Interrater Consistency Statistics by Grade—Mathematics

Grade	Item	Number of Score Categories	Number of Responses Scored Twice	Percent Exact	Percent Adjacent	Correlation	LW Kappa
3	MA286752A	4	6,427	88.11	11.58	0.93	0.88
	MA297478A	4	6,451	98.11	1.84	0.99	0.98
	MA297478A_PA	4	20	100.00	0.00	1.00	1.00
	MA300753A	4	6,316	94.16	5.67	0.98	0.95
	MA623654449	4	210	88.10	11.90	0.93	0.88
	MA623656013	4	194	97.94	2.06	0.99	0.98
	MA735951978	4	6,383	85.93	13.69	0.93	0.88
4	MA250543	5	200	77.00	19.50	0.90	0.82
	MA302496A	5	6,479	80.15	18.61	0.92	0.85
	MA311579A	5	6,529	92.04	7.58	0.98	0.95
	MA311581	5	186	86.02	12.90	0.94	0.89
	MA900750814	5	6,530	80.11	18.94	0.93	0.85
	MA903574399	5	6,532	93.39	6.28	0.98	0.96
5	MA298005	5	6,601	83.09	15.13	0.93	0.86
	MA301608	5	6,594	85.52	13.69	0.94	0.88
	MA311366	5	203	86.70	12.32	0.95	0.89
	MA704359678	5	203	73.40	24.63	0.92	0.82
	MA802310847	5	6,604	91.63	8.16	0.98	0.95
	MA802310847_PA	5	24	100.00	0.00	1.00	1.00
	MA901073764	5	6,613	78.24	19.78	0.93	0.85
6	MA298139	5	205	89.76	10.24	0.98	0.94
	MA307234	5	6,560	84.77	14.13	0.95	0.90
	MA307339	5	207	87.44	12.56	0.95	0.89
	MA703253363	5	6,556	87.71	11.18	0.96	0.91
	MA900337563	5	6,566	85.09	14.24	0.95	0.89
	MA902139605	5	6,603	91.43	8.42	0.96	0.93
7	MA306566	5	6,461	83.53	14.63	0.94	0.87
	MA316886	5	243	93.00	6.58	0.96	0.94
	MA703943185	5	242	88.43	10.74	0.97	0.93
	MA717236235	5	6,687	82.79	16.21	0.95	0.88
	MA802914027	5	6,580	92.86	6.58	0.98	0.95
	MA900936469	5	6,690	89.00	10.52	0.97	0.93
8	MA297652	5	243	92.18	7.41	0.98	0.95
	MA307515	5	6,854	80.67	16.94	0.94	0.87
	MA311459	5	6,813	84.38	14.74	0.94	0.88
	MA314812	5	248	90.32	8.87	0.97	0.94

continued

Grade	Item	Number of Score Categories	Number of Responses Scored Twice	Percent Exact	Percent Adjacent	Correlation	LW Kappa
8	MA715920050	5	6,945	79.29	19.51	0.93	0.85
	MA715920050_PA	5	16	100.00	0.00	1.00	1.00
	MA902400539	5	6,811	83.69	15.25	0.95	0.88
10	MA302066	5	64,552	88.57	10.73	0.97	0.92
	MA302066_ES	5	945	95.87	3.70	0.94	0.89
	MA311223	5	65,314	80.69	18.14	0.95	0.88
	MA311223_ES	5	961	88.87	10.72	0.92	0.86
	MA713808299	5	66,734	86.65	12.63	0.96	0.91
	MA713808299_ES	5	1,104	91.76	7.97	0.92	0.87
	MA806383722	5	3,080	86.27	13.02	0.93	0.87
	MA806408603	5	3,069	88.95	10.43	0.95	0.91
	MA901364620	5	66,771	80.82	18.04	0.93	0.85
	MA901364620_ES	5	1,097	80.13	18.05	0.82	0.72

Table H-3. Item-Level Interrater Consistency Statistics—STE

Grade	Item	Number of Score Categories	Number of Responses Scored Twice	Percent Exact	Percent Adjacent	Correlation	LW Kappa
5	SC264893	4	299	74.92	22.41	0.83	0.74
	SC313154_PA	4	25	88.00	12.00	0.86	0.79
	SC626958463	3	6,066	74.86	24.70	0.67	0.60
	SC626958463_PA	3	31	67.74	32.26	0.63	0.52
	SC629273289	3	6,616	83.68	16.19	0.73	0.70
	SC630756792	4	6,552	62.39	33.38	0.75	0.63
	SC802761427	4	352	64.20	33.24	0.73	0.60
	SC903853405	4	13,412	72.56	25.28	0.77	0.68
	SC911956141	4	6,653	73.71	24.74	0.84	0.74
8	SC631744146_PA	4	26	80.77	19.23	0.84	0.75
	SC807345964	4	6,679	72.18	26.20	0.80	0.70
	SC809178849	4	300	80.33	18.67	0.80	0.72
	SC810865313	3	6,380	73.24	24.51	0.75	0.67
	SC814258458	4	299	80.94	18.06	0.88	0.81
	SC816553266	3	7,123	81.62	17.94	0.81	0.75
	SC903853728	4	15,258	67.47	29.82	0.83	0.71
	SC911252123	4	7,224	72.84	25.65	0.80	0.70

Table H-4. Item-Level Interrater Consistency Statistics—Biology

Grade	Item	Number of Score Categories	Number of Responses Scored Twice	Percent Exact	Percent Adjacent	Correlation	LW Kappa
HS	SC289153	5	57,789	56.74	34.91	0.72	0.59
	SC289153_ES	5	1,666	75.75	20.05	0.63	0.52
	SC312659	5	58,837	81.06	17.54	0.93	0.86
	SC312659_ES	5	1,776	82.26	17.29	0.79	0.69
	SC312659_PA	5	420	90.24	8.57	0.93	0.89
	SC312659_PA_ES	5	67	83.58	16.42	0.87	0.79
	SC316264	5	57,311	81.19	17.73	0.94	0.87
	SC316264_ES	5	1,445	89.07	10.66	0.88	0.81
	SC810679235	4	58,124	68.71	27.14	0.81	0.70
	SC810679235_ES	4	1,754	76.00	21.95	0.52	0.40
	SC816235890_PA	4	407	89.19	10.57	0.88	0.80
	SC816235890_PA_ES	4	62	93.55	6.45	0.72	0.71

Table H-5. Item-Level Interrater Consistency Statistics—Introductory Physics

Grade	Item	Number of Score Categories	Number of Responses Scored Twice	Percent Exact	Percent Adjacent	Correlation	LW Kappa
HS	SC280834	5	14,091	67.17	29.50	0.87	0.75
	SC280834_ES	5	198	78.79	20.71	0.81	0.70
	SC302741	5	13,887	81.70	17.12	0.92	0.85
	SC302741_ES	5	189	93.12	6.88	0.84	0.79
	SC313765	5	14,020	74.25	24.02	0.89	0.79
	SC313765_ES	5	218	80.28	17.89	0.74	0.67
	SC805182225	4	14,033	69.64	28.64	0.79	0.68
	SC805182225_ES	4	204	91.18	8.82	0.81	0.76
	SC805975282_PA	4	43	79.07	18.60	0.83	0.74
	SC805975282_PA_ES	4	27	70.37	25.93	0.55	0.40

Table H-6. Validity Constant Proportion of Exact Agreement by Score Points

Subject	Grade	Ncat	Ntot	Exact	Score Point 0	Score Point 1	Score Point 2	Score Point 3	Score Point 4	Score Point 5
ELA	3	3	132	84.19	89.19	89.72	70.51	--	--	--
		4	6,574	89.92	90.22	93.68	78.84	83.04	--	--
		5	3,153	88.5	97.78	91.46	83.82	69.83	73.28	--
	4	3	190	95.84	95.76	97.78	78	--	--	--
		4	6,800	87.24	94.61	87.65	80.46	83.85		--
		5	3,265	89.48	96.71	93.27	88	76.63	74.21	--
	5	4	6,843	87.91	91.46	93.17	73.88	84.76	--	--
		5	6,465	88.29	98.39	93.62	73.51	69.48	61.46	--
	6	4	6,590	88.45	96.58	85.04	80.5	83.65	--	--
		6	6,590	88.58	97.91	92.14	84.09	76.38	56.64	66.34
	7	4	7,096	87.55	95.69	86.08	78	86.2	--	--
		6	6,716	83.34	91.56	91.33	82.26	65.65	67.07	63.56
	8	4	6,918	88.08	95.11	80.65	82.69	92.23	--	--
		5	182	95.12	100	94.82	100	93	70	--
		6	6,736	81.12	97.04	86.63	83.15	75.47	57.8	57.32
Mathematics	3	4	8,234	96.68	99.15	95.86	95.02	96.22	--	--
	4	5	7,692	95.42	95.55	96.5	92	95.37	97.09	--
	5	5	7,869	92.62	99.27	92.37	91.05	86.2	94.98	--
	6	5	8,490	93.27	97.02	93.99	91.86	89.49	93.43	--
	7	5	8,618	90.32	98.12	88.33	89.08	87.62	92.41	--
	8	5	8,659	89.89	97.02	90.05	84.35	85.56	93.22	--

Table H-7. Item-level Validity Statistics—ELA Grade 3

UIN	Trait	Ncat	Stat	Overall Exact Agreement	Agreement by Score Point 0	Agreement by Score Point 1	Agreement by Score Point 2	Agreement by Score Point 3	Agreement by Score Point 4
EL308855	Overall	3	N	132	37	58	37	0	0
			Percent	84.19	89.19	89.72	70.51	0	0
EL308857	Overall	4	N	192	54	96	24	18	0
			Percent	88.52	98.07	94.69	79.50	39	0
EL835251909	Overall	4	N	3,229	520	2415	152	142	0
			Percent	89.5	95.17	91.41	57.95	69.83	0
EL626052459	Conventions	4	N	182	91	44	16	31	0
			Percent	92.33	98.71	98	69	77.58	0
	Idea Development	5	N	182	52	83	16	11	20
			Percent	88.55	100	96.59	69	36	70
EL912362165	Conventions	4	N	2,971	128	1571	858	414	0
			Percent	90.32	60.78	96.99	82.71	89.89	0
	Idea Development	5	N	2,971	937	762	858	220	194
			Percent	88.50	97.66	90.90	84.10	71.52	73.62

Table H-8. Item-level Validity Statistics—ELA Grade 4

UIN	Trait	Ncat	Stat	Overall Exact Agreement	Agreement by Score Point 0	Agreement by Score Point 1	Agreement by Score Point 2	Agreement by Score Point 3	Agreement by Score Point 4
EL307728	Overall	3	N	190	94	87	9	0	0
			Percent	95.84	95.76	97.78	78	0	0
EL307729	Overall	4	N	188	59	90	21	18	0
			Percent	86.19	84.75	91.14	76	78	0
EL800957624	Overall	4	N	3347	1,115	1,035	767	430	0
			Percent	82.31	91.92	81.08	73.09	76.78	0
EL624655949	Conventions	3	N	187	50	39	51	47	0
			Percent	91.31	100	92.15	80.02	93.62	0
	Idea Development	3	N	187	50	39	51	10	37
			Percent	89.77	100	89.85	82.22	70	91.62
EL909132428	Conventions	4	N	3078	730	910	885	553	0
			Percent	92.42	99.15	94.59	86.97	88.70	0
	Idea Development	5	N	3078	817	823	885	408	145
			Percent	89.46	96.51	93.43	88.33	76.79	69.77

Table H-9. Item-level Validity Statistics—ELA Grade 5

UIN	Trait	Ncat	Stat	Overall Exact Agreement	Agreement by Score Point 0	Agreement by Score Point 1	Agreement by Score Point 2	Agreement by Score Point 3	Agreement by Score Point 4
EL626356806	Conventions	4	N	189	45	52	75	17	0
			Percent	84.7	100	86.62	81.39	53	0
	Idea Development	4	N	189	45	52	75	17	0
			Percent	81.87	100	82.42	81.24	35	0
EL711854812	Conventions	4	N	190	0	91	40	59	0
			Percent	92.64	0	94.54	82.67	96.46	0
	Idea Development	5	N	190	44	47	40	19	40
			Percent	87.77	93	100	82.42	89	72.42
EL806746086	Conventions	4	N	3133	934	1069	592	538	0
			Percent	85.76	93.24	92.04	67.35	80.56	0
	Idea Development	5	N	3133	934	1069	601	508	21
			Percent	86.69	98.37	94.4	69.38	71.48	38
EL834856783	Conventions	4	N	3142	902	1339	431	470	0
			Percent	90.33	88.76	94.65	79.44	91.04	0
	Idea Development	5	N	3142	2170	71	431	230	240
			Percent	89.91	98.51	77.66	78.43	63.46	61.68

Table H-10. Item-level Validity Statistics—ELA Grade 6

UIN	Trait	Ncat	Stat	Overall Exact Agreement	Agreement by Score Point 0	Agreement by Score Point 1	Agreement by Score Point 2	Agreement by Score Point 3	Agreement by Score Point 4	Agreement by Score Point 5
EL303519	Conventions	4	N	179	48	31	59	41	0	0
			Percent	88.28	93.81	77.52	82.98	97.59	0	0
	Idea Development	6	N	179	37	42	59	24	14	3
			Percent	84.93	78.43	90.62	84.75	100	56.79	100
EL626869132	Conventions	4	N	179	53	41	47	38	0	0
			Percent	83.81	92.58	92.71	76.6	70.89	0	0
	Idea Development	6	N	179	31	63	47	15	15	8
			Percent	85.53	100	98.43	83.02	60.2	53.47	50.25
EL911525969	Conventions	4	N	3125	1074	770	727	554	0	0
			Percent	83.02	92.74	78.68	74.67	81.17	0	0
	Idea Development	6	N	3125	619	1083	805	340	161	117
			Percent	84.64	96.16	91.83	80.24	72.79	58.36	58.12
EL913132900	Conventions	4	N	3107	1395	869	433	410	0	0
			Percent	94.18	99.78	90.59	90.37	86.79	0	0
	Idea Development	6	N	3107	1395	869	433	241	50	119
			Percent	92.92	99.15	92.15	91.28	80.11	52	74.66

Table H-11. Item-level Validity Statistics—ELA Grade 7

UIN	Trait	Ncat	Stat	Overall Exact Agreement	Agreement by Score Point 0	Agreement by Score Point 1	Agreement by Score Point 2	Agreement by Score Point 3	Agreement by Score Point 4	Agreement by Score Point 5
EL292181	Conventions	4	N	190	102	44	44	0	0	0
			Percent	88.42	100	70	80	0	0	0
	Idea Development	4	N	190	102	44	44	0	0	0
			Percent	93.23	96.88	98	80	0	0	0
EL628749729	Conventions	4	N	201	50	23	54	74	0	0
			Percent	86.13	97.96	56.61	81.48	90.7	0	0
	Idea Development	6	N	201	44	29	10	74	12	32
			Percent	85.57	100	92.97	20	91.81	58	75.41
EL811753816	Conventions	4	N	3200	1242	603	657	698	0	0
			Percent	87.81	94.49	84.36	84.74	81.77	0	0
	Idea Development	6	N	3200	1005	835	339	696	217	108
			Percent	83.32	95.44	89.66	62.98	83.09	50.16	53.59
EL909750218	Conventions	4	N	3315	847	936	778	754	0	0
			Percent	87	96.65	88.11	88.47	73.27	0	0
	Idea Development	6	N	3315	879	904	413	621	391	107
			Percent	83.23	86.71	92.82	68.95	80.19	76.73	70.07

Table H-12. Item-level Validity Statistics—ELA Grade 8

UIN	Trait	Ncat	Stat	Overall Exact Agreement	Agreement by Score Point 0	Agreement by Score Point 1	Agreement by Score Point 2	Agreement by Score Point 3	Agreement by Score Point 4	Agreement by Score Point 5
EL290818	Conventions	4	N	208	31	74	53	50	0	0
			Percent	81.84	100	69.08	75.64	96.04	0	0
	Idea Development	6	N	208	49	56	53	20	17	13
			Percent	88.48	95.76	92.8	85.06	85.2	88	62
EL623953378	Conventions	4	N	182	22	57	51	52	0	0
			Percent	94.53	86.5	91.18	100	96.25	0	0
	Idea Development	5	N	182	22	57	51	42	10	0
			Percent	95.12	100	94.82	100	93	70	0
EL836248600	Conventions	4	N	3247	900	657	630	1060	0	0
			Percent	86.68	94.17	73.37	79.9	92.58	0	0
	Idea Development	6	N	3247	811	746	630	555	418	87
			Percent	81.36	97.42	83.52	80.43	74.21	63.61	50.69
EL911774388	Conventions	4	N	3281	428	755	817	1281	0	0
			Percent	89.51	97.18	87.32	84.21	91.62	0	0
	Idea Development	6	N	3281	428	733	839	772	345	164
			Percent	80.41	96.47	89.33	85.07	76.13	49.27	60.46

Table H-13. Item-level Validity Statistics—Mathematics Grade 3

UIN	Trait	Ncat	Stat	Overall Exact Agreement	Agreement by Score Point 0	Agreement by Score Point 1	Agreement by Score Point 2	Agreement by Score Point 3
MA286752A	Overall	4	N	1713	597	410	325	381
			Percent	94.71	99.04	94.83	95.37	87.21
MA297478A	Overall	4	N	2533	654	633	598	648
			Percent	99.33	99.55	98.72	99.18	99.84
MA300753A	Overall	4	N	2150	541	603	436	570
			Percent	96.9	98.7	95.4	95.93	97.52
MA623654449	Overall	4	N	62	19	24	2	17
			Percent	98.35	100	100	100	94
MA623656013	Overall	4	N	56	9	10	15	22
			Percent	100	100	100	100	100
MA735951978	Overall	4	N	1720	462	465	368	425
			Percent	94.32	99.18	93.19	86.64	96.92

Table H-14. Item-level Validity Statistics—Mathematics Grade 4

UIN	Trait	Ncat	Stat	Overall Exact Agreement	Agreement by Score Point 0	Agreement by Score Point 1	Agreement by Score Point 2	Agreement by Score Point 3
MA250543	Overall	5	N	76	37	9	11	2
			Percent	82.95	97.16	33.67	82	100
MA302496A	Overall	5	N	2055	685	503	392	329
			Percent	94.98	93.35	96.95	94.33	95.72
MA311579A	Overall	5	N	1728	386	365	92	216
			Percent	97.7	98.75	95.61	96.61	96.81
MA311581	Overall	5	N	54	5	8	14	16
			Percent	96.31	100	100	92.86	93.81
MA900750814	Overall	5	N	1777	527	268	558	174
			Percent	92.02	94.96	97.37	86.17	88.52
MA903574399	Overall	5	N	2002	157	225	341	471
			Percent	97.38	98.72	98.26	97.89	97.03

Table H-15. Item-level Validity Statistics—Mathematics Grade 5

UIN	Trait	Ncat	Stat	Overall Exact Agreement	Agreement by Score Point 0	Agreement by Score Point 1	Agreement by Score Point 2	Agreement by Score Point 3
MA298005	Overall	5	N	1910	104	205	663	286
			Percent	91.3	100	83.4	93.08	88.63
MA301608	Overall	5	N	2082	299	552	505	280
			Percent	96.1	100	95.43	92.33	96.81
MA311366	Overall	5	N	63	0	29	8	12
			Percent	92.14	0	100	87.62	67
MA704359678	Overall	5	N	107	19	40	16	0
			Percent	92.56	100	100	94	0
MA802310847	Overall	5	N	1768	370	351	335	363
			Percent	95.69	98.15	94.44	91.36	98.11
MA901073764	Overall	5	N	1939	278	335	375	391
			Percent	87.42	99.64	89.06	85.43	66.37

Table H-16. Item-level Validity Statistics—Mathematics Grade 6

UIN	Trait	Ncat	Stat	Overall Exact Agreement	Agreement by Score Point 0	Agreement by Score Point 1	Agreement by Score Point 2	Agreement by Score Point 3
MA298139	Overall	5	N	101	36	9	34	21
			Percent	93.15	100	89.11	97.18	76.29
MA307234	Overall	5	N	1735	243	483	278	267
			Percent	91.97	92.61	93.21	88.51	86.25
MA307339	Overall	5	N	67	9	20	20	10
			Percent	97.04	100	100	100	80.2
MA703253363	Overall	5	N	1763	528	454	153	274
			Percent	93.17	98.12	90.34	81.73	92.05
MA900337563	Overall	5	N	2216	479	663	327	368
			Percent	90.44	97.9	93.37	83.27	82.64
MA902139605	Overall	5	N	2608	407	547	927	576
			Percent	96.5	96.84	98.34	97.19	94.78

Table H-17. Item-level Validity Statistics—Mathematics Grade 7

UIN	Trait	Ncat	Stat	Overall Exact Agreement	Agreement by Score Point 0	Agreement by Score Point 1	Agreement by Score Point 2	Agreement by Score Point 3
MA306566	Overall	5	N	1851	157	325	583	484
			Percent	85.98	100	83.06	84.1	89.87
MA316886	Overall	5	N	100	55	0	0	45
			Percent	92.23	93.18	0	0	91.07
MA703943185	Overall	5	N	70	25	3	13	10
			Percent	90	96	100	76.92	70
MA717236235	Overall	5	N	1929	263	437	469	403
			Percent	83.62	97.43	85.35	78.87	78.66
MA802914027	Overall	5	N	2672	194	561	790	509
			Percent	96.53	100	91.48	99.29	93.65
MA900936469	Overall	5	N	1996	290	481	434	353
			Percent	92.42	97.6	90.87	88.57	86.14

Table H-18. Item-level Validity Statistics—Mathematics Grade 8

UIN	Trait	Ncat	Stat	Overall Exact Agreement	Agreement by Score Point 0	Agreement by Score Point 1	Agreement by Score Point 2	Agreement by Score Point 3
MA297652	Overall	5	N	91	4	16	7	39
			Percent	100	100	100	100	100
MA307515	Overall	5	N	2177	11	294	470	638
			Percent	85.76	100	77.92	80.53	78.86
MA311459	Overall	5	N	1861	214	578	223	351
			Percent	85.76	98.43	90.47	80.99	77.47
MA314812	Overall	5	N	82	23	14	14	17
			Percent	94	95.74	93	86	94.12
MA715920050	Overall	5	N	2584	568	602	399	489
			Percent	94.72	97.25	94.54	95.25	91.75
MA902400539	Overall	5	N	1864	421	368	299	433
			Percent	91.49	95.97	91.2	77.89	93.36

Table H-19. Item-Level Interrater Consistency Statistics—Alt/ELA

Grade	Item	Number of Score Categories	Number of Responses Scored Twice	Percent Exact	Percent Adjacent	Correlation
3	comp1	5	204	99.51	0.49	0.94
	comp2	5	203	99.01	0.99	0.89
	comp3	5	202	97.03	2.97	0.83
	ind1	4	172	98.26	1.74	0.97
	ind2	4	160	100.00	0.00	1.00
	ind3	4	175	98.86	1.14	0.99
	sk1	4	172	99.42	0.58	0.98
	sk2	4	160	98.75	1.25	0.97
	sk3	4	175	95.43	1.71	0.91
4	comp1	5	200	98.50	1.50	0.85
	comp2	5	200	99.50	0.50	0.94
	comp3	5	201	98.51	1.49	0.90
	ind1	4	177	99.44	0.56	0.99
	ind2	4	166	98.80	1.20	0.98
	ind3	4	183	97.81	2.19	0.98
	sk1	4	177	99.44	0.56	0.98
	sk2	4	166	99.40	0.00	0.91
	sk3	4	183	97.81	1.64	0.98
5	comp1	5	201	99.00	1.00	0.92
	comp2	5	201	99.00	1.00	0.92
	comp3	5	200	98.00	2.00	0.89
	ind1	4	168	98.21	1.79	0.96
	ind2	4	157	98.09	1.91	0.96
	ind3	4	167	100.00	0.00	1.00
	sk1	4	168	100.00	0.00	1.00
	sk2	4	157	100.00	0.00	1.00
	sk3	4	167	97.01	2.40	0.97
6	comp1	5	185	99.46	0.54	0.95
	comp2	5	184	99.46	0.54	0.96
	comp3	5	183	97.27	2.73	0.87
	ind1	4	161	99.38	0.62	0.99
	ind2	4	142	99.30	0.70	0.98
	ind3	4	158	99.37	0.63	0.99
	sk1	4	161	99.38	0.62	0.98
	sk2	4	142	98.59	1.41	0.96
	sk3	4	158	96.20	3.80	0.97
7	comp1	5	586	99.66	0.34	0.95
	comp2	5	588	99.83	0.17	0.98
	comp3	5	581	98.97	1.03	0.93
	ind1	4	534	98.31	1.69	0.97
	ind2	4	478	98.54	1.26	0.96
	ind3	4	512	98.63	1.37	0.99
	sk1	4	534	98.69	1.12	0.94

continued

Grade	Item	Number of Score Categories	Number of Responses Scored Twice	Percent Exact	Percent Adjacent	Correlation
7	sk2	4	478	98.33	1.67	0.96
	sk3	4	512	95.70	3.91	0.96
8	comp1	5	212	99.06	0.94	0.89
	comp2	5	212	99.53	0.47	0.96
	comp3	5	210	99.52	0.48	0.97
	ind1	4	194	98.45	1.55	0.97
	ind2	4	176	98.86	1.14	0.97
	ind3	4	189	97.35	2.65	0.98
	sk1	4	194	100.00	0.00	1.00
	sk2	4	176	98.86	1.14	0.97
	sk3	4	189	94.71	3.17	0.93
HS	comp1	5	326	99.08	0.92	0.91
	comp2	5	327	99.69	0.31	0.97
	comp3	5	324	97.84	2.16	0.84
	ind1	4	280	98.21	1.79	0.96
	ind2	4	254	98.82	1.18	0.97
	ind3	4	275	99.27	0.73	0.99
	sk1	4	280	98.93	1.07	0.97
	sk2	4	254	99.21	0.79	0.98
	sk3	4	275	97.09	2.55	0.98

**The percentages of exact agreement, adjacent agreement and third score do not necessarily sum to 1 due to the scoring rules. The most prevalent case is when a strand contains a score of "M" (indicating a required component is missing/incomplete) within a rubric area. Any instance of an "M" by scorer 1 or 2 must be confirmed by an expert scorer (scorer 3). Even if scorer 1 and 2 both agree on an "M", the third scorer would still provide a confirmation or overturning score. The third scorer will also review strands at random to provide oversight on a particular scorer or even portfolios that are of interest.*

Table H-20. Item-Level Interrater Consistency Statistics—Alt/Mathematics

Grade	Item	Number of Score Categories	Number of Responses Scored Twice	Percent Exact	Percent Adjacent	Correlation	% Third Score*
3	comp1	5	206	99.03	0.97	0.90	0.97
	comp5	5	204	98.53	1.47	0.83	1.47
	ind1	4	170	100.00	0.00	1.00	1.18
	ind5	4	170	98.82	1.18	0.98	2.94
	sk1	4	170	98.82	1.18	0.98	1.18
	sk5	4	170	98.82	1.18	0.97	2.35
4	comp1	5	202	98.02	1.98	0.81	1.98
	comp3	5	201	98.01	1.99	0.84	1.99
	ind1	4	165	99.39	0.61	0.99	1.82
	ind3	4	171	100.00	0.00	1.00	1.17
	sk1	4	165	98.79	1.21	0.95	1.82
	sk3	4	171	98.83	1.17	0.95	1.17
5	comp2	5	198	97.47	2.53	0.83	2.53
	comp3	5	198	97.47	2.53	0.83	2.53
	ind2	4	160	96.25	3.75	0.95	4.38
	ind3	4	157	99.36	0.64	0.99	0.64
	sk2	4	160	96.88	3.13	0.91	5.00
	sk3	4	157	99.36	0.64	0.98	1.27
6	comp2	5	187	96.79	3.21	0.77	3.21
	comp5	5	187	97.86	2.14	0.84	2.67
	ind2	4	162	98.15	1.85	0.97	1.85
	ind5	4	159	98.74	1.26	0.98	2.52
	sk2	4	162	100.00	0.00	1.00	1.23
	sk5	4	159	98.74	1.26	0.94	2.52
7	comp1	5	588	99.15	0.85	0.95	1.53
	comp4	5	587	99.66	0.34	0.95	0.68
	ind1	4	520	97.50	2.50	0.97	2.69
	ind4	4	509	98.43	1.57	0.97	2.55
	sk1	4	520	98.65	1.35	0.95	2.69
	sk4	4	509	98.62	1.38	0.94	2.16
8	comp2	5	213	99.06	0.94	0.95	0.94
	comp4	5	212	100.00	0.00	1.00	0.00
	ind2	4	184	97.83	2.17	0.97	3.26
	ind4	4	185	96.76	3.24	0.95	4.86
	sk2	4	184	98.91	1.09	0.97	3.26
	sk4	4	185	98.38	1.62	0.96	4.86

continued

Grade	Item	Number of Score Categories	Number of Responses Scored Twice	Percent Exact	Percent Adjacent	Correlation	% Third Score*
HS	comp1	5	89	98.88	1.12	0.81	1.12
	comp2	5	275	99.64	0.36	0.96	0.73
	comp3	5	191	100.00	0.00	1.00	0.52
	comp4	5	246	99.59	0.41	0.97	0.41
	comp5	5	179	100.00	0.00	1.00	0.56
	ind1	4	72	100.00	0.00	1.00	0.00
	ind2	4	235	98.30	1.70	0.98	2.13
	ind3	4	171	100.00	0.00	1.00	0.00
	ind4	4	210	99.05	0.95	0.99	1.43
	ind5	4	148	99.32	0.68	0.99	0.68
	sk1	4	72	100.00	0.00	1.00	0.00
	sk2	4	235	99.57	0.43	0.99	1.70
	sk3	4	171	100.00	0.00	1.00	0.00
	sk4	4	210	99.05	0.95	0.97	1.90
	sk5	4	148	100.00	0.00	1.00	0.00

**The percentages of exact agreement, adjacent agreement and third score do not necessarily sum to 1 due to the scoring rules. The most prevalent case is when a strand contains a score of "M" (indicating a required component is missing/incomplete) within a rubric area. Any instance of an "M" by scorer 1 or 2 must be confirmed by an expert scorer (scorer 3). Even if scorer 1 and 2 both agree on an "M", the third scorer would still provide a confirmation or overturning score. The third scorer will also review strands at random to provide oversight on a particular scorer or even portfolios that are of interest.*

Table H-21. Item-Level Interrater Consistency Statistics—Alt/STE

Grade	Item	Number of Score Categories	Number of Responses Scored Twice	Percent Exact	Percent Adjacent	Correlation	% Third Score*
5	comp1	5	182	97.25	2.75	0.86	2.75
	comp2	5	190	95.26	4.74	0.74	4.74
	comp3	5	184	97.28	2.72	0.84	2.72
	comp4	5	11	90.91	9.09	0.67	9.09
	ind1	4	159	98.11	1.89	0.99	3.14
	ind2	4	159	98.11	1.89	0.99	3.14
	ind3	4	160	100.00	0.00	1.00	0.00
	ind4	4	10	100.00	0.00	1.00	0.00
	sk1	4	159	98.74	1.26	0.92	2.52
	sk2	4	159	98.74	1.26	0.93	3.14
	sk3	4	160	100.00	0.00	1.00	0.00
	sk4	4	10	100.00	0.00	1.00	0.00
8	comp1	5	196	98.47	1.53	0.91	1.53
	comp2	5	204	97.55	2.45	0.84	2.45
	comp3	5	180	98.33	1.67	0.90	1.67
	comp4	5	35	91.43	8.57	0.75	8.57
	ind1	4	176	97.73	1.70	0.97	3.41
	ind2	4	175	100.00	0.00	1.00	0.00
	ind3	4	166	99.40	0.60	1.00	1.81
	ind4	4	30	93.33	6.67	0.96	6.67
	sk1	4	176	98.86	1.14	0.97	3.41
	sk2	4	175	100.00	0.00	1.00	0.00
	sk3	4	166	98.19	1.81	0.96	2.41
	sk4	4	30	100.00	0.00	1.00	6.67

**The percentages of exact agreement, adjacent agreement and third score do not necessarily sum to 1 due to the scoring rules. The most prevalent case is when a strand contains a score of "M" (indicating a required component is missing/incomplete) within a rubric area. Any instance of an "M" by scorer 1 or 2 must be confirmed by an expert scorer (scorer 3). Even if scorer 1 and 2 both agree on an "M", the third scorer would still provide a confirmation or overturning score. The third scorer will also review strands at random to provide oversight on a particular scorer or even portfolios that are of interest.*

Table H-22. Item-Level Interrater Consistency Statistics—Alt/HS Admin*

Grade	Item	Number of Score Categories	Number of Responses Scored Twice	Percent Exact	Percent Adjacent	Correlation	% Third Score*
Biology	comp1	5	197	97.46	2.54	0.81	2.54
	comp2	5	191	96.34	3.66	0.71	4.19
	comp3	5	190	96.84	3.16	0.74	3.68
	ind1	4	165	98.18	1.82	0.99	2.42
	ind2	4	169	96.45	2.96	0.97	4.73
	ind3	4	157	98.09	1.91	0.99	2.55
	sk1	4	165	100.00	0.00	1.00	1.21
	sk2	4	169	98.82	1.18	0.98	4.14
	sk3	4	157	100.00	0.00	1.00	2.55
Introductory Physics	comp1	5	29	96.55	3.45	0.88	3.45
	comp2	5	29	100.00	0.00	1.00	0.00
	comp3	5	29	93.10	6.90	0.76	6.90
	ind1	4	28	100.00	0.00	1.00	3.57
	ind2	4	28	100.00	0.00	1.00	0.00
	ind3	4	25	100.00	0.00	1.00	0.00
	sk1	4	28	100.00	0.00	1.00	3.57
	sk2	4	28	100.00	0.00	1.00	0.00
	sk3	4	25	100.00	0.00	1.00	0.00

**The percentages of exact agreement, adjacent agreement and third score are too low to report.*

APPENDIX I

ITEM-LEVEL CLASSICAL STATISTICS

Table I-1. Item-Level Classical Test Theory Statistics—ELA Grade 3

Item Number	Item Type	N	Difficulty	Discrimination	Percent Omitted (%)
EL292647	MC	63,945	0.70	0.58	0
EL292648	MC	63,945	0.74	0.55	0
EL292654	MC	63,945	0.54	0.44	0
EL292657	MC	63,945	0.61	0.37	0
EL835280082	MC	63,945	0.52	0.42	0
EL835281423	MC	63,945	0.53	0.33	0
EL835281675	MC	63,945	0.71	0.51	0
EL835338102	MC	63,945	0.73	0.52	0
EL835338434	MC	63,945	0.79	0.52	0
EL835338750	MC	63,945	0.61	0.34	0
EL835338894	MC	63,945	0.68	0.54	0
EL835339761	MC	63,945	0.83	0.54	0
EL835340904	MC	63,945	0.61	0.51	0
EL835341639	MC	63,945	0.49	0.40	0
EL905643350	MC	63,945	0.59	0.35	0
EL912460887	MC	63,945	0.67	0.53	0
EL912462780	MC	63,945	0.66	0.50	0
EL912463130	MC	63,945	0.76	0.53	0
EL912463283	MC	63,945	0.70	0.52	0
EL912463417	MC	63,945	0.68	0.56	0
EL912651426	MC	63,945	0.62	0.53	0
EL916150555	MC	63,945	0.46	0.39	0
EL916532720	MC	63,945	0.82	0.55	0
EL916535053	MC	63,945	0.79	0.40	0
EL292656	OR	63,945	0.77	0.70	0
EL835251909	OR	63,945	0.35	0.60	1
EL835276438	OR	63,945	0.40	0.46	1
EL912365258	OR	63,945	0.66	0.57	0
EL912440150	OR	63,945	0.67	0.51	0
EL916535595	OR	63,945	0.60	0.46	1
EL912362165	WP	63,945	0.24	0.63	2

Table I-2. Item-Level Classical Test Theory Statistics—ELA Grade 4

Item Number	Item Type	N	Difficulty	Discrimination	Percent Omitted (%)
EL307617	MC	64,472	0.76	0.53	0
EL307622	MC	64,472	0.58	0.47	0
EL307624	MC	64,472	0.69	0.48	0
EL800937934	MC	64,472	0.55	0.55	0
EL800938150	MC	64,472	0.48	0.38	0
EL800939230	MC	64,472	0.65	0.42	0
EL800940688	MC	64,472	0.78	0.54	0
EL800940863	MC	64,472	0.78	0.56	0
EL800941423	MC	64,472	0.73	0.44	0
EL800941788	MC	64,472	0.69	0.44	0
EL800943061	MC	64,472	0.80	0.55	0
EL804278958	MC	64,472	0.60	0.49	0
EL909145470	MC	64,472	0.91	0.43	0
EL909147325	MC	64,472	0.49	0.35	0
EL909150609	MC	64,472	0.73	0.42	0
EL909151025	MC	64,472	0.42	0.37	0
EL909155188	MC	64,472	0.71	0.23	0
EL909156962	MC	64,472	0.61	0.42	0
EL909157777	MC	64,472	0.52	0.35	0
EL911976285	MC	64,472	0.39	0.32	0

continued

Item Number	Item Type	N	Difficulty	Discrimination	Percent Omitted (%)
EL914243985	MC	64,472	0.66	0.45	0
EL914273301	MC	64,472	0.68	0.54	0
EL914444197	MC	64,472	0.60	0.50	0
EL914444576	MC	64,472	0.43	0.31	0
EL800853520	OR	64,472	0.73	0.61	0
EL800937262	OR	64,472	0.67	0.32	0
EL800957624	OR	64,472	0.40	0.65	0
EL909153399	OR	64,472	0.57	0.51	0
EL913040076	OR	64,472	0.60	0.53	0
EL913342853	OR	64,472	0.50	0.50	3
EL909132428	WP	64,472	0.34	0.72	1

Table I-3. Item-Level Classical Test Theory Statistics—ELA Grade 5

Item Number	Item Type	N	Difficulty	Discrimination	Percent Omitted (%)
EL302392	MC	65,715	0.90	0.48	0
EL302393	MC	65,715	0.90	0.54	0
EL302401	MC	65,715	0.79	0.48	0
EL302402	MC	65,715	0.72	0.43	0
EL806707883	MC	65,715	0.82	0.44	0
EL806708176	MC	65,715	0.41	0.30	0
EL806709102	MC	65,715	0.49	0.56	0
EL806709302	MC	65,715	0.61	0.33	0
EL806709547	MC	65,715	0.91	0.43	0
EL806709790	MC	65,715	0.82	0.53	0
EL806710293	MC	65,715	0.60	0.50	0
EL806712207	MC	65,715	0.88	0.49	0
EL827636609	MC	65,715	0.70	0.48	0
EL834972269	MC	65,715	0.66	0.54	0
EL834972500	MC	65,715	0.81	0.54	0
EL834976700	MC	65,715	0.77	0.50	0
EL834977047	MC	65,715	0.83	0.53	0
EL834977330	MC	65,715	0.67	0.46	0
EL834978026	MC	65,715	0.73	0.53	0
EL834978663	MC	65,715	0.73	0.51	0
EL834979059	MC	65,715	0.79	0.44	0
EL834979779	MC	65,715	0.76	0.54	0
EL912500446	MC	65,715	0.62	0.45	0
EL912579695	MC	65,715	0.77	0.56	0
EL806706594	OR	65,715	0.75	0.59	0
EL806756112	OR	65,715	0.51	0.56	1
EL834950831	OR	65,715	0.80	0.59	0
EL834952362	OR	65,715	0.54	0.55	0
EL912584876	OR	65,715	0.70	0.59	0
EL806746086	WP	65,715	0.33	0.73	1
EL834856783	WP	65,715	0.31	0.70	1

Table I-4. Item-Level Classical Test Theory Statistics—ELA Grade 6

Item Number	Item Type	N	Difficulty	Discrimination	Percent Omitted (%)
EL308506	MC	65,876	0.40	0.44	0
EL308510	MC	65,876	0.56	0.51	0
EL308512	MC	65,876	0.73	0.50	0
EL308513	MC	65,876	0.60	0.44	0
EL308518	MC	65,876	0.82	0.54	0
EL835402993	MC	65,876	0.57	0.37	0
EL835415824	MC	65,876	0.71	0.51	0
EL835417652	MC	65,876	0.71	0.46	0
EL835419727	MC	65,876	0.68	0.54	0
EL835420555	MC	65,876	0.73	0.51	0
EL835421418	MC	65,876	0.80	0.50	0
EL835421936	MC	65,876	0.59	0.41	0
EL835422818	MC	65,876	0.70	0.45	0
EL903544223	MC	65,876	0.80	0.50	0
EL913137826	MC	65,876	0.61	0.48	0
EL913146798	MC	65,876	0.53	0.48	0
EL913147467	MC	65,876	0.71	0.51	0
EL913177923	MC	65,876	0.82	0.48	0
EL913179570	MC	65,876	0.68	0.44	0
EL916473284	MC	65,876	0.41	0.47	0
EL917825386	MC	65,876	0.63	0.55	0
EL917861668	MC	65,876	0.81	0.42	0
EL918180282	MC	65,876	0.64	0.41	0
EL920039686	MC	65,876	0.86	0.50	0
EL835401351	OR	65,876	0.67	0.54	0
EL835420875	OR	65,876	0.57	0.59	0
EL913133585	OR	65,876	0.52	0.59	0
EL913135249	OR	65,876	0.69	0.47	0
EL916444331	OR	65,876	0.53	0.59	0
EL911525969	WP	65,876	0.36	0.78	1
EL913132900	WP	65,876	0.36	0.75	1

Table I-5. Item-Level Classical Test Theory Statistics—ELA Grade 7

Item Number	Item Type	N	Difficulty	Discrimination	Percent Omitted (%)
EL314056	MC	67,583	0.70	0.46	0
EL314058	MC	67,583	0.59	0.50	0
EL314063	MC	67,583	0.71	0.57	0
EL811653297	MC	67,583	0.80	0.50	0
EL811653729	MC	67,583	0.66	0.41	0
EL811659059	MC	67,583	0.64	0.52	0
EL811661018	MC	67,583	0.70	0.39	0
EL811720784	MC	67,583	0.52	0.46	0
EL811721117	MC	67,583	0.56	0.40	0
EL811723366	MC	67,583	0.70	0.42	0
EL811734832	MC	67,583	0.75	0.50	0
EL811735509	MC	67,583	0.51	0.46	0
EL909281464	MC	67,583	0.80	0.49	0
EL909375770	MC	67,583	0.54	0.51	0
EL909470766	MC	67,583	0.81	0.49	0
EL909471269	MC	67,583	0.61	0.40	0
EL909471961	MC	67,583	0.72	0.40	0
EL909747660	MC	67,583	0.77	0.52	0
EL909748887	MC	67,583	0.51	0.41	0
EL909752861	MC	67,583	0.81	0.51	0
EL909764274	MC	67,583	0.62	0.36	0

continued

Item Number	Item Type	N	Difficulty	Discrimination	Percent Omitted (%)
EL911458693	MC	67,583	0.57	0.46	0
EL911550107	MC	67,583	0.59	0.38	0
EL912448606	MC	67,583	0.60	0.40	0
EL912450318	MC	67,583	0.50	0.44	0
EL916135715	MC	67,583	0.54	0.38	0
EL811660409	OR	67,583	0.59	0.57	0
EL811735935	OR	67,583	0.55	0.58	0
EL909749262	OR	67,583	0.66	0.54	0
EL912364723	OR	67,583	0.50	0.52	0
EL811753816	WP	67,583	0.38	0.80	1
EL909750218	WP	67,583	0.44	0.78	1

Table I-6. Item-Level Classical Test Theory Statistics—ELA Grade 8

Item Number	Item Type	N	Difficulty	Discrimination	Percent Omitted (%)
EL309393	MC	69,884	0.52	0.39	0
EL309397	MC	69,884	0.71	0.44	0
EL309401	MC	69,884	0.65	0.51	0
EL836438880	MC	69,884	0.81	0.52	0
EL836456432	MC	69,884	0.73	0.40	0
EL836459385	MC	69,884	0.80	0.50	0
EL836461762	MC	69,884	0.74	0.51	0
EL836463708	MC	69,884	0.49	0.35	0
EL836464683	MC	69,884	0.82	0.54	0
EL836547482	MC	69,884	0.85	0.50	0
EL900353074	MC	69,884	0.81	0.53	0
EL904652080	MC	69,884	0.75	0.32	0
EL911558166	MC	69,884	0.83	0.38	0
EL911657712	MC	69,884	0.74	0.39	0
EL911763814	MC	69,884	0.84	0.53	0
EL911764401	MC	69,884	0.77	0.49	0
EL911862506	MC	69,884	0.90	0.46	0
EL911946437	MC	69,884	0.75	0.53	0
EL913447634	MC	69,884	0.64	0.36	0
EL913755133	MC	69,884	0.83	0.47	0
EL914324180	MC	69,884	0.58	0.26	0
EL914376798	MC	69,884	0.57	0.27	0
EL917559756	MC	69,884	0.70	0.50	0
EL919039373	MC	69,884	0.62	0.40	0
EL836448634	OR	69,884	0.65	0.55	0
EL836455548	OR	69,884	0.63	0.60	0
EL911659849	OR	69,884	0.88	0.55	0
EL913448483	OR	69,884	0.57	0.63	0
EL913761016	OR	69,884	0.69	0.53	0
EL836248600	WP	69,884	0.47	0.84	1
EL911774388	WP	69,884	0.45	0.81	1

Table I-7. Item-Level Classical Test Theory Statistics—ELA Grade 10

Item Number	Item Type	N	Difficulty	Discrimination	Percent Omitted (%)
EL012153811	MC	66,706	0.80	0.41	0
EL012157583	MC	66,706	0.65	0.42	0
EL012733933	MC	66,706	0.76	0.44	0
EL013253097	MC	66,706	0.79	0.40	0
EL013255897	MC	66,706	0.64	0.40	0
EL013257840	MC	66,706	0.91	0.31	0
EL013258596	MC	66,706	0.68	0.44	0
EL013353391	MC	66,706	0.65	0.32	0
EL015041902	MC	66,706	0.86	0.44	0
EL909729691	MC	66,706	0.81	0.54	0
EL909753277	MC	66,706	0.72	0.47	0
EL909754342	MC	66,706	0.86	0.55	0
EL909755882	MC	66,706	0.79	0.49	0
EL910540421	MC	66,706	0.78	0.36	0
EL910641090	MC	66,706	0.85	0.57	0
EL910747872	MC	66,706	0.74	0.49	0
EL910857457	MC	66,706	0.89	0.47	0
EL910962538	MC	66,706	0.90	0.47	0
EL911153175	MC	66,706	0.51	0.26	0
EL911243156	MC	66,706	0.89	0.50	0
EL911243823	MC	66,706	0.82	0.37	0
EL012160579	OR	66,706	0.61	0.50	0
EL014953733	OR	66,706	0.66	0.48	0
EL019560241	OR	66,706	0.58	0.46	0
EL909560185	OR	66,706	0.88	0.51	0
EL909731553	OR	66,706	0.66	0.57	0
EL910860957	OR	66,706	0.73	0.58	0
EL910938823	OR	66,706	0.83	0.55	1
EL013138637	WP	66,706	0.59	0.84	1
EL910467723	WP	66,706	0.64	0.82	1

Table I-8. Item-Level Classical Test Theory Statistics—Mathematics Grade 3

Item Number	Item Type	N	Difficulty	Discrimination	Percent Omitted (%)
MA264568	MC	64,882	0.74	0.49	0
MA303411	MC	64,882	0.45	0.47	0
MA303418	MC	64,882	0.53	0.58	0
MA306346	MC	64,882	0.48	0.65	0
MA310835	MC	64,882	0.60	0.64	0
MA310877	MC	64,882	0.40	0.31	0
MA735579087	MC	64,882	0.41	0.55	0
MA735732140	MC	64,882	0.77	0.50	0
MA900371208	MC	64,882	0.48	0.41	0
MA900374280	MC	64,882	0.72	0.53	0
MA900374565	MC	64,882	0.63	0.49	0
MA900379786	MC	64,882	0.30	0.31	0
MA900445883	MC	64,882	0.52	0.52	0
MA900571833	MC	64,882	0.71	0.51	0
MA900574704	MC	64,882	0.79	0.45	0
MA902576979	MC	64,882	0.40	0.39	0
MA260575	OR	64,882	0.67	0.56	0
MA286752A	OR	64,882	0.29	0.71	1
MA297478A	OR	64,882	0.69	0.67	0
MA300753A	OR	64,882	0.54	0.77	1
MA306288	OR	64,882	0.43	0.67	0
MA306339	OR	64,882	0.53	0.57	0

continued

Item Number	Item Type	N	Difficulty	Discrimination	Percent Omitted (%)
MA306355	OR	64,882	0.77	0.53	0
MA310895	OR	64,882	0.42	0.42	0
MA703080328	OR	64,882	0.28	0.45	0
MA735659609	OR	64,882	0.75	0.50	2
MA735662802	OR	64,882	0.69	0.61	0
MA735767424	OR	64,882	0.56	0.58	0
MA735951978	OR	64,882	0.41	0.78	1
MA736029388	OR	64,882	0.59	0.61	1
MA834448527	OR	64,882	0.86	0.44	0
MA900371363	OR	64,882	0.37	0.40	2
MA900376906	OR	64,882	0.54	0.62	0
MA900430931	OR	64,882	0.28	0.47	3
MA900437563	OR	64,882	0.45	0.59	0
MA900440136	OR	64,882	0.47	0.49	1
MA900578884	OR	64,882	0.42	0.51	0
MA901139069	OR	64,882	0.73	0.56	0
MA902238195	OR	64,882	0.68	0.37	0
MA905135964	OR	64,882	0.31	0.26	0

Table I-9. Item-Level Classical Test Theory Statistics—Mathematics Grade 4

Item Number	Item Type	N	Difficulty	Discrimination	Percent Omitted (%)
MA227395	MC	65,347	0.46	0.41	0
MA247687	MC	65,347	0.88	0.39	0
MA286765	MC	65,347	0.66	0.51	0
MA307310	MC	65,347	0.57	0.57	0
MA307326	MC	65,347	0.84	0.42	0
MA307692	MC	65,347	0.63	0.33	0
MA900662785	MC	65,347	0.58	0.60	0
MA900751683	MC	65,347	0.45	0.48	0
MA900754381	MC	65,347	0.41	0.56	0
MA900843428	MC	65,347	0.61	0.65	0
MA900845776	MC	65,347	0.77	0.38	0
MA227864	OR	65,347	0.71	0.43	0
MA279790	OR	65,347	0.75	0.50	0
MA294263	OR	65,347	0.22	0.48	0
MA302496A	OR	65,347	0.45	0.78	0
MA307066	OR	65,347	0.45	0.52	0
MA311579A	OR	65,347	0.62	0.75	0
MA623833763	OR	65,347	0.52	0.63	0
MA704650142	OR	65,347	0.56	0.55	0
MA704652242	OR	65,347	0.48	0.33	0
MA714230904	OR	65,347	0.28	0.47	0
MA800607912	OR	65,347	0.66	0.62	1
MA800633803	OR	65,347	0.57	0.54	0
MA800767155	OR	65,347	0.58	0.62	0
MA803738583	OR	65,347	0.29	0.67	0
MA900740880	OR	65,347	0.47	0.59	0
MA900749728	OR	65,347	0.25	0.40	1
MA900750814	OR	65,347	0.68	0.75	0
MA900751271	OR	65,347	0.65	0.47	0
MA900755205	OR	65,347	0.40	0.61	0
MA900775955	OR	65,347	0.59	0.55	0
MA900842465	OR	65,347	0.47	0.64	0
MA903053494	OR	65,347	0.57	0.67	0
MA903134963	OR	65,347	0.54	0.63	0
MA903537924	OR	65,347	0.64	0.57	0
MA903574399	OR	65,347	0.44	0.81	0

continued

Item Number	Item Type	N	Difficulty	Discrimination	Percent Omitted (%)
MA903673001	OR	65,347	0.40	0.63	0
MA903757124	OR	65,347	0.30	0.52	1
MA903869200	OR	65,347	0.42	0.52	0
MA907358909	OR	65,347	0.30	0.60	0

Table I-10. Item-Level Classical Test Theory Statistics—Mathematics Grade 5

Item Number	Item Type	N	Difficulty	Discrimination	Percent Omitted (%)
MA272788	MC	66,623	0.81	0.39	0
MA280507	MC	66,623	0.37	0.33	0
MA282154	MC	66,623	0.57	0.64	0
MA301145	MC	66,623	0.66	0.60	0
MA301593	MC	66,623	0.60	0.48	0
MA301831	MC	66,623	0.31	0.43	0
MA303749	MC	66,623	0.39	0.47	0
MA311287	MC	66,623	0.67	0.52	0
MA311301	MC	66,623	0.31	0.26	0
MA311307	MC	66,623	0.65	0.53	0
MA801650702	MC	66,623	0.57	0.58	0
MA801654509	MC	66,623	0.50	0.54	0
MA801668672	MC	66,623	0.76	0.51	0
MA900664816	MC	66,623	0.69	0.52	0
MA900941108	MC	66,623	0.51	0.38	0
MA901081374	MC	66,623	0.14	0.30	0
MA904134029	MC	66,623	0.52	0.44	0
MA207523	OR	66,623	0.50	0.63	0
MA287421	OR	66,623	0.74	0.54	0
MA298005	OR	66,623	0.52	0.71	1
MA301608	OR	66,623	0.38	0.67	1
MA303755	OR	66,623	0.44	0.50	0
MA310322	OR	66,623	0.66	0.53	0
MA624345222	OR	66,623	0.40	0.59	0
MA715102107	OR	66,623	0.88	0.31	0
MA715102342	OR	66,623	0.47	0.68	0
MA801176573	OR	66,623	0.51	0.60	1
MA802310847	OR	66,623	0.58	0.74	0
MA804575779	OR	66,623	0.53	0.59	0
MA804577344	OR	66,623	0.55	0.59	0
MA804577928	OR	66,623	0.45	0.50	0
MA804580860	OR	66,623	0.33	0.60	0
MA804583343	OR	66,623	0.47	0.56	1
MA900983475	OR	66,623	0.42	0.71	0
MA901073764	OR	66,623	0.40	0.79	1
MA903581246	OR	66,623	0.34	0.47	0
MA903733887	OR	66,623	0.53	0.63	0
MA904333760	OR	66,623	0.27	0.59	0
MA904338797	OR	66,623	0.57	0.63	0
MA908431377	OR	66,623	0.60	0.37	0

Table I-11. Item-Level Classical Test Theory Statistics—Mathematics Grade 6

Item Number	Item Type	N	Difficulty	Discrimination	Percent Omitted (%)
MA264407	MC	66,600	0.49	0.52	0
MA272299	MC	66,600	0.73	0.50	0
MA272301	MC	66,600	0.39	0.39	0
MA293850	MC	66,600	0.58	0.50	0
MA298153	MC	66,600	0.67	0.52	0
MA298171	MC	66,600	0.57	0.51	0
MA301497	MC	66,600	0.59	0.42	0
MA311654	MC	66,600	0.61	0.41	0
MA736452061	MC	66,600	0.31	0.49	0
MA805276878	MC	66,600	0.45	0.25	0
MA900281418	MC	66,600	0.63	0.52	0
MA900470149	MC	66,600	0.74	0.39	0
MA900540139	MC	66,600	0.30	0.47	0
MA900541677	MC	66,600	0.28	0.41	0
MA908142878	MC	66,600	0.39	0.32	0
MA301231	OR	66,600	0.44	0.60	0
MA303713	OR	66,600	0.73	0.53	0
MA307234	OR	66,600	0.52	0.78	1
MA311664	OR	66,600	0.28	0.63	1
MA703149118	OR	66,600	0.43	0.65	0
MA703177677	OR	66,600	0.68	0.55	1
MA703178216	OR	66,600	0.36	0.41	1
MA703178717	OR	66,600	0.41	0.54	0
MA703181586	OR	66,600	0.39	0.61	0
MA703253363	OR	66,600	0.30	0.77	1
MA713648266	OR	66,600	0.28	0.56	0
MA714280042	OR	66,600	0.24	0.39	0
MA736363428	OR	66,600	0.64	0.52	1
MA736365457	OR	66,600	0.72	0.41	0
MA736481231	OR	66,600	0.48	0.65	1
MA736510525	OR	66,600	0.33	0.59	1
MA805104699	OR	66,600	0.26	0.62	0
MA805166085	OR	66,600	0.23	0.26	1
MA900283851	OR	66,600	0.59	0.70	1
MA900337563	OR	66,600	0.36	0.78	1
MA900437517	OR	66,600	0.35	0.47	0
MA900454764	OR	66,600	0.66	0.59	1
MA900462230	OR	66,600	0.62	0.60	0
MA900763184	OR	66,600	0.59	0.60	0
MA902139605	OR	66,600	0.50	0.79	1

Table I-12. Item-Level Classical Test Theory Statistics—Mathematics Grade 7

Item Number	Item Type	N	Difficulty	Discrimination	Percent Omitted (%)
MA208377	MC	68,114	0.84	0.43	0
MA219513	MC	68,114	0.77	0.48	0
MA250531	MC	68,114	0.49	0.44	0
MA259184	MC	68,114	0.79	0.48	0
MA282220	MC	68,114	0.60	0.41	0
MA298183	MC	68,114	0.50	0.34	0
MA298208	MC	68,114	0.42	0.49	0
MA303697	MC	68,114	0.34	0.43	0
MA306487	MC	68,114	0.47	0.40	0
MA306632	MC	68,114	0.38	0.40	0
MA311107	MC	68,114	0.43	0.30	0
MA801363142	MC	68,114	0.37	0.39	0
MA801653090	MC	68,114	0.53	0.37	0
MA804677297	MC	68,114	0.21	0.30	0
MA900554929	MC	68,114	0.49	0.56	0
MA900556478	MC	68,114	0.35	0.46	0
MA900559852	MC	68,114	0.44	0.39	0
MA903153837	MC	68,114	0.37	0.35	0
MA904158907	MC	68,114	0.57	0.40	0
MA306506	OR	68,114	0.19	0.42	0
MA306559	OR	68,114	0.15	0.58	1
MA306566	OR	68,114	0.28	0.82	4
MA306625	OR	68,114	0.13	0.54	0
MA314790	OR	68,114	0.18	0.59	1
MA624047703	OR	68,114	0.40	0.56	0
MA703857670	OR	68,114	0.78	0.50	0
MA703872935	OR	68,114	0.58	0.55	0
MA713848070	OR	68,114	0.31	0.61	0
MA713849179	OR	68,114	0.30	0.64	0
MA717236235	OR	68,114	0.39	0.82	1
MA802914027	OR	68,114	0.43	0.80	3
MA804458974	OR	68,114	0.34	0.56	1
MA900553374	OR	68,114	0.23	0.63	2
MA900740124	OR	68,114	0.30	0.62	0
MA900741988	OR	68,114	0.26	0.60	1
MA900745156	OR	68,114	0.32	0.73	1
MA900831542	OR	68,114	0.57	0.54	0
MA900936469	OR	68,114	0.39	0.85	1
MA903155316	OR	68,114	0.58	0.59	0
MA904222253	OR	68,114	0.43	0.57	0

Table I-13. Item-Level Classical Test Theory Statistics—Mathematics Grade 8

Item Number	Item Type	N	Difficulty	Discrimination	Percent Omitted (%)
MA259251	MC	70,453	0.47	0.47	0
MA264730	MC	70,453	0.63	0.52	0
MA275045	MC	70,453	0.68	0.54	0
MA301683	MC	70,453	0.53	0.36	0
MA301689	MC	70,453	0.40	0.43	0
MA307538	MC	70,453	0.51	0.43	0
MA311392	MC	70,453	0.41	0.37	0
MA311428	MC	70,453	0.49	0.55	0
MA800475574	MC	70,453	0.71	0.42	0
MA804466151	MC	70,453	0.72	0.35	0
MA901135378	MC	70,453	0.71	0.56	0
MA901135957	MC	70,453	0.40	0.44	0
MA901137084	MC	70,453	0.49	0.43	0
MA901137701	MC	70,453	0.71	0.40	0
MA901139314	MC	70,453	0.56	0.56	0
MA901142533	MC	70,453	0.52	0.44	0
MA901143832	MC	70,453	0.65	0.60	0
MA902262781	MC	70,453	0.39	0.43	0
MA902284919	MC	70,453	0.56	0.59	0
MA905271170	MC	70,453	0.61	0.47	0
MA908451759	MC	70,453	0.54	0.31	0
MA307515	OR	70,453	0.32	0.82	2
MA311386	OR	70,453	0.47	0.57	0
MA311459	OR	70,453	0.30	0.80	3
MA704833889	OR	70,453	0.44	0.57	1
MA715919547	OR	70,453	0.37	0.58	0
MA715920050	OR	70,446	0.60	0.75	1
MA800475031	OR	70,453	0.66	0.50	0
MA800562180	OR	70,453	0.57	0.57	0
MA803864446	OR	70,453	0.70	0.48	0
MA901143488	OR	70,453	0.43	0.56	0
MA901248805	OR	70,453	0.68	0.63	0
MA901252301	OR	70,453	0.51	0.67	1
MA902268353	OR	70,453	0.30	0.58	0
MA902281251	OR	70,453	0.58	0.67	0
MA902283272	OR	70,453	0.68	0.56	0
MA902305954	OR	70,453	0.43	0.54	0
MA902359126	OR	70,453	0.47	0.66	0
MA902400539	OR	70,453	0.30	0.79	2
MA905906652	OR	70,453	0.48	0.51	0

Table I-14. Item-Level Classical Test Theory Statistics—Mathematics Grade 10

Item Number	Item Type	N	Difficulty	Discrimination	Percent Omitted (%)
MA250982	MC	65,629	0.55	0.43	0
MA281578	MC	65,629	0.46	0.51	0
MA281661	MC	65,629	0.48	0.39	0
MA287432	MC	65,629	0.76	0.57	0
MA287734	MC	65,629	0.45	0.57	0
MA294292	MC	65,629	0.60	0.60	0
MA308751	MC	65,629	0.61	0.37	0
MA311209	MC	65,629	0.41	0.59	0
MA311237	MC	65,629	0.76	0.45	0
MA311240	MC	65,629	0.51	0.36	0
MA314948	MC	65,629	0.66	0.47	0
MA315404	MC	65,629	0.72	0.53	0
MA315444	MC	65,629	0.64	0.53	0
MA315448	MC	65,629	0.78	0.49	0
MA315696	MC	65,629	0.77	0.42	0
MA900784138	MC	65,629	0.68	0.37	0
MA901373728	MC	65,629	0.60	0.36	0
MA903566809	MC	65,629	0.82	0.51	0
MA903579407	MC	65,629	0.72	0.49	0
MA903681943	MC	65,629	0.45	0.36	0
MA274106	OR	65,629	0.46	0.56	0
MA302066	OR	65,629	0.41	0.81	4
MA307124	OR	65,629	0.31	0.55	1
MA311223	OR	65,629	0.61	0.81	3
MA713335046	OR	65,629	0.70	0.60	0
MA713346383	OR	65,629	0.27	0.72	2
MA713808299	OR	65,629	0.53	0.78	1
MA713829689	OR	65,629	0.48	0.64	0
MA717348780	OR	65,629	0.39	0.50	0
MA805405196	OR	65,629	0.49	0.40	0
MA900779724	OR	65,629	0.41	0.72	1
MA901364620	OR	65,629	0.60	0.74	1
MA901372985	OR	65,629	0.49	0.35	0
MA901375276	OR	65,629	0.19	0.55	0
MA901378123	OR	65,629	0.41	0.75	0
MA901700241	OR	65,629	0.60	0.47	0
MA901762643	OR	65,629	0.40	0.57	0
MA901767462	OR	65,629	0.34	0.58	1
MA903452431	OR	65,629	0.33	0.57	0
MA903457147	OR	65,629	0.34	0.69	0
MA903470727	OR	65,629	0.53	0.65	0
MA903658309	OR	65,629	0.55	0.67	0

Table I-15. Item-Level Classical Test Theory Statistics—STE Grade 5

Item Number	Item Type	N	Difficulty	Discrimination	Percent Omitted (%)
SC294474	MC	67,315	0.63	0.40	1
SC299518	MC	67,315	0.60	0.43	1
SC304477	MC	61,002	0.59	0.39	1
SC304593	MC	61,002	0.69	0.50	1
SC304689	MC	67,315	0.77	0.58	1
SC313116	MC	67,315	0.48	0.39	1
SC315783	MC	67,315	0.62	0.46	1
SC315960	MC	67,315	0.66	0.50	1
SC315963	MC	67,315	0.68	0.49	1
SC629544010	MC	67,315	0.42	0.43	1
SC630232218	MC	67,315	0.70	0.53	1
SC632355523	MC	67,315	0.56	0.51	1
SC736168952	MC	67,315	0.66	0.53	1
SC804073428	MC	61,002	0.81	0.47	1
SC804249221	MC	67,315	0.46	0.40	1
SC814661140	MC	67,315	0.83	0.50	1
SC903846864	MC	67,315	0.65	0.50	1
SC903852865	MC	67,315	0.65	0.46	1
SC904133849	MC	67,315	0.75	0.33	1
SC910555750	MC	67,315	0.86	0.50	1
SC911434880	MC	67,315	0.36	0.40	1
SC911554259	MC	67,315	0.49	0.52	1
SC313154	OR	60,995	0.35	0.62	2
SC625636354	OR	67,315	0.45	0.29	1
SC625638794	OR	61,002	0.58	0.51	2
SC626958463	OR	61,002	0.59	0.61	2
SC629273289	OR	67,315	0.28	0.51	2
SC630161361	OR	67,315	0.50	0.44	1
SC630756792	OR	61,002	0.40	0.65	2
SC710851159	OR	61,002	0.56	0.56	1
SC718080983	OR	67,315	0.56	0.42	1
SC718140870	OR	67,315	0.64	0.54	2
SC803880630	OR	67,315	0.60	0.56	1
SC804250232	OR	67,315	0.58	0.62	1
SC903843564	OR	67,315	0.45	0.46	1
SC903853405	OR	67,315	0.31	0.65	2
SC904142336	OR	67,315	0.85	0.29	1
SC910545826	OR	67,315	0.79	0.44	1
SC911947283	OR	67,315	0.55	0.41	1
SC911952526	OR	67,315	0.70	0.58	2
SC911956141	OR	67,315	0.42	0.68	2

Table I-16. Item-Level Classical Test Theory Statistics—STE Grade 8

Item Number	Item Type	N	Difficulty	Discrimination	Percent Omitted (%)
SC265230	MC	63,674	0.33	0.15	0
SC291845	MC	69,981	0.28	0.34	0
SC294244	MC	69,981	0.31	0.27	0
SC304491	MC	69,981	0.45	0.39	0
SC310231	MC	69,981	0.60	0.39	0
SC313185	MC	69,981	0.70	0.57	0
SC313192	MC	69,981	0.35	0.29	0
SC631649634	MC	69,981	0.38	0.40	0
SC632265448	MC	69,981	0.66	0.44	0
SC632267387	MC	69,981	0.35	0.13	0
SC632268044	MC	69,981	0.55	0.43	0
SC633058958	MC	69,981	0.64	0.41	0
SC735475827	MC	69,981	0.41	0.32	0
SC803873079	MC	69,981	0.28	0.28	0
SC814037351	MC	69,981	0.41	0.48	0
SC903843363	MC	69,981	0.75	0.54	0
SC903846698	MC	69,981	0.72	0.57	0
SC903847508	MC	69,981	0.48	0.44	0
SC910947265	MC	69,981	0.44	0.52	0
SC910959157	MC	69,981	0.74	0.47	0
SC630748134	OR	69,981	0.49	0.53	0
SC631744146	OR	63,667	0.39	0.70	1
SC632267532	OR	69,981	0.43	0.61	0
SC632843069	OR	69,981	0.53	0.52	0
SC633724344	OR	63,674	0.53	0.51	0
SC718682565	OR	63,674	0.66	0.35	1
SC718684123	OR	63,674	0.58	0.44	1
SC735551980	OR	69,981	0.61	0.49	0
SC803361743	OR	69,981	0.58	0.27	1
SC804379456	OR	69,981	0.64	0.56	0
SC807303457	OR	63,674	0.57	0.38	1
SC807345964	OR	63,674	0.47	0.67	1
SC810865313	OR	63,674	0.39	0.60	2
SC815762323	OR	69,981	0.71	0.56	0
SC816553266	OR	69,981	0.39	0.55	2
SC903849539	OR	69,981	0.39	0.53	1
SC903853728	OR	69,981	0.49	0.75	2
SC905147343	OR	69,981	0.71	0.48	0
SC905636245	OR	69,981	0.58	0.60	1
SC910949833	OR	69,981	0.64	0.33	0
SC911252123	OR	69,981	0.51	0.66	1

Table I-17. Item-Level Classical Test Theory Statistics—HS Biology (Next-Generation)

Item Number	Item Type	N	Difficulty	Discrimination	Percent Omitted (%)
SC290963	MC	56,008	0.62	0.48	0
SC290995	MC	56,008	0.67	0.49	0
SC295301	MC	56,008	0.74	0.56	0
SC305782	MC	56,008	0.55	0.47	0
SC310067	MC	56,008	0.55	0.40	0
SC310116	MC	56,008	0.41	0.51	0
SC310169	MC	56,008	0.38	0.33	0
SC310170	MC	56,008	0.56	0.46	0
SC312640	MC	56,008	0.63	0.54	0
SC313336	MC	56,008	0.77	0.46	0
SC316130	MC	56,008	0.55	0.49	0
SC626969020	MC	56,008	0.71	0.51	0
SC628779508	MC	56,008	0.23	0.53	0
SC630004484	MC	56,008	0.53	0.44	0
SC632411482	MC	56,008	0.44	0.57	0
SC705540607	MC	56,008	0.46	0.39	0
SC802252224	MC	56,008	0.46	0.37	0
SC802464161	MC	56,008	0.73	0.42	0
SC808656513	MC	56,008	0.46	0.49	0
SC809547981	MC	56,008	0.73	0.55	0
SC816240449	MC	56,008	0.63	0.47	0
SC289153	OR	56,008	0.42	0.67	2
SC299815	OR	56,008	0.73	0.50	0
SC310118	OR	56,008	0.39	0.55	0
SC312659	OR	56,008	0.48	0.79	1
SC316264	OR	56,008	0.52	0.80	3
SC721652006	OR	56,008	0.70	0.56	1
SC723341794	OR	56,008	0.51	0.54	0
SC735277981	OR	56,008	0.56	0.55	0
SC735278731	OR	56,008	0.37	0.36	0
SC735565579	OR	56,008	0.69	0.40	0
SC800133220	OR	56,008	0.38	0.53	0
SC800159954	OR	56,008	0.36	0.13	0
SC800237153	OR	56,008	0.52	0.53	0
SC800265247	OR	56,008	0.80	0.43	0
SC801968916	OR	56,008	0.38	0.43	0
SC802140462	OR	56,008	0.65	0.57	0
SC802366273	OR	56,008	0.79	0.53	0
SC809565082	OR	56,008	0.58	0.56	0
SC810644809	OR	56,008	0.73	0.55	0
SC810679235	OR	56,008	0.46	0.73	1
SC816235890	OR	56,008	0.29	0.74	0

Table I-18. Item-Level Classical Test Theory Statistics—HS Introductory Physics (Next-Generation)

Item Number	Item Type	N	Difficulty	Discrimination	Percent Omitted (%)
SC295853	MC	14,002	0.72	0.51	0
SC295930	MC	14,002	0.61	0.59	0
SC299327	MC	14,002	0.56	0.33	0
SC305502	MC	14,002	0.56	0.60	0
SC310444	MC	14,002	0.46	0.55	0
SC310503	MC	14,002	0.66	0.57	0
SC313700	MC	14,002	0.65	0.58	0
SC316336	MC	14,002	0.83	0.41	0
SC316360	MC	14,002	0.61	0.28	0
SC316412	MC	14,002	0.47	0.40	0
SC628500455	MC	14,002	0.47	0.30	0
SC628806324	MC	14,002	0.70	0.42	0
SC630646904	MC	14,002	0.66	0.34	0
SC630647903	MC	14,002	0.60	0.53	0
SC630758569	MC	14,002	0.60	0.56	0
SC704634184	MC	14,002	0.74	0.46	0
SC801055214	MC	14,002	0.78	0.45	0
SC802855383	MC	14,002	0.70	0.59	0
SC804654929	MC	14,002	0.61	0.65	0
SC805444653	MC	14,002	0.60	0.47	0
SC805445772	MC	14,002	0.35	0.37	0
SC811061342	MC	14,002	0.86	0.41	0
SC812978638	MC	14,002	0.67	0.52	0
SC814083596	MC	14,002	0.41	0.39	0
SC814178657	MC	14,002	0.52	0.51	0
SC814182548	MC	14,002	0.74	0.32	0
SC814934778	MC	14,002	0.63	0.44	0
SC815481175	MC	14,002	0.32	0.40	0
SC280834	OR	14,002	0.53	0.80	2
SC302741	OR	14,002	0.34	0.77	2
SC313765	OR	14,002	0.41	0.78	2
SC717248397	OR	14,002	0.46	0.42	0
SC736560727	OR	14,002	0.80	0.49	0
SC804439301	OR	14,002	0.57	0.47	0
SC804657396	OR	14,002	0.70	0.53	0
SC805182225	OR	14,002	0.46	0.74	2
SC805336879	OR	14,002	0.63	0.49	1
SC805444497	OR	14,002	0.49	0.59	0
SC805445031	OR	14,002	0.87	0.38	1
SC805553291	OR	14,002	0.40	0.54	0
SC805975282	OR	14,002	0.52	0.77	0
SC812979643	OR	14,002	0.80	0.31	0

Table I-19. Item-Level Classical Test Theory Statistics—Alt/ELA

Grade	Item Number	Item Type	N	Difficulty	Discrimination
3	comp1	OR	866	0.59	0.30
	comp2	OR	866	0.59	0.28
	comp3	OR	866	0.58	0.36
	ind1	OR	833	0.93	0.50
	ind2	OR	787	0.92	0.49
	ind3	OR	821	0.84	0.44
	sk1	OR	833	0.97	0.35
	sk2	OR	787	0.96	0.32
	sk3	OR	821	0.47	0.47
4	comp1	OR	832	0.59	0.30
	comp2	OR	832	0.59	0.32
	comp3	OR	832	0.58	0.35
	ind1	OR	802	0.95	0.38
	ind2	OR	748	0.94	0.51
	ind3	OR	794	0.87	0.38
	sk1	OR	802	0.97	0.36
	sk2	OR	748	0.96	0.36
	sk3	OR	794	0.49	0.47
5	comp1	OR	756	0.59	0.31
	comp2	OR	756	0.59	0.33
	comp3	OR	756	0.58	0.40
	ind1	OR	727	0.95	0.38
	ind2	OR	692	0.94	0.43
	ind3	OR	705	0.87	0.42
	sk1	OR	727	0.97	0.35
	sk2	OR	692	0.96	0.42
	sk3	OR	705	0.52	0.53
6	comp1	OR	740	0.59	0.34
	comp2	OR	740	0.59	0.38
	comp3	OR	740	0.58	0.39
	ind1	OR	710	0.95	0.45
	ind2	OR	680	0.94	0.49
	ind3	OR	707	0.85	0.44
	sk1	OR	710	0.96	0.29
	sk2	OR	680	0.96	0.39
	sk3	OR	707	0.50	0.48
7	comp1	OR	730	0.59	0.28
	comp2	OR	730	0.59	0.32
	comp3	OR	730	0.58	0.34
	ind1	OR	704	0.95	0.40
	ind2	OR	648	0.94	0.47
	ind3	OR	690	0.86	0.40
	sk1	OR	704	0.97	0.36
	sk2	OR	648	0.96	0.40
	sk3	OR	690	0.52	0.51

continued

Grade	Item Number	Item Type	N	Difficulty	Discrimination
8	comp1	OR	754	0.59	0.38
	comp2	OR	754	0.59	0.41
	comp3	OR	754	0.58	0.44
	ind1	OR	734	0.95	0.45
	ind2	OR	705	0.93	0.48
	ind3	OR	704	0.85	0.50
	sk1	OR	734	0.96	0.34
	sk2	OR	705	0.96	0.35
	sk3	OR	704	0.51	0.52
HS	comp1	OR	729	0.59	0.32
	comp2	OR	729	0.59	0.33
	comp3	OR	729	0.58	0.36
	ind1	OR	703	0.94	0.37
	ind2	OR	650	0.93	0.42
	ind3	OR	687	0.86	0.43
	sk1	OR	703	0.97	0.30
	sk2	OR	650	0.97	0.31
	sk3	OR	687	0.55	0.53

Table I-20. Item-Level Classical Test Theory Statistics—Alt/Mathematics

Grade	Item Number	Item Type	N	Difficulty	Discrimination
3	comp1	OR	774	0.59	0.42
	comp5	OR	774	0.59	0.42
	ind1	OR	774	0.93	0.76
	ind5	OR	774	0.93	0.72
	sk1	OR	774	0.97	0.51
	sk5	OR	774	0.97	0.54
4	comp1	OR	738	0.59	0.46
	comp3	OR	738	0.59	0.48
	ind1	OR	738	0.93	0.72
	ind3	OR	738	0.94	0.74
	sk1	OR	738	0.97	0.52
	sk3	OR	738	0.97	0.53
5	comp2	OR	665	0.58	0.58
	comp3	OR	665	0.59	0.59
	ind2	OR	665	0.94	0.71
	ind3	OR	665	0.94	0.69
	sk2	OR	665	0.96	0.56
	sk3	OR	665	0.97	0.58
6	comp2	OR	688	0.59	0.52
	comp5	OR	688	0.58	0.53
	ind2	OR	688	0.93	0.75
	ind5	OR	688	0.93	0.78
	sk2	OR	688	0.97	0.45
	sk5	OR	688	0.97	0.46
7	comp1	OR	660	0.59	0.47
	comp4	OR	660	0.59	0.38
	ind1	OR	660	0.93	0.75
	ind4	OR	660	0.94	0.72
	sk1	OR	660	0.97	0.46
	sk4	OR	660	0.97	0.47

continued

Grade	Item Number	Item Type	N	Difficulty	Discrimination
8	comp2	OR	683	0.58	0.51
	comp4	OR	683	0.59	0.43
	ind2	OR	683	0.92	0.70
	ind4	OR	683	0.94	0.67
	sk2	OR	683	0.96	0.59
	sk4	OR	683	0.96	0.64
HS	comp1	OR	194	0.59	0.16
	comp2	OR	589	0.59	0.23
	comp3	OR	440	0.59	0.23
	comp4	OR	588	0.58	0.30
	comp5	OR	407	0.58	0.21
	ind1	OR	181	0.92	0.49
	ind2	OR	555	0.94	0.38
	ind3	OR	422	0.94	0.43
	ind4	OR	552	0.92	0.51
	ind5	OR	379	0.92	0.45
	sk1	OR	181	0.98	0.30
	sk2	OR	555	0.97	0.34
	sk3	OR	422	0.96	0.30
	sk4	OR	552	0.96	0.33
	sk5	OR	379	0.97	0.38

Table I-21. Item-Level Classical Test Theory Statistics—Alt/STE

Grade	Item Number	Item Type	N	Difficulty	Discrimination
5	comp1	OR	678	0.58	0.38
	comp2	OR	683	0.58	0.42
	comp3	OR	674	0.58	0.38
	comp4	OR	54	0.55	0.53
	ind1	OR	654	0.87	0.57
	ind2	OR	654	0.86	0.60
	ind3	OR	649	0.86	0.58
	ind4	OR	52	0.86	0.70
	sk1	OR	654	0.97	0.28
	sk2	OR	654	0.97	0.33
	sk3	OR	649	0.97	0.31
	sk4	OR	52	0.96	0.15
8	comp1	OR	676	0.58	0.41
	comp2	OR	692	0.58	0.38
	comp3	OR	648	0.58	0.40
	comp4	OR	102	0.57	0.40
	ind1	OR	660	0.85	0.63
	ind2	OR	667	0.87	0.63
	ind3	OR	631	0.86	0.64
	ind4	OR	96	0.87	0.40
	sk1	OR	660	0.97	0.39
	sk2	OR	667	0.97	0.38
	sk3	OR	631	0.97	0.36
	sk4	OR	96	0.97	0.19

Table I-22. Item-Level Classical Test Theory Statistics—Alt/Biology

Grade	Item Number	Item Type	N	Difficulty	Discrimination
HS	comp1	OR	428	0.58	0.42
	comp2	OR	428	0.58	0.39
	comp3	OR	428	0.58	0.39
	ind1	OR	420	0.85	0.66
	ind2	OR	418	0.84	0.67
	ind3	OR	412	0.85	0.65
	sk1	OR	420	0.96	0.34
	sk2	OR	418	0.96	0.21
	sk3	OR	412	0.96	0.29

Table I-23. Item-Level Classical Test Theory Statistics—Alt/Chemistry

Grade	Item Number	Item Type	N	Difficulty	Discrimination
HS	comp1	OR	122	0.60	0.31
	comp2	OR	122	0.60	0.31
	comp3	OR	122	0.60	0.31
	ind1	OR	119	0.98	0.29
	ind2	OR	119	0.97	0.28
	ind3	OR	118	0.97	0.23
	sk1	OR	119	0.98	0.21
	sk2	OR	119	0.98	0.29
	sk3	OR	118	0.97	0.41

Discrimination statistics cannot be reported for some Alt/Chemistry items because the sample size of students was too small in 2021.

Table I-24. Item-Level Classical Test Theory Statistics—Alt/Introductory Physics

Grade	Item Number	Item Type	N	Difficulty	Discrimination
HS	comp1	OR	67	0.57	0.48
	comp2	OR	67	0.58	0.36
	comp3	OR	67	0.57	0.46
	ind1	OR	66	0.81	0.66
	ind2	OR	62	0.83	0.59
	ind3	OR	62	0.79	0.74
	sk1	OR	66	0.92	0.27
	sk2	OR	62	0.92	0.20
	sk3	OR	62	0.94	0.17

Difficulty and discrimination statistics cannot be reported for Alt/Introductory Physics because the sample size of students was too small in 2021.

Table I-25. Item-Level Classical Test Theory Statistics—Alt/TEC

Grade	Item Number	Item Type	N	Difficulty	Discrimination
HS	comp1	OR	119	0.59	0.32
	comp2	OR	119	0.60	0.27
	comp3	OR	119	0.59	0.26
	ind1	OR	115	0.96	0.52
	ind2	OR	116	0.96	0.52
	ind3	OR	117	0.95	0.46
	sk1	OR	115	0.97	0.48
	sk2	OR	116	0.96	0.42
	sk3	OR	117	0.94	0.50

APPENDIX J
ITEM-LEVEL SCORE DISTRIBUTIONS

Table J-1. Item-Level Score Distributions for SR, CR, and ES Items—ELA

Grade	Item Number	N	Total Possible Points	Percent of Students at Score Point					
				0	1	2	3	4	5
3	EL006751660	12,192	2	38	46	14	--	--	--
	EL009614485	12,379	2	41	48	11	--	--	--
	EL015502194	12,452	2	31	40	29	--	--	--
	EL019650296	12,359	2	7	28	62	--	--	--
	EL292656	63,945	2	17	10	72	--	--	--
	EL835251909	63,945	3	19	59	18	3	--	--
	EL835276438	63,945	2	27	63	8	--	--	--
	EL912362165#SCORE_TRAIT_Conv	63,945	3	23	57	13	6	--	--
	EL912362165#SCORE_TRAIT_Ideadev	63,945	4	57	21	13	4	2	--
	EL912365258	63,945	2	23	21	55	--	--	--
	EL912440150	63,945	2	24	18	58	--	--	--
	EL916535595	63,945	2	10	59	30	--	--	--
4	EL006974765	12,559	2	69	21	10	--	--	--
	EL007146589	12,350	2	49	32	19	--	--	--
	EL007247569	12,153	2	30	48	21	--	--	--
	EL010675360	12,321	2	41	34	25	--	--	--
	EL800853520	64,472	2	19	16	65	--	--	--
	EL800937262	64,472	2	7	52	41	--	--	--
	EL800957624	64,472	3	23	41	27	8	--	--
	EL909132428#SCORE_TRAIT_Conv	64,472	3	23	42	22	12	--	--
	EL909132428#SCORE_TRAIT_Ideadev	64,472	4	37	26	23	12	2	--
	EL909153399	64,472	2	34	19	47	--	--	--
	EL913040076	64,472	2	20	38	41	--	--	--
	EL913342853	64,472	2	22	50	25	--	--	--
5	EL014938540	12,748	2	17	38	45	--	--	--
	EL014982130	12,773	2	26	11	63	--	--	--
	EL033646585	12,720	2	15	30	55	--	--	--
	EL033803027	12,691	2	37	38	25	--	--	--
	EL806706594	65,715	2	20	10	70	--	--	--
	EL806746086#SCORE_TRAIT_Conv	65,715	3	19	50	23	7	--	--
	EL806746086#SCORE_TRAIT_Ideadev	65,715	4	24	46	23	6	0	--
	EL806756112	65,715	2	25	47	27	--	--	--
	EL834856783#SCORE_TRAIT_Conv	65,715	3	23	45	16	14	--	--
	EL834856783#SCORE_TRAIT_Ideadev	65,715	4	58	9	16	13	3	--
	EL834950831	65,715	2	7	27	66	--	--	--
	EL834952362	65,715	2	32	27	41	--	--	--
	EL912584876	65,715	2	26	8	65	--	--	--
6	EL006740824	12,938	2	49	20	31	--	--	--
	EL007043764	12,708	2	38	5	57	--	--	--
	EL013938374	12,678	2	39	35	26	--	--	--
	EL014764160	12,796	2	45	12	43	--	--	--
	EL835401351	65,876	2	14	36	49	--	--	--
	EL835420875	65,876	2	25	36	39	--	--	--
	EL911525969#SCORE_TRAIT_Conv	65,876	3	22	35	28	14	--	--
	EL911525969#SCORE_TRAIT_Ideadev	65,876	5	12	38	30	14	4	1

continued

Grade	Item Number	N	Total Possible Points	Percent of Students at Score Point					
				0	1	2	3	4	5
6	EL913132900#SCORE_TRAIT_Conv	65,876	3	19	35	31	14	--	--
	EL913132900#SCORE_TRAIT_Ideadev	65,876	5	15	39	31	11	3	1
	EL913133585	65,876	2	37	22	42	--	--	--
	EL913135249	65,876	2	26	11	63	--	--	--
	EL916444331	65,876	2	23	47	29	--	--	--
7	EL006978834	16,374	2	37	16	48	--	--	--
	EL020249887	16,405	2	26	42	31	--	--	--
	EL811660409	67,583	2	33	14	52	--	--	--
	EL811735935	67,583	2	15	58	26	--	--	--
	EL811753816#SCORE_TRAIT_Conv	67,583	3	18	32	33	17	--	--
	EL811753816#SCORE_TRAIT_Ideadev	67,583	5	14	35	32	12	4	1
	EL909749262	67,583	2	32	5	63	--	--	--
	EL909750218#SCORE_TRAIT_Conv	67,583	3	13	31	32	23	--	--
	EL909750218#SCORE_TRAIT_Ideadev	67,583	5	9	32	30	20	7	1
	EL912364723	67,583	2	31	37	32	--	--	--
8	EL007070531	13,587	2	57	4	39	--	--	--
	EL007158893	13,606	2	27	5	69	--	--	--
	EL007954597	13,456	2	32	28	40	--	--	--
	EL015758631	13,604	2	31	43	26	--	--	--
	EL836248600#SCORE_TRAIT_Conv	69,884	3	15	20	33	31	--	--
	EL836248600#SCORE_TRAIT_Ideadev	69,884	5	13	23	31	22	9	1
	EL836448634	69,884	2	21	28	51	--	--	--
	EL836455548	69,884	2	17	39	44	--	--	--
	EL911659849	69,884	2	10	5	85	--	--	--
	EL911774388#SCORE_TRAIT_Conv	69,884	3	15	26	29	30	--	--
	EL911774388#SCORE_TRAIT_Ideadev	69,884	5	13	26	29	21	7	2
	EL913448483	69,884	2	20	45	35	--	--	--
	EL913761016	69,884	2	11	39	50	--	--	--
10	EL012160579	66,706	2	20	38	42	--	--	--
	EL013138637#SCORE_TRAIT_Conv	66,706	3	6	14	25	53	--	--
	EL013138637#SCORE_TRAIT_Ideadev	66,706	5	8	13	24	27	25	1
	EL014953733	66,706	2	10	48	43	--	--	--
	EL019560241	66,706	2	28	29	44	--	--	--
	EL909560185	66,706	2	4	16	80	--	--	--
	EL909731553	66,706	2	25	16	58	--	--	--
	EL910467723#SCORE_TRAIT_Conv	66,706	3	4	11	23	60	--	--
	EL910467723#SCORE_TRAIT_Ideadev	66,706	5	4	11	23	30	27	3
	EL910860957	66,706	2	24	4	71	--	--	--
	EL910938823	66,706	2	3	25	71	--	--	--

Table J-2. Item-Level Score Distributions for SR, SA, and CR Items—Mathematics

Grade	Item Number	N	Total Possible Points	Percent of Students at Score Point					
				0	1	2	3	4	5
3	MA286752A	64,882	3	45	27	21	6	--	--
	MA297478A	64,882	3	13	17	18	51	--	--
	MA300753A	64,882	3	25	21	20	34	--	--
	MA735951978	64,882	3	31	30	23	16	--	--
4	MA302496A	65,347	4	16	29	22	22	10	--
	MA311579A	65,347	4	14	16	13	21	36	--
	MA803738583	65,347	2	51	39	10	--	--	--
	MA900750814	65,347	4	10	9	16	30	35	--
	MA903053494	65,347	2	17	52	31	--	--	--
	MA903574399	65,347	4	27	18	23	17	15	--
5	MA298005	66,623	4	15	8	43	15	17	--
	MA301608	66,623	4	18	40	21	11	9	--
	MA802310847	66,623	4	16	16	16	24	27	--
	MA804575779	66,623	2	26	43	32	--	--	--
	MA804580860	66,623	2	45	44	11	--	--	--
	MA901073764	66,623	4	30	19	24	11	15	--
6	MA307234	66,600	4	14	26	21	11	27	--
	MA703181586	66,600	2	39	44	17	--	--	--
	MA703181586P	66,600	2	39	44	17	--	--	--
	MA703253363	66,600	4	46	20	10	11	12	--
	MA900283851	66,600	2	17	47	36	--	--	--
	MA900337563	66,600	4	27	33	14	16	8	--
	MA902139605	66,600	4	7	24	37	21	10	--
7	MA306566	68,114	4	47	15	15	13	7	--
	MA713849179	68,114	2	53	35	13	--	--	--
	MA717236235	68,114	4	31	20	18	17	12	--
	MA802914027	68,114	4	26	14	33	7	18	--
	MA900745156	68,114	2	52	30	17	--	--	--
	MA900936469	68,114	4	32	22	15	14	16	--
8	MA307515	70,453	4	49	13	10	12	15	--
	MA311459	70,453	4	37	29	13	10	9	--
	MA715920050	70,446	4	13	12	18	29	26	--
	MA902268353	70,453	2	52	35	13	--	--	--
	MA902281251	70,453	2	29	27	44	--	--	--
	MA902400539	70,453	4	43	23	10	11	11	--
10	MA302066	65,629	4	33	11	16	25	12	--
	MA311223	65,629	4	14	17	10	14	41	--
	MA713346383	65,629	2	66	11	21	--	--	--
	MA713808299	65,629	4	15	24	17	19	24	--
	MA901364620	65,629	4	9	14	24	29	23	--
	MA901375276	65,629	2	70	21	9	--	--	--
	MA901378123	65,629	2	50	18	31	--	--	--
	MA903452431	65,629	2	52	30	18	--	--	--
	MA903457147	65,629	2	52	29	19	--	--	--
	MA903658309	65,629	2	28	34	38	--	--	--

Table J-3. Item-Level Score Distributions for SR and CR Items—STE

Grade	Item Number	N	Total Possible Points	Percent of Students at Score Point 0	1	2	3	4	5
5	HI031932817	67,315	3	26	28	33	11	--	--
	SC313154	60,995	3	28	44	20	6	--	--
	SC626958463	61,002	2	12	53	33	--	--	--
	SC629273289	67,315	2	45	50	3	--	--	--
	SC630161361	67,315	2	24	49	26	--	--	--
	SC630756792	61,002	3	30	28	27	12	--	--
	SC803880630	67,315	2	19	38	41	--	--	--
	SC804250232	67,315	2	21	39	39	--	--	--
	SC903853405	67,315	3	36	34	25	3	--	--
	SC911956141	67,315	3	26	28	33	11	--	--
8	HI030309126	69,981	3	16	25	46	12	--	--
	SC631744146	63,667	3	28	34	27	9	--	--
	SC632843069	69,981	2	26	41	32	--	--	--
	SC804379456	69,981	2	16	39	45	--	--	--
	SC807345964	63,674	3	17	36	35	11	--	--
	SC810865313	63,674	2	45	29	24	--	--	--
	SC816553266	69,981	2	38	43	17	--	--	--
	SC903853728	69,981	3	26	19	32	21	--	--
	SC905636245	69,981	2	20	43	36	--	--	--
	SC911252123	69,981	3	16	25	46	12	--	--

Table J-4. Item-Level Score Distributions for SR and CR Items—Biology (Next-Generation)

Grade	Item Number	N	Total Possible Points	Percent of Students at Score Point 0	1	2	3	4	5
HS	SC289153	56,008	4	18	22	32	21	5	--
	SC310118	56,008	2	40	40	20	--	--	--
	SC312659	56,008	4	16	18	31	23	11	--
	SC316264	56,008	4	15	24	12	25	21	--
	SC735278731	56,008	2	40	45	15	--	--	--
	SC800133220	56,008	2	41	42	17	--	--	--
	SC800237153	56,008	2	24	49	27	--	--	--
	SC810644809	56,008	2	10	34	56	--	--	--
	SC810679235	56,008	3	26	27	25	20	--	--
	SC816235890	56,008	3	48	26	16	9	--	--

Table J-5. Item-Level Score Distributions for SR and CR Items—Introductory Physics (Next-Generation)

Grade	Item Number	N	Total Possible Points	Percent of Students at Score Point					
				0	1	2	3	4	5
HS	SC280834	14,002	4	12	23	20	24	18	--
	SC302741	14,002	4	27	36	16	12	8	--
	SC313765	14,002	4	17	29	30	13	9	--
	SC804439301	14,002	2	20	46	34	--	--	--
	SC804657396	14,002	2	14	32	55	--	--	--
	SC805182225	14,002	3	20	28	40	10	--	--
	SC805336879	14,002	2	14	44	41	--	--	--
	SC805444497	14,002	2	27	47	25	--	--	--
	SC805553291	14,002	2	36	48	17	--	--	--
	SC805975282	14,002	3	19	29	29	23	--	--

Table J-6. Item-Level Score Distributions—Alt/ELA

Grade	Item Number	N	Total Possible Points	Percent of Students at Score Point					
				0	1	2	3	4	5
3	comp1	866	5	0.00	0.00	4.27	95.73	0.00	0.00
	comp2	866	5	0.00	0.00	4.73	95.27	0.00	0.00
	comp3	866	5	0.00	0.00	9.82	90.18	0.00	0.00
	gp1	866	2	0.00	26.21	73.79	--	--	--
	gp2	866	2	0.00	45.15	54.85	--	--	--
	gp3	866	2	0.00	0.12	99.88	--	--	--
	ind1	866	4	3.81	1.15	5.08	14.90	75.06	--
	ind2	866	4	9.12	1.39	3.58	16.28	69.63	--
	ind3	866	4	5.20	3.70	11.66	24.60	54.85	--
	se1	866	2	0.58	0.35	99.08	--	--	--
	se2	866	2	0.46	0.81	98.73	--	--	--
	se3	866	2	0.92	0.23	98.85	--	--	--
	sk1	866	4	3.81	0.00	1.85	9.47	84.87	--
	sk2	866	4	9.12	0.12	1.27	11.78	77.71	--
	sk3	866	4	5.20	38.45	31.52	22.98	1.85	--
4	comp1	832	5	0.00	0.00	3.97	96.03	0.00	0.00
	comp2	832	5	0.00	0.00	4.33	95.67	0.00	0.00
	comp3	832	5	0.00	0.00	8.41	91.59	0.00	0.00
	gp1	832	2	0.00	26.44	73.56	--	--	--
	gp2	832	2	0.00	43.75	56.25	--	--	--
	gp3	832	2	0.00	0.12	99.88	--	--	--
	ind1	832	4	3.61	0.48	2.64	11.90	81.37	--
	ind2	832	4	10.10	0.96	3.61	13.22	72.12	--
	ind3	832	4	4.57	2.76	8.29	24.88	59.50	--
	se1	832	2	0.60	0.36	99.04	--	--	--
	se2	832	2	0.48	0.12	99.40	--	--	--
	se3	832	2	1.20	0.72	98.08	--	--	--
	sk1	832	4	3.61	0.00	0.96	9.98	85.46	--
	sk2	832	4	10.10	0.12	1.08	10.58	78.13	--
	sk3	832	4	4.57	34.74	30.89	28.25	1.56	--
5	comp1	756	5	0.00	0.00	5.03	94.97	0.00	0.00
	comp2	756	5	0.00	0.00	5.29	94.71	0.00	0.00
	comp3	756	5	0.00	0.00	10.05	89.95	0.00	0.00
	gp1	756	2	0.00	26.98	73.02	--	--	--
	gp2	756	2	0.00	48.02	51.98	--	--	--

continued

Grade	Item Number	N	Total Possible Points	Percent of Students at Score Point					
				0	1	2	3	4	5
5	gp3	756	2	0.00	0.00	100.00	--	--	--
	ind1	756	4	3.84	0.26	2.65	11.38	81.88	--
	ind2	756	4	8.47	0.66	3.17	14.95	72.75	--
	ind3	756	4	6.75	1.59	9.39	25.79	56.48	--
	se1	756	2	1.46	1.32	97.22	--	--	--
	se2	756	2	1.19	1.06	97.75	--	--	--
	se3	756	2	1.59	0.93	97.49	--	--	--
	sk1	756	4	3.84	0.40	1.59	8.99	85.19	--
	sk2	756	4	8.47	0.00	1.46	11.24	78.84	--
	sk3	756	4	6.75	30.16	29.37	30.56	3.17	--
6	comp1	740	5	0.00	0.00	4.86	95.14	0.00	0.00
	comp2	740	5	0.00	0.00	5.95	94.05	0.00	0.00
	comp3	740	5	0.00	0.00	8.24	91.76	0.00	0.00
	gp1	740	2	0.00	31.76	68.24	--	--	--
	gp2	740	2	0.00	47.57	52.43	--	--	--
	gp3	740	2	0.00	0.14	99.86	--	--	--
	ind1	740	4	4.05	0.54	3.38	12.43	79.59	--
	ind2	740	4	8.11	0.68	2.57	14.86	73.78	--
	ind3	740	4	4.46	2.57	11.76	26.62	54.59	--
	se1	740	2	2.43	0.95	96.62	--	--	--
	se2	740	2	2.70	0.41	96.89	--	--	--
	se3	740	2	2.57	0.81	96.62	--	--	--
	sk1	740	4	4.05	0.00	1.89	11.08	82.97	--
	sk2	740	4	8.11	0.14	1.62	10.54	79.59	--
	sk3	740	4	4.46	33.11	32.70	27.16	2.57	--
7	comp1	730	5	0.00	0.00	3.29	96.71	0.00	0.00
	comp2	730	5	0.00	0.00	3.97	96.03	0.00	0.00
	comp3	730	5	0.00	0.00	7.53	92.47	0.00	0.00
	gp1	730	2	0.00	26.99	73.01	--	--	--
	gp2	730	2	0.00	47.12	52.88	--	--	--
	gp3	730	2	0.00	0.00	100.00	--	--	--
	ind1	730	4	3.56	0.96	2.74	11.92	80.82	--
	ind2	730	4	11.23	1.10	1.92	14.38	71.37	--
	ind3	730	4	5.48	2.33	9.86	24.93	57.40	--
	se1	730	2	1.64	0.41	97.95	--	--	--
	se2	730	2	0.55	0.55	98.90	--	--	--
	se3	730	2	1.64	0.68	97.67	--	--	--
	sk1	730	4	3.56	0.00	1.92	9.45	85.07	--
	sk2	730	4	11.23	0.27	2.05	10.41	76.03	--
	sk3	730	4	5.48	28.36	33.29	30.00	2.88	--
8	comp1	754	5	0.00	0.00	5.04	94.96	0.00	0.00
	comp2	754	5	0.00	0.00	5.44	94.56	0.00	0.00
	comp3	754	5	0.00	0.00	8.62	91.38	0.00	0.00
	gp1	754	2	0.00	29.71	70.29	--	--	--
	gp2	754	2	0.00	53.05	46.95	--	--	--
	gp3	754	2	0.00	0.00	100.00	--	--	--
	ind1	754	4	2.65	0.80	2.65	12.47	81.43	--
	ind2	754	4	6.50	1.06	3.05	15.12	74.27	--
	ind3	754	4	6.63	2.79	10.61	24.67	55.31	--
	se1	754	2	1.19	0.40	98.41	--	--	--
	se2	754	2	0.80	0.27	98.94	--	--	--
	se3	754	2	1.46	0.13	98.41	--	--	--
	sk1	754	4	2.65	0.27	1.06	12.73	83.29	--
	sk2	754	4	6.50	0.40	2.12	10.74	80.24	--
	sk3	754	4	6.63	31.96	28.25	29.58	3.58	--
HS	comp1	729	5	0.00	0.00	3.70	96.30	0.00	0.00
	comp2	729	5	0.00	0.00	4.25	95.75	0.00	0.00

continued

Grade	Item Number	N	Total Possible Points	Percent of Students at Score Point 0	1	2	3	4	5
HS	comp3	729	5	0.00	0.00	7.54	92.46	0.00	0.00
	gp1	729	2	0.00	30.59	69.41	--	--	--
	gp2	729	2	0.00	48.70	51.30	--	--	--
	gp3	729	2	0.00	0.00	100.00	--	--	--
	ind1	729	4	3.57	0.55	2.33	15.64	77.91	--
	ind2	729	4	10.84	0.82	2.61	15.64	70.10	--
	ind3	729	4	5.76	2.61	9.33	27.02	55.28	--
	se1	729	2	1.51	0.41	98.08	--	--	--
	se2	729	2	1.51	0.69	97.81	--	--	--
	se3	729	2	2.06	1.51	96.43	--	--	--
	sk1	729	4	3.57	0.14	1.10	10.43	84.77	--
	sk2	729	4	10.84	0.55	0.82	9.19	78.60	--
	sk3	729	4	5.76	24.97	29.08	34.98	5.21	--

Table J-7. Item-Level Score Distributions—Alt/Mathematics

Grade	Item Number	N	Total Possible Points	Percent of Students at Score Point 0	1	2	3	4	5
3	comp1	774	5	0.00	0.00	5.56	94.44	0.00	0.00
	comp5	774	5	0.00	0.00	4.65	95.35	0.00	0.00
	gp1	774	2	0.00	29.84	70.16	--	--	--
	gp5	774	2	0.00	29.84	70.16	--	--	--
	ind1	774	4	0.00	1.81	4.26	15.76	78.17	--
	ind5	774	4	0.00	1.55	5.04	14.99	78.42	--
	se1	774	2	0.13	0.26	99.61	--	--	--
	se5	774	2	0.26	0.00	99.74	--	--	--
	sk1	774	4	0.00	0.00	2.07	8.53	89.41	--
	sk5	774	4	0.00	0.00	2.07	9.04	88.89	--
4	comp1	738	5	0.00	0.00	5.01	94.99	0.00	0.00
	comp3	738	5	0.00	0.00	5.83	94.17	0.00	0.00
	gp1	738	2	0.00	29.67	70.33	--	--	--
	gp3	738	2	0.00	25.88	74.12	--	--	--
	ind1	738	4	0.00	0.41	5.15	16.12	78.32	--
	ind3	738	4	0.00	1.08	2.98	15.18	80.76	--
	se1	738	2	0.27	0.14	99.59	--	--	--
	se3	738	2	0.27	0.14	99.59	--	--	--
	sk1	738	4	0.00	0.00	0.95	9.49	89.57	--
	sk3	738	4	0.00	0.00	1.08	10.03	88.89	--
5	comp2	665	5	0.00	0.00	8.12	91.88	0.00	0.00
	comp3	665	5	0.00	0.00	6.77	93.23	0.00	0.00
	gp2	665	2	0.00	32.18	67.82	--	--	--
	gp3	665	2	0.00	31.73	68.27	--	--	--
	ind2	665	4	0.00	0.75	3.31	16.54	79.40	--
	ind3	665	4	0.00	0.45	2.86	16.39	80.30	--
	se2	665	2	0.90	1.05	98.05	--	--	--
	se3	665	2	0.75	1.05	98.20	--	--	--
	sk2	665	4	0.00	0.15	1.50	11.13	87.22	--
	sk3	665	4	0.00	0.00	1.95	10.08	87.97	--
6	comp2	688	5	0.00	0.00	6.98	93.02	0.00	0.00
	comp5	688	5	0.00	0.00	7.56	92.44	0.00	0.00
	gp2	688	2	0.00	32.41	67.59	--	--	--

continued

Grade	Item Number	N	Total Possible Points	Percent of Students at Score Point					
				0	1	2	3	4	5
6	gp5	688	2	0.00	42.73	57.27	--	--	--
	ind2	688	4	0.00	1.02	4.94	13.23	80.81	--
	ind5	688	4	0.00	1.45	3.92	16.86	77.76	--
	se2	688	2	1.74	0.58	97.67	--	--	--
	se5	688	2	1.60	0.87	97.53	--	--	--
	sk2	688	4	0.00	0.29	1.60	8.72	89.39	--
	sk5	688	4	0.00	0.29	1.31	9.30	89.10	--
7	comp1	660	5	0.00	0.00	6.82	93.18	0.00	0.00
	comp4	660	5	0.00	0.00	3.18	96.82	0.00	0.00
	gp1	660	2	0.00	35.15	64.85	--	--	--
	gp4	660	2	0.00	28.48	71.52	--	--	--
	ind1	660	4	0.00	1.67	3.64	15.45	79.24	--
	ind4	660	4	0.00	1.67	3.33	12.58	82.42	--
	se1	660	2	0.15	0.61	99.24	--	--	--
	se4	660	2	0.61	0.61	98.79	--	--	--
	sk1	660	4	0.00	0.00	1.36	9.55	89.09	--
	sk4	660	4	0.00	0.00	1.36	9.70	88.94	--
8	comp2	683	5	0.00	0.00	11.27	88.73	0.00	0.00
	comp4	683	5	0.00	0.00	4.39	95.61	0.00	0.00
	gp2	683	2	0.00	39.39	60.61	--	--	--
	gp4	683	2	0.00	34.41	65.59	--	--	--
	ind2	683	4	0.00	1.02	5.71	15.96	77.31	--
	ind4	683	4	0.00	0.88	3.37	13.18	82.58	--
	se2	683	2	0.59	0.15	99.27	--	--	--
	se4	683	2	1.02	0.73	98.24	--	--	--
	sk2	683	4	0.00	0.44	2.20	11.57	85.80	--
	sk4	683	4	0.00	0.59	2.78	10.10	86.53	--
HS	comp1	194	5	0.00	0.00	4.12	95.88	0.00	0.00
	comp2	589	5	0.00	0.00	4.24	95.76	0.00	0.00
	comp3	440	5	0.00	0.00	4.77	95.23	0.00	0.00
	comp4	588	5	0.00	0.00	8.67	91.33	0.00	0.00
	comp5	407	5	0.00	0.00	7.86	92.14	0.00	0.00
	gp1	194	2	0.00	36.08	63.92	--	--	--
	gp2	589	2	0.00	26.83	73.17	--	--	--
	gp3	440	2	0.00	30.45	69.55	--	--	--
	gp4	588	2	0.00	30.27	69.73	--	--	--
	gp5	407	2	0.00	37.84	62.16	--	--	--
	ind1	194	4	6.70	0.52	4.12	19.07	69.59	--
	ind2	589	4	5.77	1.36	4.58	10.70	77.59	--
	ind3	440	4	4.09	0.91	3.18	15.45	76.36	--
	ind4	588	4	6.12	1.87	3.40	16.16	72.45	--
	ind5	407	4	6.88	2.21	3.69	14.50	72.73	--
	se1	194	2	0.00	0.00	100.00	--	--	--
	se2	589	2	1.70	0.85	97.45	--	--	--
	se3	440	2	1.59	1.14	97.27	--	--	--
	se4	588	2	1.36	1.36	97.28	--	--	--
	se5	407	2	1.23	0.98	97.79	--	--	--
	sk1	194	4	6.70	0.00	1.03	7.22	85.05	--
	sk2	589	4	5.77	0.17	0.85	9.68	83.53	--
	sk3	440	4	4.09	0.23	1.14	12.73	81.82	--
	sk4	588	4	6.12	0.17	1.70	9.52	82.48	--
	sk5	407	4	6.88	0.00	0.74	10.32	82.06	--

Table J-8. Item-Level Score Distributions—Alt/STE

Grade	Item Number	N	Total Possible Points	Percent of Students at Score Point 0	1	2	3	4	5
5	comp1	678	5	0.00	0.00	10.03	89.97	0.00	0.00
	comp2	683	5	0.00	0.00	8.49	91.51	0.00	0.00
	comp3	674	5	0.00	0.00	9.35	90.65	0.00	0.00
	comp4	54	5	0.00	0.00	25.93	74.07	0.00	0.00
	gp1	678	2	0.00	0.00	100.00	--	--	--
	gp2	683	2	0.00	0.00	100.00	--	--	--
	gp3	674	2	0.00	0.00	100.00	--	--	--
	gp4	54	2	0.00	0.00	100.00	--	--	--
	ind1	678	4	3.54	3.54	9.14	22.42	61.36	--
	ind2	683	4	4.25	3.95	10.54	22.55	58.71	--
	ind3	674	4	3.71	3.41	9.79	25.96	57.12	--
	ind4	54	4	3.70	3.70	9.26	25.93	57.41	--
	se1	678	2	1.62	0.88	97.49	--	--	--
	se2	683	2	0.73	0.59	98.68	--	--	--
	se3	674	2	1.34	1.04	97.63	--	--	--
	se4	54	2	11.11	1.85	87.04	--	--	--
	sk1	678	4	3.54	0.29	1.62	8.85	85.69	--
	sk2	683	4	4.25	0.15	1.61	8.05	85.94	--
	sk3	674	4	3.71	0.00	1.63	8.61	86.05	--
	sk4	54	4	3.70	0.00	0.00	14.81	81.48	--
8	comp1	676	5	0.00	0.00	8.88	91.12	0.00	0.00
	comp2	692	5	0.00	0.00	8.09	91.91	0.00	0.00
	comp3	648	5	0.00	0.00	9.26	90.74	0.00	0.00
	comp4	102	5	0.00	0.00	16.67	83.33	0.00	0.00
	gp1	676	2	0.00	0.00	100.00	--	--	--
	gp2	692	2	0.00	0.00	100.00	--	--	--
	gp3	648	2	0.00	0.00	100.00	--	--	--
	gp4	102	2	0.00	0.00	100.00	--	--	--
	ind1	676	4	2.37	4.59	8.43	27.37	57.25	--
	ind2	692	4	3.61	2.60	8.38	25.29	60.12	--
	ind3	648	4	2.62	4.32	9.72	22.99	60.34	--
	ind4	102	4	5.88	3.92	9.80	18.63	61.76	--
	se1	676	2	1.63	0.59	97.78	--	--	--
	se2	692	2	1.30	0.29	98.41	--	--	--
	se3	648	2	2.01	0.93	97.07	--	--	--
	se4	102	2	0.98	0.00	99.02	--	--	--
	sk1	676	4	2.37	0.44	2.37	7.25	87.57	--
	sk2	692	4	3.61	0.14	1.59	7.95	86.71	--
	sk3	648	4	2.62	0.15	2.01	8.64	86.57	--
	sk4	102	4	5.88	0.00	1.96	5.88	86.27	--

Table J-9. Item-Level Score Distributions—Alt/Biology

Grade	Item Number	N	Total Possible Points	Percent of Students at Score Point					
				0	1	2	3	4	5
HS	comp1	428	5	0.00	0.00	8.41	91.59	0.00	0.00
	comp2	428	5	0.00	0.00	8.41	91.59	0.00	0.00
	comp3	428	5	0.00	0.00	7.94	92.06	0.00	0.00
	gp1	428	2	0.00	0.00	100.00	--	--	--
	gp2	428	2	0.00	0.00	100.00	--	--	--
	gp3	428	2	0.00	0.00	100.00	--	--	--
	ind1	428	4	1.87	4.44	10.28	23.13	60.28	--
	ind2	428	4	2.34	4.21	12.15	24.30	57.01	--
	ind3	428	4	3.74	3.97	10.51	23.13	58.64	--
	se1	428	2	2.80	1.40	95.79	--	--	--
	se2	428	2	3.50	0.93	95.56	--	--	--
	se3	428	2	3.74	1.17	95.09	--	--	--
	sk1	428	4	1.87	0.00	1.40	13.55	83.18	--
	sk2	428	4	2.34	0.47	1.64	9.11	86.45	--
	sk3	428	4	3.74	0.00	1.17	11.45	83.64	--

Table J-10. Item-Level Score Distributions—Alt/Chemistry

Grade	Item Number	N	Total Possible Points	Percent of Students at Score Point					
				0	1	2	3	4	5
HS	comp1	122	5	0.00	0.00	1.64	98.36	0.00	0.00
	comp2	122	5	0.00	0.00	1.64	98.36	0.00	0.00
	comp3	122	5	0.00	0.00	1.64	98.36	0.00	0.00
	gp1	122	2	0.00	10.66	89.34	--	--	--
	gp2	122	2	0.00	13.93	86.07	--	--	--
	gp3	122	2	0.00	13.93	86.07	--	--	--
	ind1	122	4	2.46	0.00	0.00	7.38	90.16	--
	ind2	122	4	2.46	0.00	0.00	11.48	86.07	--
	ind3	122	4	3.28	0.00	0.82	9.02	86.89	--
	se1	122	2	0.00	0.00	100.00	--	--	--
	se2	122	2	0.00	0.00	100.00	--	--	--
	se3	122	2	0.00	0.00	100.00	--	--	--
	sk1	122	4	2.46	0.00	0.82	4.92	91.80	--
	sk2	122	4	2.46	0.00	0.00	8.20	89.34	--
	sk3	122	4	3.28	0.00	0.00	10.66	86.07	--

Table J-11. Item-Level Score Distributions—Alt/Introductory Physics

Grade	Item Number	N	Total Possible Points	Percent of Students at Score Point 0	1	2	3	4	5
HS	comp1	67	5	0.00	0.00	14.93	85.07	0.00	0.00
	comp2	67	5	0.00	0.00	10.45	89.55	0.00	0.00
	comp3	67	5	0.00	0.00	13.43	86.57	0.00	0.00
	gp1	67	2	0.00	0.00	100.00	--	--	--
	gp2	67	2	0.00	0.00	100.00	--	--	--
	gp3	67	2	0.00	0.00	100.00	--	--	--
	ind1	67	4	1.49	8.96	13.43	19.40	56.72	--
	ind2	67	4	7.46	5.97	11.94	20.90	53.73	--
	ind3	67	4	7.46	10.45	11.94	20.90	49.25	--
	se1	67	2	8.96	0.00	91.04	--	--	--
	se2	67	2	7.46	1.49	91.04	--	--	--
	se3	67	2	7.46	4.48	88.06	--	--	--
	sk1	67	4	1.49	0.00	2.99	26.87	68.66	--
	sk2	67	4	7.46	0.00	4.48	20.90	67.16	--
	sk3	67	4	7.46	0.00	5.97	8.96	77.61	--

Table J-12. Item-Level Score Distributions—Alt/ Technology/Engineering

Grade	Item Number	N	Total Possible Points	Percent of Students at Score Point 0	1	2	3	4	5
HS	comp1	119	5	0.00	0.00	3.36	96.64	0.00	0.00
	comp2	119	5	0.00	0.00	1.68	98.32	0.00	0.00
	comp3	119	5	0.00	0.00	2.52	97.48	0.00	0.00
	gp1	119	2	0.00	28.57	71.43	--	--	--
	gp2	119	2	0.00	25.21	74.79	--	--	--
	gp3	119	2	0.00	30.25	69.75	--	--	--
	ind1	119	4	3.36	0.84	0.00	11.76	84.03	--
	ind2	119	4	2.52	0.84	2.52	8.40	85.71	--
	ind3	119	4	1.68	0.84	3.36	10.92	83.19	--
	se1	119	2	0.00	0.84	99.16	--	--	--
	se2	119	2	0.00	0.84	99.16	--	--	--
	se3	119	2	0.00	0.00	100.00	--	--	--
	sk1	119	4	3.36	0.00	0.84	11.76	84.03	--
	sk2	119	4	2.52	0.00	2.52	9.24	85.71	--
	sk3	119	4	1.68	0.00	5.04	14.29	78.99	--

APPENDIX K
DIFFERENTIAL ITEM FUNCTIONING RESULTS

Table K-1. Number of Items Classified as "Low" or "High" DIF, Overall and by Group Favored—ELA

Grade	Group		Item Type	Number of Items	Number "Low"			Number "High"		
	Reference	Focal			Total	Favoring		Total	Favoring	
						Reference	Focal		Reference	Focal
3	Male	Female	MC	24	1	1	0	0	0	0
			OR	6	1	0	1	0	0	0
			WP	1	0	0	0	0	0	0
	Not EL/FEL	EL/FEL	MC	24	0	0	0	0	0	0
			OR	6	0	0	0	0	0	0
			WP	1	0	0	0	0	0	0
	Not Low Income	Low Income	MC	24	0	0	0	0	0	0
			OR	6	0	0	0	0	0	0
			WP	1	0	0	0	0	0	0
	White	African American/Black	MC	24	0	0	0	0	0	0
			OR	6	0	0	0	0	0	0
			WP	1	0	0	0	0	0	0
		Hispanic/Latino	MC	24	0	0	0	0	0	0
			OR	6	0	0	0	0	0	0
			WP	1	0	0	0	0	0	0
	Students without Disabilities	Students with Disabilities	MC	24	0	0	0	0	0	0
			OR	6	0	0	0	0	0	0
			WP	1	0	0	0	0	0	0
4	Male	Female	MC	24	1	1	0	0	0	0
			OR	6	1	1	0	0	0	0
			WP	1	1	0	1	0	0	0
	Not EL/FEL	EL/FEL	MC	24	2	2	0	0	0	0
			OR	6	0	0	0	0	0	0
			WP	1	0	0	0	0	0	0
	Not Low Income	Low Income	MC	24	0	0	0	0	0	0
			OR	6	0	0	0	0	0	0
			WP	1	0	0	0	0	0	0
	White	African American/Black	MC	24	1	1	0	0	0	0
			OR	6	0	0	0	0	0	0
			WP	1	0	0	0	0	0	0
		Hispanic/Latino	MC	24	1	1	0	0	0	0
			OR	6	0	0	0	0	0	0
			WP	1	0	0	0	0	0	0
	Students without Disabilities	Students with Disabilities	MC	24	0	0	0	0	0	0
			OR	6	0	0	0	0	0	0
			WP	1	0	0	0	0	0	0

continued

Grade	Group Reference	Group Focal	Item Type	Number of Items	Number "Low" Total	Number "Low" Favoring Reference	Number "Low" Favoring Focal	Number "High" Total	Number "High" Favoring Reference	Number "High" Favoring Focal
5	Male	Female	MC	24	3	2	1	1	1	0
			OR	5	0	0	0	0	0	0
			WP	2	0	0	0	0	0	0
	Not EL/FEL	EL/FEL	MC	24	1	1	0	0	0	0
			OR	5	0	0	0	0	0	0
			WP	2	0	0	0	0	0	0
	Not Low Income	Low Income	MC	24	0	0	0	0	0	0
			OR	5	0	0	0	0	0	0
			WP	2	0	0	0	0	0	0
	White	African American/Black	MC	24	1	1	0	0	0	0
			OR	5	0	0	0	0	0	0
			WP	2	0	0	0	0	0	0
		Hispanic/Latino	MC	24	1	1	0	0	0	0
			OR	5	0	0	0	0	0	0
			WP	2	0	0	0	0	0	0
	Students without Disabilities	Students with Disabilities	MC	24	0	0	0	0	0	0
			OR	5	0	0	0	0	0	0
			WP	2	0	0	0	0	0	0
6	Male	Female	MC	24	3	3	0	0	0	0
			OR	5	0	0	0	0	0	0
			WP	2	0	0	0	0	0	0
	Not EL/FEL	EL/FEL	MC	24	3	3	0	0	0	0
			OR	5	0	0	0	0	0	0
			WP	2	0	0	0	0	0	0
	Not Low Income	Low Income	MC	24	1	1	0	0	0	0
			OR	5	0	0	0	0	0	0
			WP	2	0	0	0	0	0	0
	White	African American/Black	MC	24	2	2	0	0	0	0
			OR	5	0	0	0	0	0	0
			WP	2	0	0	0	0	0	0
		Hispanic/Latino	MC	24	2	2	0	0	0	0
			OR	5	0	0	0	0	0	0
			WP	2	0	0	0	0	0	0
	Students without Disabilities	Students with Disabilities	MC	24	0	0	0	0	0	0
			OR	5	0	0	0	0	0	0
			WP	2	0	0	0	0	0	0

continued

Grade	Group: Reference	Group: Focal	Item Type	Number of Items	Number "Low": Total	Number "Low": Favoring Reference	Number "Low": Favoring Focal	Number "High": Total	Number "High": Favoring Reference	Number "High": Favoring Focal
7	Male	Female	MC	26	4	3	1	0	0	0
			OR	4	0	0	0	0	0	0
			WP	2	0	0	0	0	0	0
	Not EL/FEL	EL/FEL	MC	26	2	2	0	0	0	0
			OR	4	0	0	0	0	0	0
			WP	2	0	0	0	0	0	0
	Not Low Income	Low Income	MC	26	0	0	0	0	0	0
			OR	4	0	0	0	0	0	0
			WP	2	0	0	0	0	0	0
	White	African American/Black	MC	26	1	1	0	0	0	0
			OR	4	0	0	0	0	0	0
			WP	2	0	0	0	0	0	0
		Hispanic/Latino	MC	26	1	1	0	0	0	0
			OR	4	0	0	0	0	0	0
			WP	2	0	0	0	0	0	0
	Students without Disabilities	Students with Disabilities	MC	26	0	0	0	0	0	0
			OR	4	0	0	0	0	0	0
			WP	2	0	0	0	0	0	0
8	Male	Female	MC	24	2	2	0	0	0	0
			OR	5	1	1	0	0	0	0
			WP	2	0	0	0	0	0	0
	Not EL/FEL	EL/FEL	MC	24	3	3	0	0	0	0
			OR	5	0	0	0	0	0	0
			WP	2	0	0	0	0	0	0
	Not Low Income	Low Income	MC	24	0	0	0	0	0	0
			OR	5	0	0	0	0	0	0
			WP	2	0	0	0	0	0	0
	White	African American/Black	MC	24	1	1	0	0	0	0
			OR	5	0	0	0	0	0	0
			WP	2	0	0	0	0	0	0
		Hispanic/Latino	MC	24	1	1	0	0	0	0
			OR	5	0	0	0	0	0	0

continued

Grade	Group		Item Type	Number of Items	Number "Low"			Number "High"		
						Favoring			Favoring	
	Reference	Focal			Total	Reference	Focal	Total	Reference	Focal
8	White	Hispanic/Latino	WP	2	0	0	0	0	0	0
	Students without Disabilities	Students with Disabilities	MC	24	0	0	0	0	0	0
			OR	5	0	0	0	0	0	0
			WP	2	0	0	0	0	0	0
10	Male	Female	MC	21	1	1	0	0	0	0
			OR	7	0	0	0	0	0	0
			WP	2	0	0	0	0	0	0
	Not EL/FEL	EL/FEL	MC	21	3	2	1	0	0	0
			OR	7	0	0	0	0	0	0
			WP	2	0	0	0	0	0	0
	Not Low Income	Low Income	MC	21	0	0	0	0	0	0
			OR	7	0	0	0	0	0	0
			WP	2	0	0	0	0	0	0
	White	African American/Black	MC	21	1	1	0	0	0	0
			OR	7	0	0	0	0	0	0
			WP	2	0	0	0	0	0	0
		Hispanic/Latino	MC	21	1	0	1	0	0	0
			OR	7	0	0	0	0	0	0
			WP	2	0	0	0	0	0	0
	Students without Disabilities	Students with Disabilities	MC	21	0	0	0	0	0	0
			OR	7	0	0	0	0	0	0
			WP	2	0	0	0	0	0	0

Table K-2. Number of Items Classified as “Low” or “High” DIF, Overall and by Group Favored—Mathematics

Grade	Group Reference	Group Focal	Item Type	Number of Items	Number “Low” Total	Number “Low” Favoring Reference	Number “Low” Favoring Focal	Number “High” Total	Number “High” Favoring Reference	Number “High” Favoring Focal
3	Male	Female	MC	16	2	1	1	1	1	0
			OR	24	4	3	1	0	0	0
	Not EL/FEL	EL/FEL	MC	16	0	0	0	0	0	0
			OR	24	0	0	0	0	0	0
	Not Low Income	Low Income	MC	16	0	0	0	0	0	0
			OR	24	0	0	0	0	0	0
	White	African American/Black	MC	16	1	1	0	0	0	0
			OR	24	3	1	2	0	0	0
		Hispanic/Latino	MC	16	0	0	0	0	0	0
			OR	24	1	1	0	0	0	0
	Students without Disabilities	Students with Disabilities	MC	16	0	0	0	0	0	0
			OR	24	0	0	0	0	0	0
4	Male	Female	MC	11	1	0	1	0	0	0
			OR	29	3	2	1	0	0	0
	Not EL/FEL	EL/FEL	MC	11	0	0	0	0	0	0
			OR	29	0	0	0	0	0	0
	Not Low Income	Low Income	MC	11	0	0	0	0	0	0
			OR	29	0	0	0	0	0	0
	White	African American/Black	MC	11	2	1	1	0	0	0
			OR	29	3	2	1	0	0	0
		Hispanic/Latino	MC	11	1	0	1	0	0	0
			OR	29	0	0	0	0	0	0
	Students without Disabilities	Students with Disabilities	MC	11	0	0	0	0	0	0
			OR	29	1	0	1	0	0	0
5	Male	Female	MC	17	2	1	1	0	0	0
			OR	23	1	1	0	1	1	0
	Not EL/FEL	EL/FEL	MC	17	0	0	0	0	0	0
			OR	23	1	1	0	0	0	0
	Not Low Income	Low Income	MC	17	0	0	0	0	0	0
			OR	23	0	0	0	0	0	0
	White	African American/Black	MC	17	0	0	0	0	0	0
			OR	23	4	4	0	0	0	0
		Hispanic/Latino	MC	17	0	0	0	0	0	0
			OR	23	1	1	0	0	0	0
	Students without Disabilities	Students with Disabilities	MC	17	0	0	0	0	0	0
			OR	23	0	0	0	0	0	0

continued

Grade	Group		Item Type	Number of Items	Number "Low"			Number "High"		
	Reference	Focal			Total	Favoring Reference	Favoring Focal	Total	Favoring Reference	Favoring Focal
6	Male	Female	MC	15	2	2	0	0	0	0
			OR	25	3	2	1	0	0	0
	Not EL/FEL	EL/FEL	MC	15	1	1	0	0	0	0
			OR	25	0	0	0	0	0	0
	Not Low Income	Low Income	MC	15	0	0	0	0	0	0
			OR	25	0	0	0	0	0	0
	White	African American/Black	MC	15	1	0	1	0	0	0
			OR	25	0	0	0	0	0	0
		Hispanic/Latino	MC	15	0	0	0	0	0	0
			OR	25	0	0	0	0	0	0
	Students without Disabilities	Students with Disabilities	MC	15	1	1	0	0	0	0
			OR	25	0	0	0	0	0	0
7	Male	Female	MC	19	5	3	2	0	0	0
			OR	21	1	1	0	0	0	0
	Not EL/FEL	EL/FEL	MC	19	0	0	0	0	0	0
			OR	21	0	0	0	0	0	0
	Not Low Income	Low Income	MC	19	0	0	0	0	0	0
			OR	21	0	0	0	0	0	0
	White	African American/Black	MC	19	1	1	0	0	0	0
			OR	21	0	0	0	0	0	0
		Hispanic/Latino	MC	19	1	1	0	0	0	0
			OR	21	0	0	0	0	0	0
	Students without Disabilities	Students with Disabilities	MC	19	1	1	0	0	0	0
			OR	21	0	0	0	0	0	0
8	Male	Female	MC	21	0	0	0	0	0	0
			OR	19	1	0	1	0	0	0
	Not EL/FEL	EL/FEL	MC	21	0	0	0	0	0	0
			OR	19	0	0	0	0	0	0
	Not Low Income	Low Income	MC	21	0	0	0	0	0	0
			OR	19	0	0	0	0	0	0
	White	African American/Black	MC	21	1	0	1	0	0	0
			OR	19	0	0	0	0	0	0
		Hispanic/Latino	MC	21	0	0	0	0	0	0
			OR	19	0	0	0	0	0	0
	Students without Disabilities	Students with Disabilities	MC	21	0	0	0	0	0	0
			OR	19	0	0	0	0	0	0

continued

Grade	Group: Reference	Group: Focal	Item Type	Number of Items	Number "Low": Total	Number "Low": Favoring Reference	Number "Low": Favoring Focal	Number "High": Total	Number "High": Favoring Reference	Number "High": Favoring Focal
10	Male	Female	MC	20	3	2	1	0	0	0
			OR	22	1	0	1	0	0	0
	Not EL/FEL	EL/FEL	MC	20	1	0	1	0	0	0
			OR	22	1	0	1	0	0	0
	Not Low Income	Low Income	MC	20	0	0	0	0	0	0
			OR	22	0	0	0	0	0	0
	White	African American/Black	MC	20	2	1	1	0	0	0
			OR	22	0	0	0	0	0	0
		Hispanic/Latino	MC	20	0	0	0	0	0	0
			OR	22	0	0	0	0	0	0
	Students without Disabilities	Students with Disabilities	MC	20	0	0	0	0	0	0
			OR	22	0	0	0	0	0	0

Table K-3. Number of Items Classified as "Low" or "High" DIF, Overall and by Group Favored—STE

Grade	Group: Reference	Group: Focal	Item Type	Number of Items	Number "Low": Total	Number "Low": Favoring Reference	Number "Low": Favoring Focal	Number "High": Total	Number "High": Favoring Reference	Number "High": Favoring Focal
5	Male	Female	MC	22	2	1	1	1	1	0
			OR	19	2	1	1	0	0	0
	Not EL/FEL	EL/FEL	MC	22	0	0	0	0	0	0
			OR	19	0	0	0	0	0	0
	Not Low Income	Low Income	MC	22	0	0	0	0	0	0
			OR	19	0	0	0	0	0	0
	White	African American/Black	MC	22	0	0	0	0	0	0
			OR	19	2	2	0	0	0	0
		Hispanic/Latino	MC	22	0	0	0	0	0	0
			OR	19	0	0	0	0	0	0
	Students without Disabilities	Students with Disabilities	MC	22	1	1	0	0	0	0
			OR	19	0	0	0	0	0	0
8	Male	Female	MC	20	3	3	0	0	0	0
			OR	21	5	3	2	0	0	0
	Not EL/FEL	EL/FEL	MC	20	0	0	0	0	0	0
			OR	21	2	2	0	0	0	0
	Not Low Income	Low Income	MC	20	0	0	0	0	0	0
			OR	21	0	0	0	0	0	0
	White	African American/Black	MC	20	1	1	0	0	0	0
			OR	21	1	1	0	0	0	0
		Hispanic/Latino	MC	20	0	0	0	0	0	0
			OR	21	0	0	0	0	0	0
	Students without Disabilities	Students with Disabilities	MC	20	0	0	0	0	0	0
			OR	21	1	0	1	0	0	0

Table K-4. Number of Items Classified as "Low" or "High" DIF, Overall and by Group Favored—Biology

Grade	Group: Reference	Group: Focal	Item Type	Number of Items	Number "Low": Total	Number "Low": Favoring Reference	Number "Low": Favoring Focal	Number "High": Total	Number "High": Favoring Reference	Number "High": Favoring Focal
HS	Male	Female	MC	21	0	0	0	0	0	0
			OR	21	1	1	0	0	0	0
	Not EL/FEL	EL/FEL	MC	21	0	0	0	0	0	0
			OR	21	0	0	0	0	0	0
	Not Low Income	Low Income	MC	21	0	0	0	0	0	0
			OR	21	0	0	0	0	0	0
	White	African American/Black	MC	21	0	0	0	0	0	0
			OR	21	0	0	0	0	0	0
		Hispanic/Latino	MC	21	0	0	0	0	0	0
			OR	21	0	0	0	0	0	0
	Students without Disabilities	Students with Disabilities	MC	21	0	0	0	0	0	0
			OR	21	0	0	0	0	0	0

Table K-5. Number of Items Classified as "Low" or "High" DIF, Overall and by Group Favored—Introductory Physics

Grade	Group: Reference	Group: Focal	Item Type	Number of Items	Number "Low": Total	Number "Low": Favoring Reference	Number "Low": Favoring Focal	Number "High": Total	Number "High": Favoring Reference	Number "High": Favoring Focal
HS	Male	Female	MC	28	5	3	2	0	0	0
			OR	14	1	1	0	0	0	0
	Not EL/FEL	EL/FEL	MC	28	3	1	2	0	0	0
			OR	14	0	0	0	0	0	0
	Not Low Income	Low Income	MC	28	0	0	0	0	0	0
			OR	14	0	0	0	0	0	0
	White	Hispanic/Latino	MC	28	1	0	1	0	0	0
			OR	14	0	0	0	0	0	0
	Students without Disabilities	Students with Disabilities	MC	28	1	1	0	0	0	0
			OR	14	0	0	0	0	0	0

APPENDIX L
2022 MCAS EQUATING REPORT

Massachusetts Comprehensive Assessment System

2022 EQUATING REPORT

2022 Massachusetts Comprehensive Assessment System

Equating Report

The purpose of this document is to summarize the psychometric calibration and equating results obtained from Cognia for Next-Gen MCAS. Presented in this report are various program summary statistics and specific results related to the study.

The results of this report are organized as follows:

1. Aggregate Results
    1. Percentage of Students by Achievement Levels Categories
    2. Raw Scores Associated with Cutpoints
    3. Calibration Report
    4. Equating Item Summary Statistics
2. Grade Subject Results
    1. A/A, B/B, Beta, Delta, Test Characteristic Curve, Test Information Function, and Cumulative Scale Score Distribution Plots
    2. Lookup Tables
    3. Cumulative Scale Score Distribution Tables
    4. Rescore Analysis Results
    5. Tabled Delta Analysis Results
    6. Tabled B/B Analysis Results
    7. Tabled Beta Analysis Results
    8. Final Item Parameters
    9. Decision Accuracy and Consistency (DAC)
    10. Fit Plots of Watchlist Items

The final results of this equating will be included as part of the 2021 - 2022 Next-Gen MCAS Technical Manual. If requested, Cognia will distribute and/or present this report at the next MCAS TAC.

Section 1.1

Percentage of Students by Achievement Levels Categories

Table 1.1.1
Percentage of Students by Achievement Levels Categories
English Language Arts

Grade	Year	Count	NM	PM	ME	EE	ME+EE	Delta	Ave. SS
3	2022	61648	13	41	39	7	46	-6.9	497.1
	2021	50011	8	39	43	10	53	-5.7	500.1
	2019	63602	6	36	48	11	58	5.8	504.8
	2018	43046	6	41	43	10	53	1.0	501.8
	2017	26459	7	41	43	8	52		500.1
4	2022	62100	14	46	36	4	40	-11.2	493.8
	2021	50867	11	38	45	6	51	-2.7	498.9
	2019	65450	7	39	44	10	54	-0.5	502.6
	2018	69078	7	38	44	10	55	3.5	502.2
	2017	63918	8	41	43	8	51		500.1
5	2022	63620	11	47	37	5	42	-7.1	495.6
	2021	51362	10	41	41	8	49	-5.0	497.9
	2019	67933	6	39	47	8	54	-1.5	501.9
	2018	69390	6	38	49	7	56	4.4	502.3
	2017	28547	7	42	46	5	51		499.9
6	2022	63887	20	37	35	8	43	-7.2	494.0
	2021	51319	19	31	37	13	50	-5.7	498.4
	2019	67612	11	33	42	13	56	3.4	502.5
	2018	53988	10	38	42	11	52	-0.7	501.3
	2017	29369	8	39	47	6	53		500.3
7	2022	65584	17	40	37	6	42	-3.2	493.7
	2021	51120	17	37	39	7	46	-4.8	495.6
	2019	67462	11	39	42	9	50	3.6	499.8
	2018	66410	13	40	39	8	47	-6.5	497.4
	2017	30209	8	38	48	6	53		500.2
8	2022	67919	16	40	36	7	43	-0.3	494.8
	2021	50822	15	41	37	7	44	-10.0	496.2
	2019	67350	11	35	42	12	54	1.1	500.6
	2018	69486	13	34	42	10	52	1.1	499.6
	2017	65314	9	40	43	8	51		499.5
10	2022	65193	7	34	51	9	60	-6.4	502.9
	2021	67110	8	26	46	20	66	2.3	508.1
	2019	67067	6	31	50	14	64		507.3

Table 1.1.2
Percentage of Students by Achievement Levels Categories
Mathematics

Grade	Year	Count	NM	PM	ME	EE	ME+EE	Delta	Ave. SS
3	2022	53433	13	39	40	8	48	9.8	497.5
	2021	45242	20	42	32	6	38	-18.0	491.2
	2019	56176	7	37	45	11	56	7.2	503.0
	2018	43501	11	40	40	9	49	-3.2	499.1
	2017	26659	11	37	44	8	52		499.2
4	2022	53577	10	40	43	7	50	10.9	498.8
	2021	45553	17	44	34	4	39	-17.8	491.7
	2019	57629	6	37	47	10	57	7.7	503.0
	2018	69779	11	40	42	7	49	-1.9	498.0
	2017	64473	10	39	44	6	51		498.7
5	2022	55635	10	48	38	5	42	3.1	496.5
	2021	46011	13	47	35	5	39	-15.5	493.5
	2019	60444	5	40	48	6	55	8.0	501.7
	2018	70083	9	45	42	5	47	-2.7	497.7
	2017	29285	8	42	42	8	49		499.4
6	2022	56939	9	43	42	6	48	8.9	498.2
	2021	46699	16	45	34	5	39	-18.9	493.4
	2019	61719	6	37	46	12	58	9.6	504.0
	2018	54582	9	43	42	6	48	-4.2	498.4
	2017	29704	9	39	46	6	52		499.7
7	2022	59311	13	45	34	8	42	2.7	495.5
	2021	46839	13	48	32	7	39	-13.4	494.9
	2019	62495	9	39	41	12	53	5.3	501.0
	2018	66925	12	40	40	8	47	-0.9	497.7
	2017	30144	9	43	40	8	48		498.9
8	2022	62311	12	48	32	8	40	4.4	495.8
	2021	47150	16	48	32	4	36	-15.1	492.0
	2019	62817	8	41	40	11	51	0.4	501.5
	2018	70044	11	39	42	8	51	1.1	498.9
	2017	66077	9	42	40	9	49		500.3
10	2022	61296	7	39	41	12	54	-1.4	503.0
	2021	57770	9	36	43	12	55	-7.4	502.2
	2019	64481	6	32	48	14	63		506.9

Table 1.1.3
Percentage of Students by Achievement Levels Categories
Science

Grade	Year	Count	NM	PM	ME	EE	ME+EE	Delta	Ave. SS
5	2022	56846	12	39	40	8	48	-0.1	498.5
	2021	45455	12	39	41	8	49	-6.8	498.2
	2019	60476	7	38	45	10	55		502.5
8	2022	62926	13	41	39	6	46	0.6	496.3
	2021	46950	11	44	36	9	45	-5.3	497.6
	2019	62933	8	41	41	9	50		500.5

Section 1.2

Raw Scores Associated with Cutpoints

Table 1.2.1
Raw Scores Associated with Cutpoints

Subject	Grade	Cut Point	2021 Actual	2022 Actual	2022 Pred
English Language Arts	3	NM–PM	6	14	11
		PM–ME	14	28	25
		ME–EE	20	37	35
English Language Arts	4	NM–PM	7	15	13
		PM–ME	15	29	26
		ME–EE	22	39	37
English Language Arts	5	NM–PM	8	16	14
		PM–ME	17	33	31
		ME–EE	23	43	42
English Language Arts	6	NM–PM	9	19	15
		PM–ME	17	32	29
		ME–EE	24	42	40
English Language Arts	7	NM–PM	10	18	16
		PM–ME	18	32	31
		ME–EE	25	44	43
English Language Arts	8	NM–PM	11	22	18
		PM–ME	20	36	34
		ME–EE	26	45	44
English Language Arts	10	NM–PM	19	19	18
		PM–ME	35	37	34
		ME–EE	45	47	44
Mathematics	3	NM–PM	7	14	14
		PM–ME	15	30	30
		ME–EE	21	43	43
Mathematics	4	NM–PM	7	14	15
		PM–ME	17	33	34
		ME–EE	25	49	49
Mathematics	5	NM–PM	7	13	12
		PM–ME	17	33	33
		ME–EE	25	50	49
Mathematics	6	NM–PM	6	11	12
		PM–ME	15	28	29
		ME–EE	24	48	47
Mathematics	7	NM–PM	5	10	10
		PM–ME	15	25	25
		ME–EE	24	46	46
Mathematics	8	NM–PM	6	12	13
		PM–ME	14	32	32
		ME–EE	25	49	49

Table 1.2.1 (continued)
Raw Scores Associated with Cutpoints

Subject	Grade	Cut Point	2021 Actual	2022 Actual	2022 Pred
Mathematics	10	NM–PM	13	11	12
		PM–ME	30	30	31
		ME–EE	53	52	52
Science	5	NM–PM	9	19	18
		PM–ME	17	34	34
		ME–EE	23	45	46
Science	8	NM–PM	9	16	16
		PM–ME	17	31	32
		ME–EE	22	45	46

Section 1.3

Calibration Report

Calibration Report—Executive Summary

FlexMIRT 3.03 was used for the IRT calibration at Cognia. All command files were set up in a way following general settings. The calibration convergence criterion was set to 0.001.

A 3PLM was used for standard four-option multiple choice (MC) items, a 2PLM was used for dichotomously scored short response items, multi-select items, and technology-enhanced items, and a Graded Response Model (GRM) was specified for the polytomously scored multi-part items and open response items. The logistic version of the IRT models was used. The prior distribution for the guessing parameter was set to be beta(5,17), and logNormal(0, 0.25) was used as the prior for the item discrimination parameter. No prior was supplied for the item difficulty parameter.

The calibration went smoothly and got converged in all subjects/grades. In particular, the largest change in parameter values (from one iteration to the next) was decreasing and tended to flatten out towards the end of the calibration process. The IRT model fit was evaluated for each of the items. The resulting parameters demonstrated good model fit for most of the items.

In ELA a two-stage process was used to bring the item parameters onto the operational scale. First all items except the writing prompts were freely calibrated. Next the items except the writing prompts were placed onto scale using the Stocking and Lord procedure. These first two steps are referred to as stage 1. Next, the writing prompts were brought onto scale holding the parameters from stage 1 fixed, and a Fixed Common Item Parameter calibration using FlexMIRT. This two-stage process is used to assure that the writing prompt estimation process does not unduly influence the dimensional structure of the initial parameter estimation in Stage 1, providing for greater scale stability.

The first table in this section shows the number of cycles to achieve convergence in Stage 1 of the ELA procedure. The second table lists the Stocking and Lord transformation constants that were calculated in the second step of Stage 1. The third table shows the number of cycles to achieve convergence in the FCIP calibration runs for Stage 2.

Table 1.3.1.a

Number of Cycles to Convergence for ELA Calibration with no Writing Prompts

Subject	Grade	Initial Cycles
English Language Arts	Grade 3	52
English Language Arts	Grade 4	32
English Language Arts	Grade 5	89
English Language Arts	Grade 6	45
English Language Arts	Grade 7	34
English Language Arts	Grade 8	46
English Language Arts	Grade 10	49

Table 1.3.1.b

Stocking and Lord Constants for ELA Equating with no Writing Prompts

Subject	Grade	Slope	Intercept
English Language Arts	3	1.12	-0.15
English Language Arts	4	1.04	-0.30
English Language Arts	5	1.10	-0.22
English Language Arts	6	1.44	-0.33
English Language Arts	7	1.29	-0.29
English Language Arts	8	1.38	-0.18
English Language Arts	10	1.09	-0.13

Table 1.3.1.c
Number of Cycles to Convergence for ELA FCIP Calibration with Writing Prompts Included

Subject	Grade	Initial Cycles	Equating Cycles
English Language Arts	Grade 3	33	8
English Language Arts	Grade 4	18	12
English Language Arts	Grade 5	81	11
English Language Arts	Grade 6	42	16
English Language Arts	Grade 7	59	24
English Language Arts	Grade 8	79	31
English Language Arts	Grade 10	88	41

The Math and Science tests were equated using a single stage procedure of freely calibrating all items and placing them on the operational scale using the Stocking and Lord procedure. The next table in this section lists the number of cycles to achieve convergence, followed by a table of the Stocking and Lord transformation constants.

Table 1.3.1.d
Number of Cycles to Convergence for Math and Science

Subject	Grade	Initial Cycles
Mathematics	Grade 3	54
Mathematics	Grade 4	60
Mathematics	Grade 5	35
Mathematics	Grade 6	56
Mathematics	Grade 7	91
Mathematics	Grade 8	31
Mathematics	Grade 10	63
Science	Grade 5	43
Science	Grade 8	45

Table 1.3.1.e
Stocking and Lord Constants for Math and Science

Subject	Grade	Slope	Intercept
Mathematics	3	1.11	-0.11
Mathematics	4	1.04	-0.01
Mathematics	5	1.01	-0.17
Mathematics	6	1.01	-0.09
Mathematics	7	1.08	-0.17
Mathematics	8	1.02	-0.16
Mathematics	10	1.01	-0.17
Science	5	1.13	-0.20
Science	8	1.05	-0.20

Four methods of evaluating the suitability of the equating items were used: the delta analysis, the b/b analysis, beta analysis and the rescore analysis. Results from the beta analyses were used to flag items that were reviewed by content personnel and no items were removed from the equating analysis. Results from these analyses are included in Section II of this report.

Items flagged by the delta method or any item that required intervention during the calibration process, were compiled and placed in our item watch list, which includes the final actions taken on these items. The final watch list is presented in the following table:

Table 1.3.2
Final Items Watch List

Subject	Grade	ItemID	Reason	Action
English Language Arts	3	IA00450 (EL626050679)	beta analysis	retained for equating
English Language Arts	3	IA00451 (EL626050927)	beta analysis	retained for equating
English Language Arts	3	IA00452 (EL626051097)	beta analysis	retained for equating
English Language Arts	3	IA00458A (EL626052459#SCORE_TRAIT_Conv)	beta analysis	retained for equating
English Language Arts	4	IA00289 (EL309792)	beta analysis	retained for equating
English Language Arts	5	IA00505 (EL626355215)	beta analysis	retained for equating
English Language Arts	5	IA00506 (EL626355557)	beta analysis	retained for equating
English Language Arts	5	IA01672 (EL711827807)	beta analysis	retained for equating
English Language Arts	6	IA00520 (EL626865416)	beta analysis	retained for equating
English Language Arts	6	IA00530 (EL626868748)	beta analysis	retained for equating
English Language Arts	6	IA00531A (EL626869132#SCORE_TRAIT_Conv)	beta analysis	retained for equating
English Language Arts	7	IA00069 (EL292172)	beta analysis	retained for equating
English Language Arts	7	IA00070 (EL292176)	beta analysis	retained for equating
English Language Arts	7	IA00658 (EL628653398)	beta analysis	retained for equating
English Language Arts	7	IA00665A (EL628749729#SCORE_TRAIT_Conv)	beta analysis	retained for equating
English Language Arts	8	IA00059 (EL290800)	beta analysis	retained for equating
English Language Arts	8	IA00062 (EL290808)	beta analysis	retained for equating
English Language Arts	8	IA00064A (EL290818#SCORE_TRAIT_Conv)	beta analysis	retained for equating
English Language Arts	8	IA00064D (EL290818#SCORE_TRAIT_Ideadev)	beta analysis	retained for equating
English Language Arts	8	IA00371 (EL623951471)	beta analysis	retained for equating
English Language Arts	8	IA00374 (EL623952612)	beta analysis	retained for equating
English Language Arts	8	IA00379 (EL623955757)	beta analysis	retained for equating
English Language Arts	10	IA04110 (EL807953958)	beta analysis	retained for equating
English Language Arts	10	IA06626A (EL811561885#SCORE_TRAIT_Conv)	beta analysis	retained for equating
Mathematics	3	IA00930 (MA306359)	beta analysis	retained for equating
Mathematics	4	IA00861 (MA297629)	beta analysis	retained for equating
Mathematics	4	IA00958 (MA307055)	beta analysis	retained for equating
Mathematics	4	IA00963 (MA307085)	beta analysis	retained for equating
Mathematics	4	IA01055 (MA311572)	beta analysis	retained for equating
Mathematics	4	IA01093 (MA623879088)	beta analysis	retained for equating
Mathematics	4	IA02819 (MA713583365)	beta analysis	retained for equating
Mathematics	4	IA02841 (MA713774890)	beta analysis	retained for equating
Mathematics	5	IA01155 (MA624357395)	beta analysis	retained for equating
Mathematics	5	IA04970 (MA800974344)	beta analysis	retained for equating
Mathematics	6	IA00827 (MA287186)	beta analysis	retained for equating
Mathematics	6	IA02037 (MA217493)	beta analysis	retained for equating
Mathematics	7	IA00796 (MA259267)	beta analysis	retained for equating

Table 1.3.2 (continued)

Final Items Watch List

Subject	Grade	ItemID	Reason	Action
Mathematics	7	IA01011 (MA311109)	beta analysis	retained for equating
Mathematics	7	IA04486 (MA227988)	beta analysis	retained for equating
Mathematics	8	IA00979 (MA307472)	beta analysis	retained for equating
Mathematics	8	IA01042 (MA311448)	beta analysis	retained for equating
Mathematics	8	IA02495 (MA309741)	beta analysis	retained for equating
Mathematics	10	IA04800 (MA717740737)	beta analysis	retained for equating
Mathematics	10	IA04846 (MA735743236)	beta analysis	retained for equating
Mathematics	10	IA04993 (MA801434971)	beta analysis	retained for equating
Mathematics	10	IA05117 (MA804678931)	beta analysis	retained for equating
Mathematics	10	IA05144 (MA805372590)	beta analysis	retained for equating
Mathematics	10	IA05170 (MA806408603)	beta analysis	retained for equating
Science	8	IA05243 (SC289702)	beta analysis	retained for equating
Science	8	IA05245 (SC290144)	beta analysis	retained for equating

Section 1.4

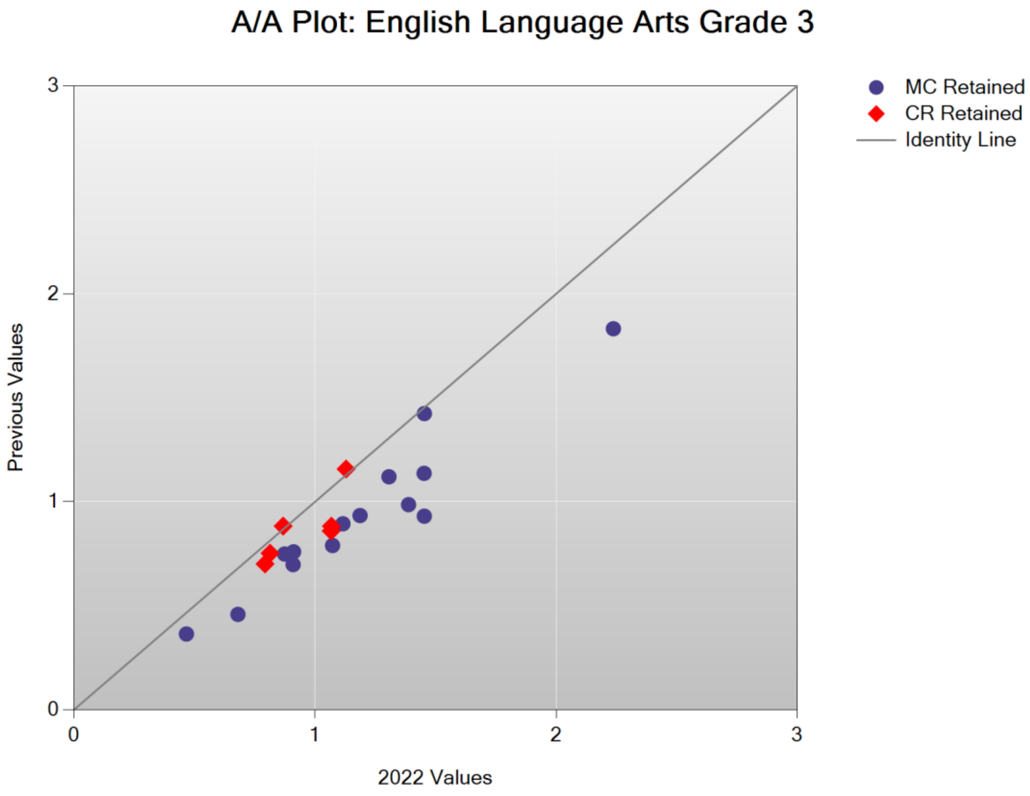
Equating Item Summary Statistics

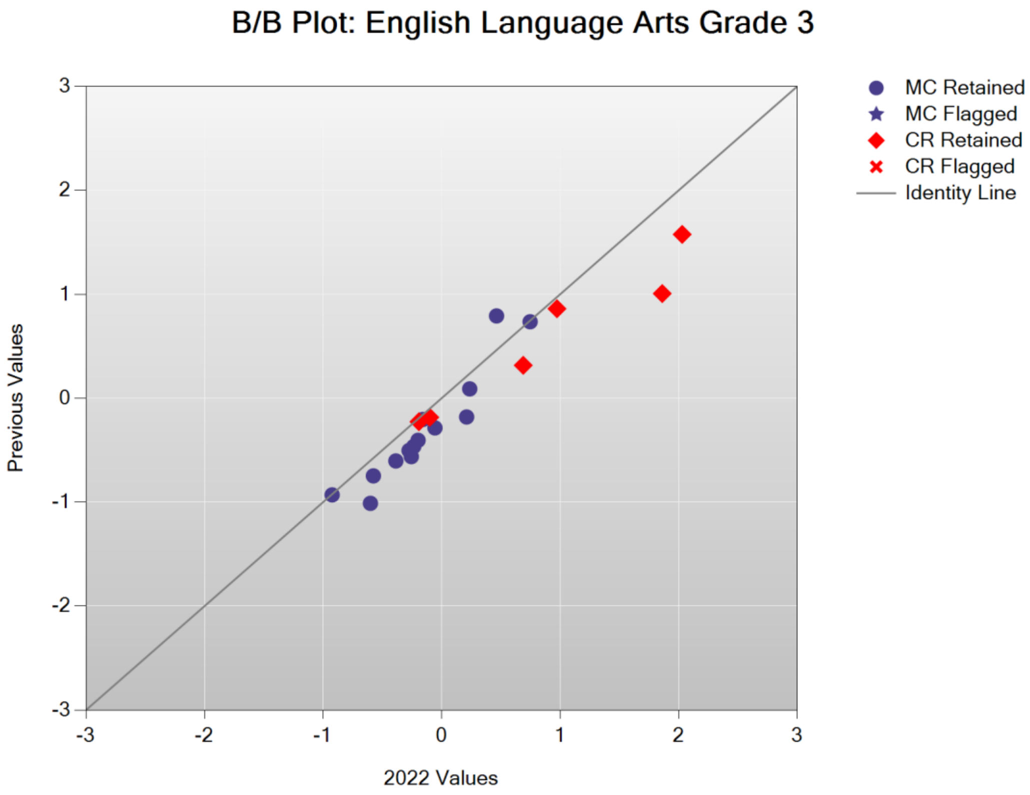
Table 1.4.1
Equating Item Summary Statistics

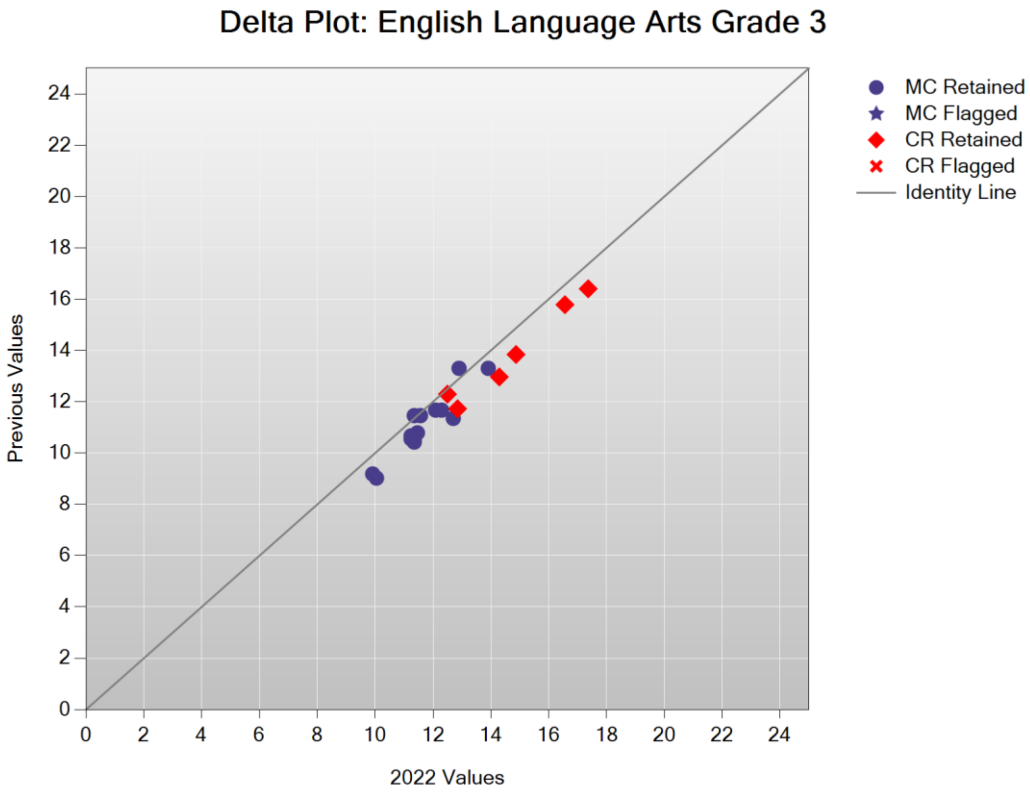
Subject	Grade	Year	P-Value		Point Biserial		a		b	
			Mean	Std Dev	Mean	Std Dev	Mean	Std Dev	Mean	Std Dev
English Language Arts	03	2022	0.54	0.18	0.49	0.09	1.11	0.38	0.16	0.77
		Previous	0.60	0.17	0.45	0.09	0.92	0.32	-0.05	0.71
English Language Arts	04	2022	0.60	0.18	0.43	0.10	0.85	0.20	-0.19	0.87
		Previous	0.67	0.17	0.42	0.09	0.77	0.16	-0.48	0.87
English Language Arts	05	2022	0.61	0.19	0.45	0.12	0.88	0.26	-0.23	0.83
		Previous	0.65	0.18	0.41	0.13	0.77	0.25	-0.53	0.85
English Language Arts	06	2022	0.62	0.15	0.47	0.14	0.90	0.22	-0.23	0.79
		Previous	0.71	0.16	0.42	0.16	0.67	0.27	-0.82	0.92
English Language Arts	07	2022	0.65	0.16	0.49	0.14	0.95	0.25	-0.44	0.76
		Previous	0.72	0.15	0.44	0.14	0.79	0.24	-0.98	0.84
English Language Arts	08	2022	0.61	0.14	0.47	0.16	0.94	0.32	-0.19	0.61
		Previous	0.67	0.13	0.43	0.15	0.71	0.26	-0.54	0.77
English Language Arts	10	2022	0.70	0.11	0.46	0.12	0.90	0.27	-0.76	0.61
		Previous	0.72	0.11	0.46	0.12	0.83	0.22	-0.93	0.68
Mathematics	03	2022	0.63	0.16	0.49	0.10	1.01	0.22	-0.35	0.79
		Previous	0.69	0.16	0.43	0.11	0.92	0.22	-0.51	0.89
Mathematics	04	2022	0.59	0.17	0.50	0.11	1.03	0.30	-0.20	0.68
		Previous	0.63	0.16	0.49	0.11	1.02	0.25	-0.19	0.60
Mathematics	05	2022	0.56	0.20	0.47	0.10	0.99	0.29	-0.11	0.85
		Previous	0.62	0.20	0.44	0.12	0.97	0.25	-0.29	0.91
Mathematics	06	2022	0.55	0.18	0.47	0.14	1.07	0.31	-0.02	0.89
		Previous	0.60	0.17	0.47	0.13	0.97	0.27	-0.15	0.90
Mathematics	07	2022	0.55	0.20	0.52	0.13	1.20	0.31	-0.09	0.74
		Previous	0.55	0.21	0.50	0.12	1.03	0.27	-0.34	0.79
Mathematics	08	2022	0.56	0.14	0.49	0.12	1.18	0.40	0.00	0.63
		Previous	0.61	0.15	0.49	0.10	1.08	0.33	-0.16	0.64
Mathematics	10	2022	0.45	0.16	0.47	0.16	1.11	0.45	0.46	0.79
		Previous	0.51	0.16	0.48	0.14	1.16	0.39	0.17	0.79
Science	05	2022	0.63	0.19	0.43	0.09	0.81	0.20	-0.41	0.96
		Previous	0.66	0.19	0.40	0.10	0.74	0.19	-0.60	1.01
Science	08	2022	0.56	0.18	0.43	0.13	0.88	0.38	-0.08	1.00
		Previous	0.59	0.17	0.41	0.13	0.81	0.33	-0.33	1.04

Section 2.1

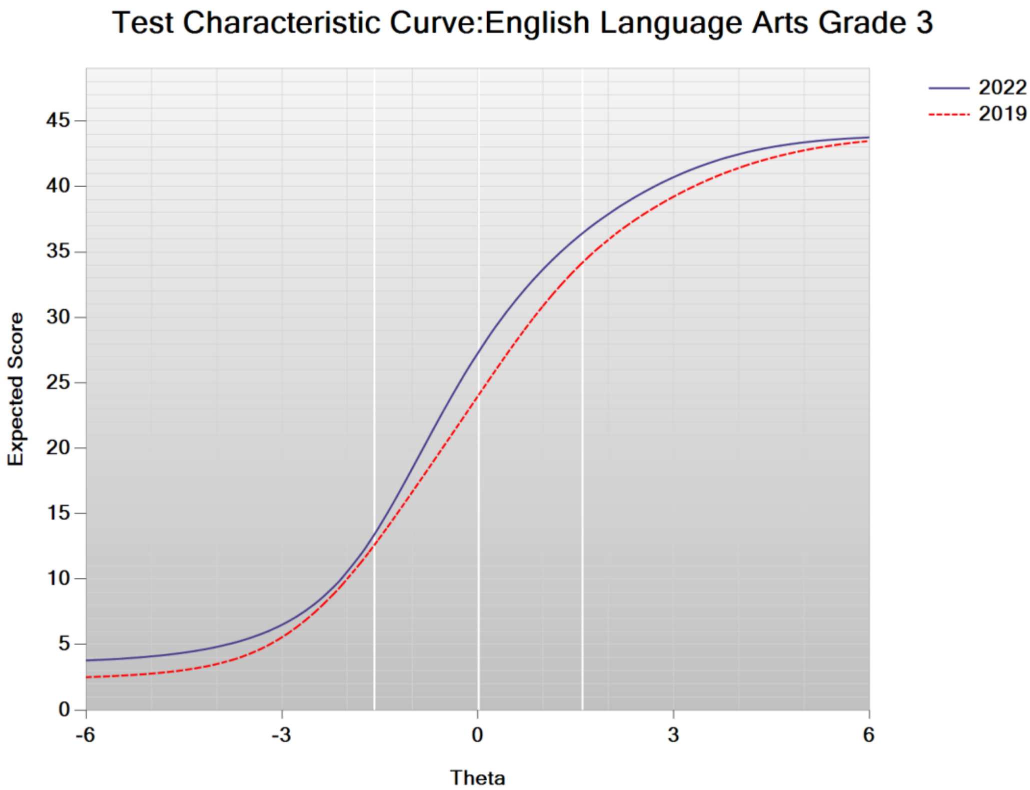
A/A, B/B, Beta, Delta, Test Characteristic Curve, Test Information Function, and Cumulative Scale Score Distribution Plots


A/A Plot: English Language Arts Grade 3
MC Retained
CR Retained
Identity Line
Previous Values
2022 Values
0
1
2
3

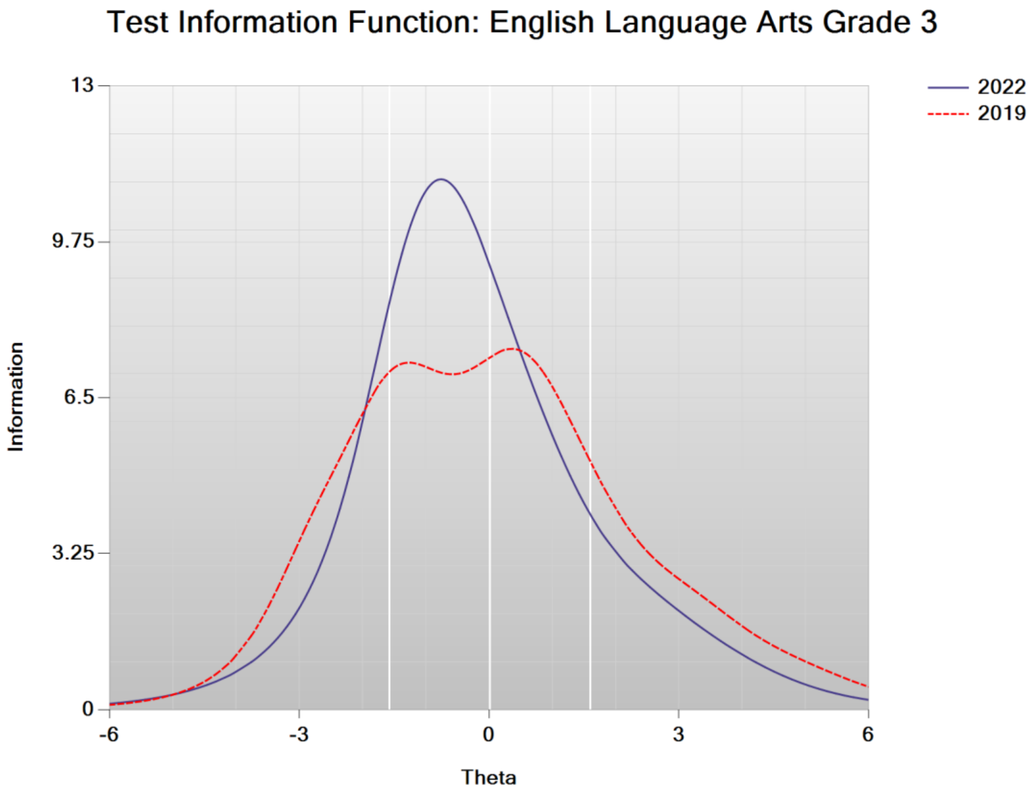

B/B Plot: English Language Arts Grade 3
MC Retained
MC Flagged
CR Retained
CR Flagged
Identity Line
Previous Values
2022 Values
-3
-2
-1
0
1
2
3



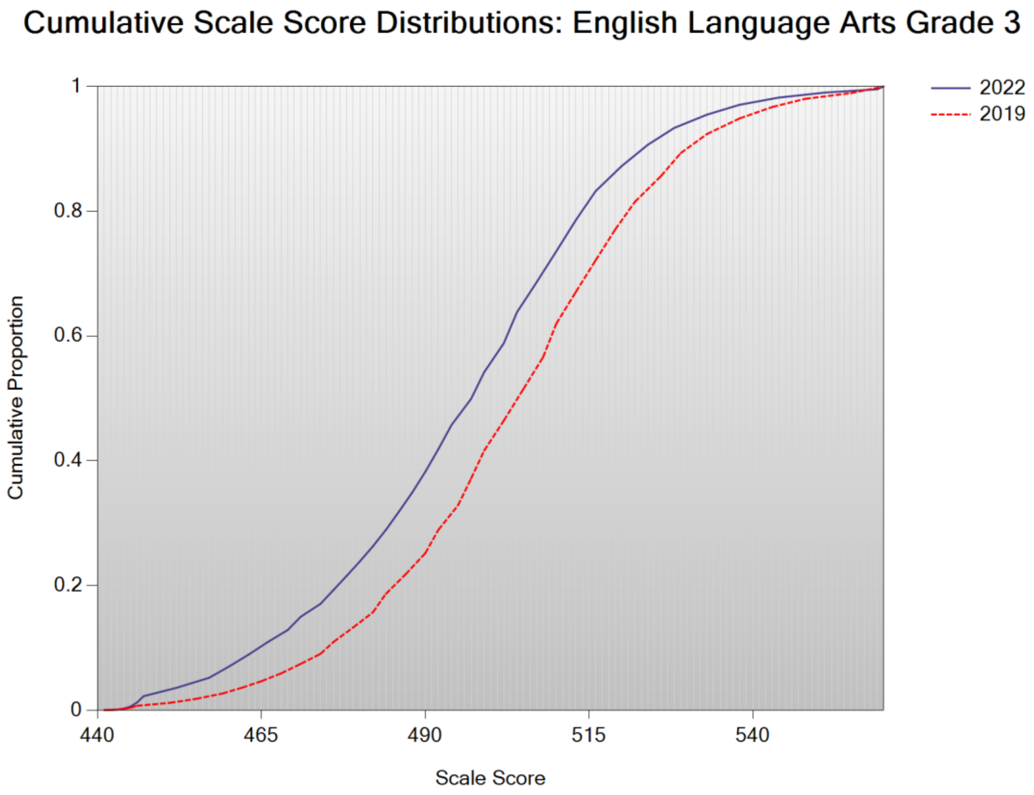
Delta Plot: English Language Arts Grade 3
MC Retained
MC Flagged
CR Retained
CR Flagged
Identity Line
Previous Values
2022 Values



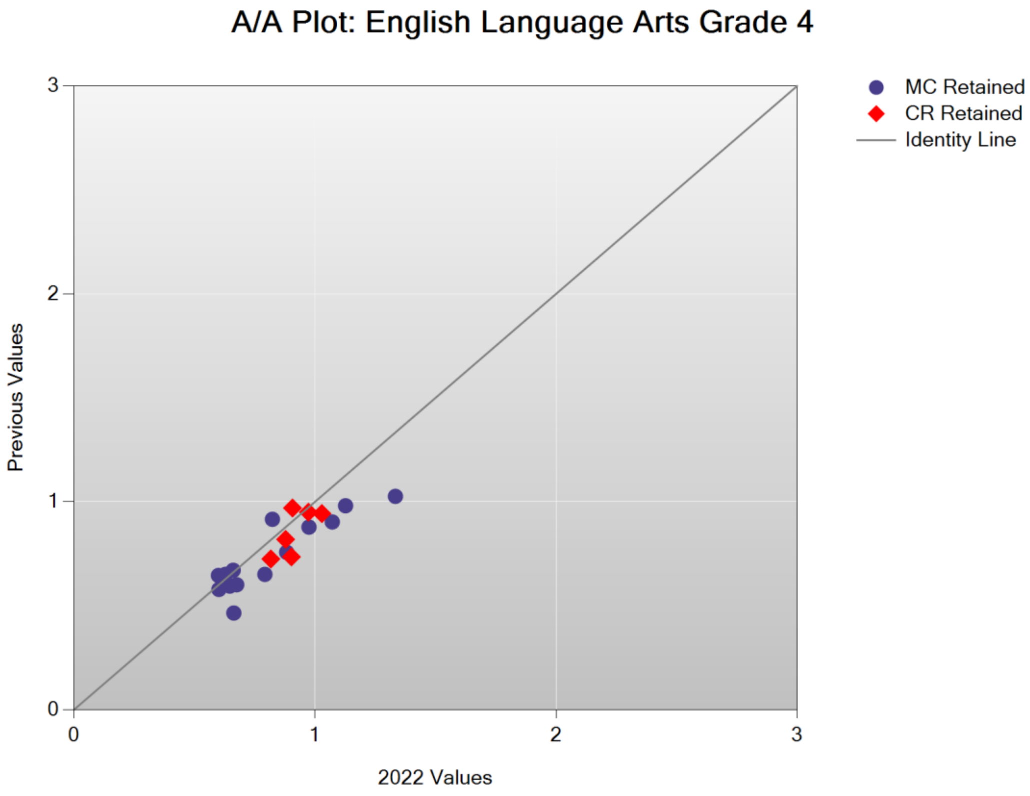
Test Characteristic Curve:English Language Arts Grade 3
2022
2019
Expected Score
Theta



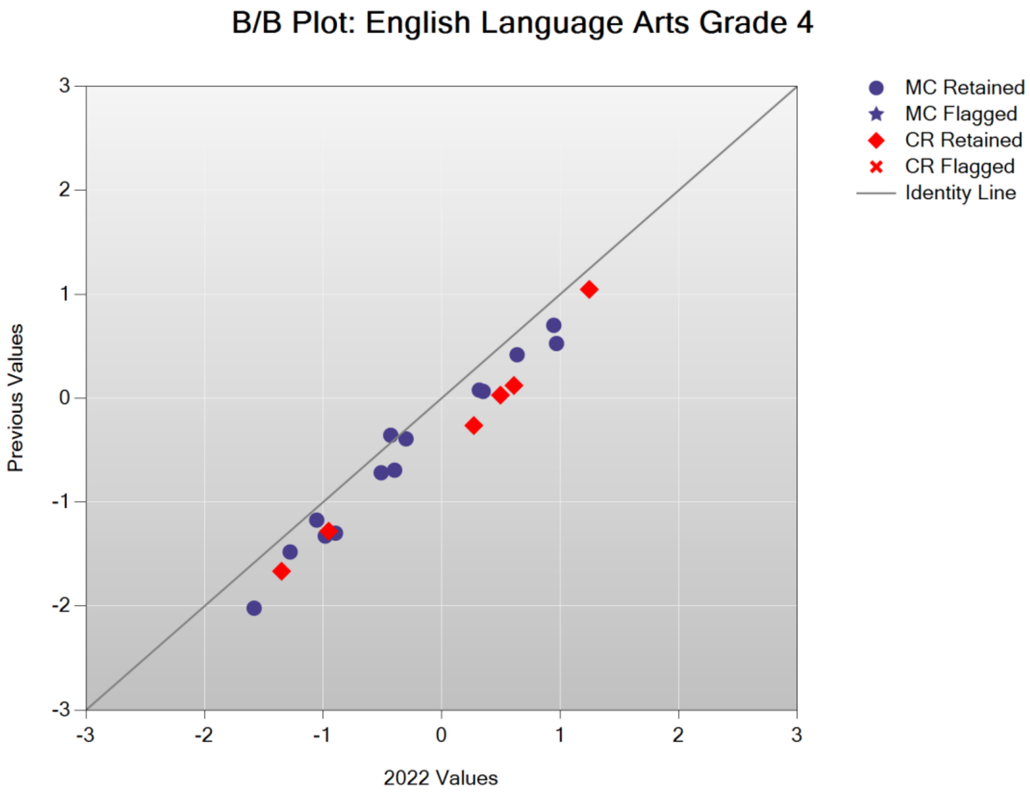
Test Information Function: English Language Arts Grade 3
2022
2019
13
9.75
6.5
3.25
0
Information
-6
-3
0
3
6
Theta



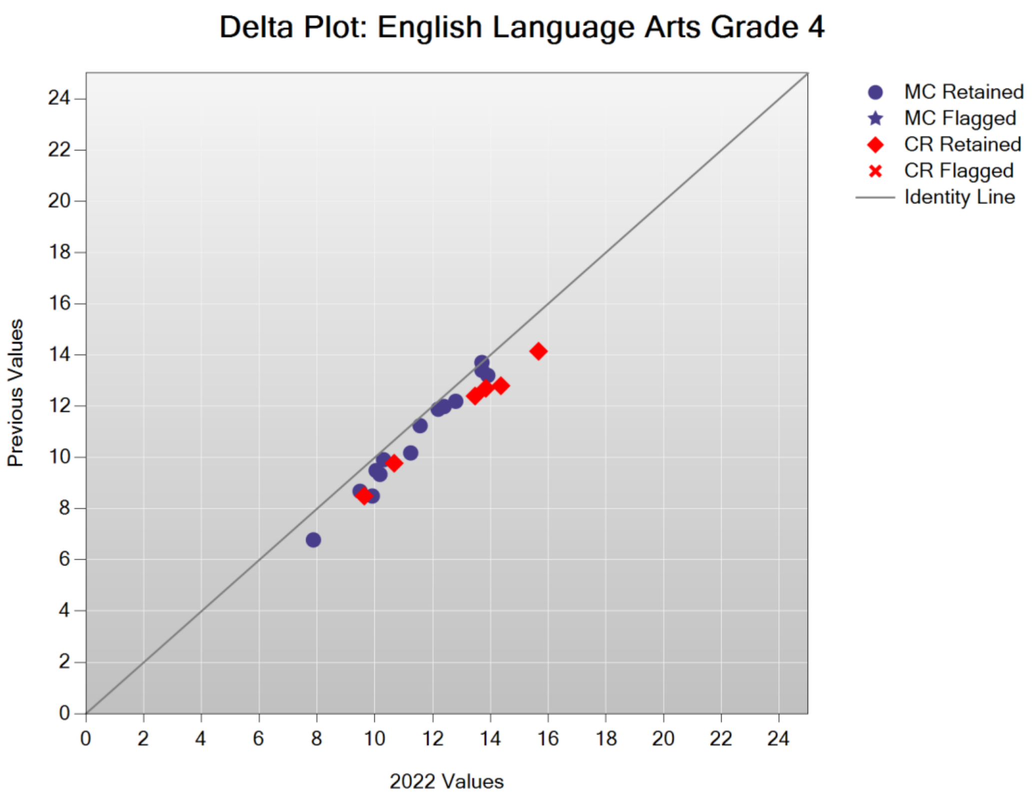
Cumulative Scale Score Distributions: English Language Arts Grade 3
2022
2019
1
0.8
0.6
0.4
0.2
0
Cumulative Proportion
440
465
490
515
540
Scale Score

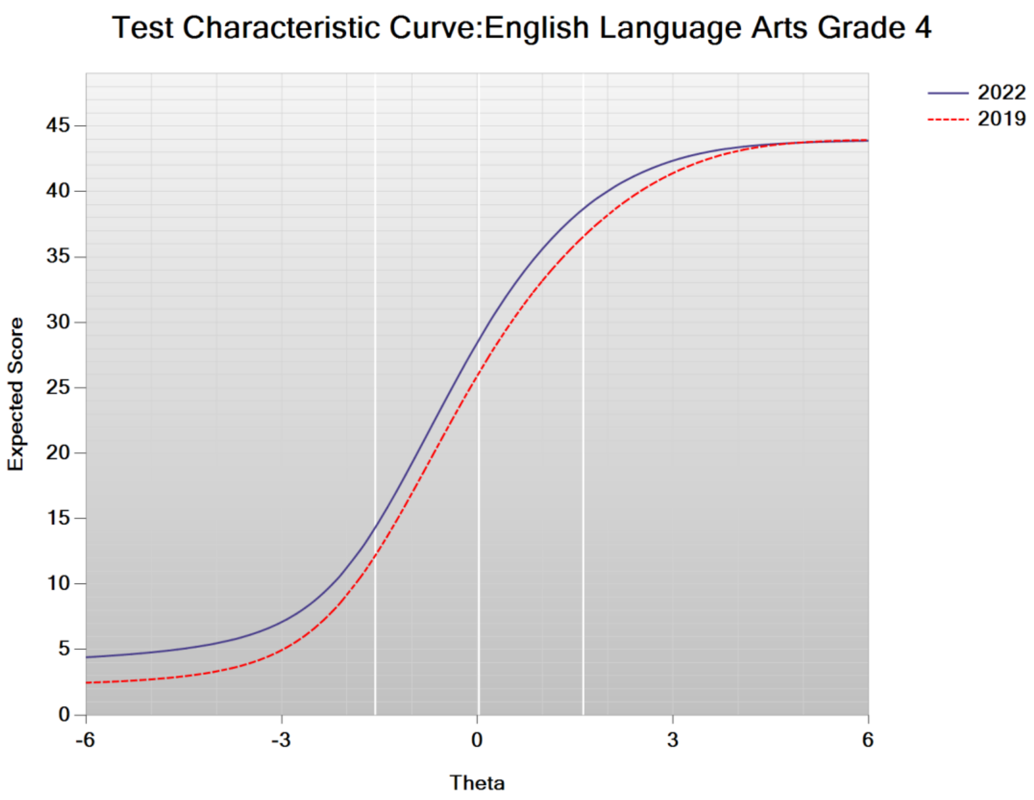


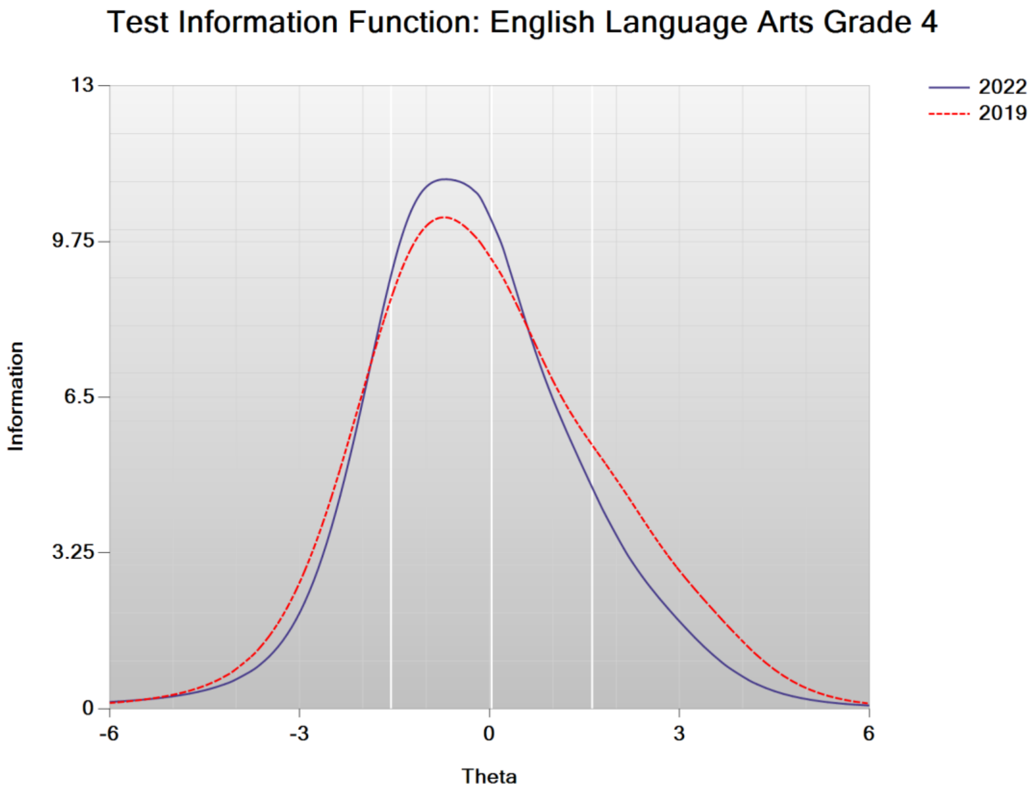
A/A Plot: English Language Arts Grade 4
MC Retained
CR Retained
Identity Line
Previous Values
2022 Values
0
1
2
3

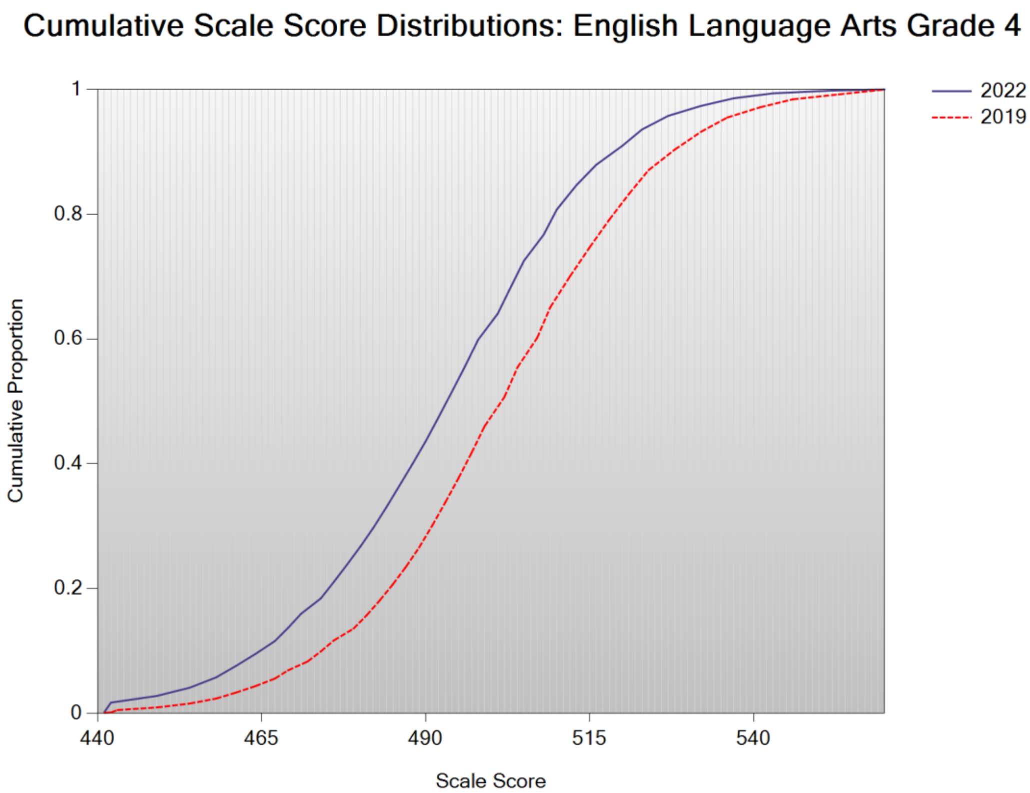


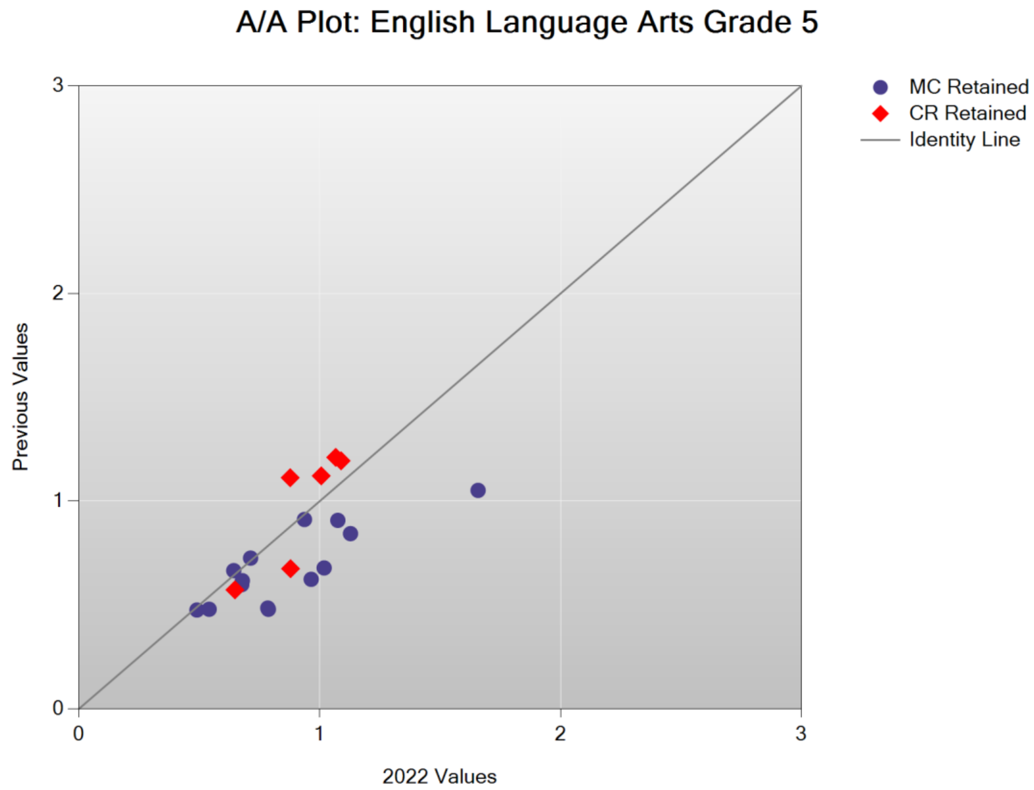
B/B Plot: English Language Arts Grade 4
MC Retained
MC Flagged
CR Retained
CR Flagged
Identity Line
Previous Values
2022 Values
-3
-2
-1
0
1
2
3

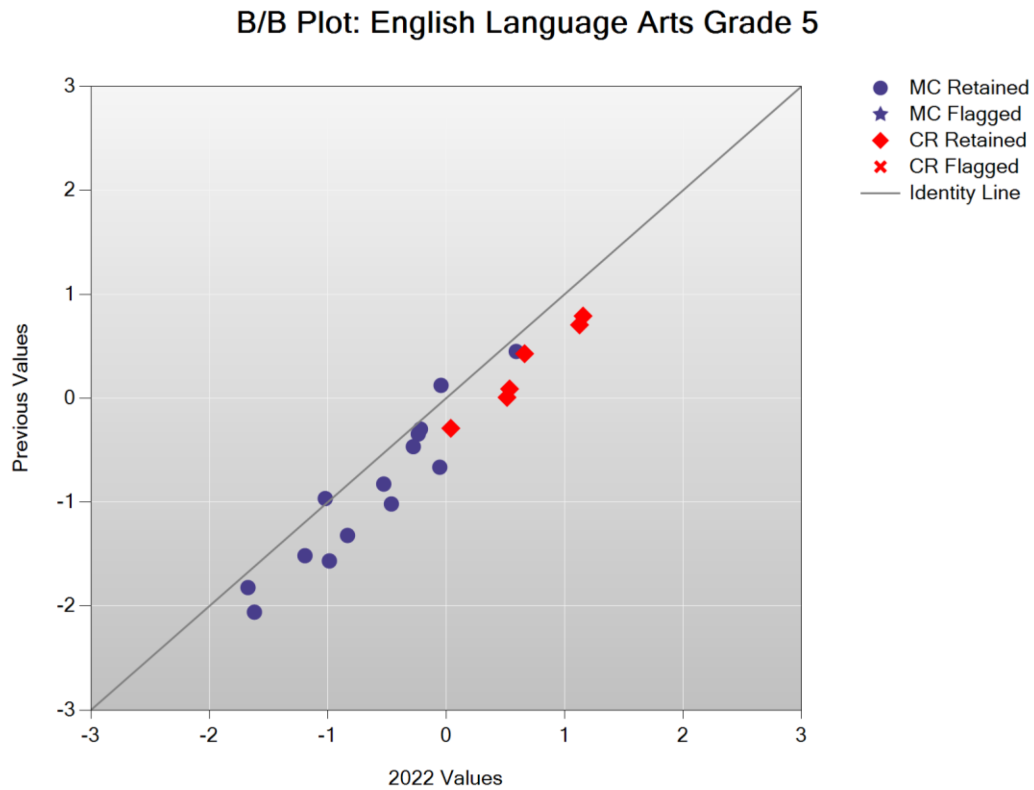

Delta Plot: English Language Arts Grade 4
MC Retained
MC Flagged
CR Retained
CR Flagged
Identity Line
Previous Values
2022 Values
0
2
4
6
8
10
12
14
16
18
20
22
24

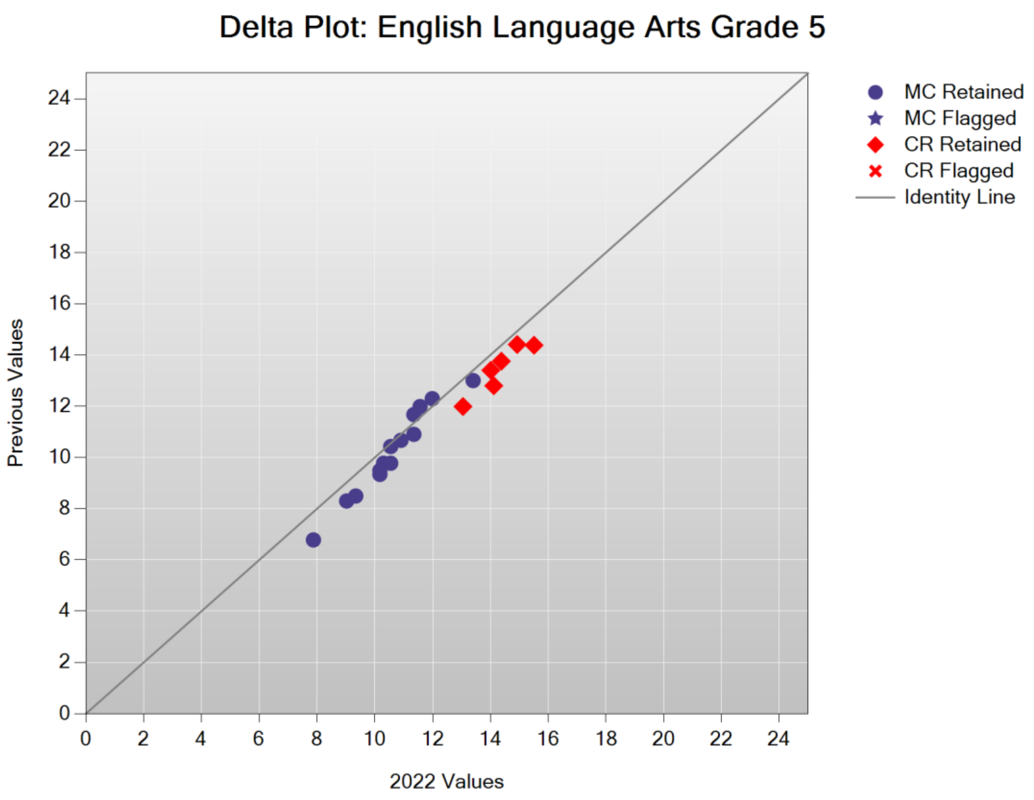

Test Characteristic Curve:English Language Arts Grade 4
2022
2019
Expected Score
Theta
0
5
10
15
20
25
30
35
40
45
-6
-3
0
3
6

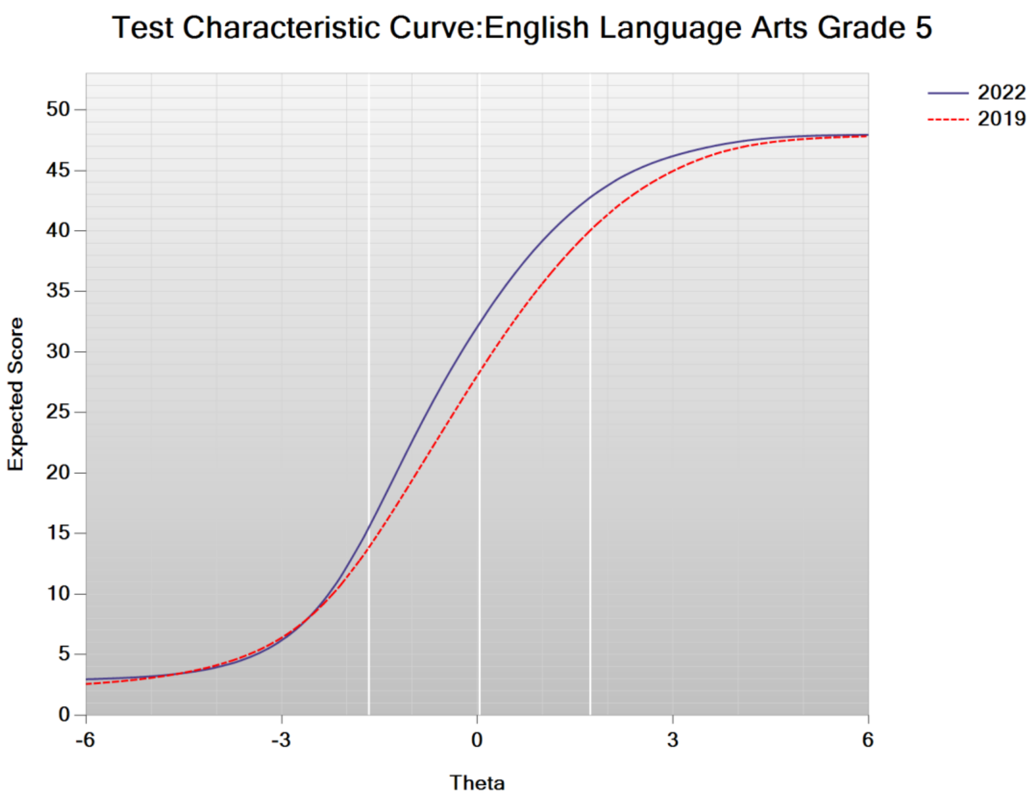

Test Information Function: English Language Arts Grade 4
13
9.75
6.5
3.25
0
-6
-3
0
3
6
Information
Theta
2022
2019

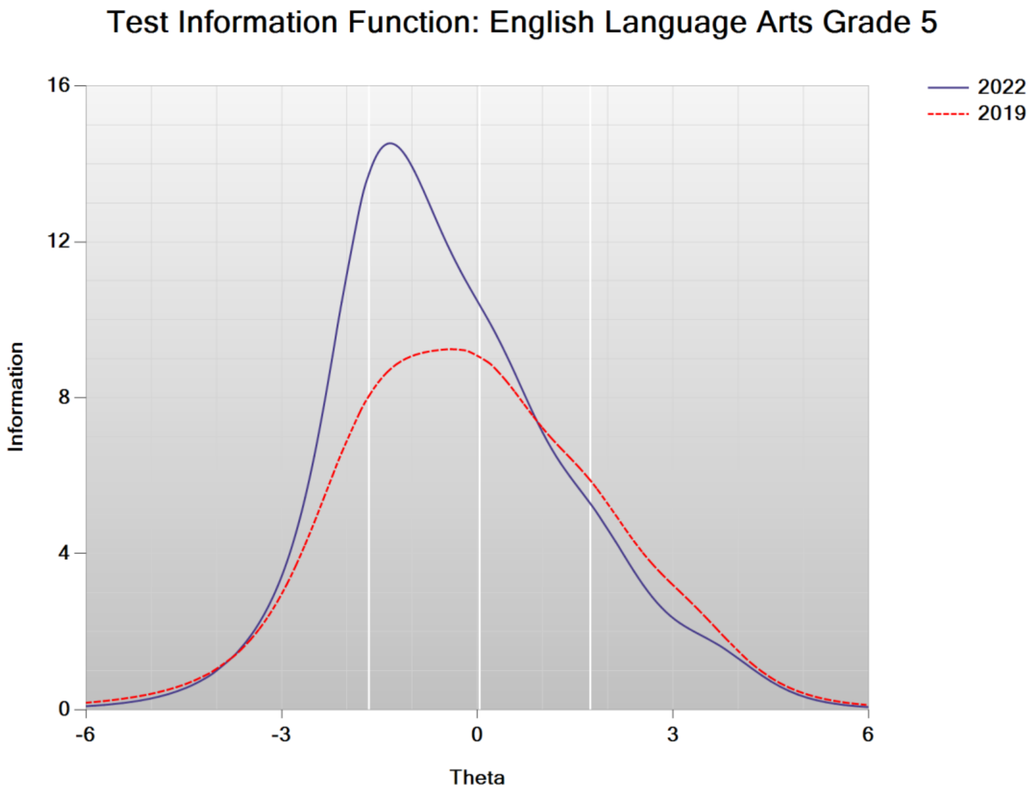

Cumulative Scale Score Distributions: English Language Arts Grade 4
1
0.8
0.6
0.4
0.2
0
440
465
490
515
540
Cumulative Proportion
Scale Score
2022
2019

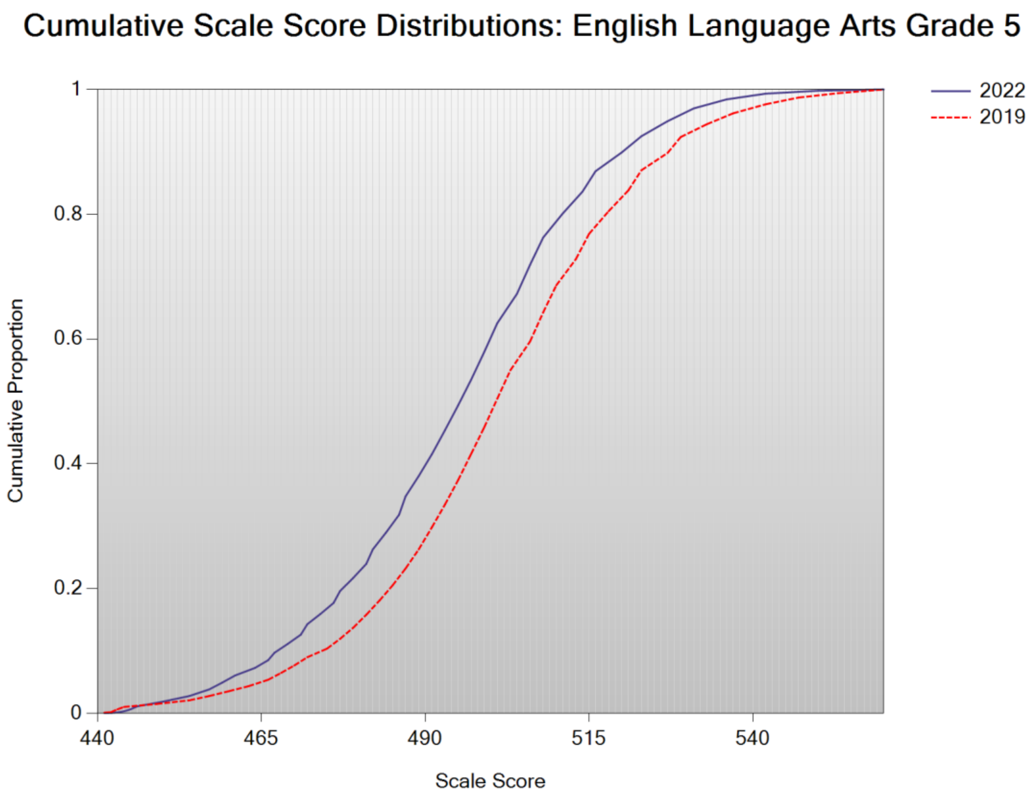

A/A Plot: English Language Arts Grade 5
MC Retained
CR Retained
Identity Line
Previous Values
2022 Values
0
1
2
3

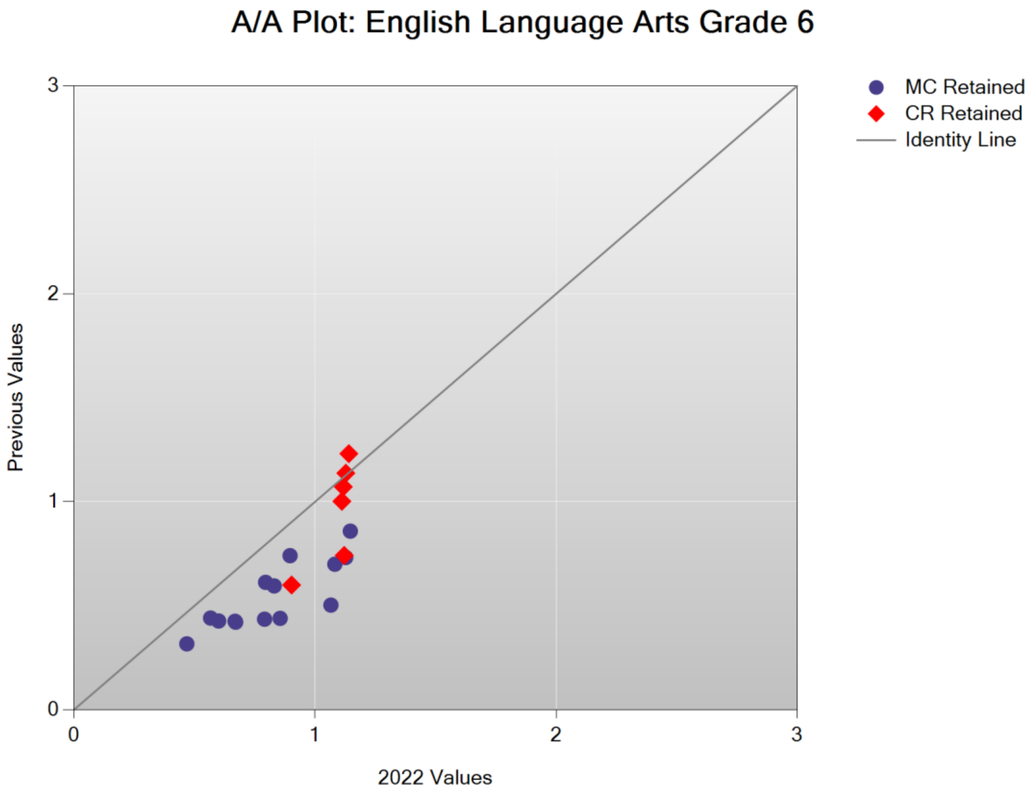

B/B Plot: English Language Arts Grade 5
MC Retained
MC Flagged
CR Retained
CR Flagged
Identity Line
Previous Values
2022 Values
-3
-2
-1
0
1
2
3

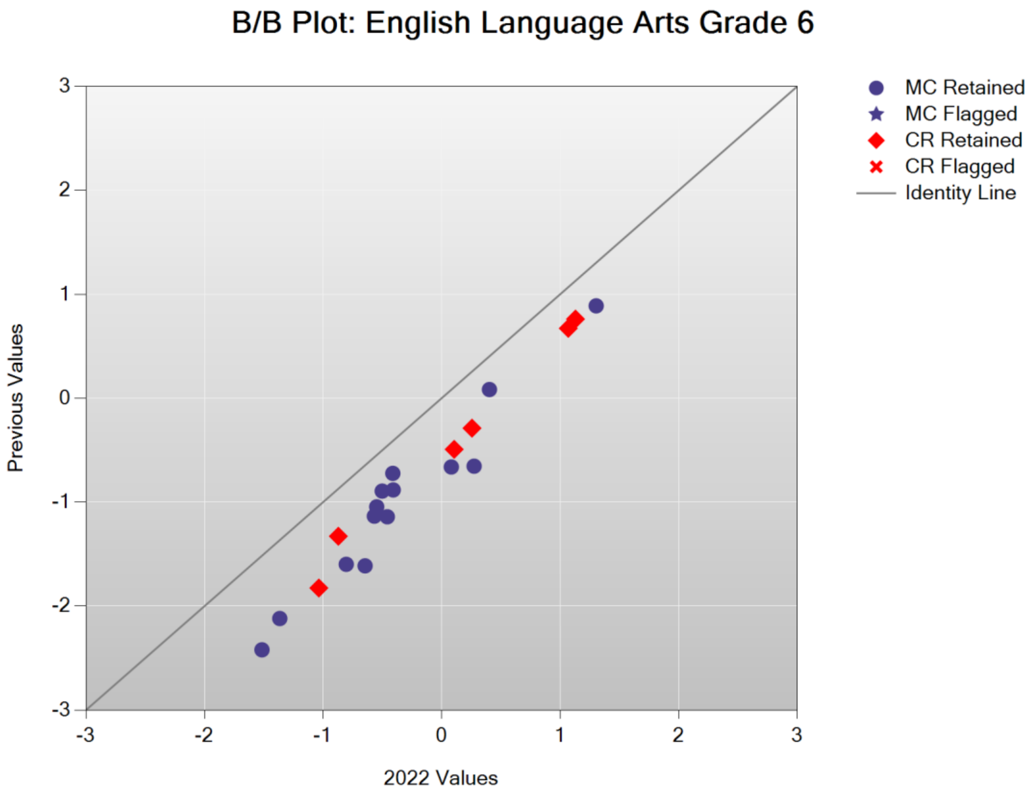

Delta Plot: English Language Arts Grade 5
MC Retained
MC Flagged
CR Retained
CR Flagged
Identity Line
Previous Values
2022 Values
0
2
4
6
8
10
12
14
16
18
20
22
24

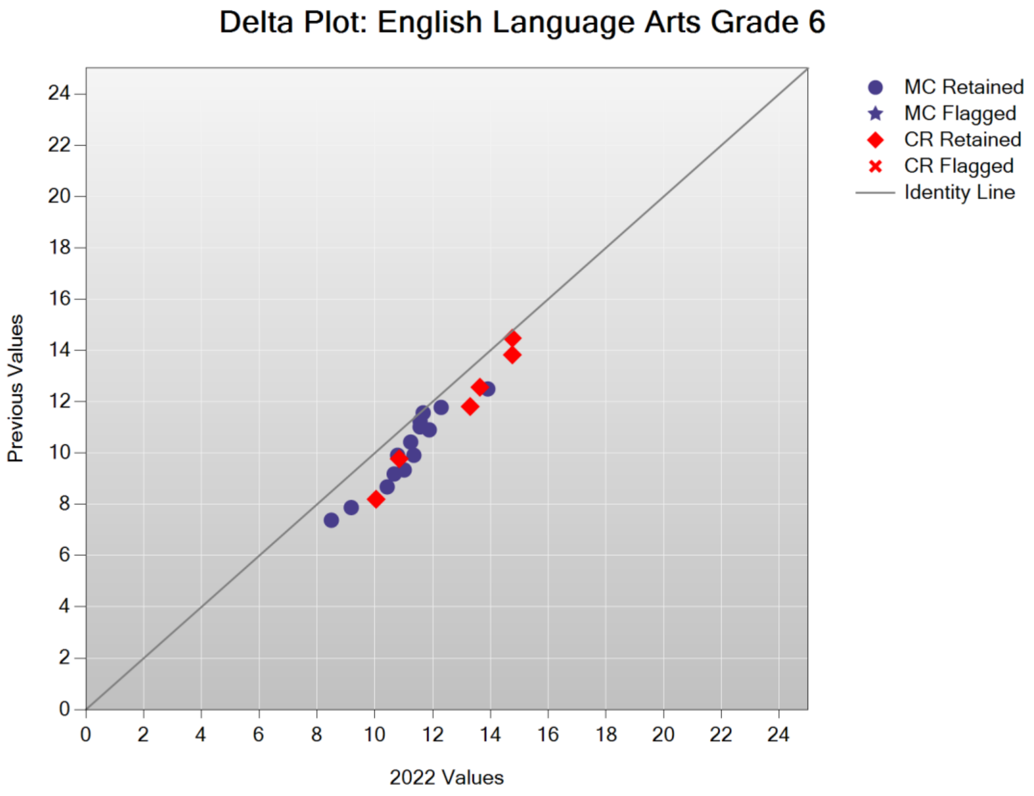

Test Characteristic Curve:English Language Arts Grade 5
2022
2019
Expected Score
Theta
0
5
10
15
20
25
30
35
40
45
50
-6
-3
0
3
6

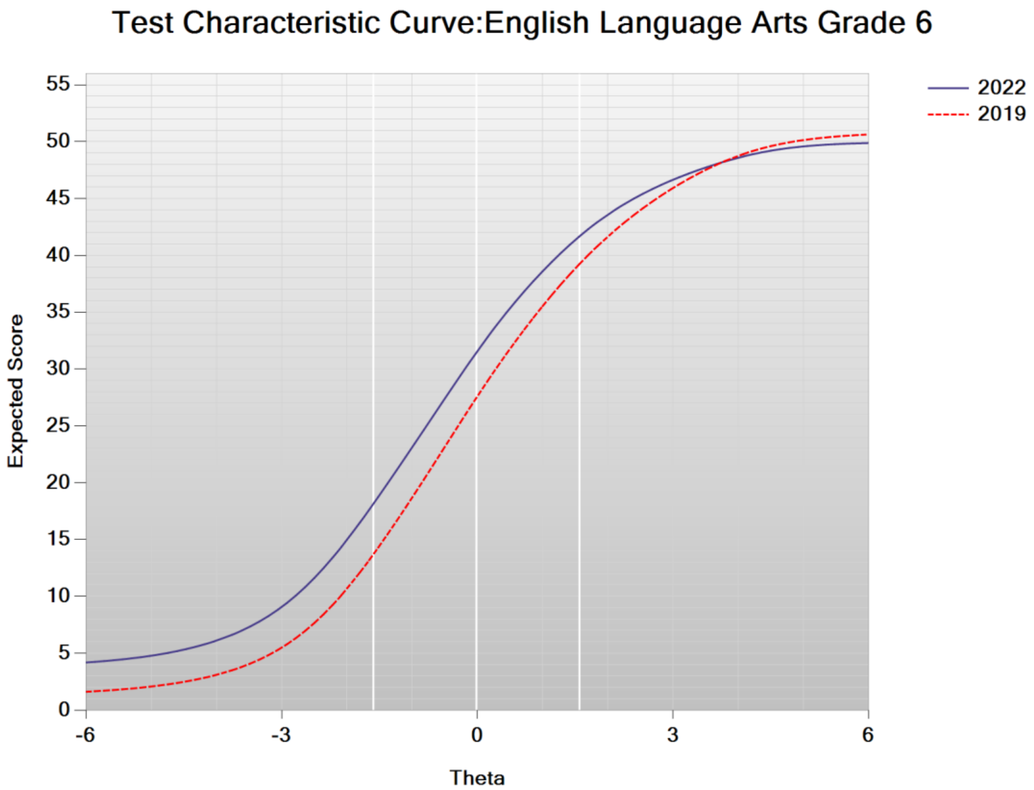

Test Information Function: English Language Arts Grade 5
2022
2019
16
12
8
4
0
Information
-6
-3
0
3
6
Theta

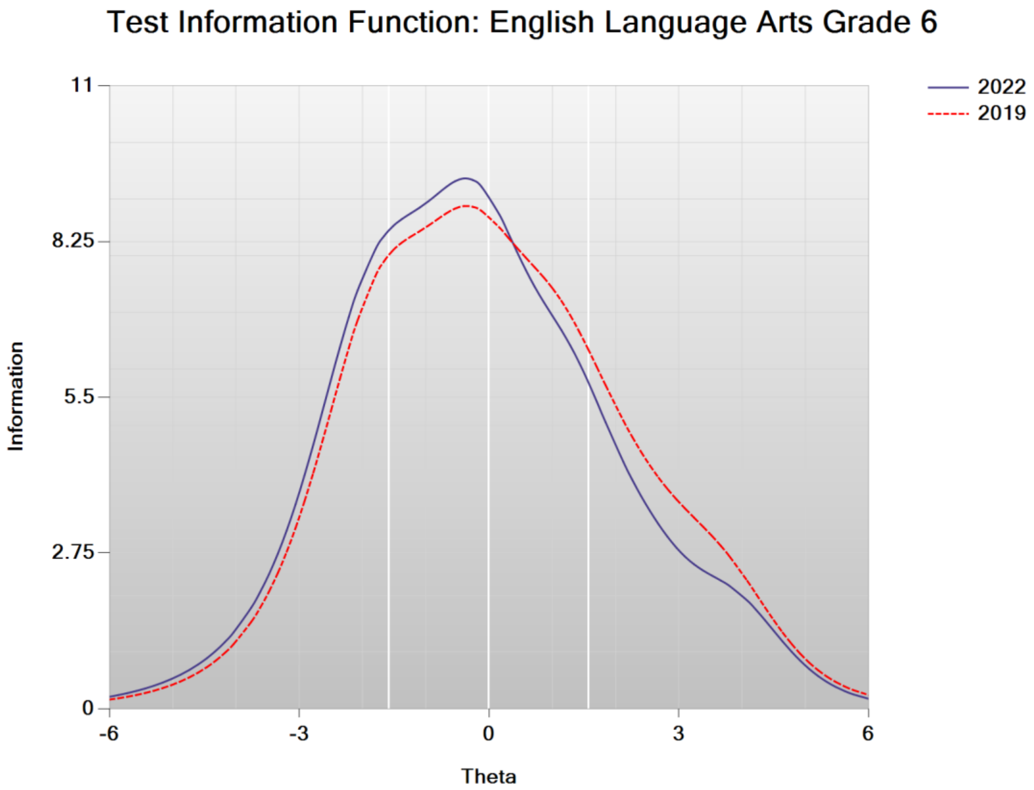

Cumulative Scale Score Distributions: English Language Arts Grade 5
2022
2019
1
0.8
0.6
0.4
0.2
0
Cumulative Proportion
440
465
490
515
540
Scale Score

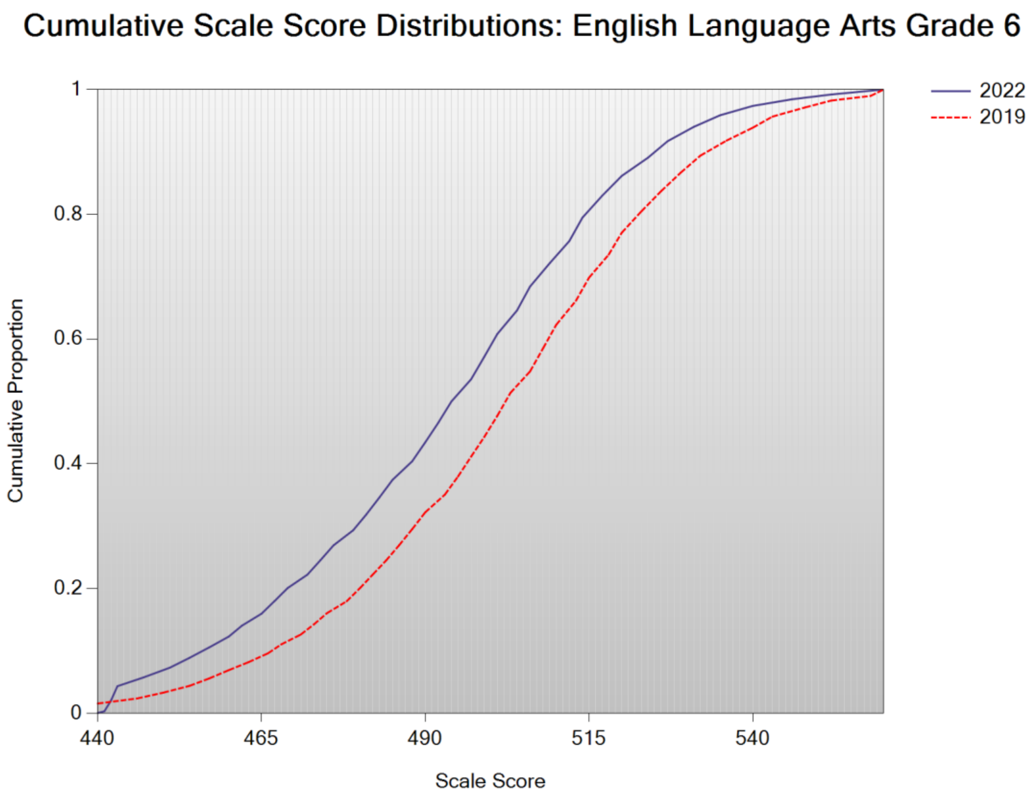

A/A Plot: English Language Arts Grade 6
Previous Values
2022 Values
MC Retained
CR Retained
Identity Line
0
1
2
3


B/B Plot: English Language Arts Grade 6
Previous Values
2022 Values
MC Retained
MC Flagged
CR Retained
CR Flagged
Identity Line
-3
-2
-1
0
1
2
3

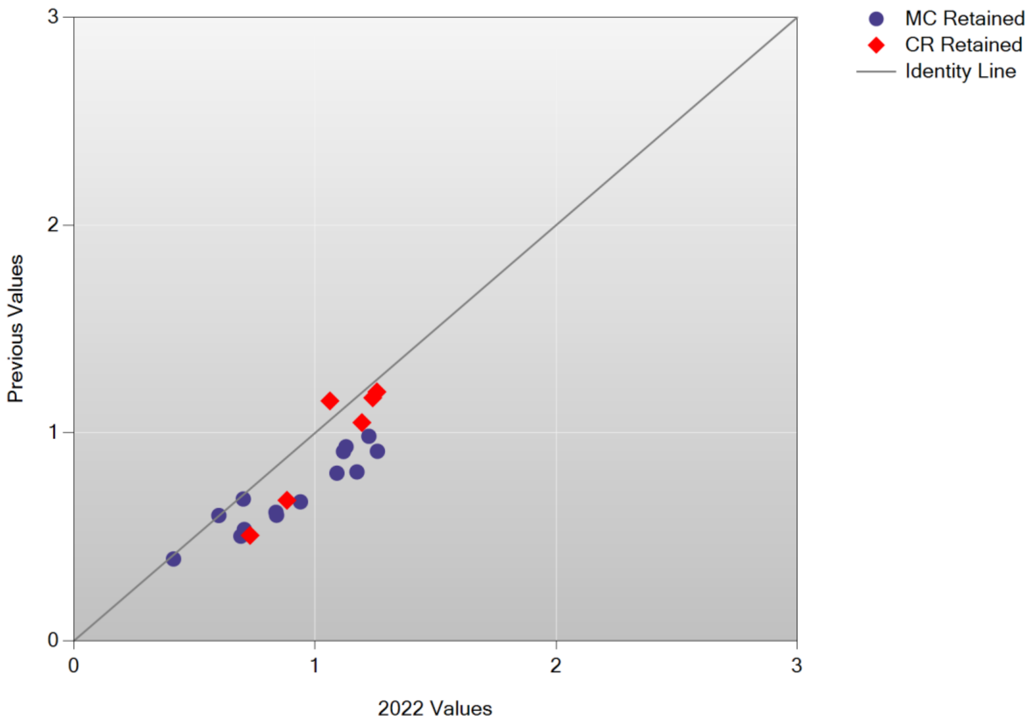

Delta Plot: English Language Arts Grade 6
MC Retained
MC Flagged
CR Retained
CR Flagged
Identity Line
Previous Values
2022 Values
0
2
4
6
8
10
12
14
16
18
20
22
24


Test Characteristic Curve:English Language Arts Grade 6
2022
2019
Expected Score
Theta
0
5
10
15
20
25
30
35
40
45
50
55
-6
-3
0
3
6

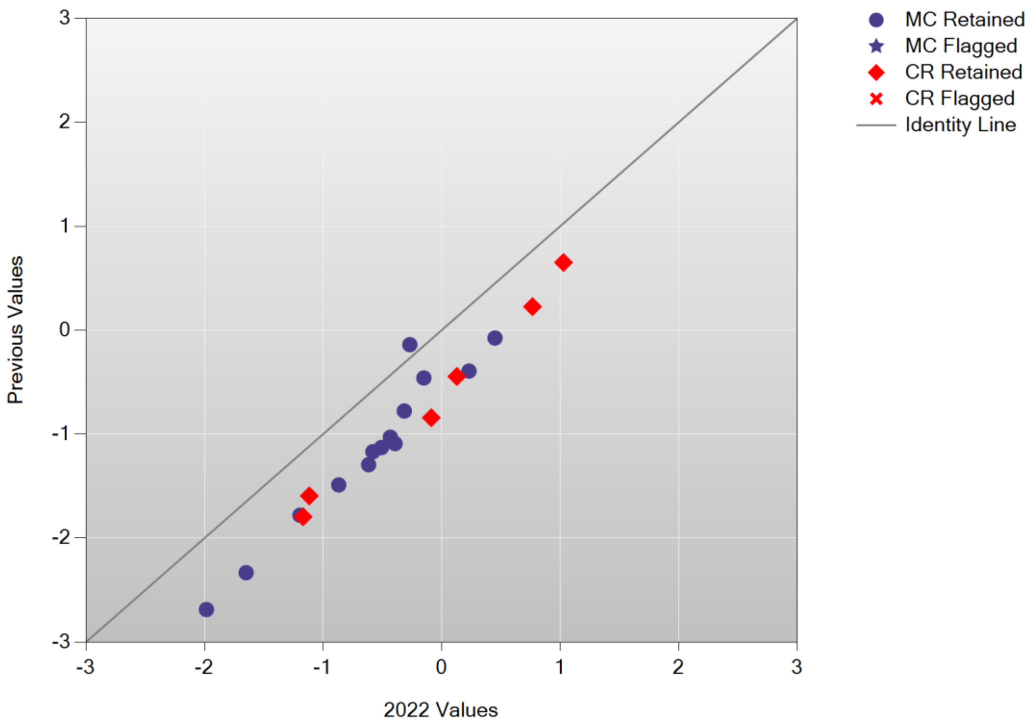

Test Information Function: English Language Arts Grade 6
2022
2019
11
8.25
5.5
2.75
0
Information
-6
-3
0
3
6
Theta

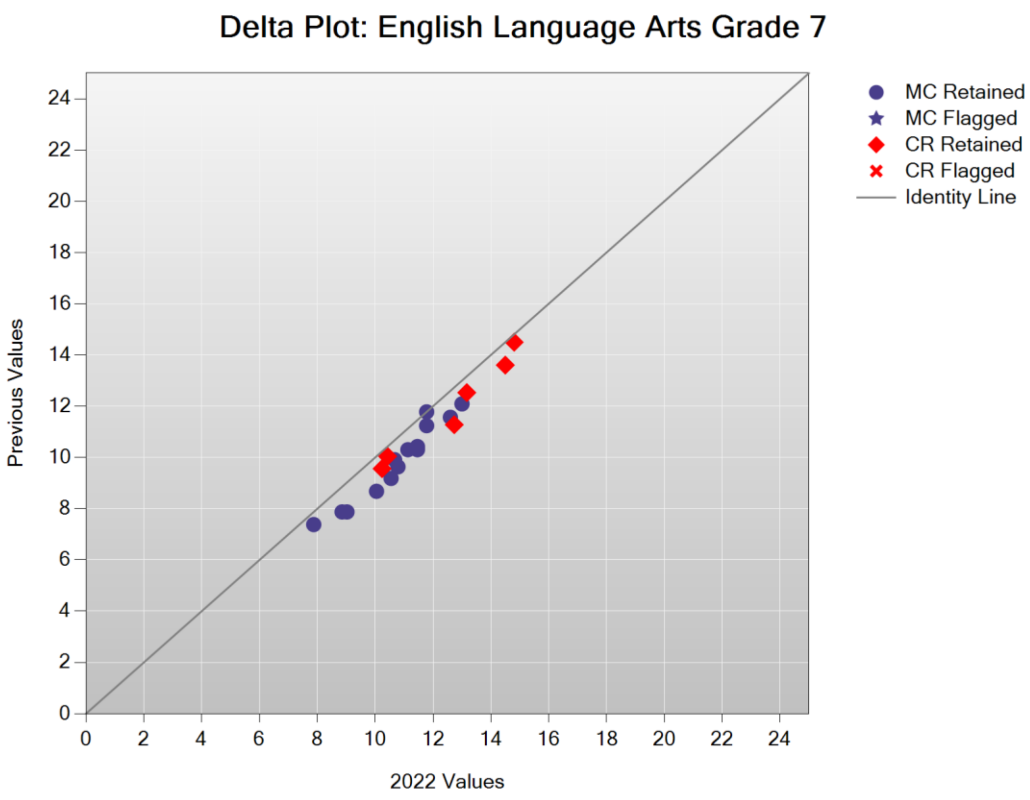

Cumulative Scale Score Distributions: English Language Arts Grade 6
2022
2019
1
0.8
0.6
0.4
0.2
0
Cumulative Proportion
440
465
490
515
540
Scale Score

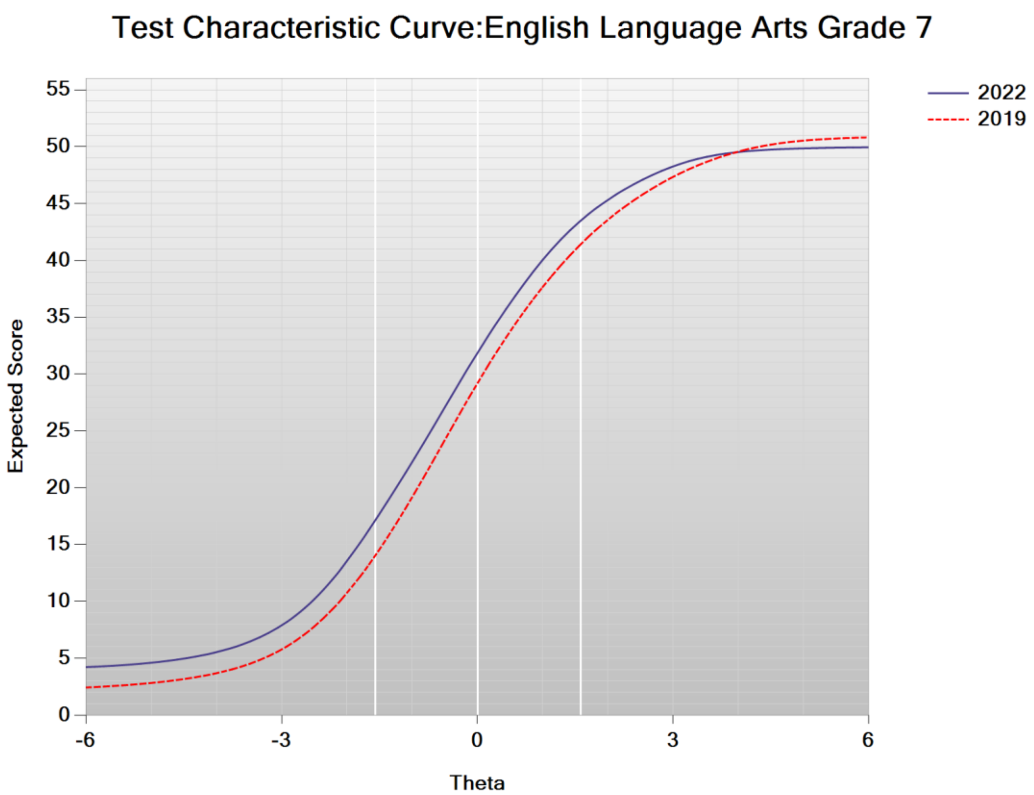
A/A Plot: English Language Arts Grade 7

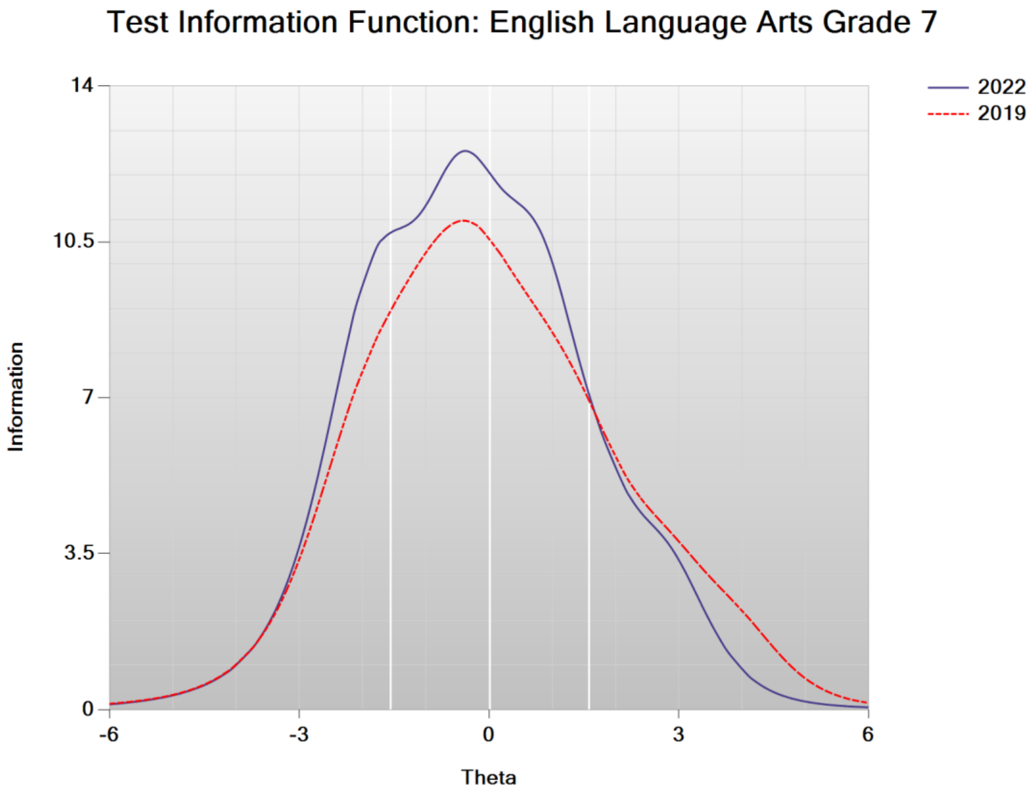


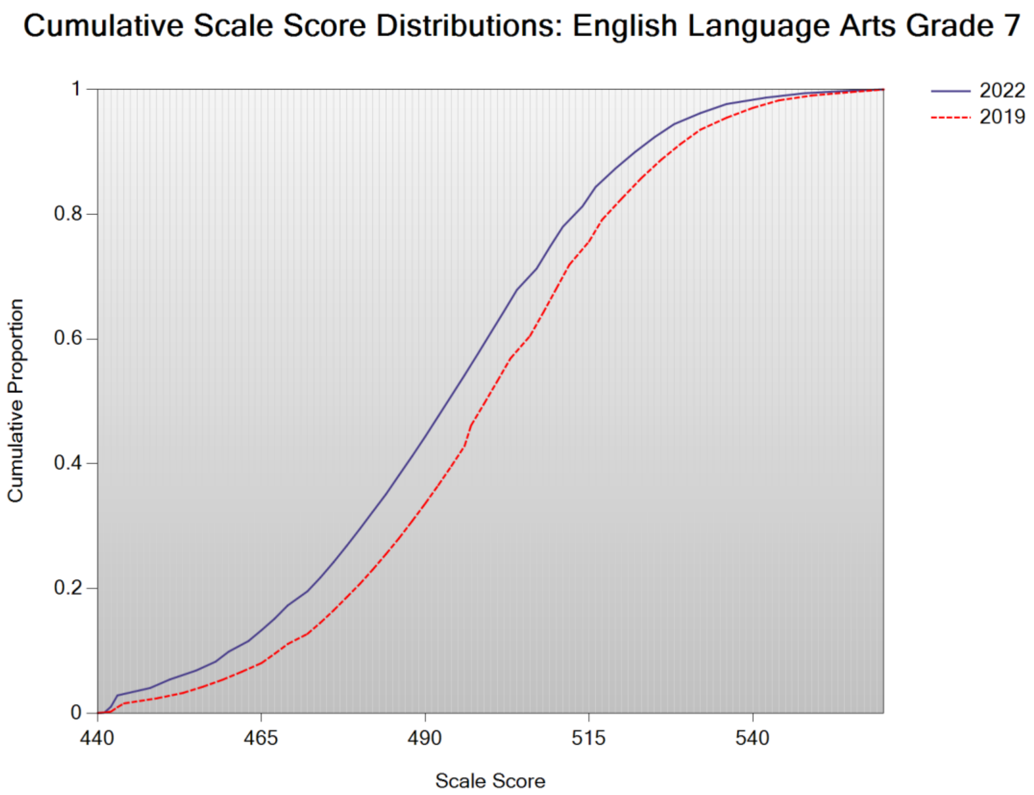
B/B Plot: English Language Arts Grade 7

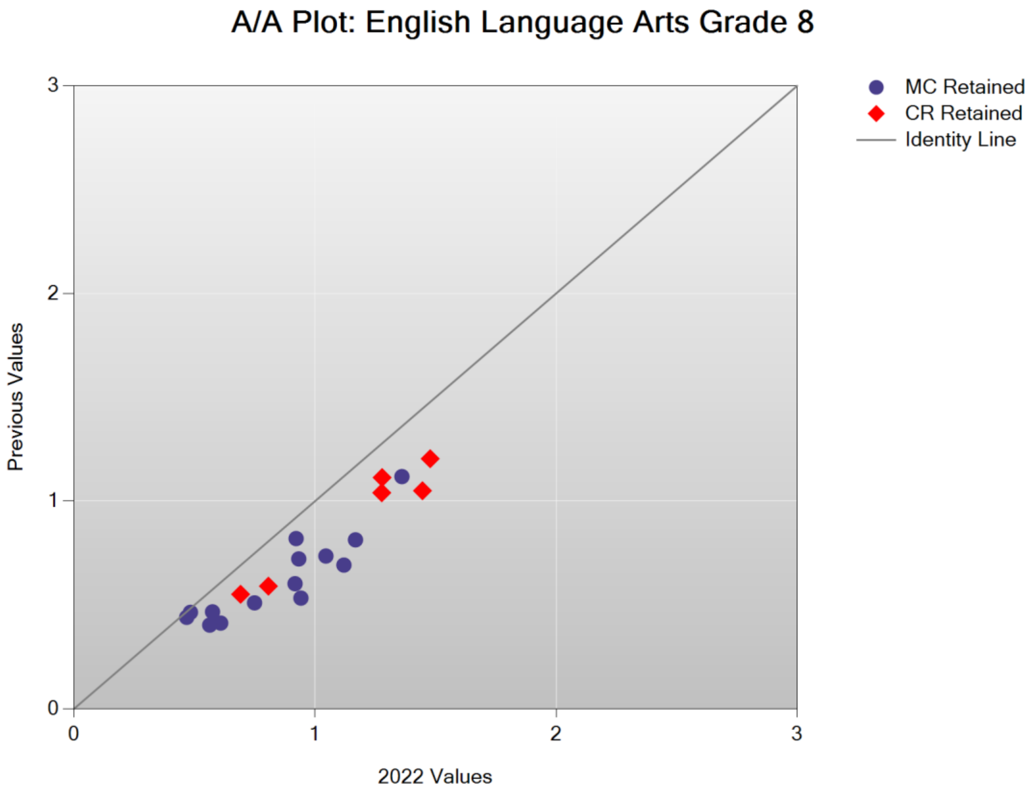


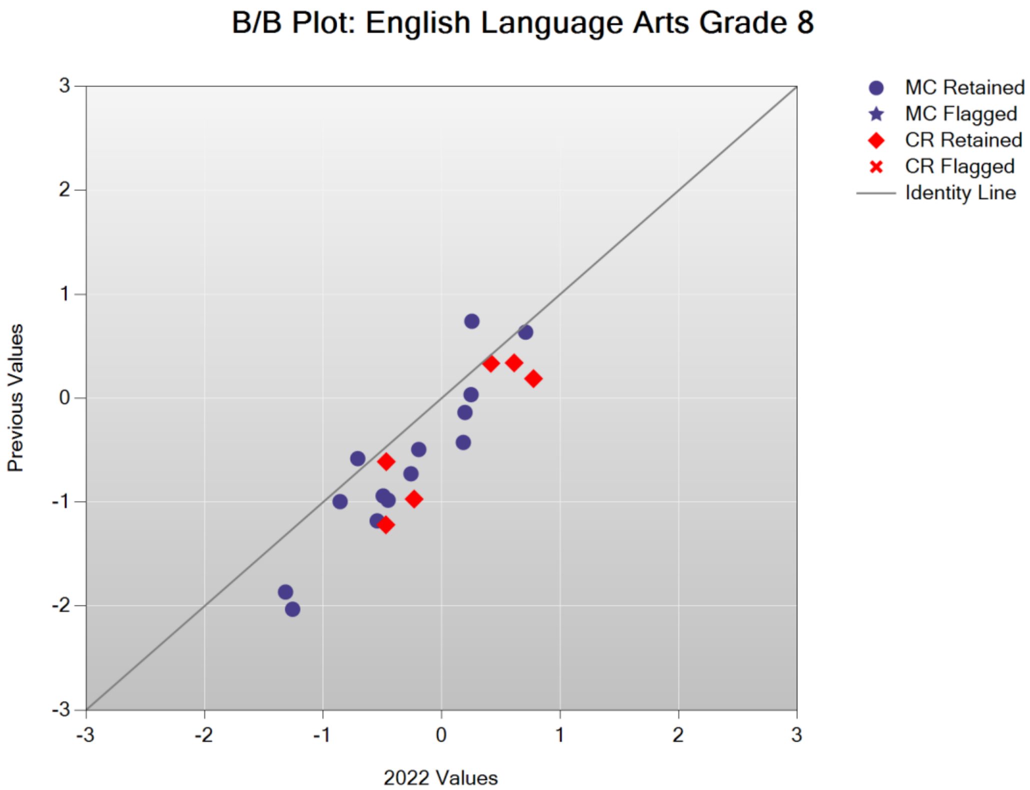

Delta Plot: English Language Arts Grade 7
MC Retained
MC Flagged
CR Retained
CR Flagged
Identity Line
Previous Values
2022 Values
0
2
4
6
8
10
12
14
16
18
20
22
24

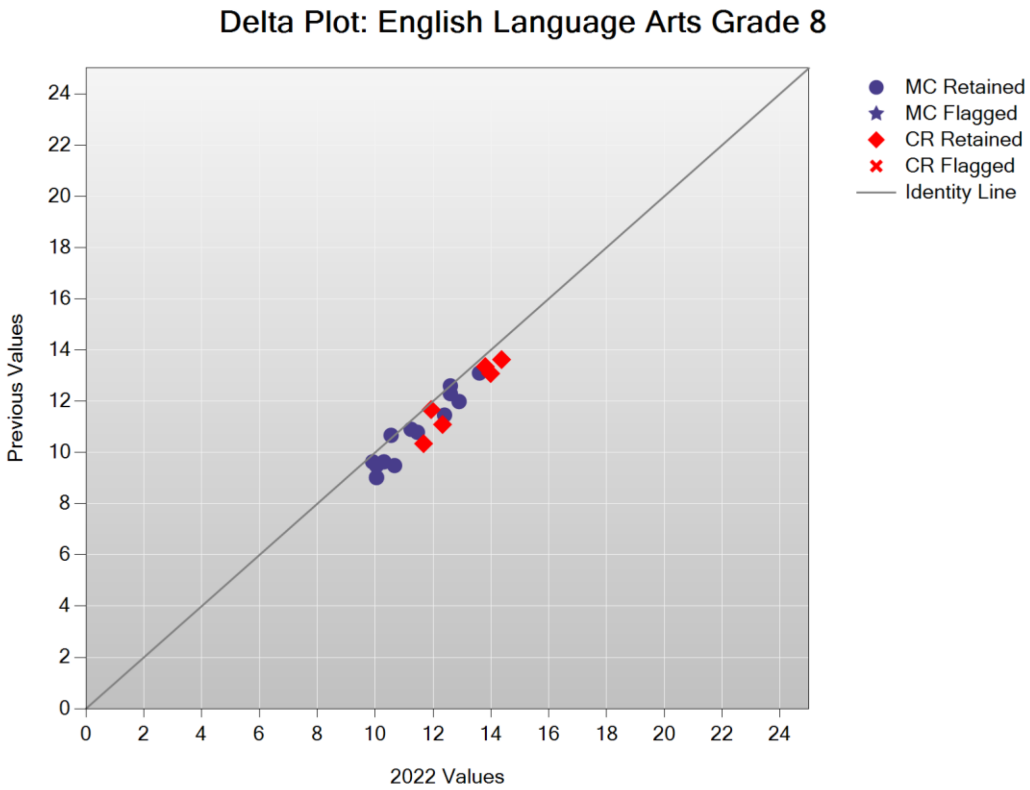

Test Characteristic Curve:English Language Arts Grade 7
2022
2019
Expected Score
Theta
0
5
10
15
20
25
30
35
40
45
50
55
-6
-3
0
3
6

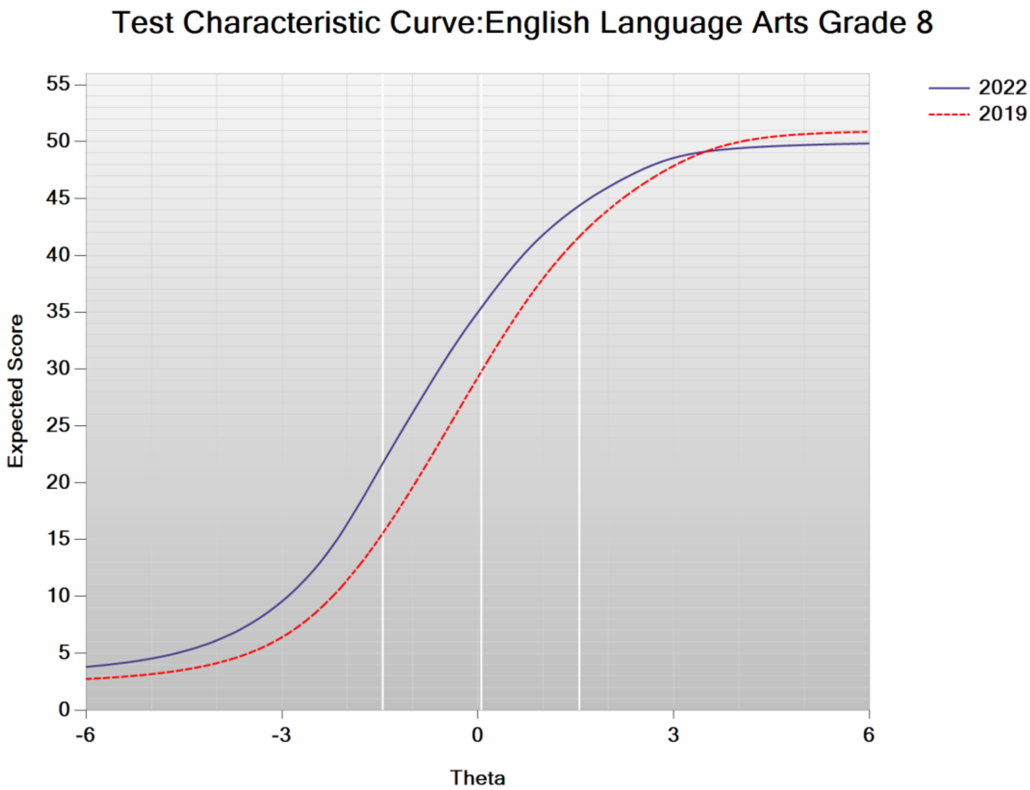

Test Information Function: English Language Arts Grade 7
Information
Theta
14
10.5
7
3.5
0
-6
-3
0
3
6
2022
2019


Cumulative Scale Score Distributions: English Language Arts Grade 7
Cumulative Proportion
Scale Score
1
0.8
0.6
0.4
0.2
0
440
465
490
515
540
2022
2019

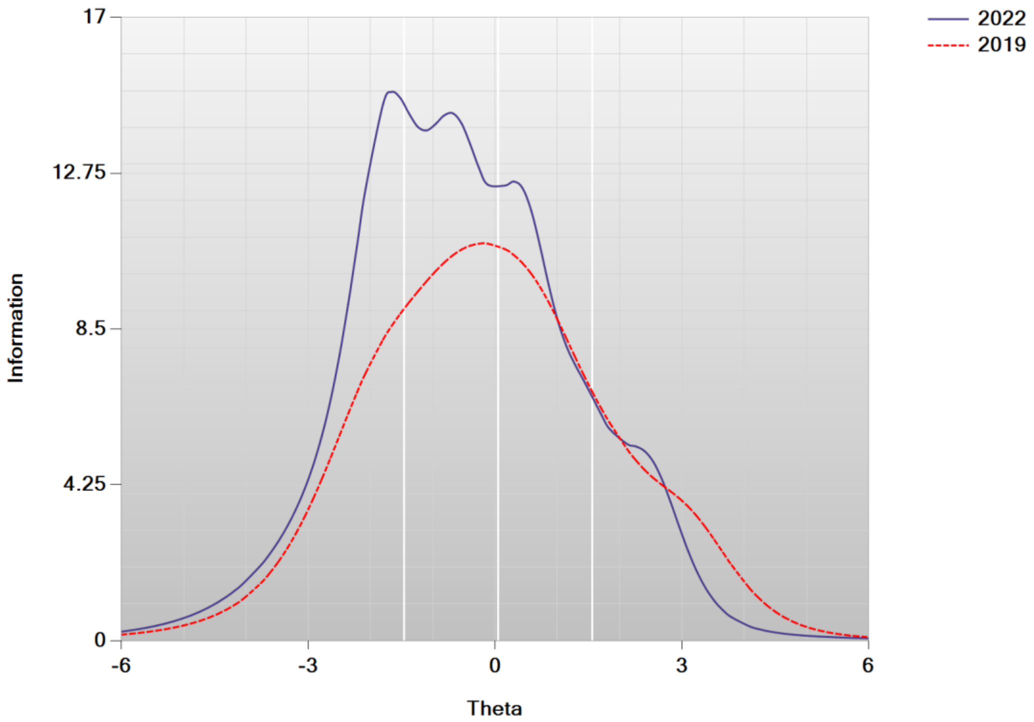

A/A Plot: English Language Arts Grade 8
MC Retained
CR Retained
Identity Line
Previous Values
2022 Values
0
1
2
3


B/B Plot: English Language Arts Grade 8
MC Retained
MC Flagged
CR Retained
CR Flagged
Identity Line
Previous Values
2022 Values
-3
-2
-1
0
1
2
3

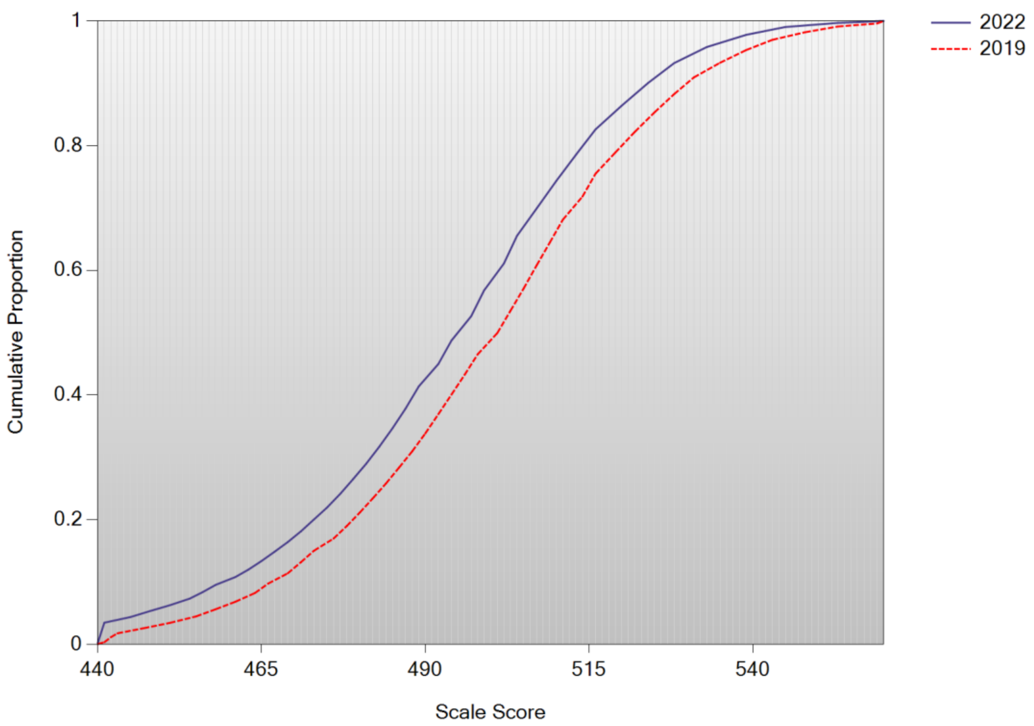

Delta Plot: English Language Arts Grade 8
MC Retained
MC Flagged
CR Retained
CR Flagged
Identity Line
Previous Values
2022 Values
0
2
4
6
8
10
12
14
16
18
20
22
24

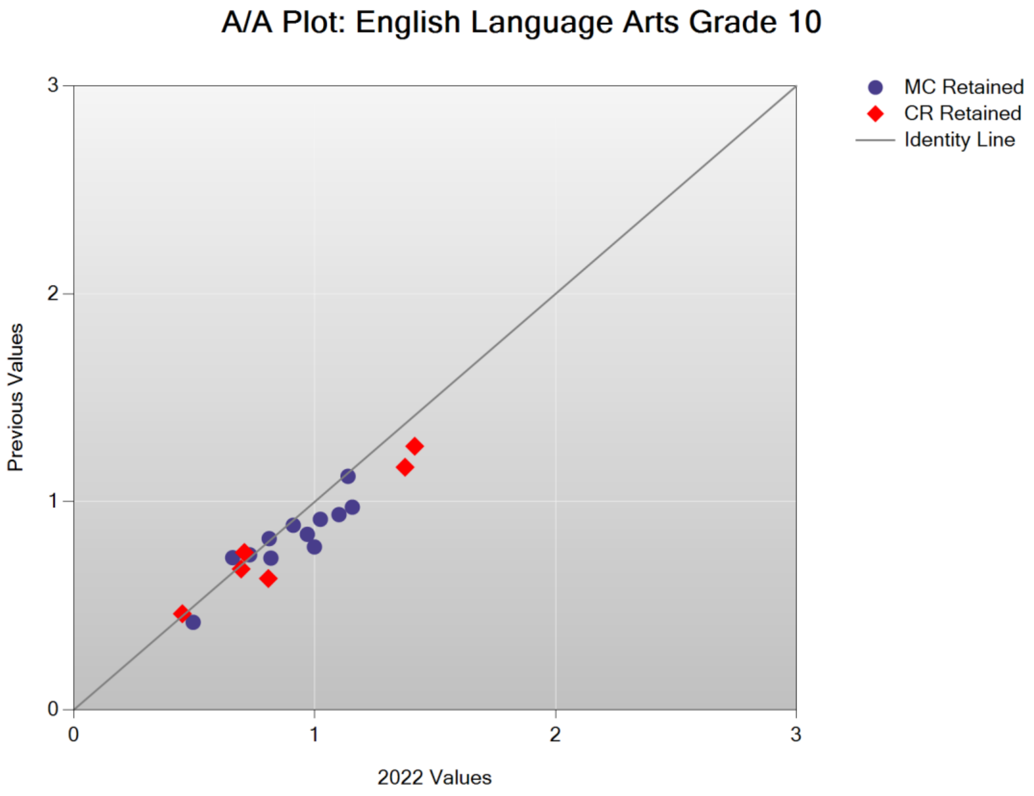

Test Characteristic Curve:English Language Arts Grade 8
2022
2019
Expected Score
Theta
55
50
45
40
35
30
25
20
15
10
5
0
-6
-3
0
3
6

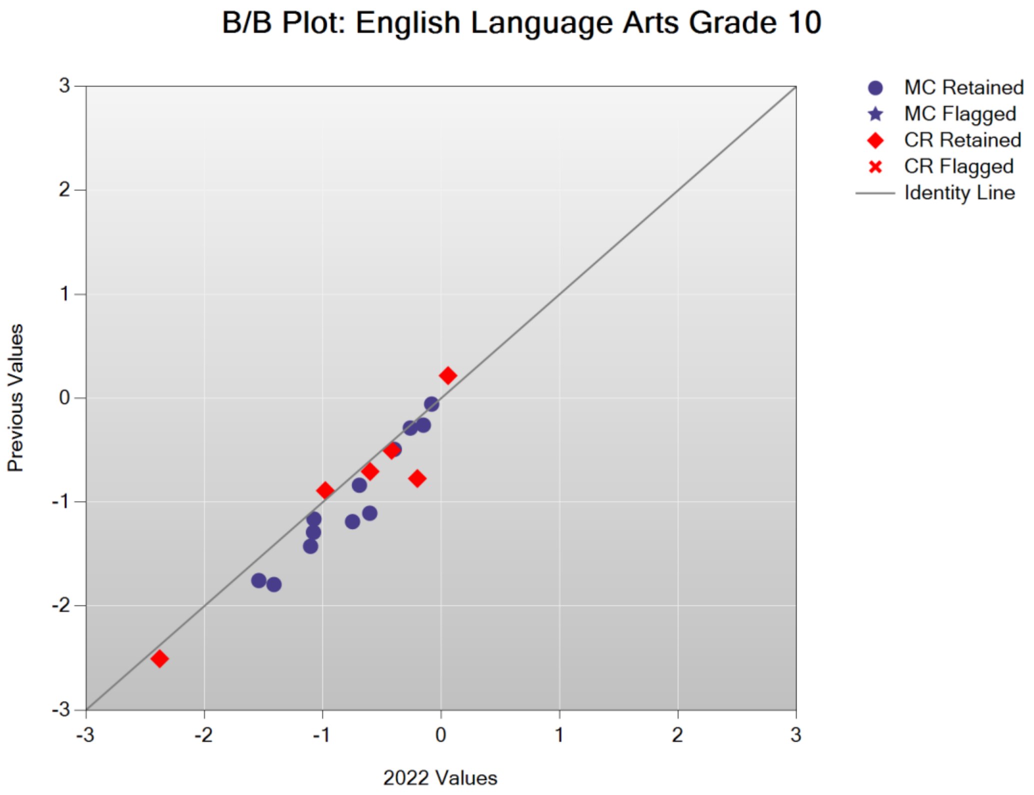
Test Information Function: English Language Arts Grade 8

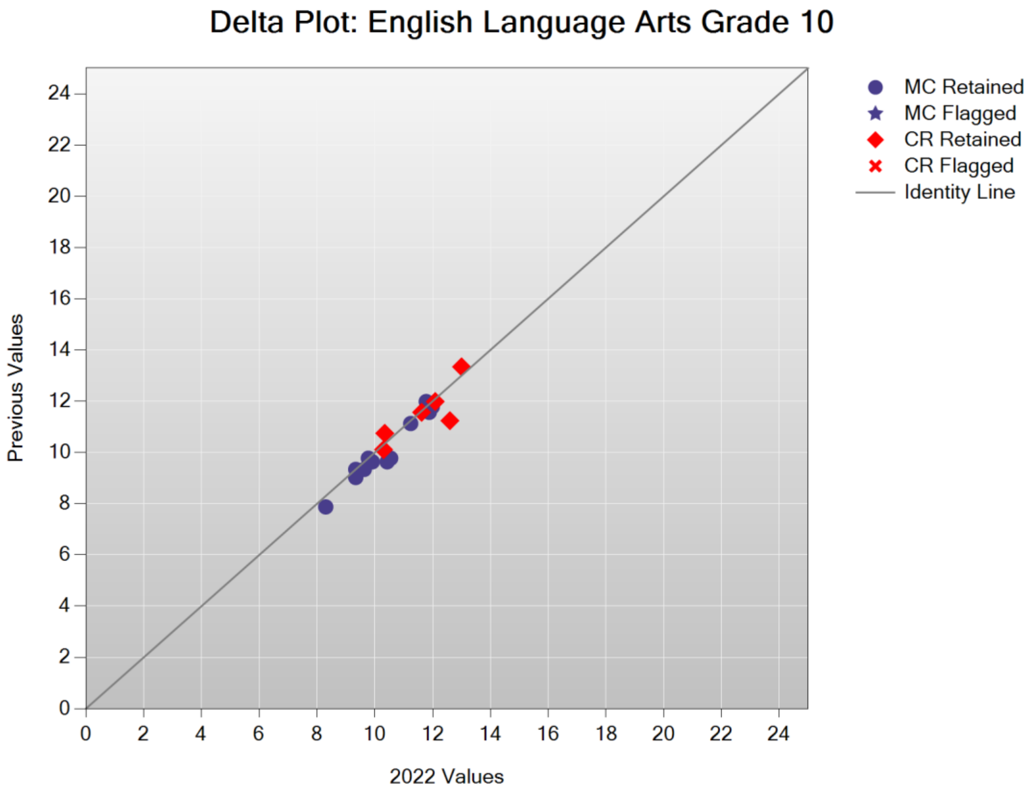


Cumulative Scale Score Distributions: English Language Arts Grade 8

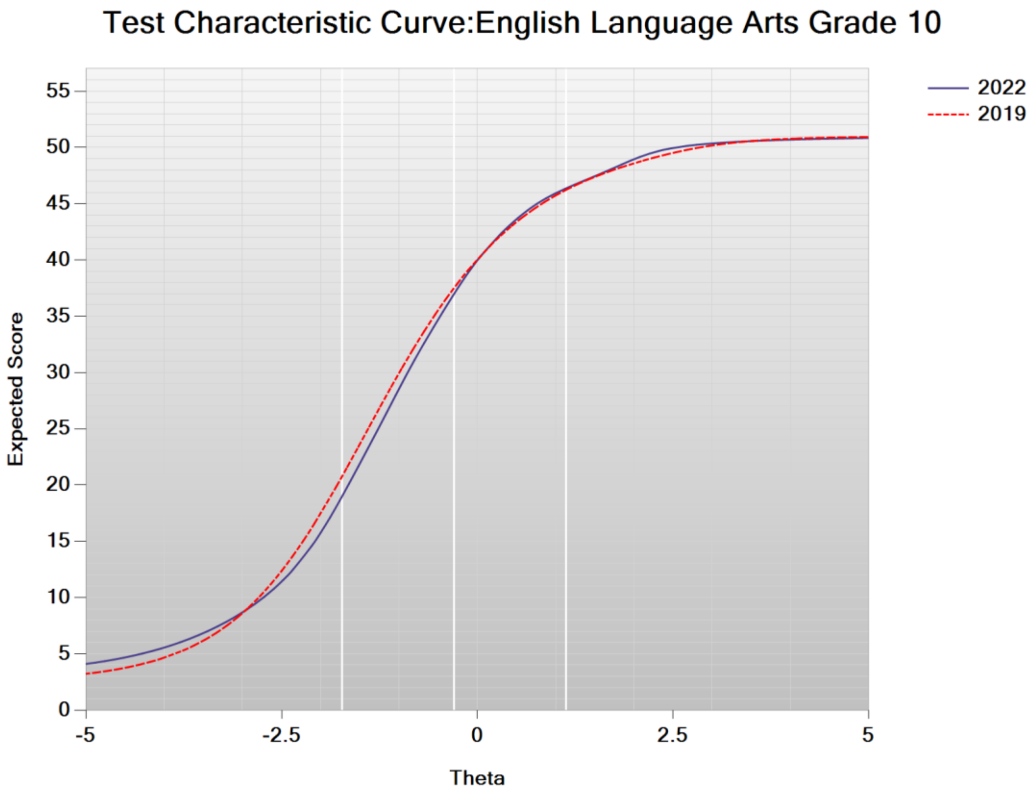



A/A Plot: English Language Arts Grade 10
MC Retained
CR Retained
Identity Line
Previous Values
2022 Values
0
1
2
3

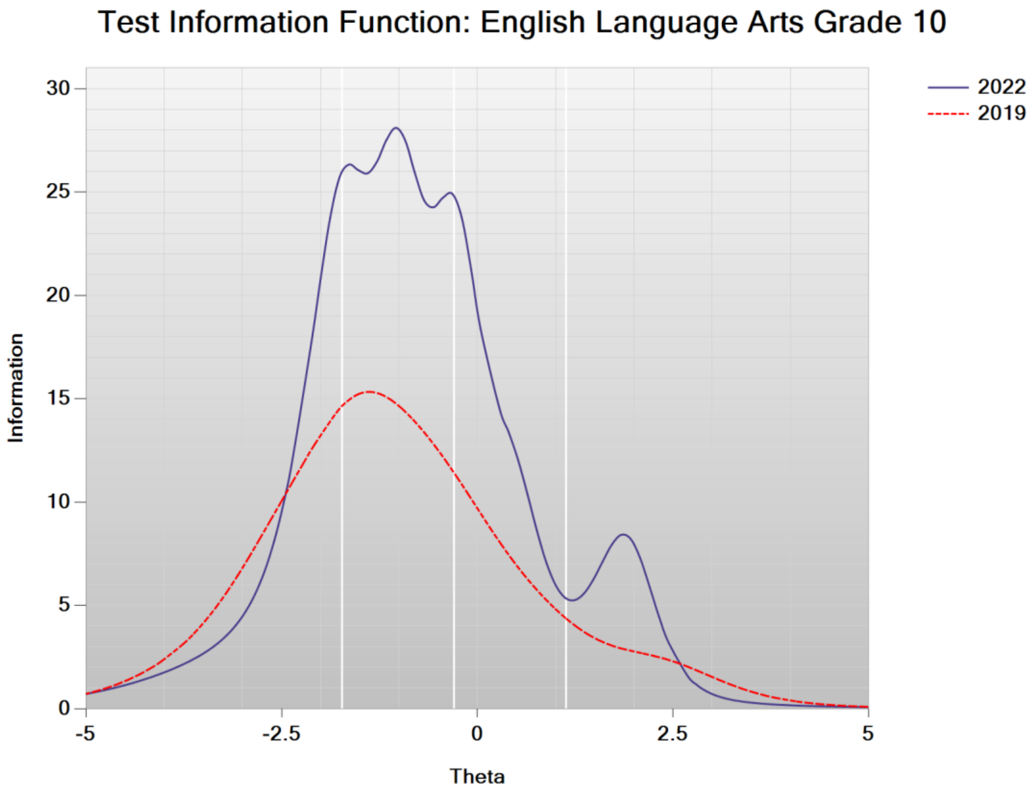

B/B Plot: English Language Arts Grade 10
MC Retained
MC Flagged
CR Retained
CR Flagged
Identity Line
Previous Values
2022 Values
-3
-2
-1
0
1
2
3



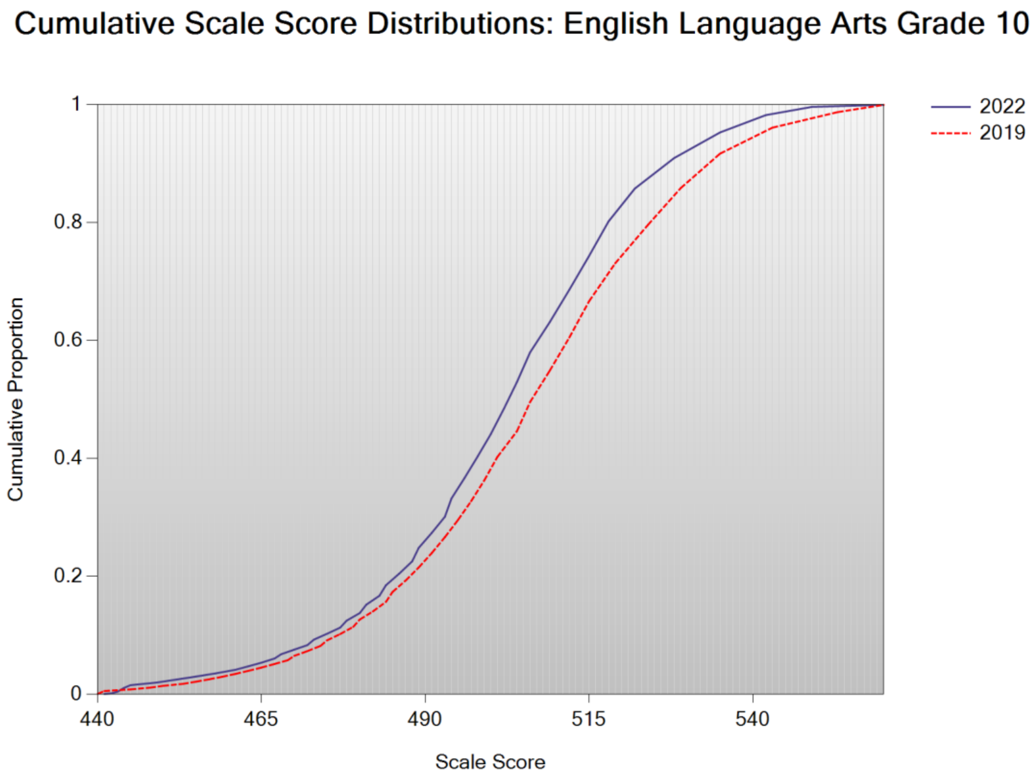
Delta Plot: English Language Arts Grade 10
MC Retained
MC Flagged
CR Retained
CR Flagged
Identity Line
Previous Values
2022 Values



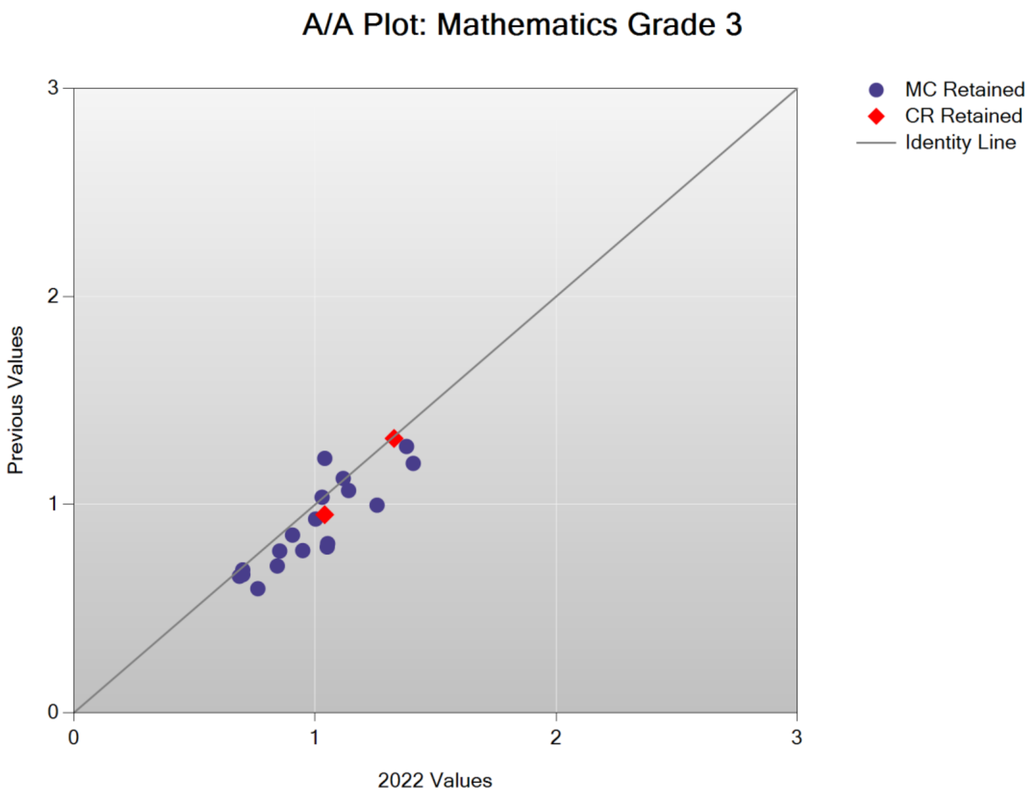
Test Characteristic Curve:English Language Arts Grade 10
2022
2019
Expected Score
Theta

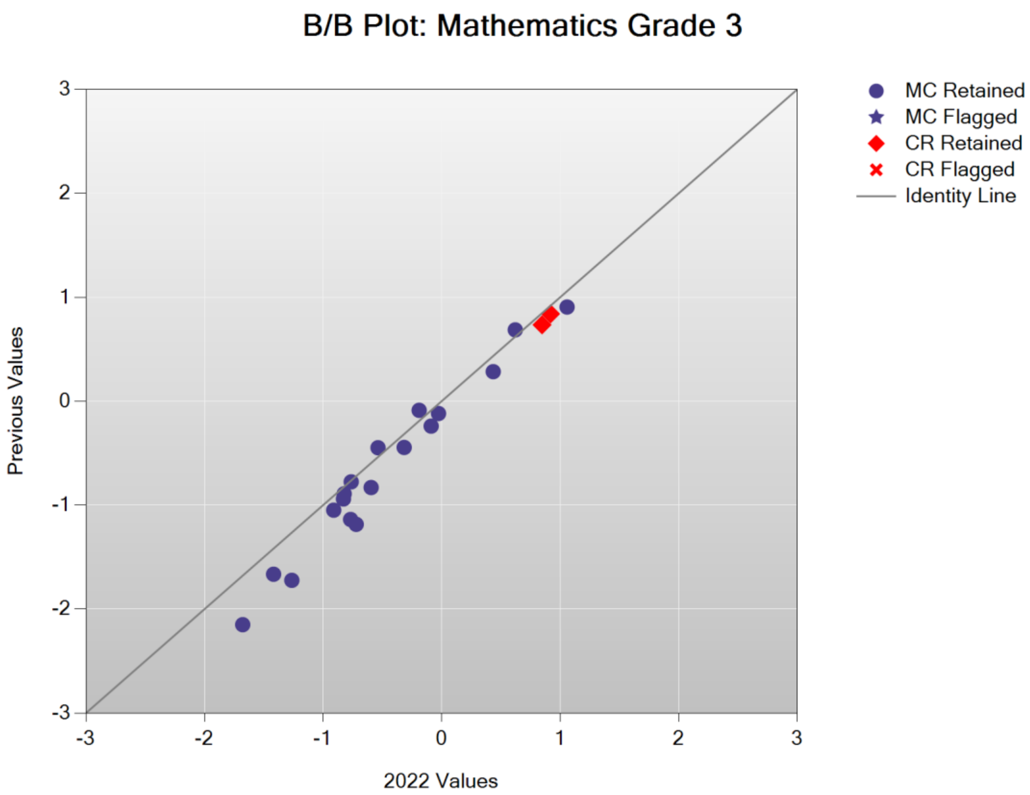


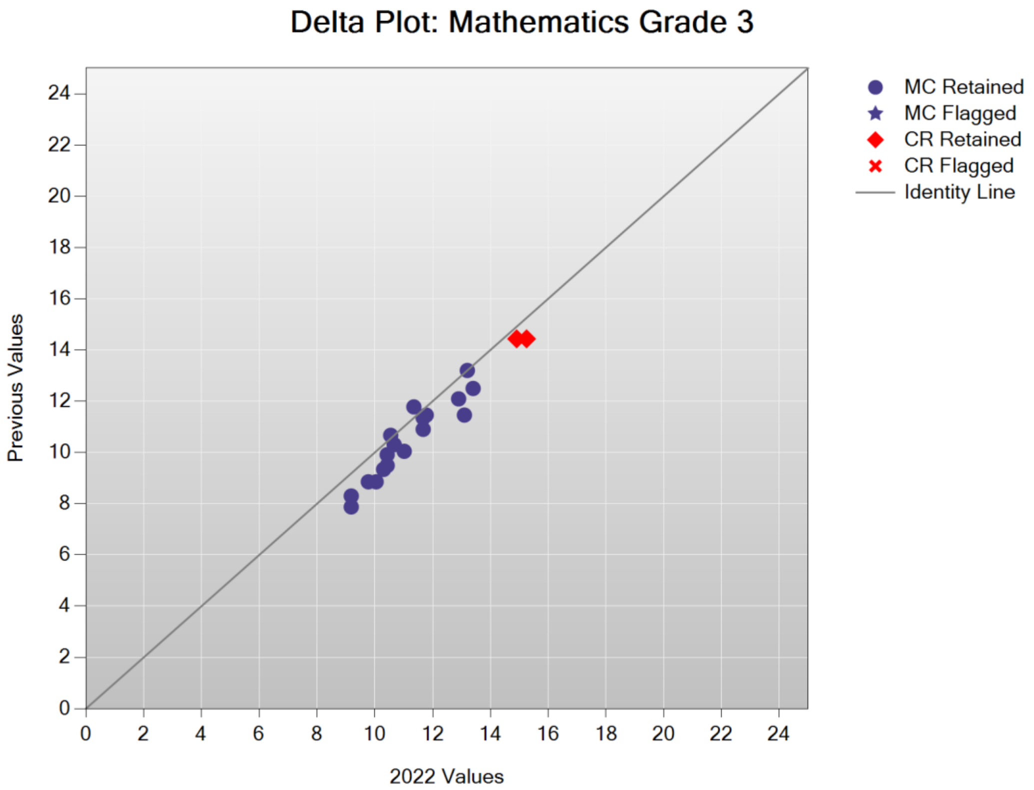
Test Information Function: English Language Arts Grade 10
2022
2019
Information
30
25
20
15
10
5
0
-5
-2.5
0
2.5
5
Theta



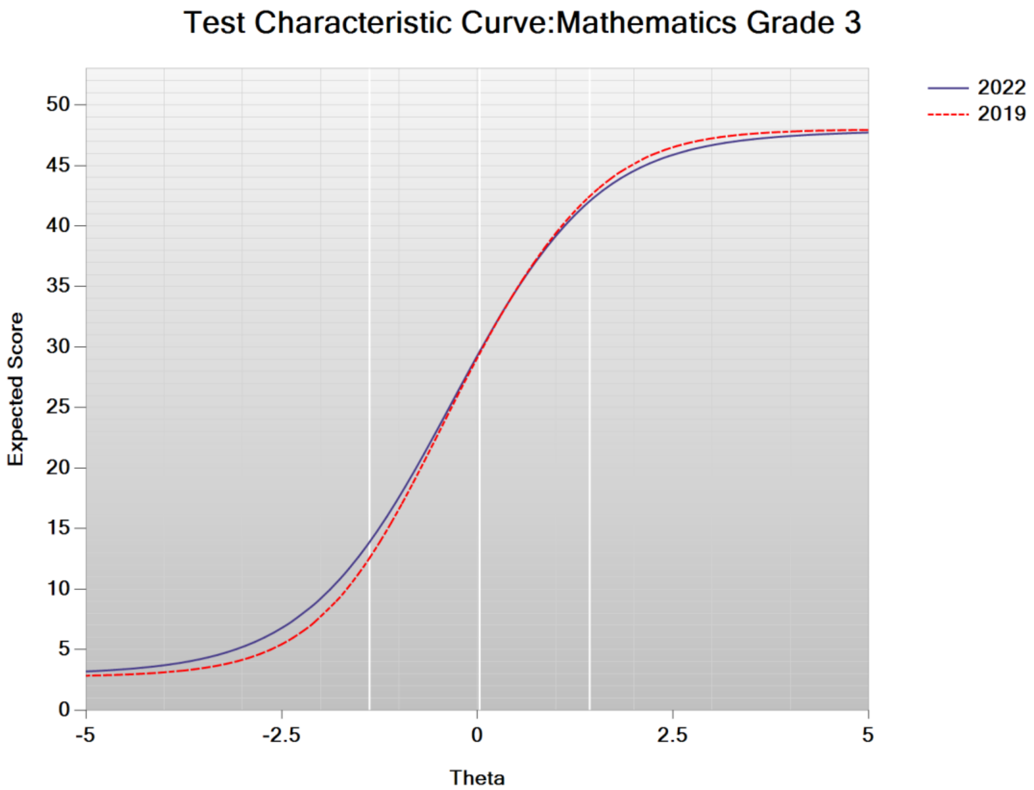
Cumulative Scale Score Distributions: English Language Arts Grade 10
2022
2019
Cumulative Proportion
1
0.8
0.6
0.4
0.2
0
440
465
490
515
540
Scale Score


A/A Plot: Mathematics Grade 3
MC Retained
CR Retained
Identity Line
Previous Values
2022 Values
0
1
2
3

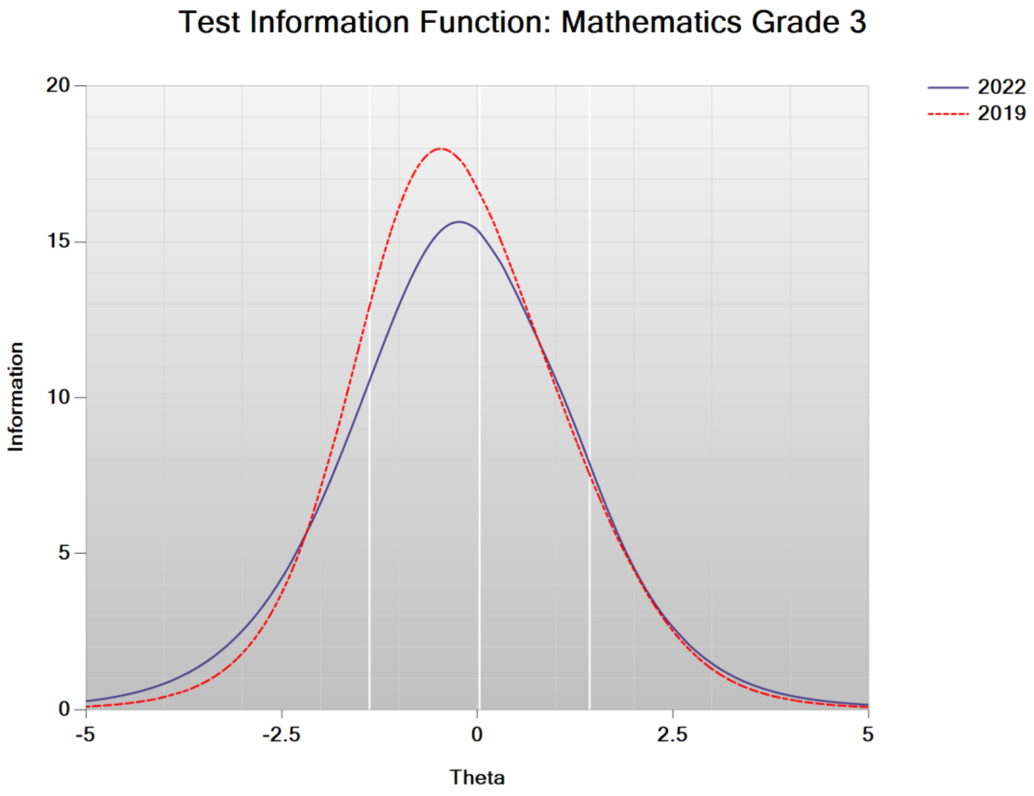

B/B Plot: Mathematics Grade 3
MC Retained
MC Flagged
CR Retained
CR Flagged
Identity Line
Previous Values
2022 Values
-3
-2
-1
0
1
2
3

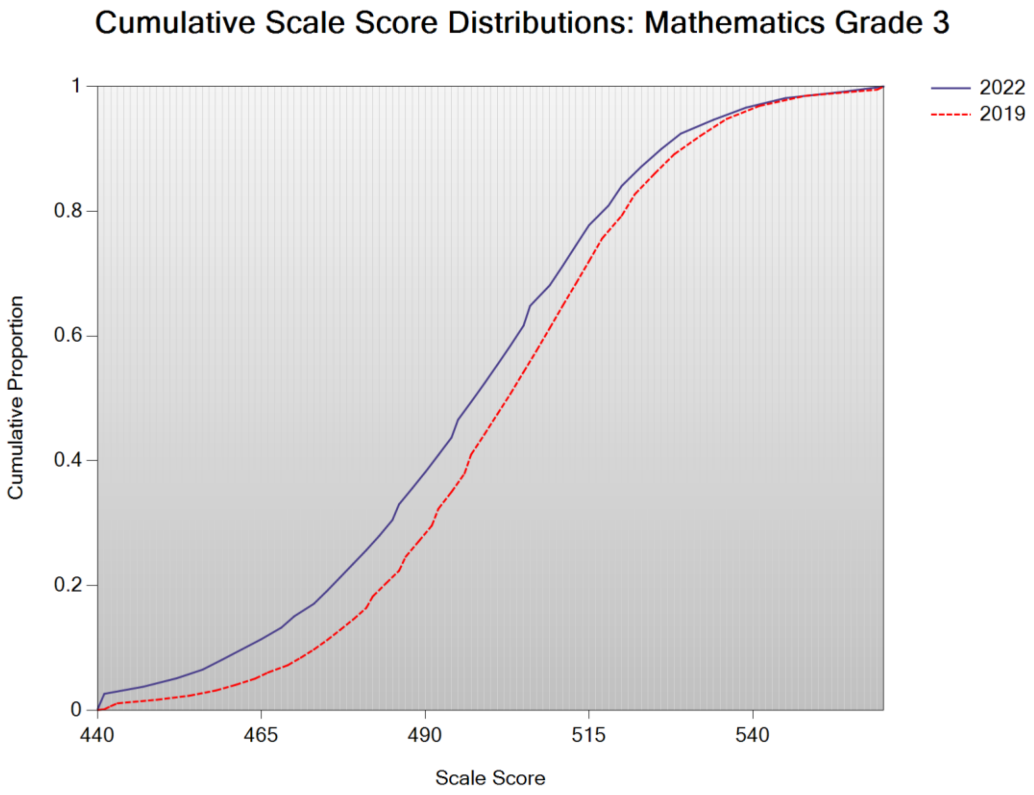


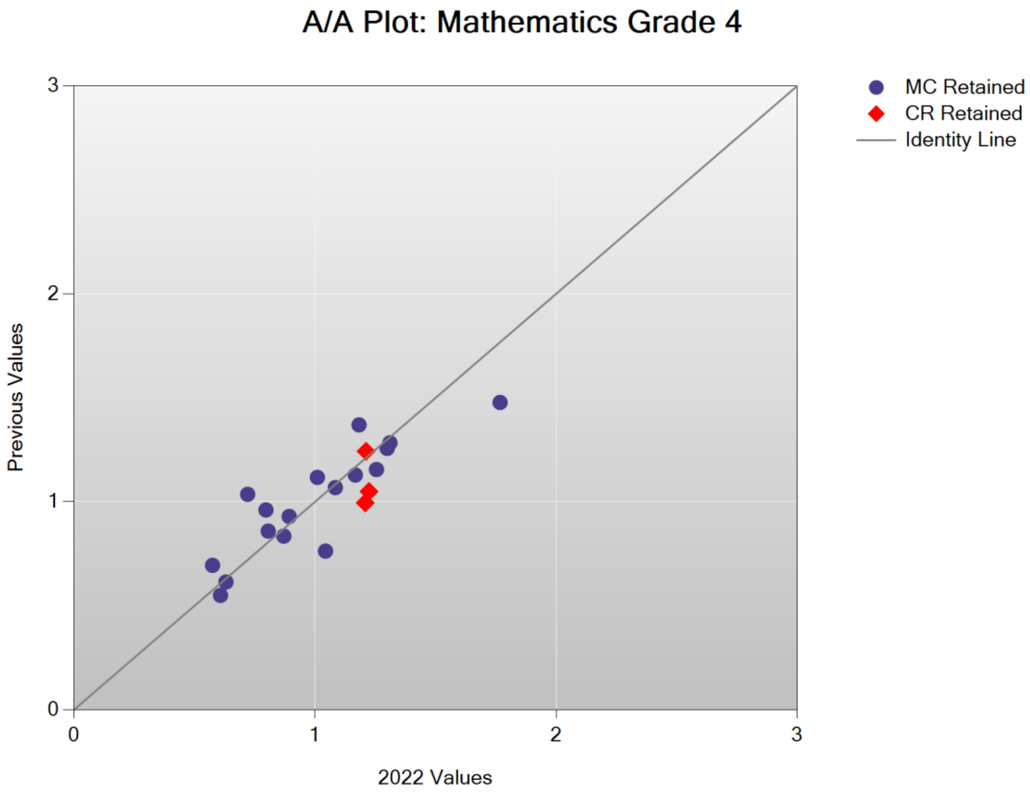
Delta Plot: Mathematics Grade 3
Previous Values
2022 Values
MC Retained
MC Flagged
CR Retained
CR Flagged
Identity Line

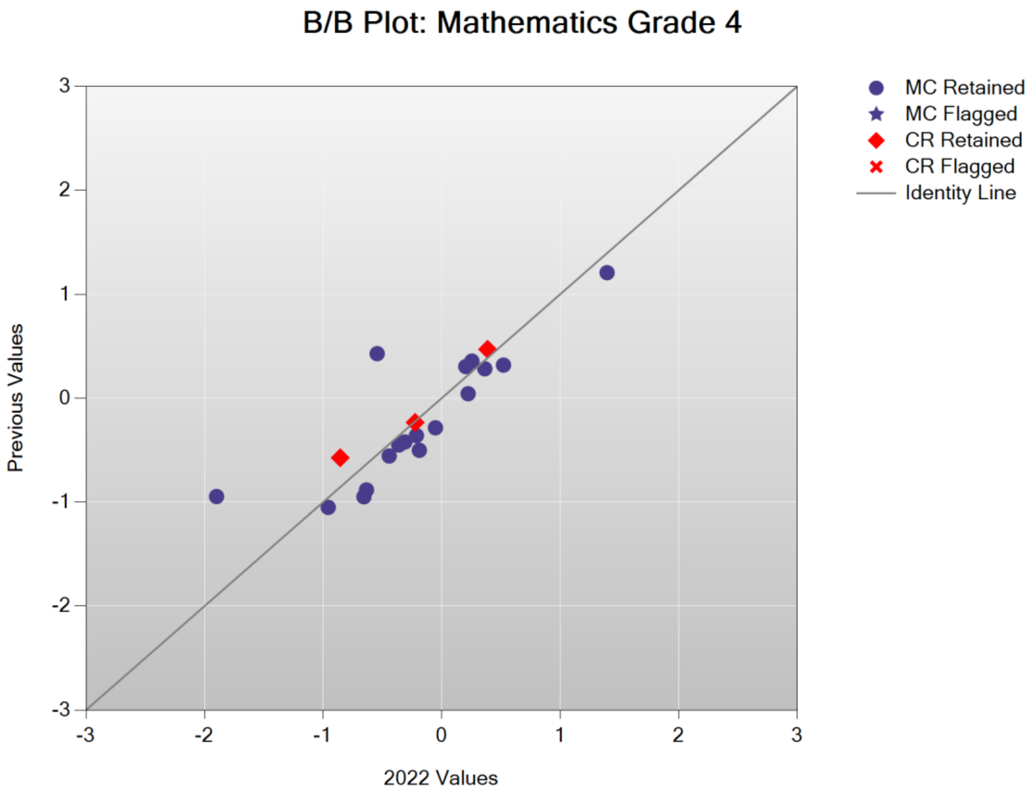


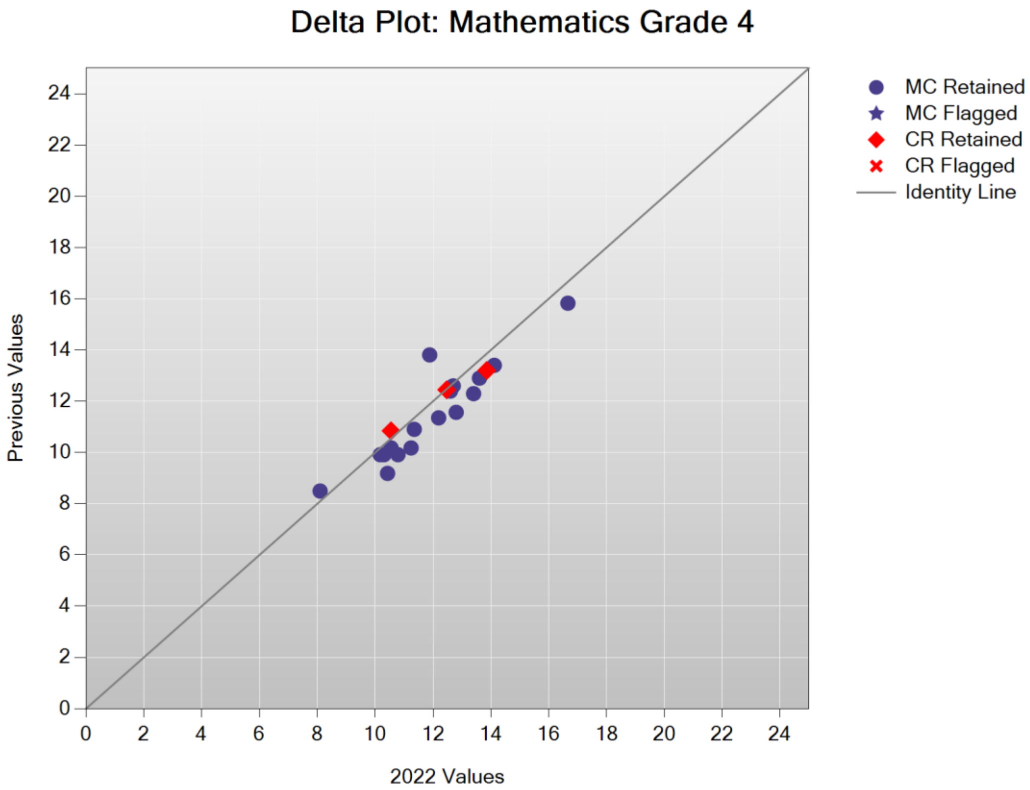
Test Characteristic Curve:Mathematics Grade 3
Expected Score
Theta
2022
2019

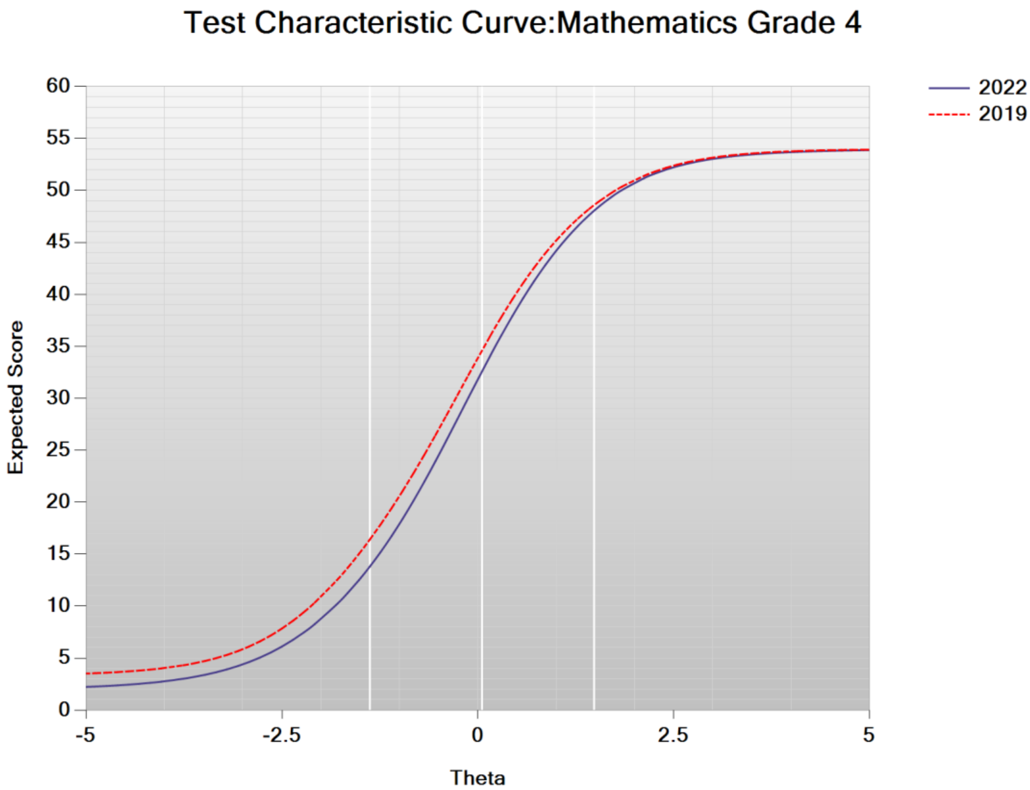

Test Information Function: Mathematics Grade 3
2022
2019
Information
20
15
10
5
0
-5
-2.5
0
2.5
5
Theta

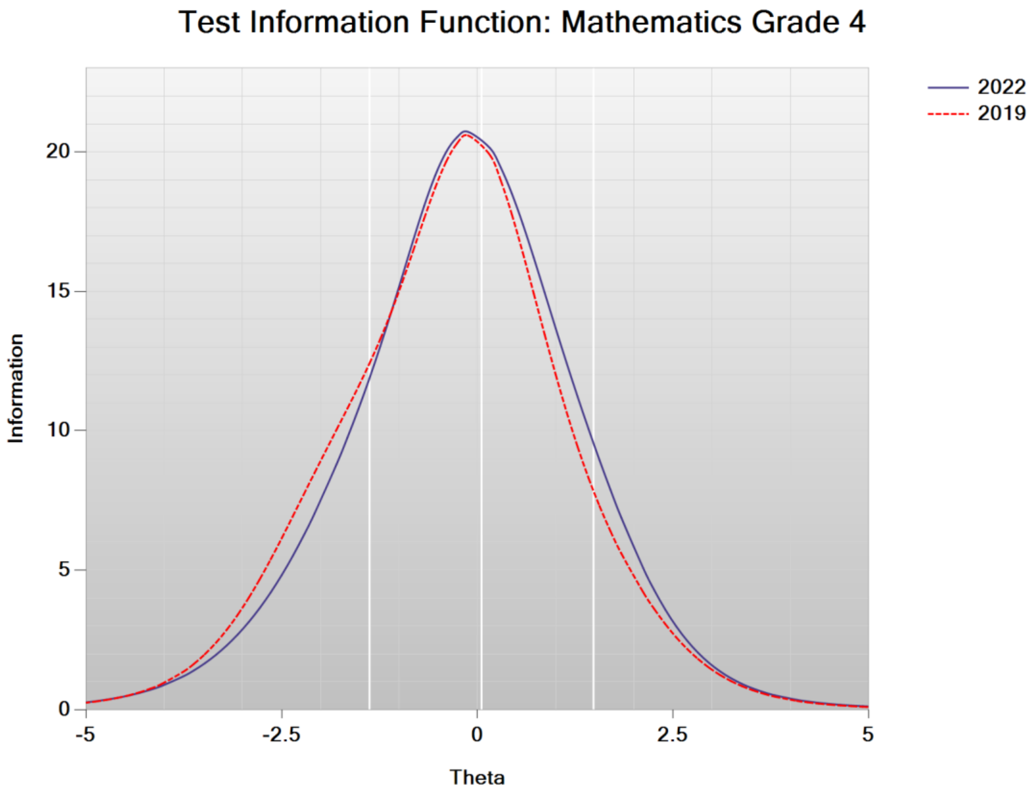

Cumulative Scale Score Distributions: Mathematics Grade 3
2022
2019
Cumulative Proportion
1
0.8
0.6
0.4
0.2
0
440
465
490
515
540
Scale Score

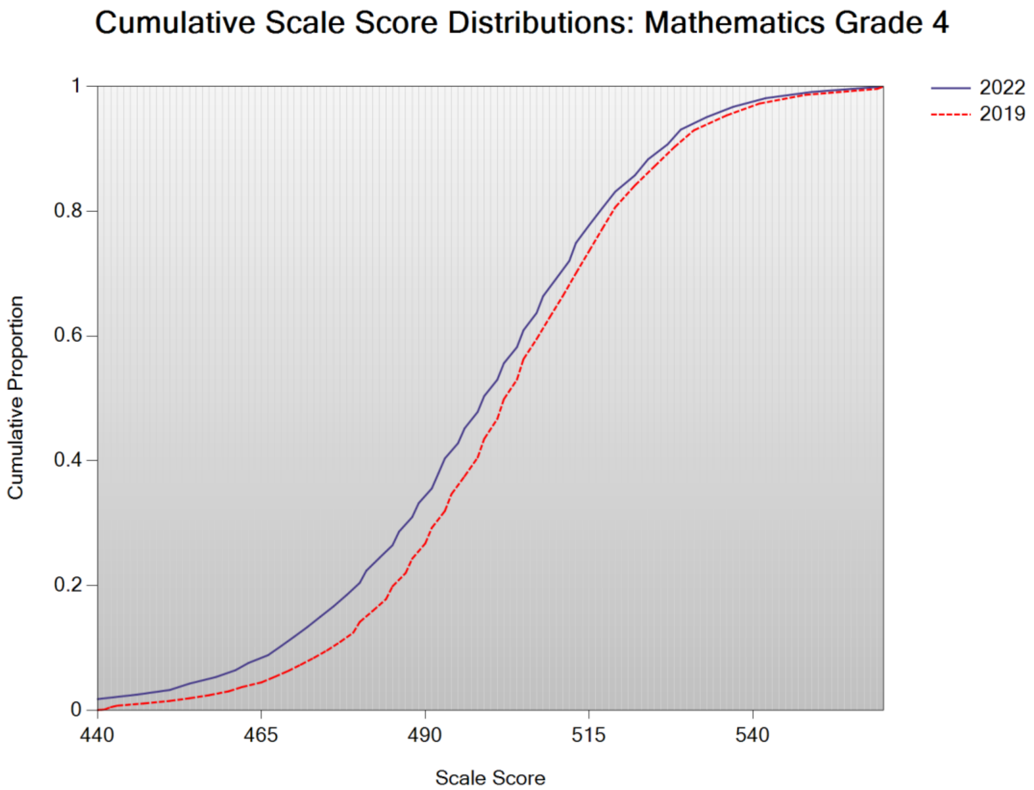

A/A Plot: Mathematics Grade 4
MC Retained
CR Retained
Identity Line
Previous Values
2022 Values
0
1
2
3


B/B Plot: Mathematics Grade 4
MC Retained
MC Flagged
CR Retained
CR Flagged
Identity Line
Previous Values
2022 Values
-3
-2
-1
0
1
2
3

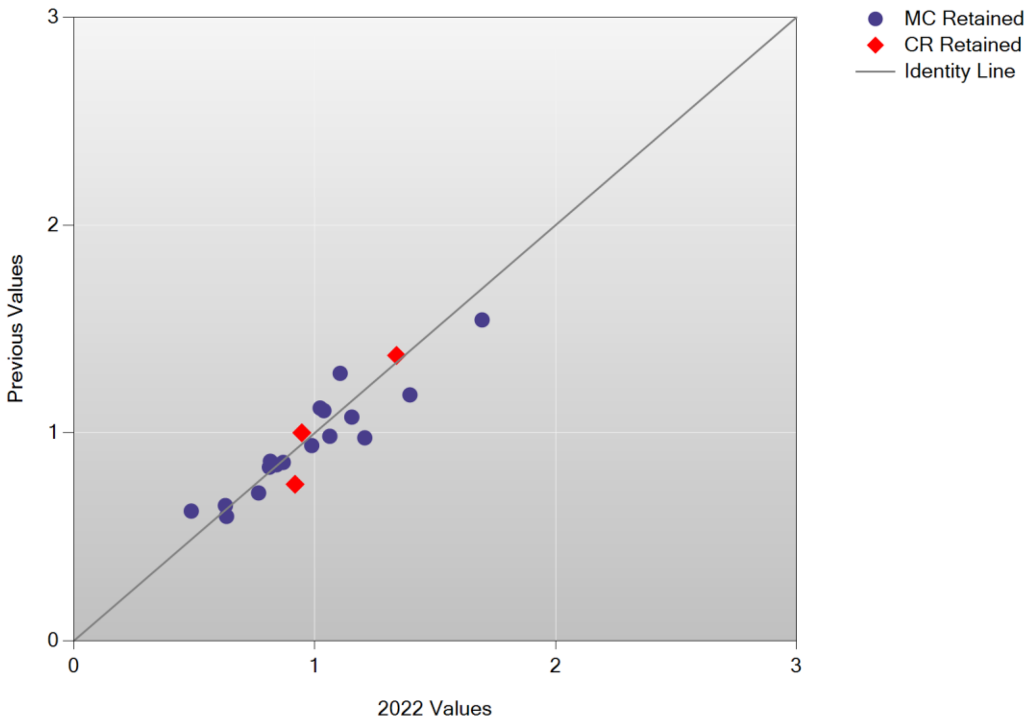

Delta Plot: Mathematics Grade 4
MC Retained
MC Flagged
CR Retained
CR Flagged
Identity Line
Previous Values
2022 Values
0
2
4
6
8
10
12
14
16
18
20
22
24


Test Characteristic Curve:Mathematics Grade 4
2022
2019
Expected Score
Theta
0
5
10
15
20
25
30
35
40
45
50
55
60
-5
-2.5
0
2.5
5

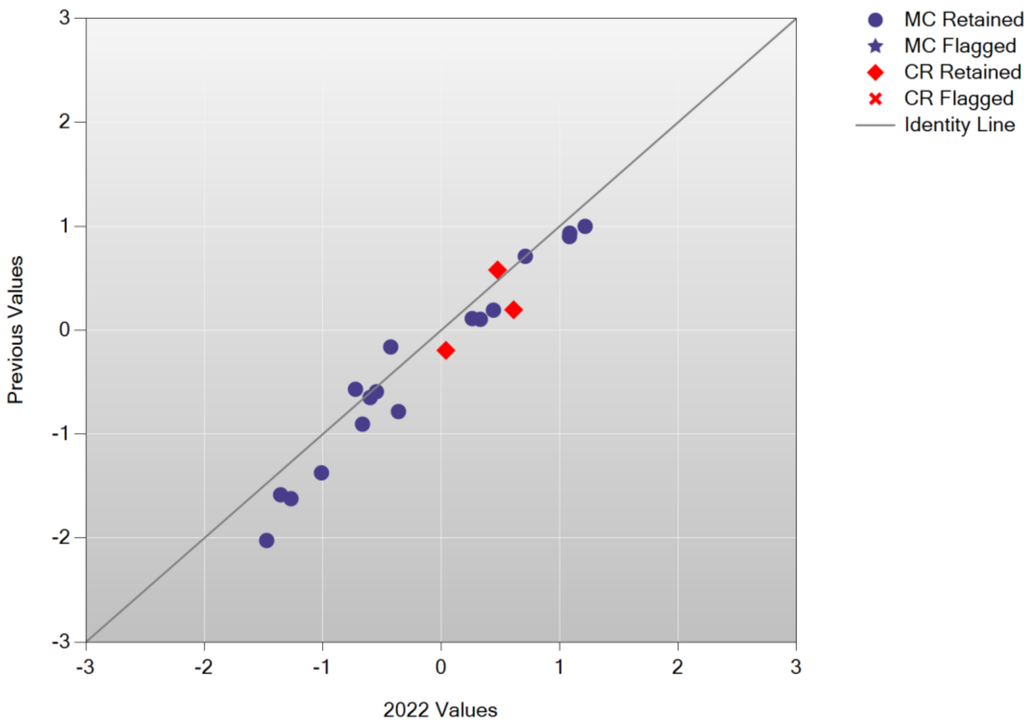

Test Information Function: Mathematics Grade 4
2022
2019
Information
20
15
10
5
0
-5
-2.5
0
2.5
5
Theta

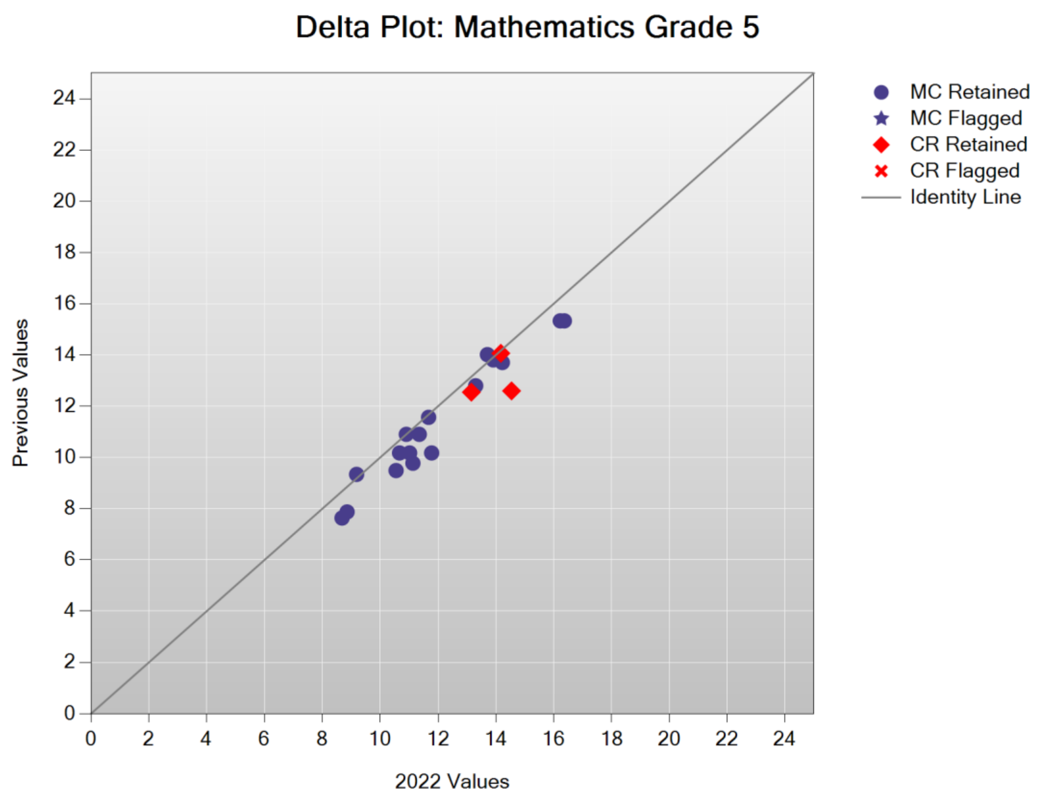

Cumulative Scale Score Distributions: Mathematics Grade 4
2022
2019
Cumulative Proportion
1
0.8
0.6
0.4
0.2
0
440
465
490
515
540
Scale Score

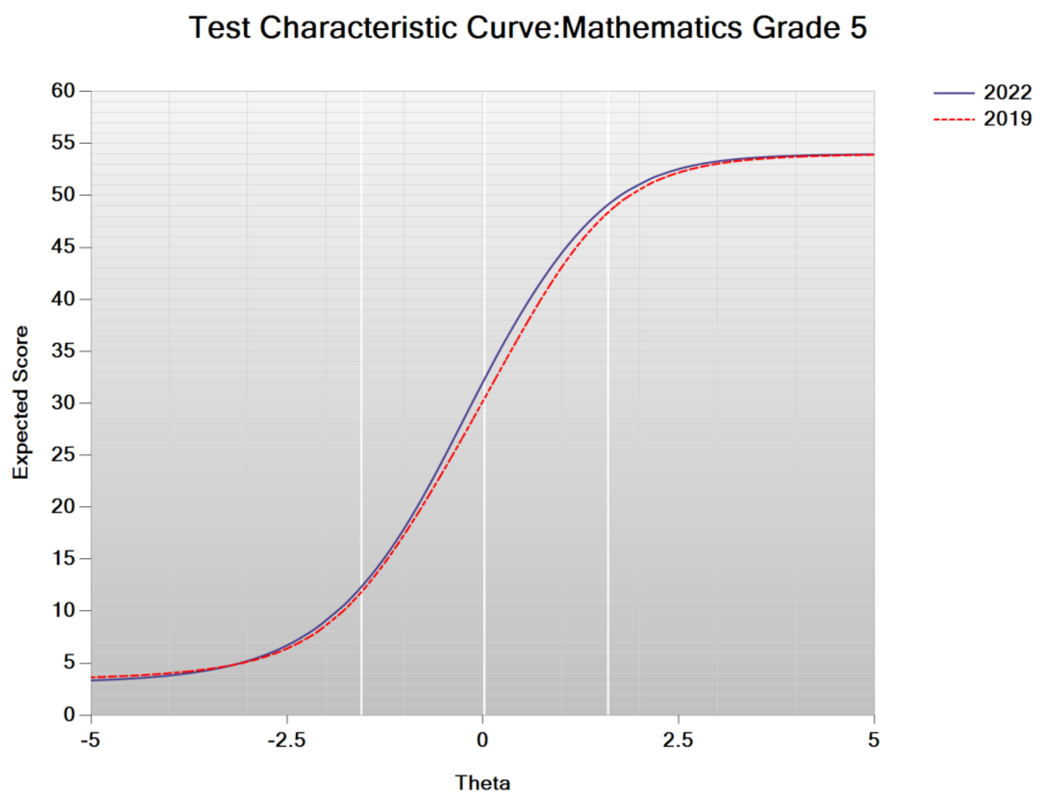
A/A Plot: Mathematics Grade 5



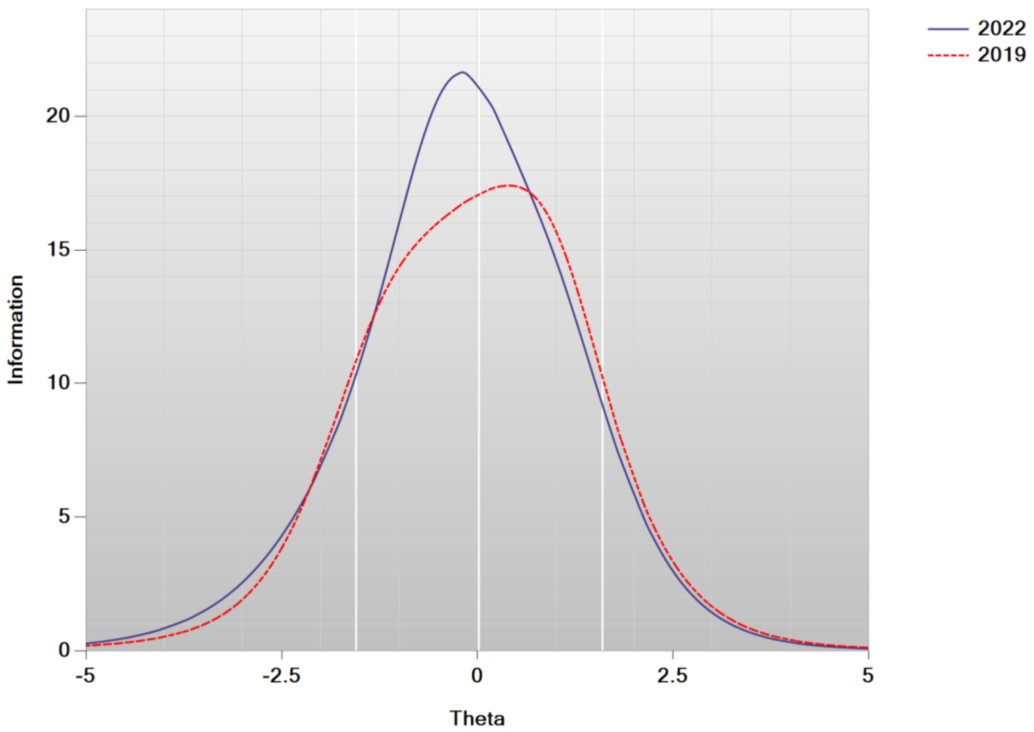
B/B Plot: Mathematics Grade 5



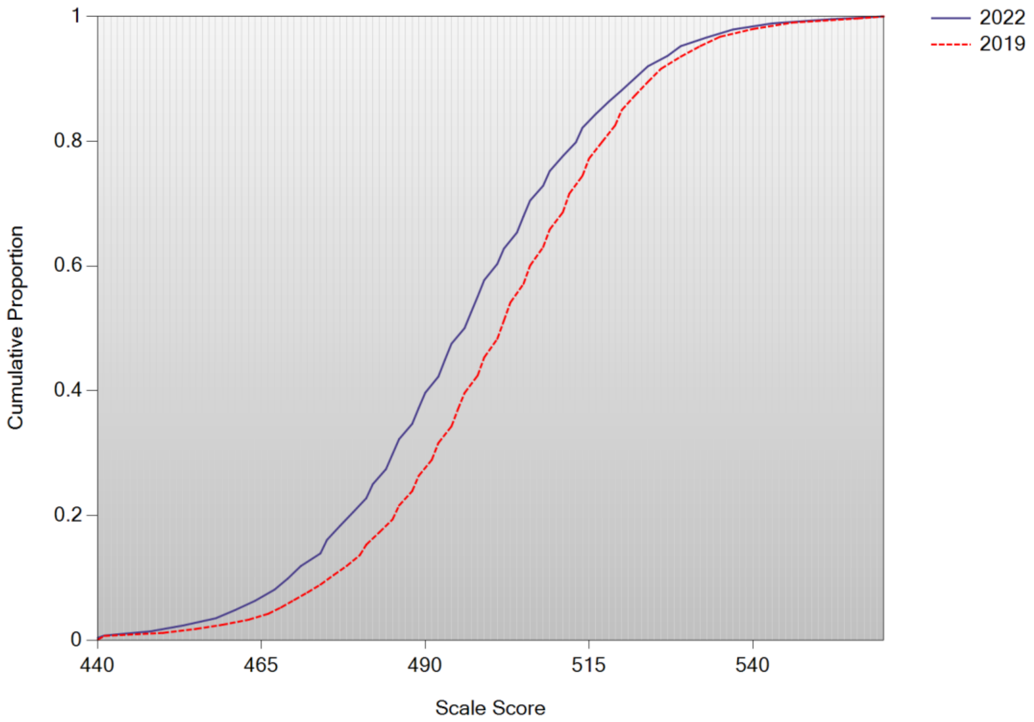

Delta Plot: Mathematics Grade 5
MC Retained
MC Flagged
CR Retained
CR Flagged
Identity Line
Previous Values
2022 Values
0
2
4
6
8
10
12
14
16
18
20
22
24

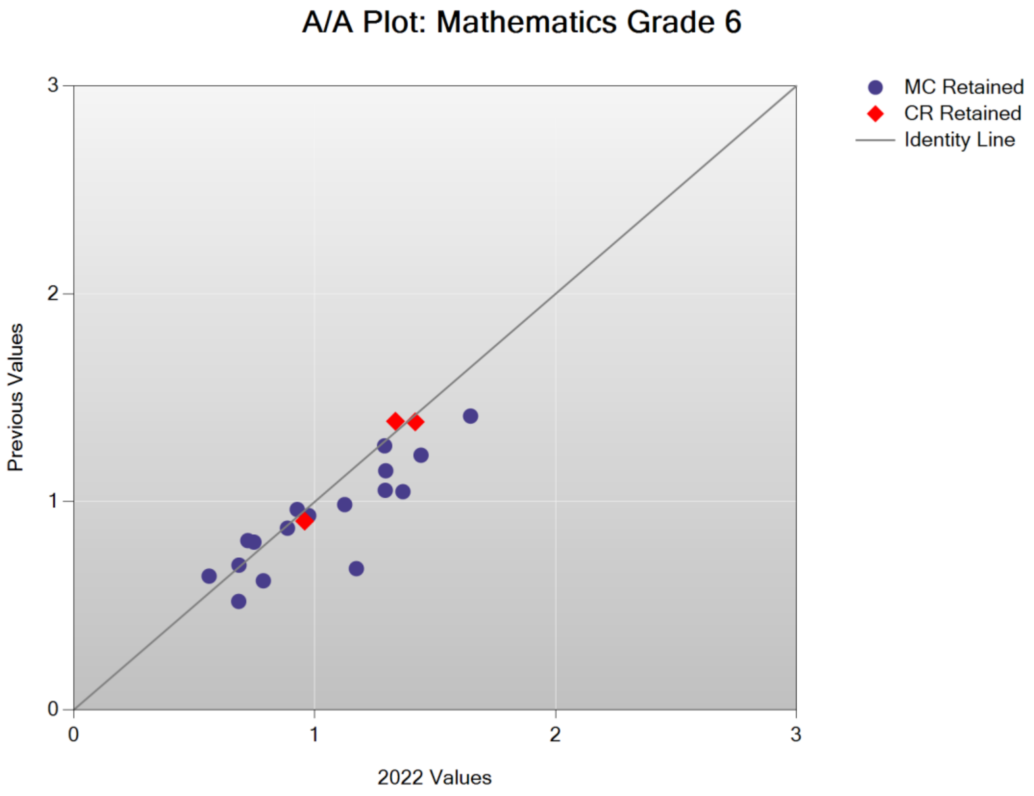

Test Characteristic Curve:Mathematics Grade 5
2022
2019
Expected Score
Theta
0
5
10
15
20
25
30
35
40
45
50
55
60
-5
-2.5
0
2.5
5

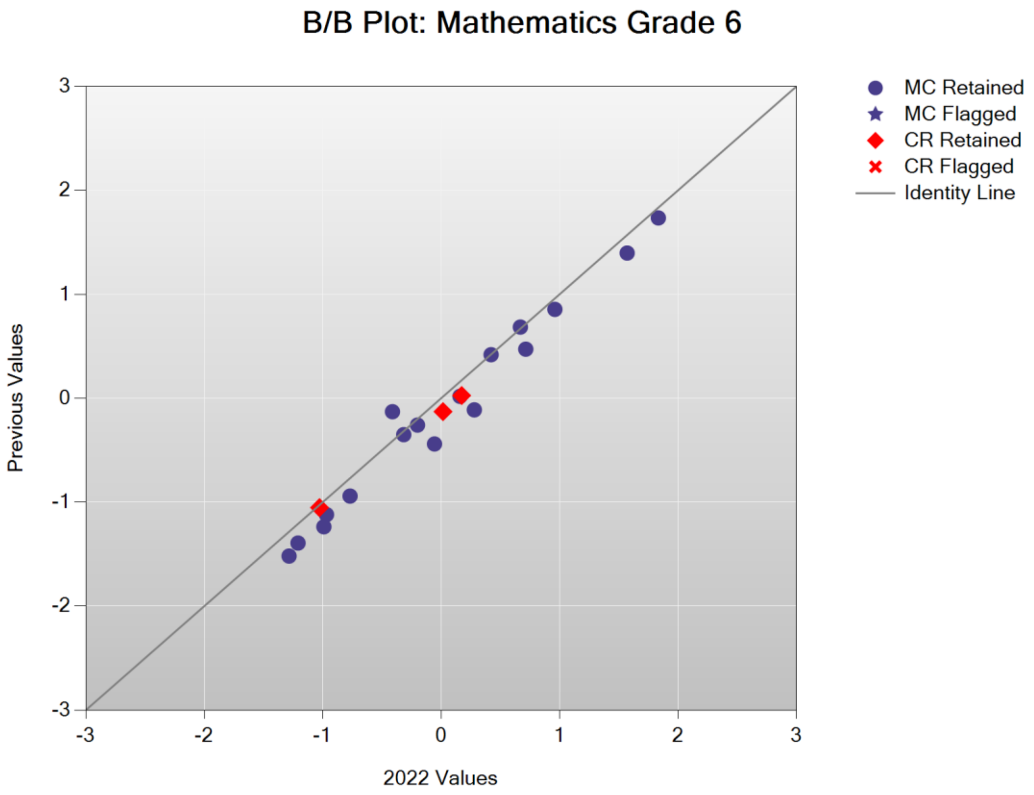
Test Information Function: Mathematics Grade 5

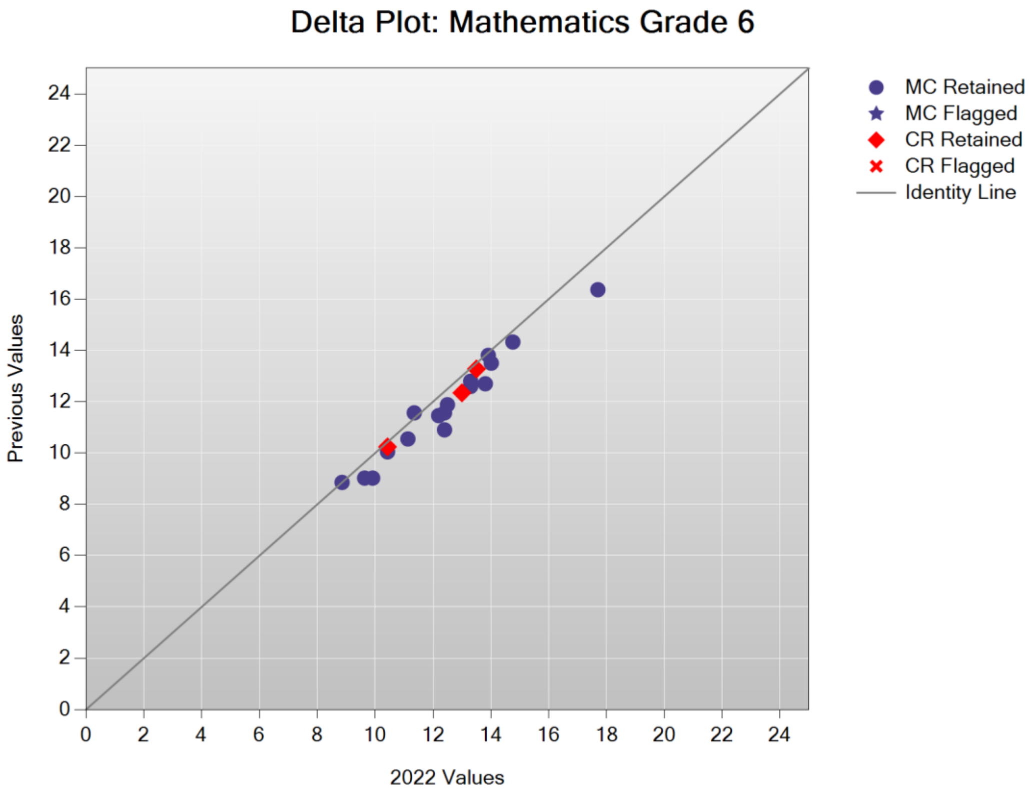


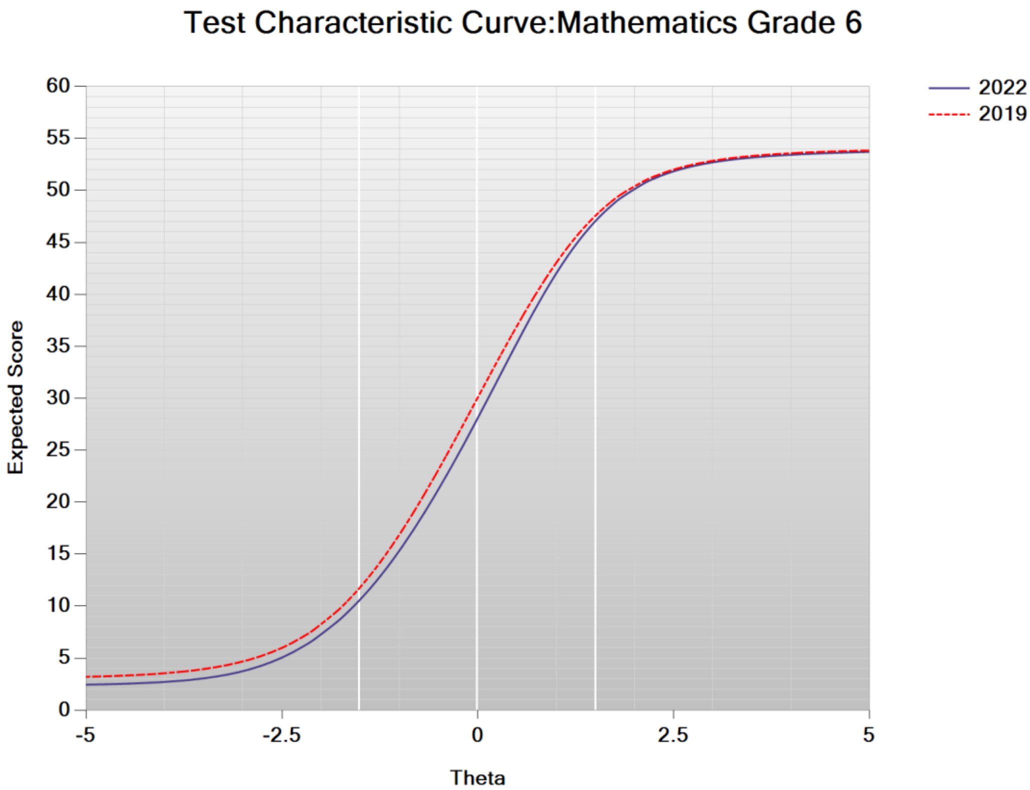
Cumulative Scale Score Distributions: Mathematics Grade 5

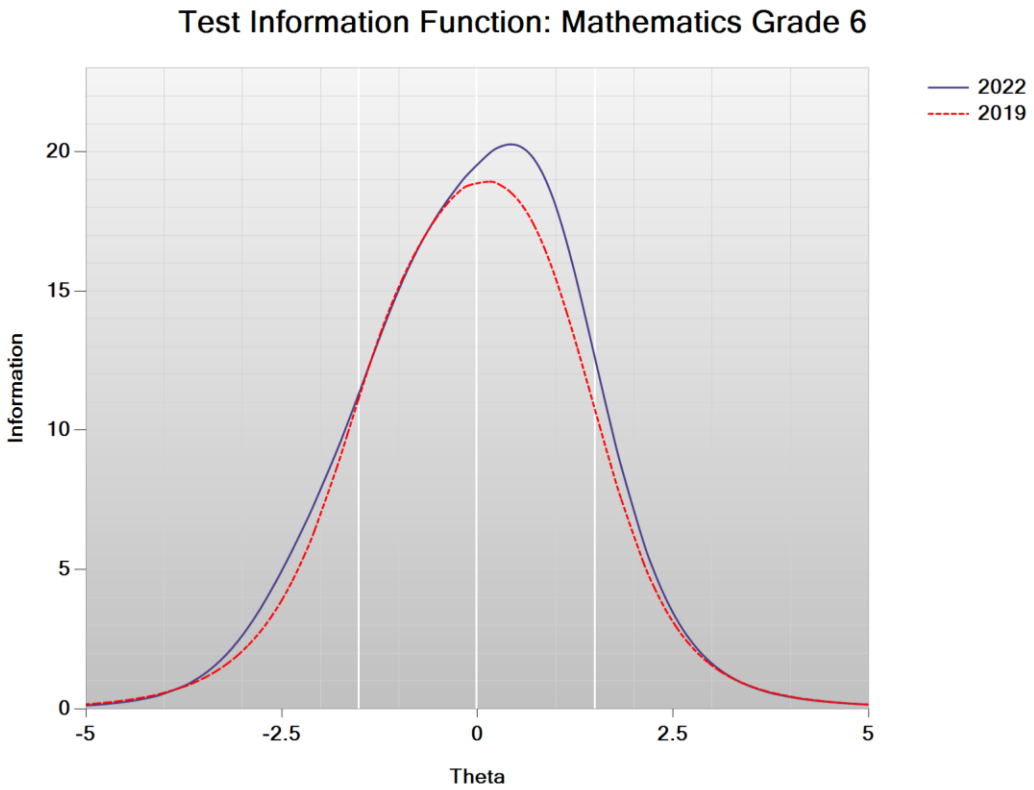


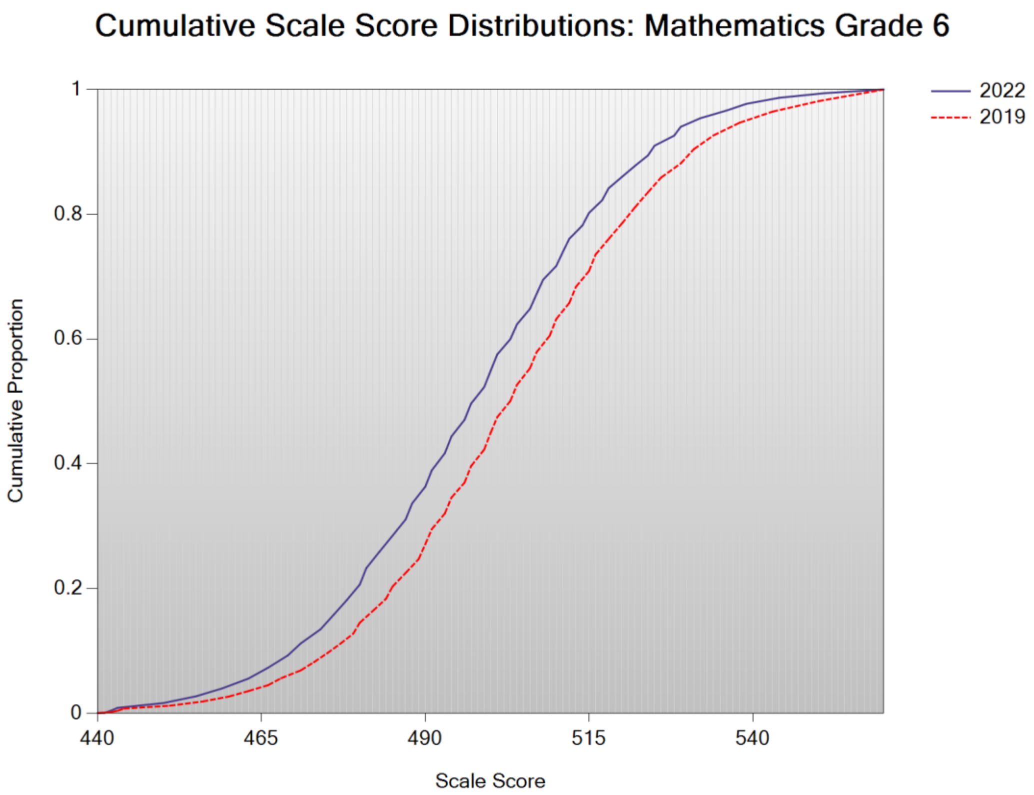

A/A Plot: Mathematics Grade 6
MC Retained
CR Retained
Identity Line
Previous Values
2022 Values
0
1
2
3

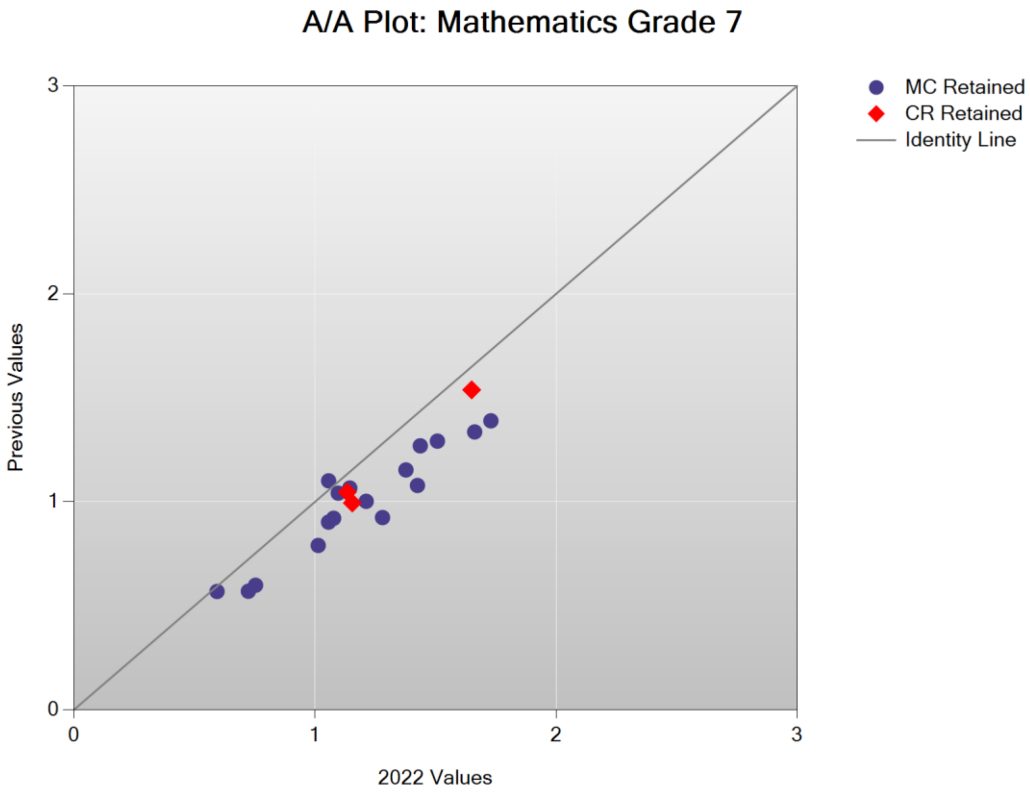

B/B Plot: Mathematics Grade 6
MC Retained
MC Flagged
CR Retained
CR Flagged
Identity Line
Previous Values
2022 Values
-3
-2
-1
0
1
2
3

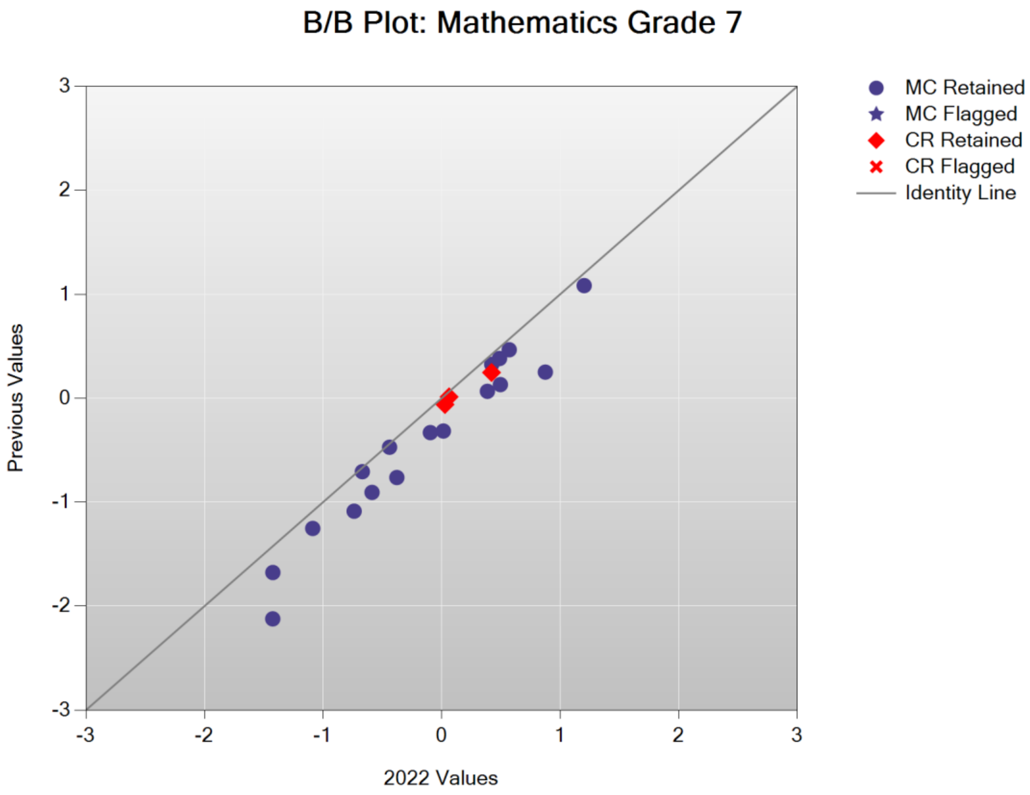

Delta Plot: Mathematics Grade 6
MC Retained
MC Flagged
CR Retained
CR Flagged
Identity Line
Previous Values
2022 Values
0
2
4
6
8
10
12
14
16
18
20
22
24


Test Characteristic Curve:Mathematics Grade 6
2022
2019
Expected Score
Theta
0
5
10
15
20
25
30
35
40
45
50
55
60
-5
-2.5
0
2.5
5

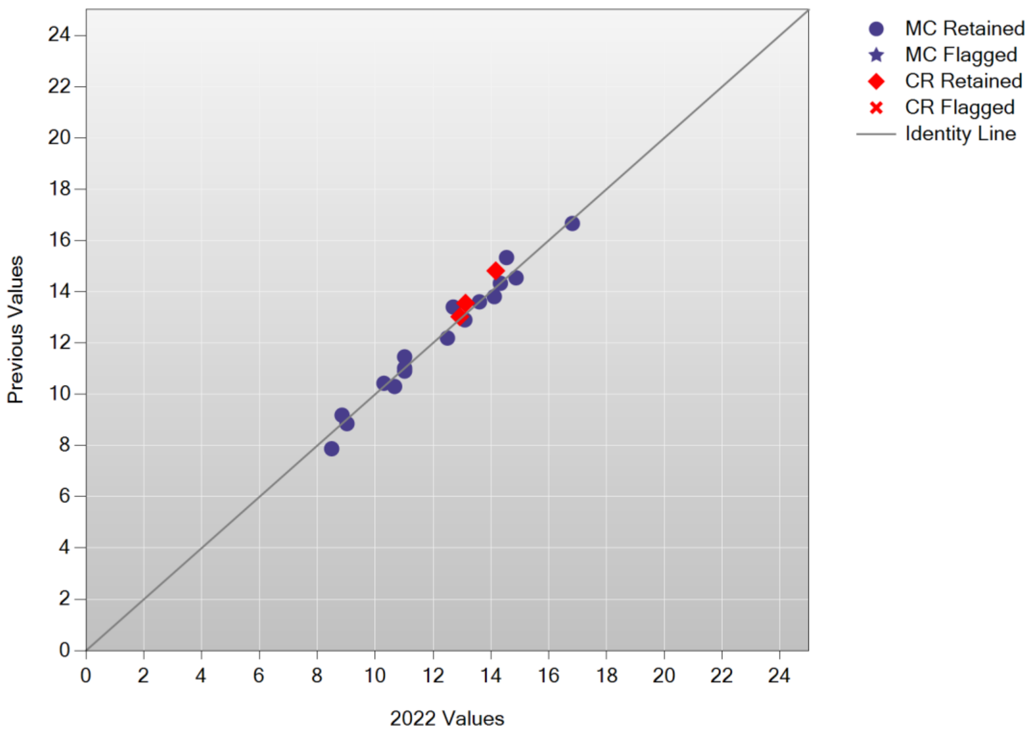

Test Information Function: Mathematics Grade 6
2022
2019
Information
20
15
10
5
0
-5
-2.5
0
2.5
5
Theta


Cumulative Scale Score Distributions: Mathematics Grade 6
2022
2019
Cumulative Proportion
1
0.8
0.6
0.4
0.2
0
440
465
490
515
540
Scale Score

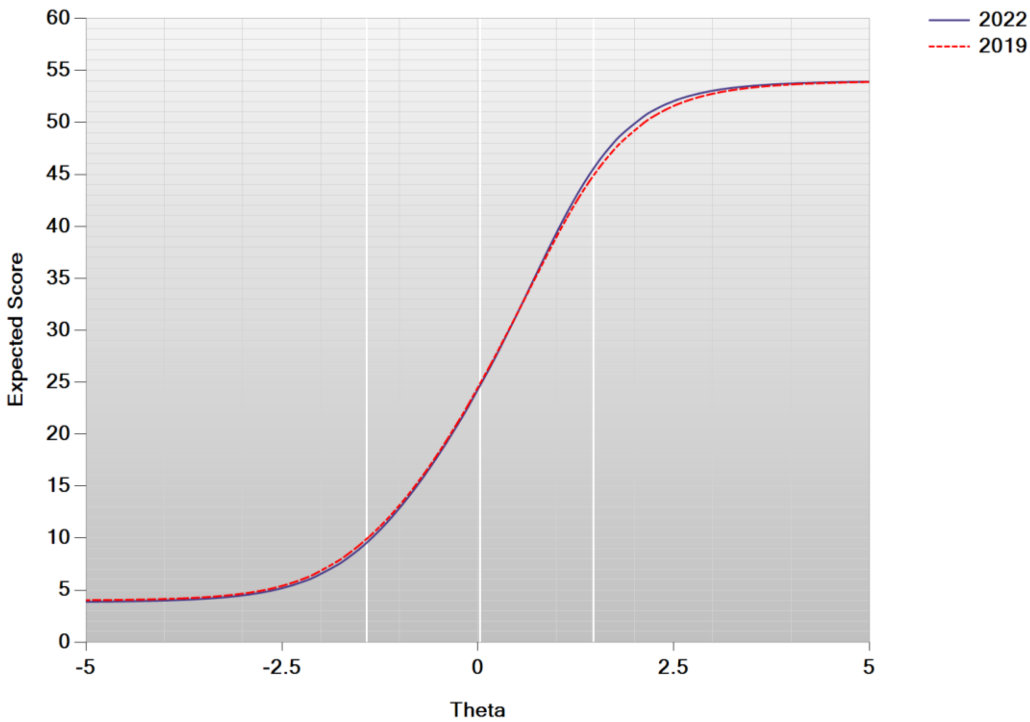

A/A Plot: Mathematics Grade 7
MC Retained
CR Retained
Identity Line
Previous Values
2022 Values
0
1
2
3

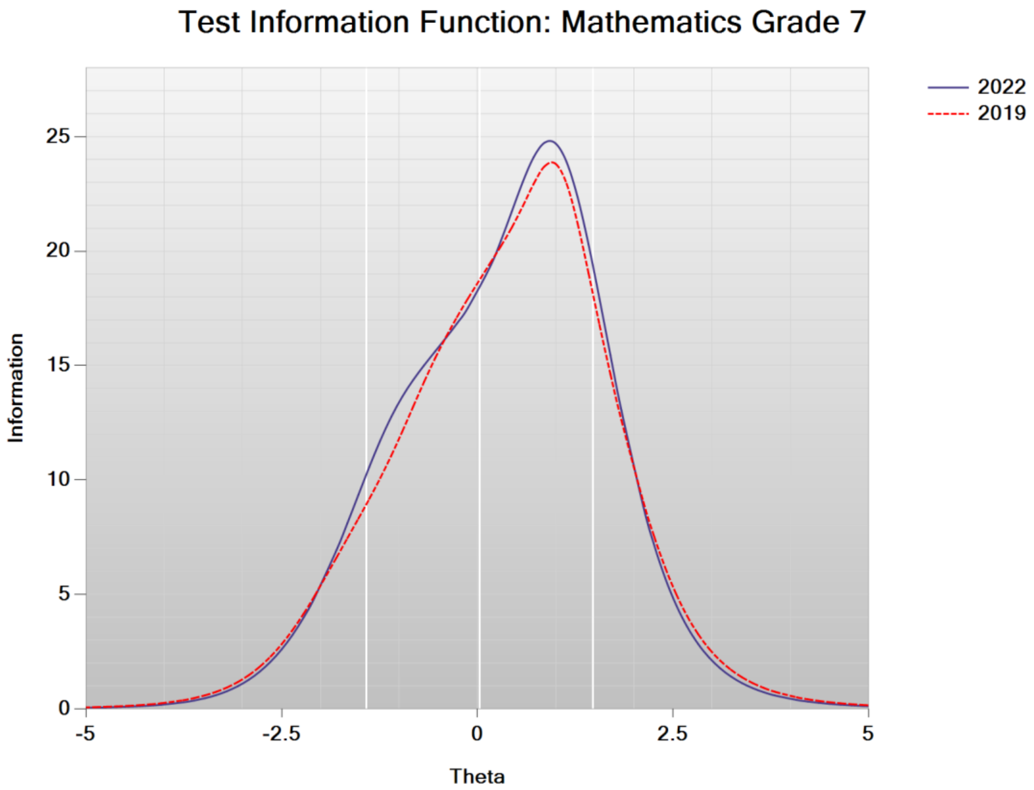

B/B Plot: Mathematics Grade 7
MC Retained
MC Flagged
CR Retained
CR Flagged
Identity Line
Previous Values
2022 Values
-3
-2
-1
0
1
2
3

Delta Plot: Mathematics Grade 7

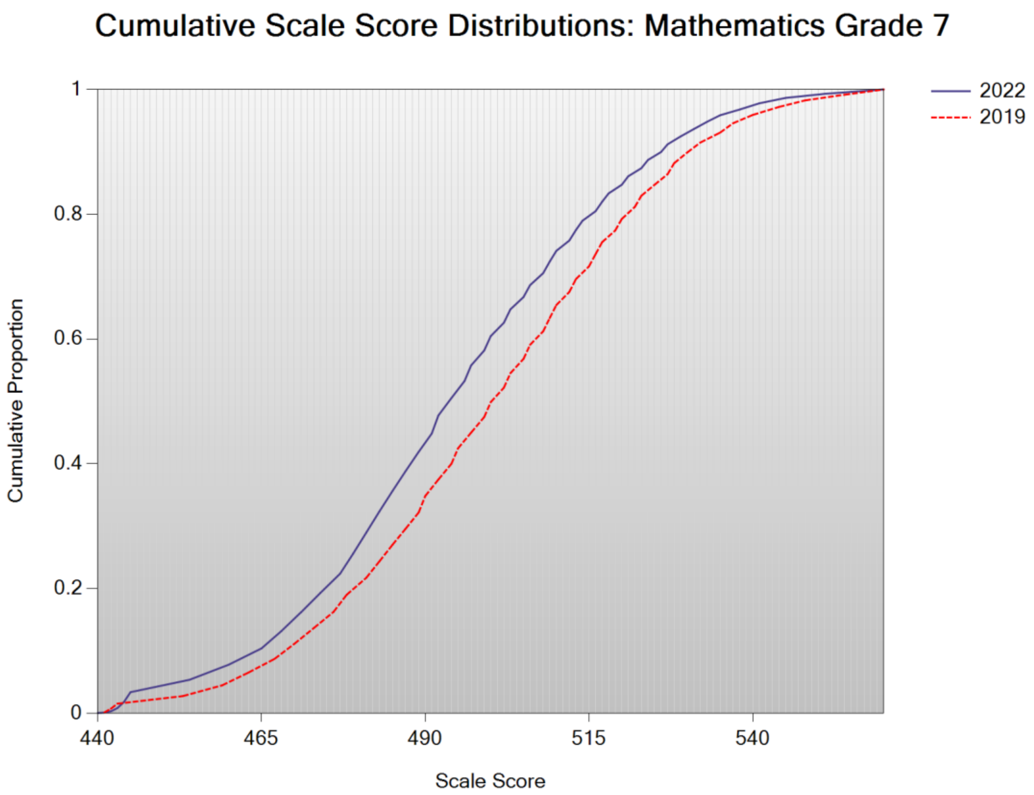


Test Characteristic Curve:Mathematics Grade 7



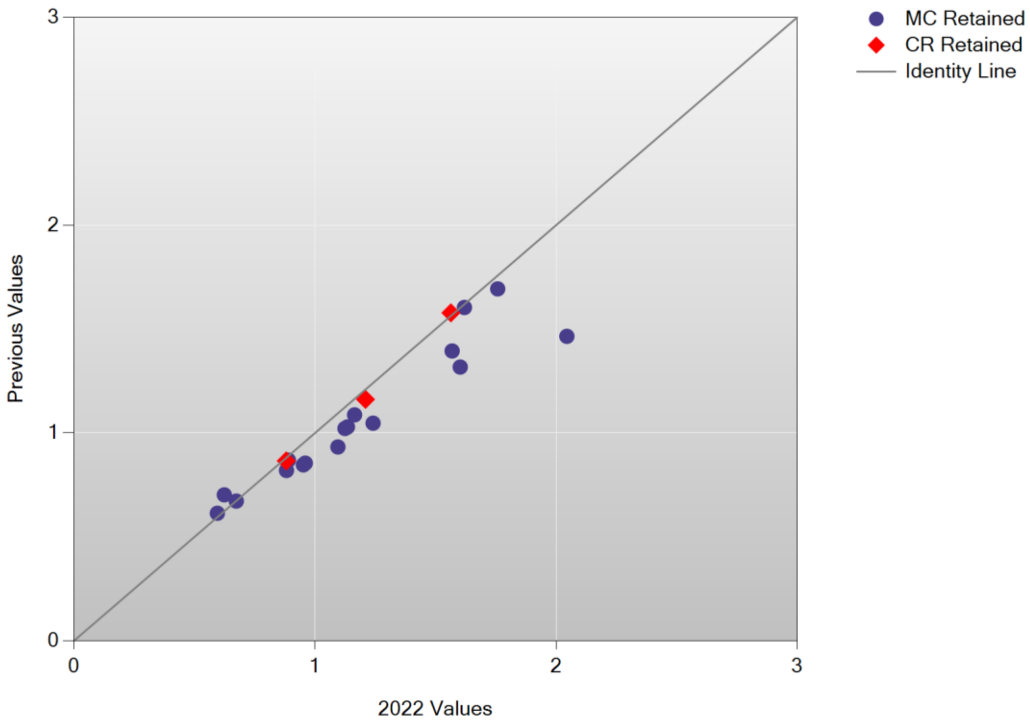


Test Information Function: Mathematics Grade 7
2022
2019
Information
Theta
25
20
15
10
5
0
-5
-2.5
0
2.5
5

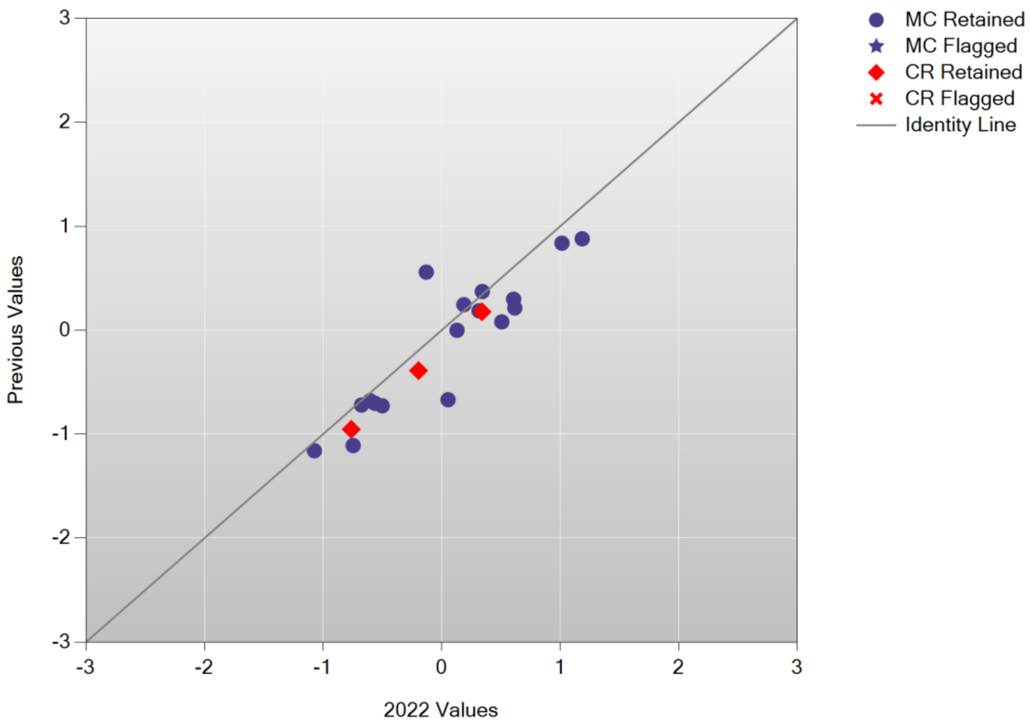


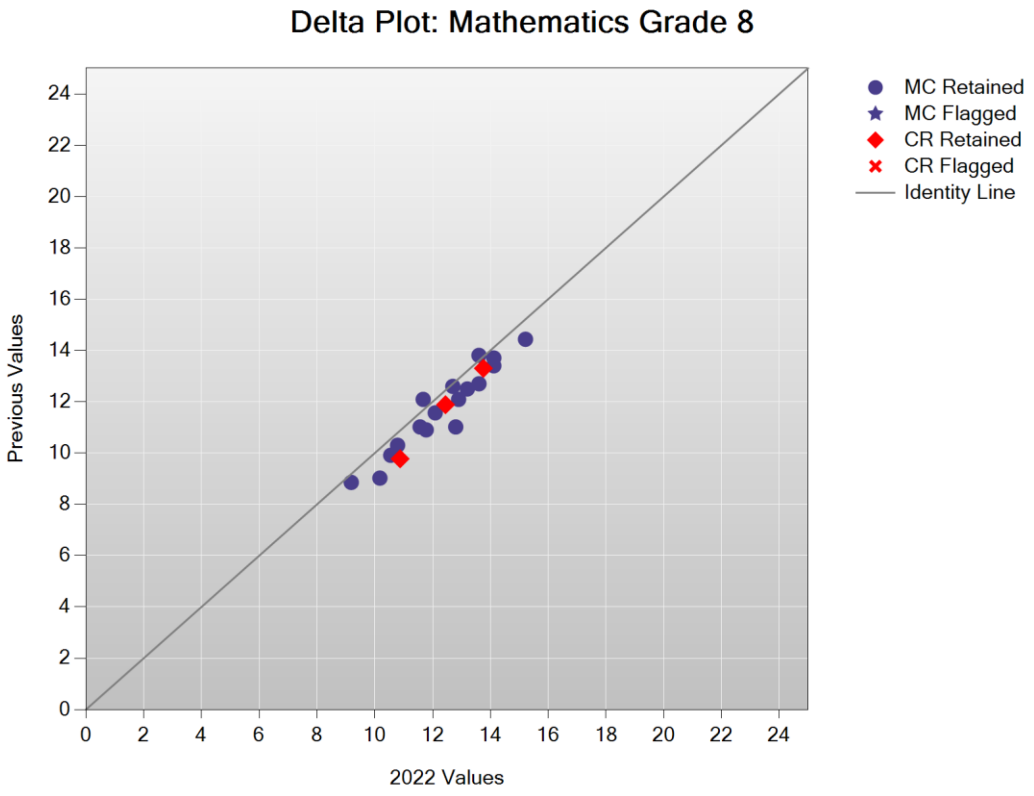
Cumulative Scale Score Distributions: Mathematics Grade 7
2022
2019
Cumulative Proportion
Scale Score
1
0.8
0.6
0.4
0.2
0
440
465
490
515
540

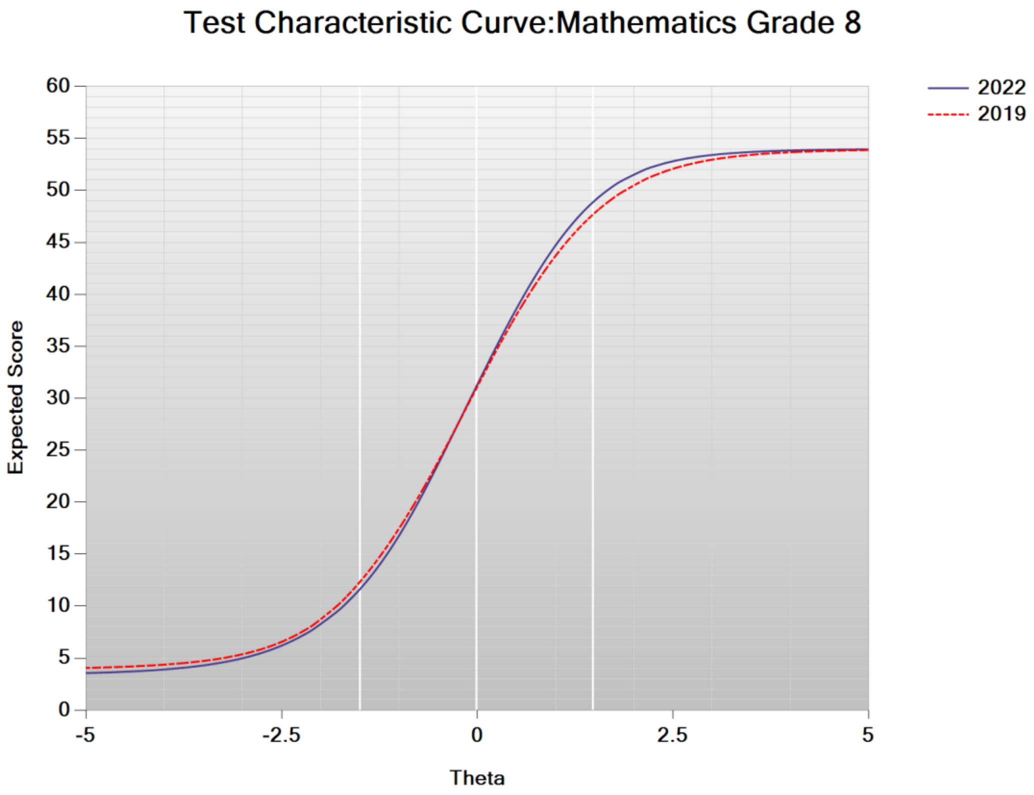
A/A Plot: Mathematics Grade 8

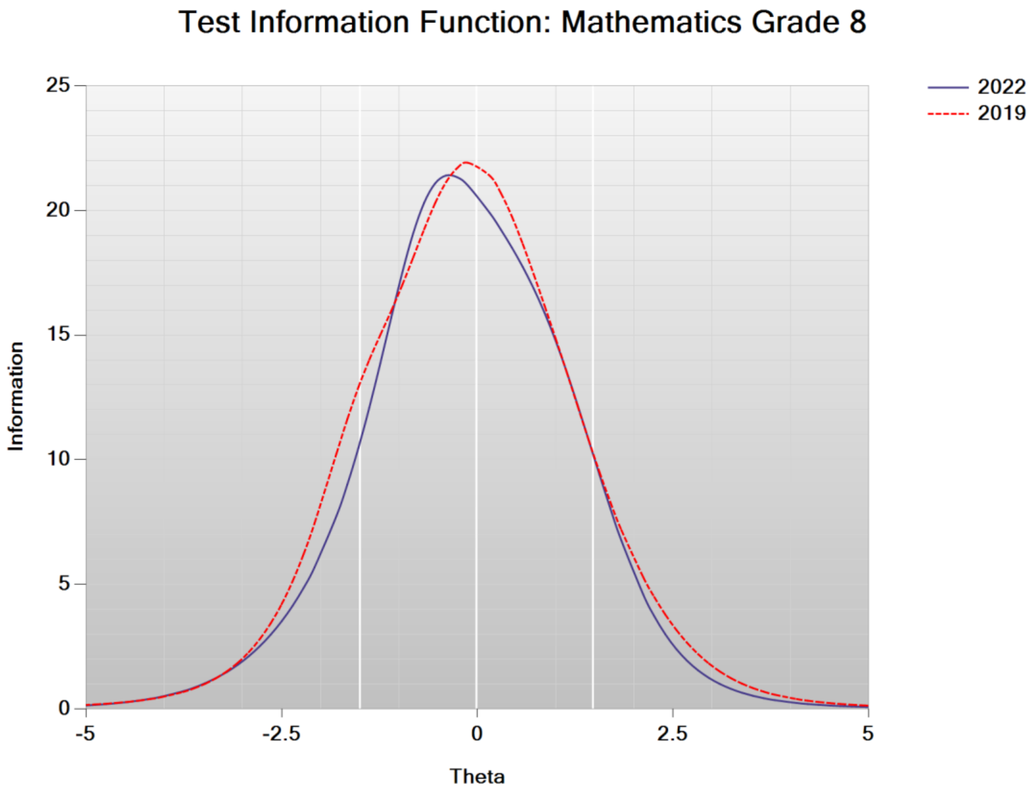


B/B Plot: Mathematics Grade 8

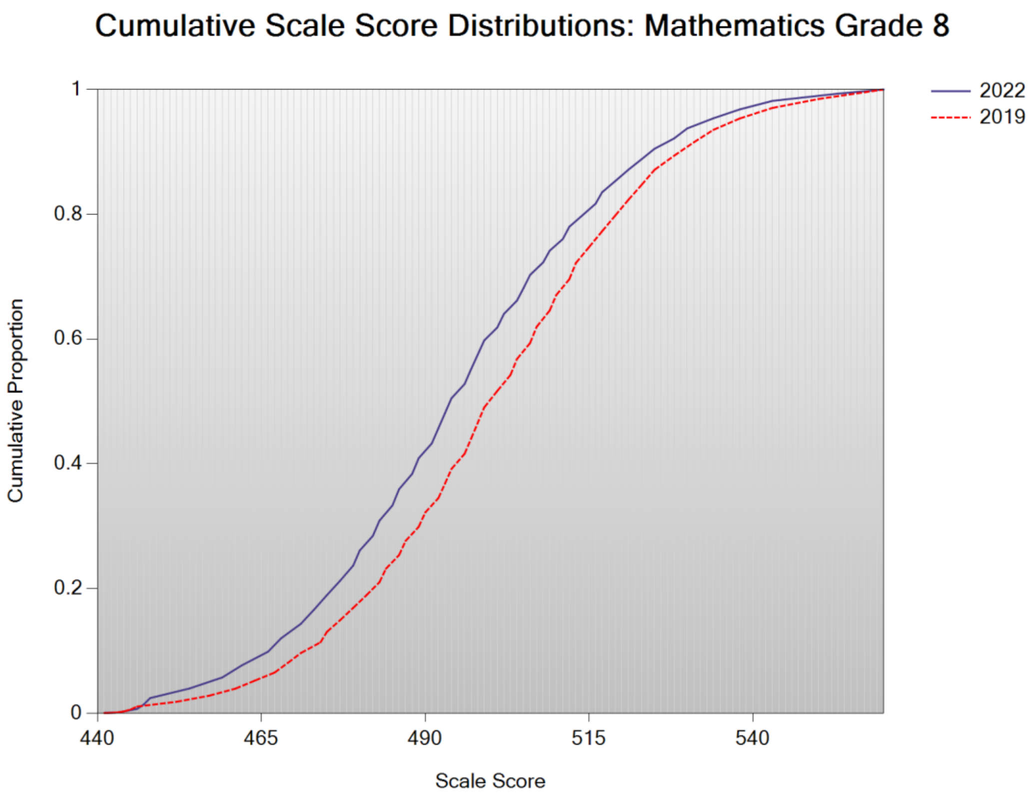



Delta Plot: Mathematics Grade 8
Previous Values
2022 Values
0
2
4
6
8
10
12
14
16
18
20
22
24
MC Retained
MC Flagged
CR Retained
CR Flagged
Identity Line

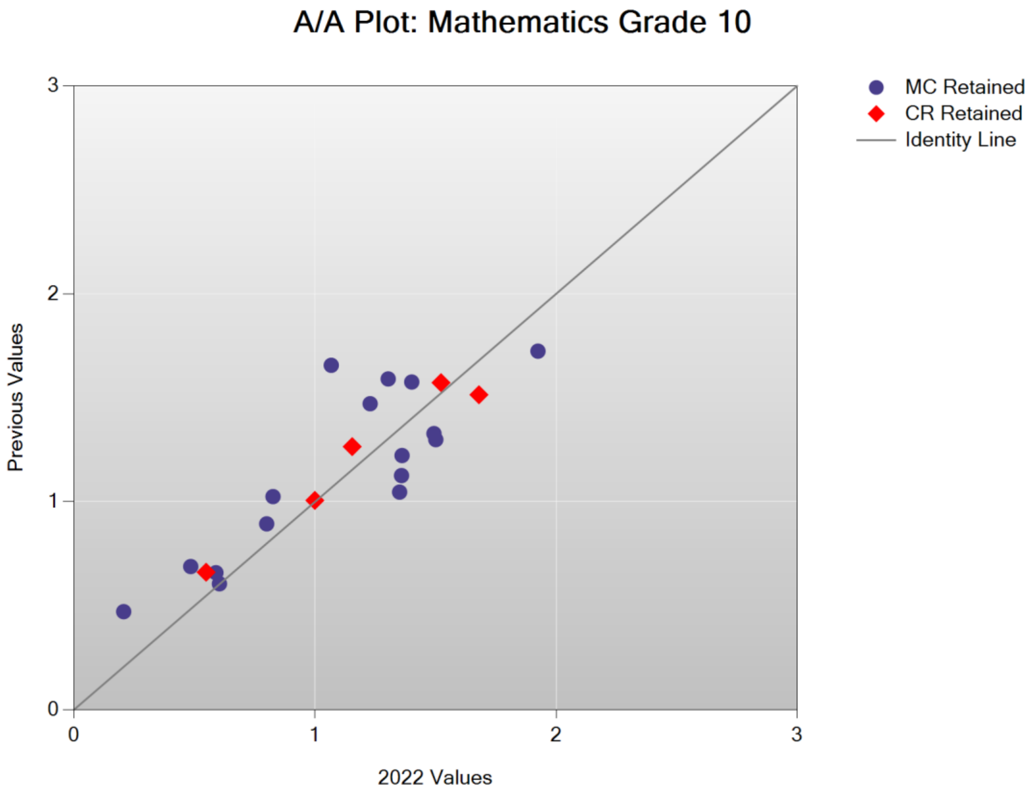

Test Characteristic Curve:Mathematics Grade 8
Expected Score
Theta
0
5
10
15
20
25
30
35
40
45
50
55
60
-5
-2.5
0
2.5
5
2022
2019

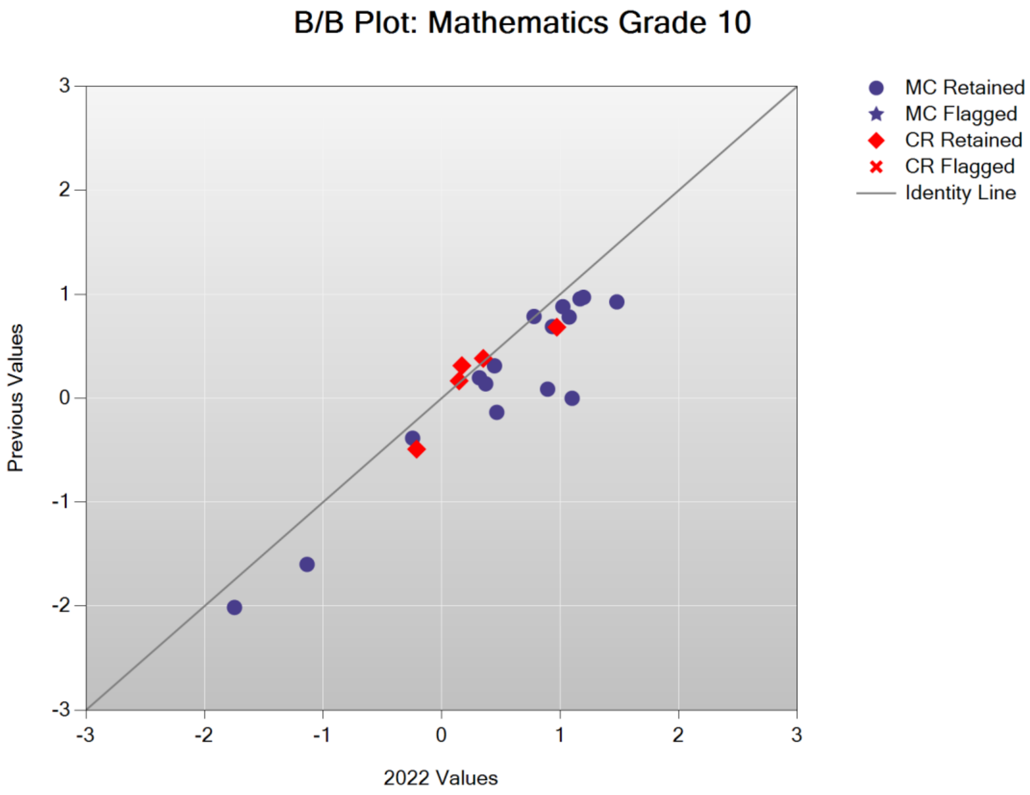


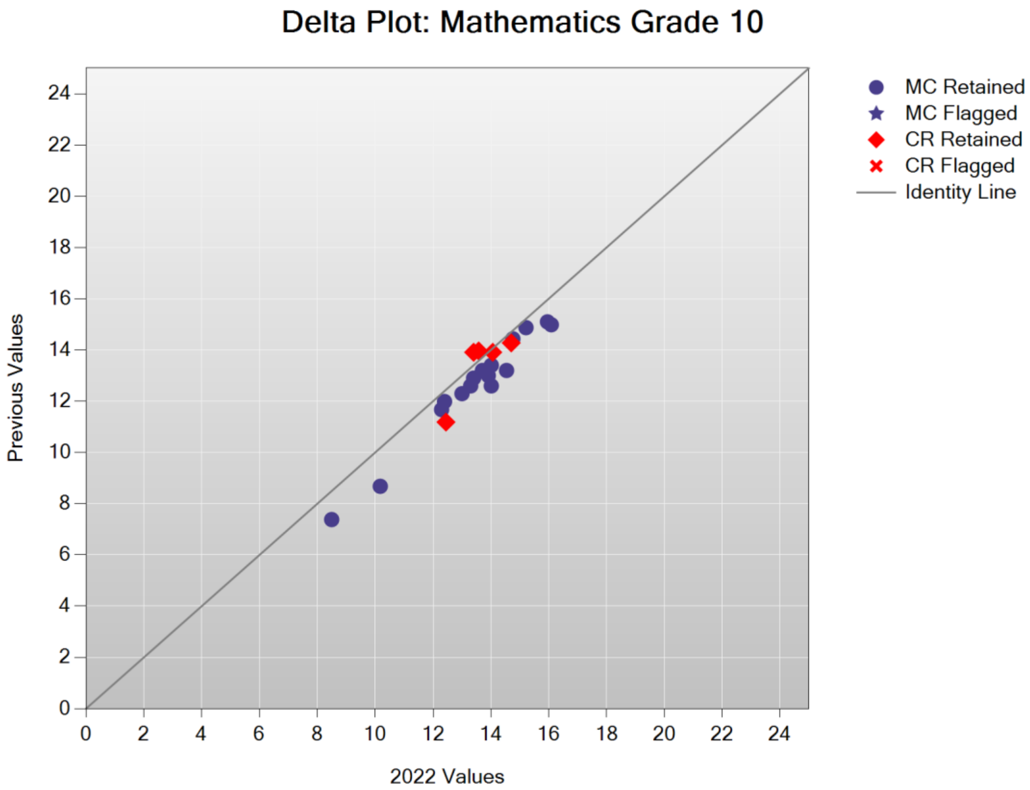
Test Information Function: Mathematics Grade 8
2022
2019
Information
Theta
25
20
15
10
5
0
-5
-2.5
0
2.5
5

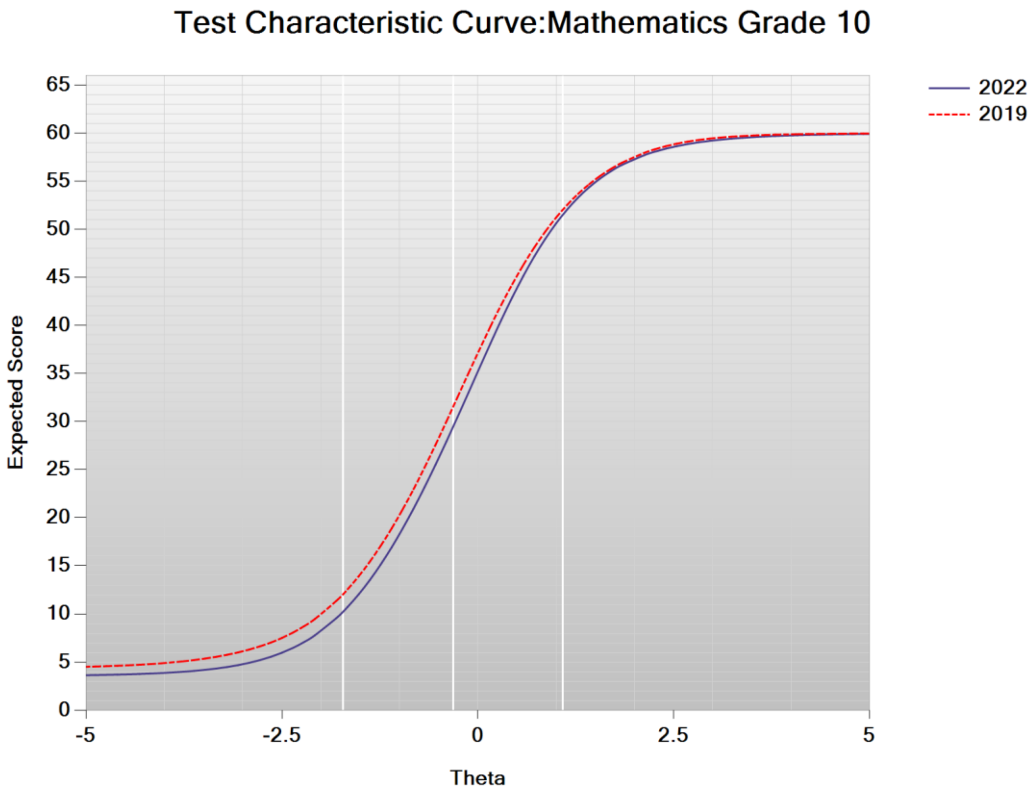


Cumulative Scale Score Distributions: Mathematics Grade 8
2022
2019
Cumulative Proportion
Scale Score
1
0.8
0.6
0.4
0.2
0
440
465
490
515
540

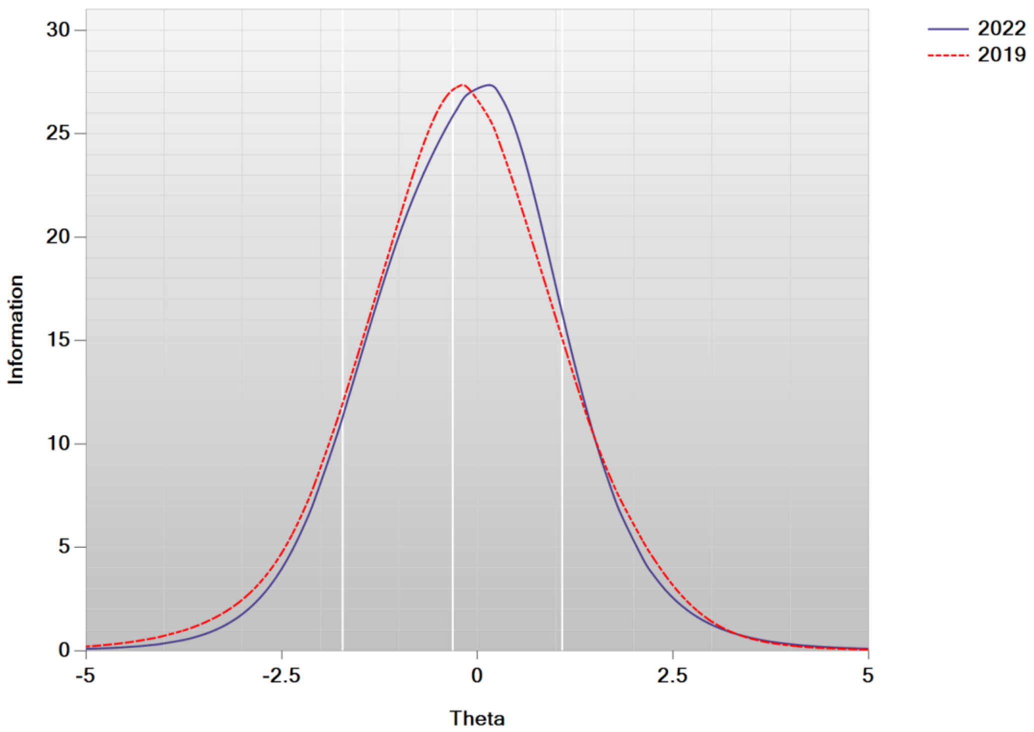

A/A Plot: Mathematics Grade 10
MC Retained
CR Retained
Identity Line
Previous Values
2022 Values
0
1
2
3


B/B Plot: Mathematics Grade 10
MC Retained
MC Flagged
CR Retained
CR Flagged
Identity Line
Previous Values
2022 Values
-3
-2
-1
0
1
2
3

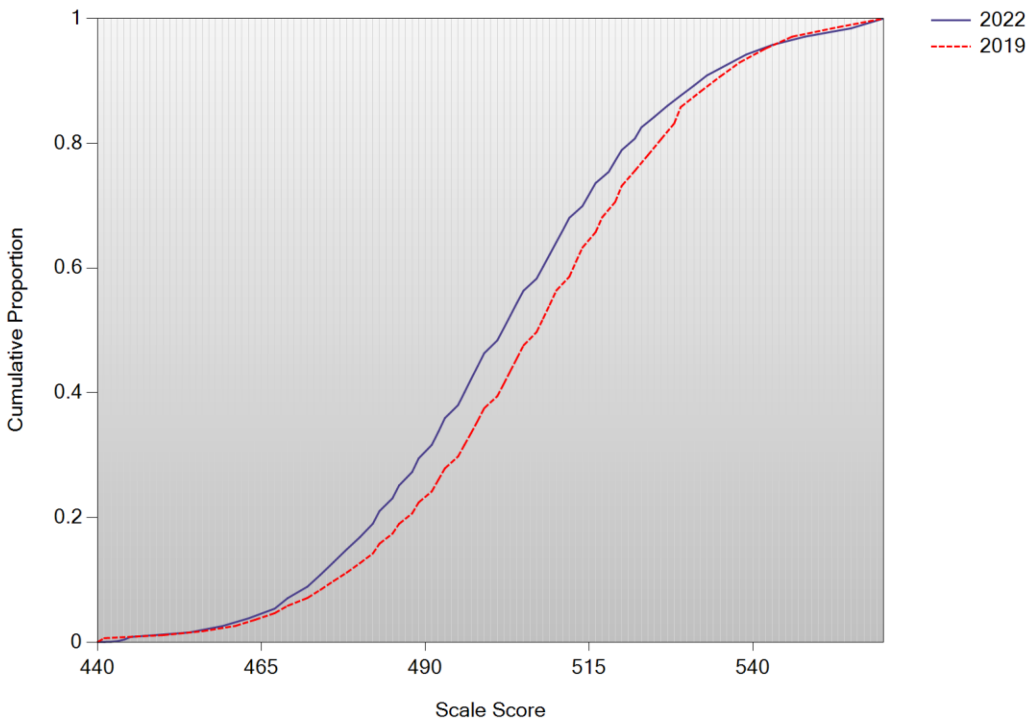

Delta Plot: Mathematics Grade 10
MC Retained
MC Flagged
CR Retained
CR Flagged
Identity Line
Previous Values
2022 Values
0
2
4
6
8
10
12
14
16
18
20
22
24


Test Characteristic Curve:Mathematics Grade 10
2022
2019
Expected Score
Theta
65
60
55
50
45
40
35
30
25
20
15
10
5
0
-5
-2.5
0
2.5
5

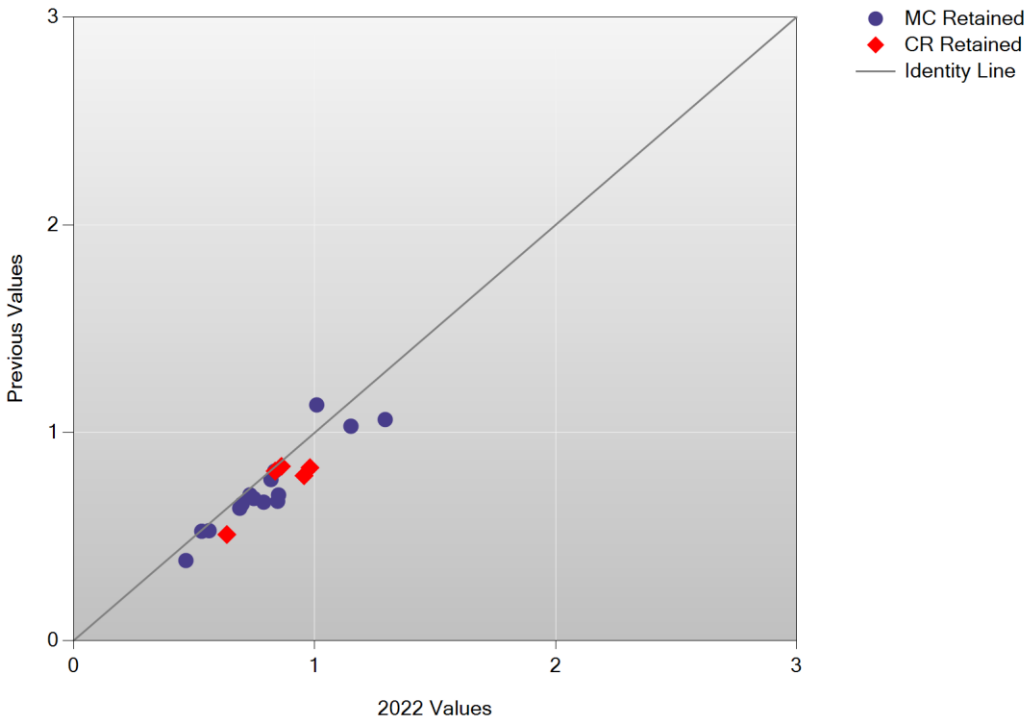
Test Information Function: Mathematics Grade 10



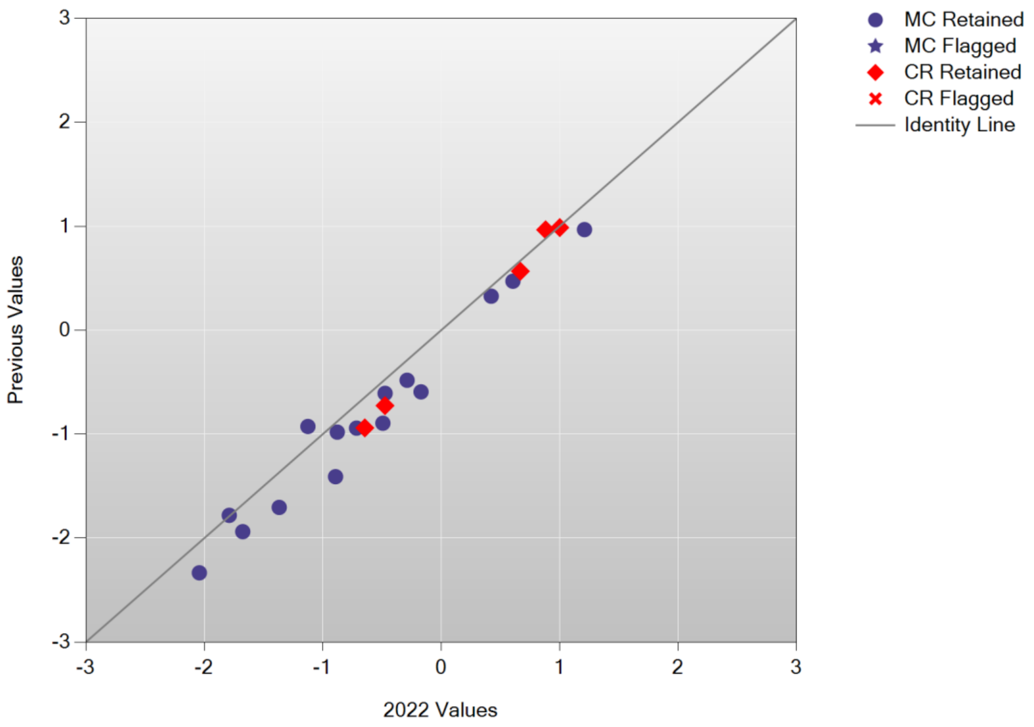
Cumulative Scale Score Distributions: Mathematics Grade 10



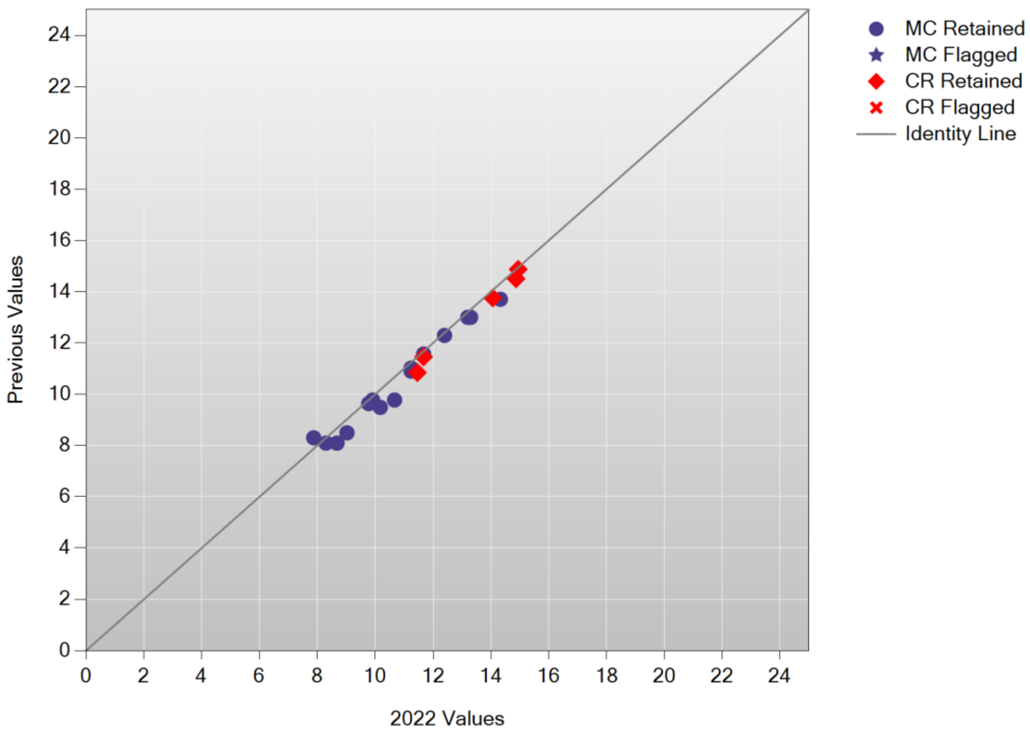
A/A Plot: Science Grade 5



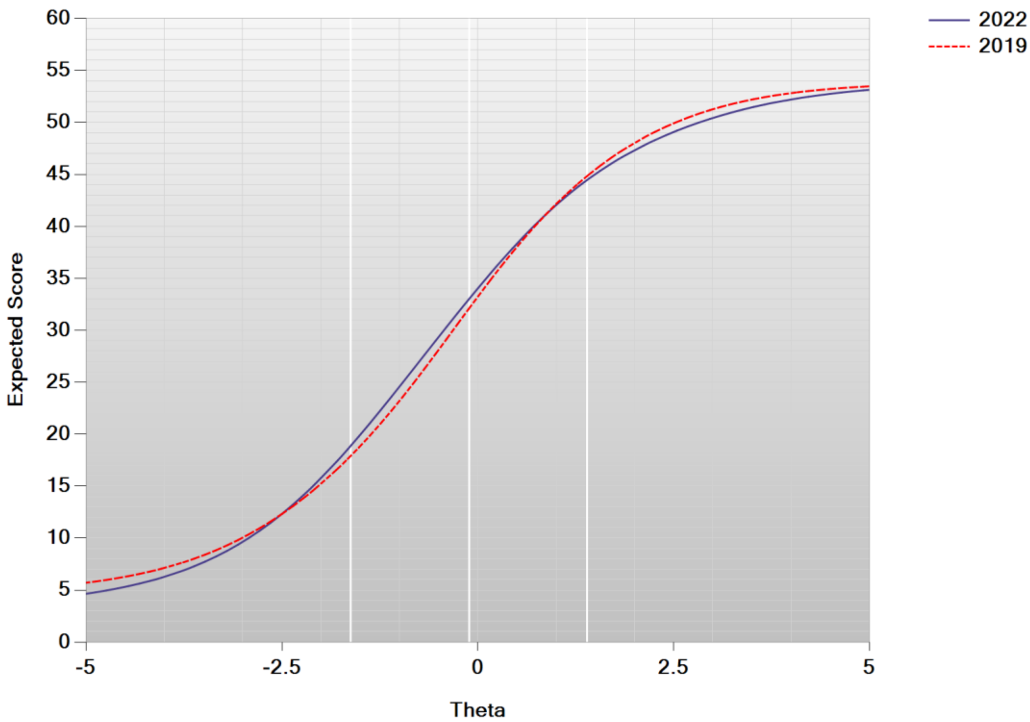
B/B Plot: Science Grade 5



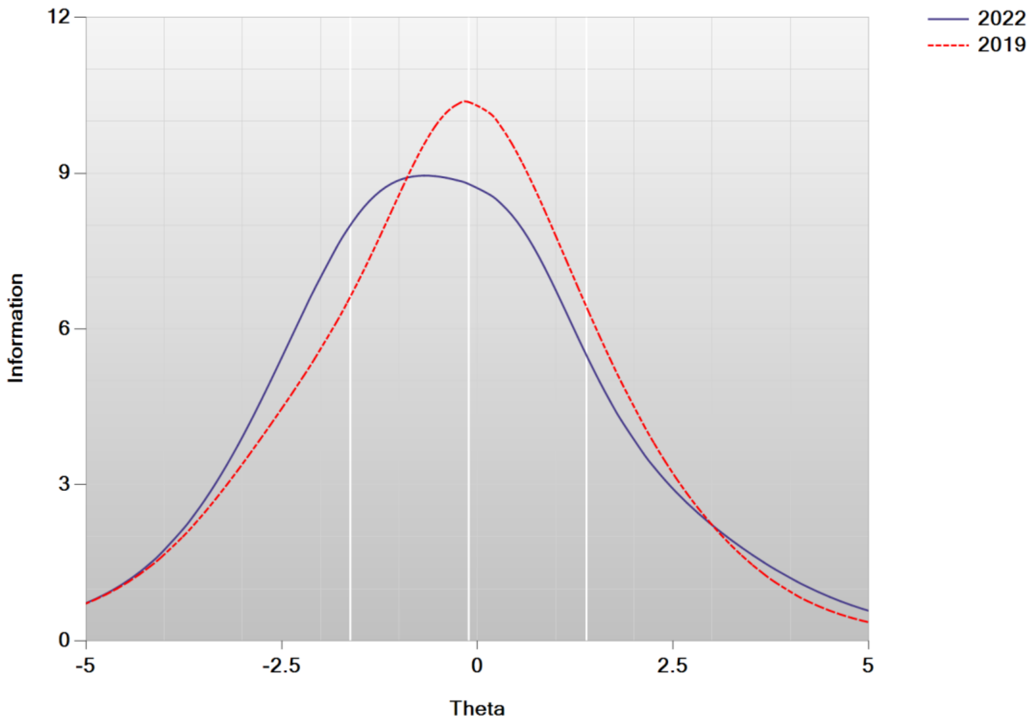
Delta Plot: Science Grade 5



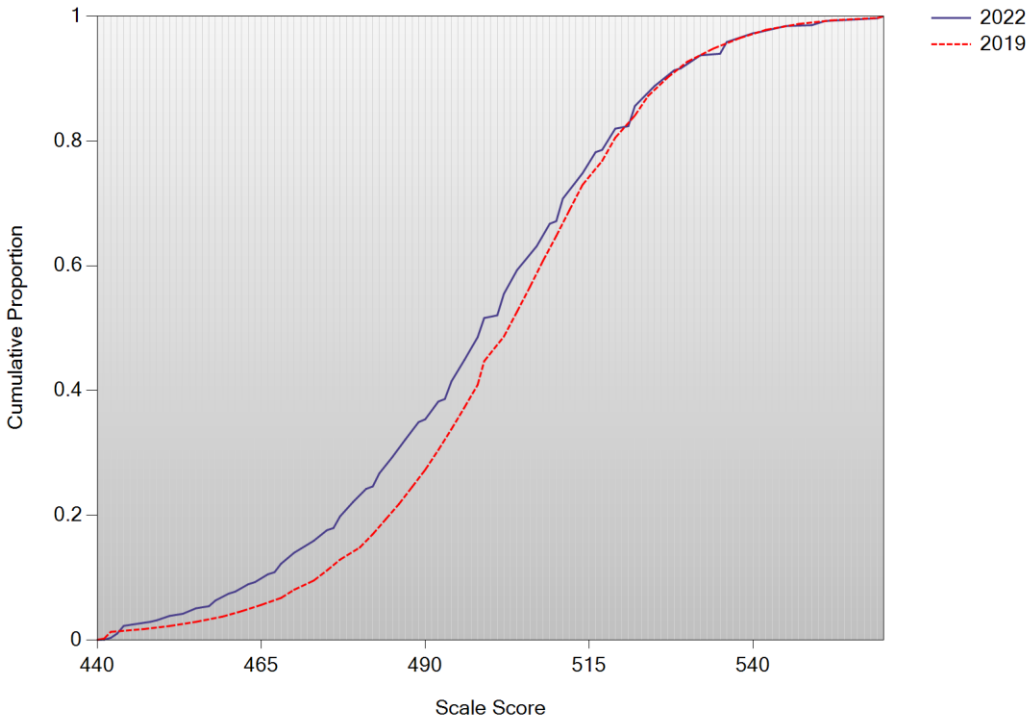
Test Characteristic Curve:Science Grade 5

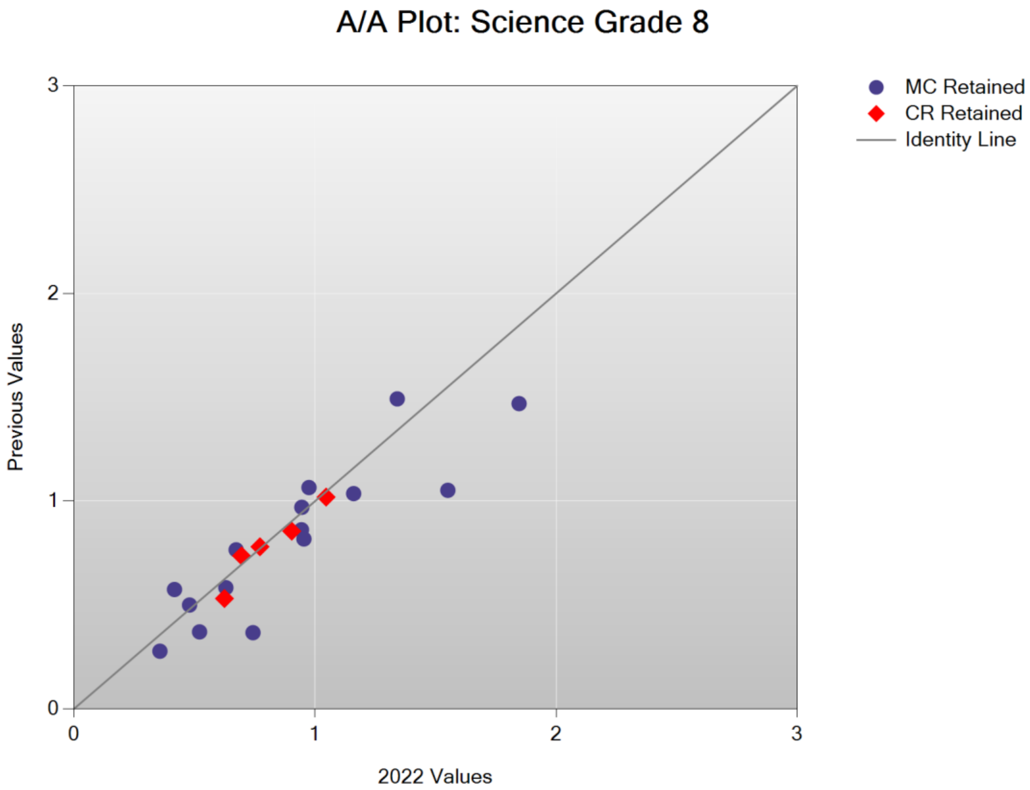


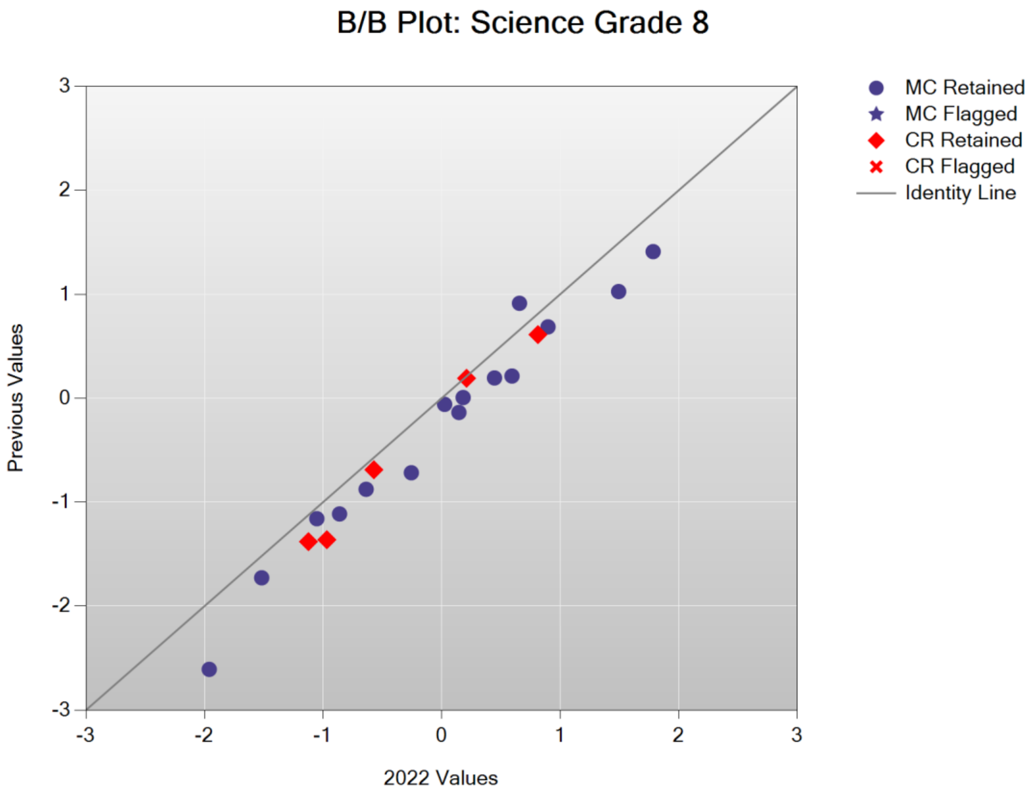
Test Information Function: Science Grade 5

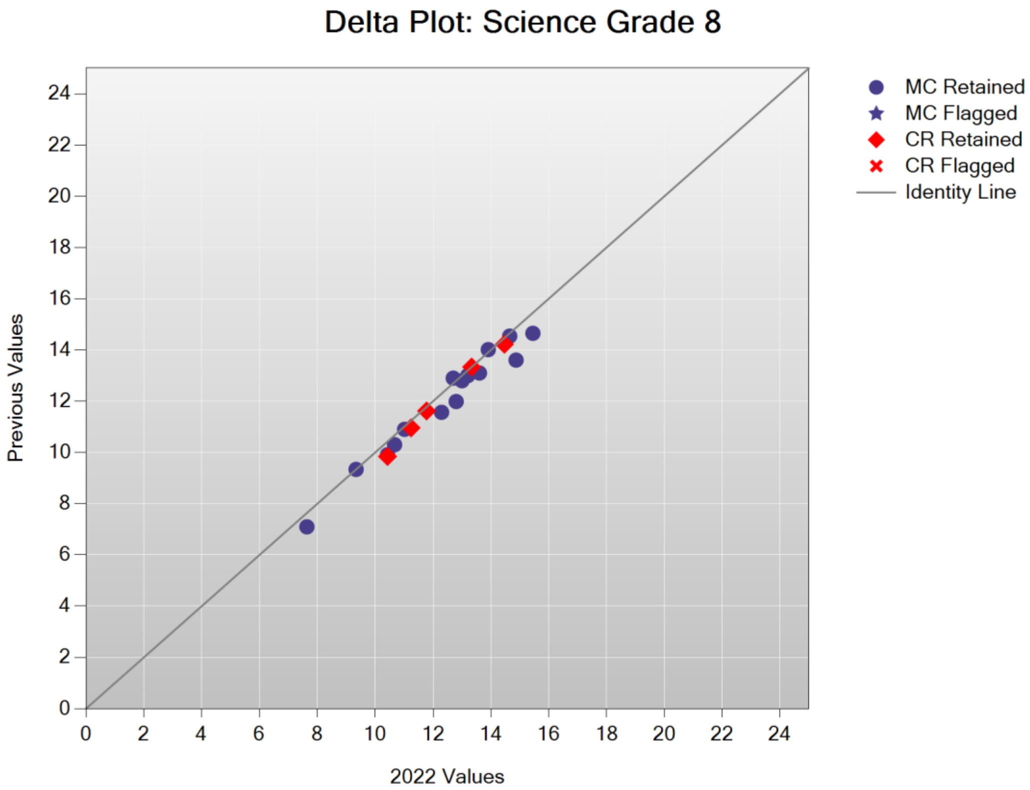


Cumulative Scale Score Distributions: Science Grade 5

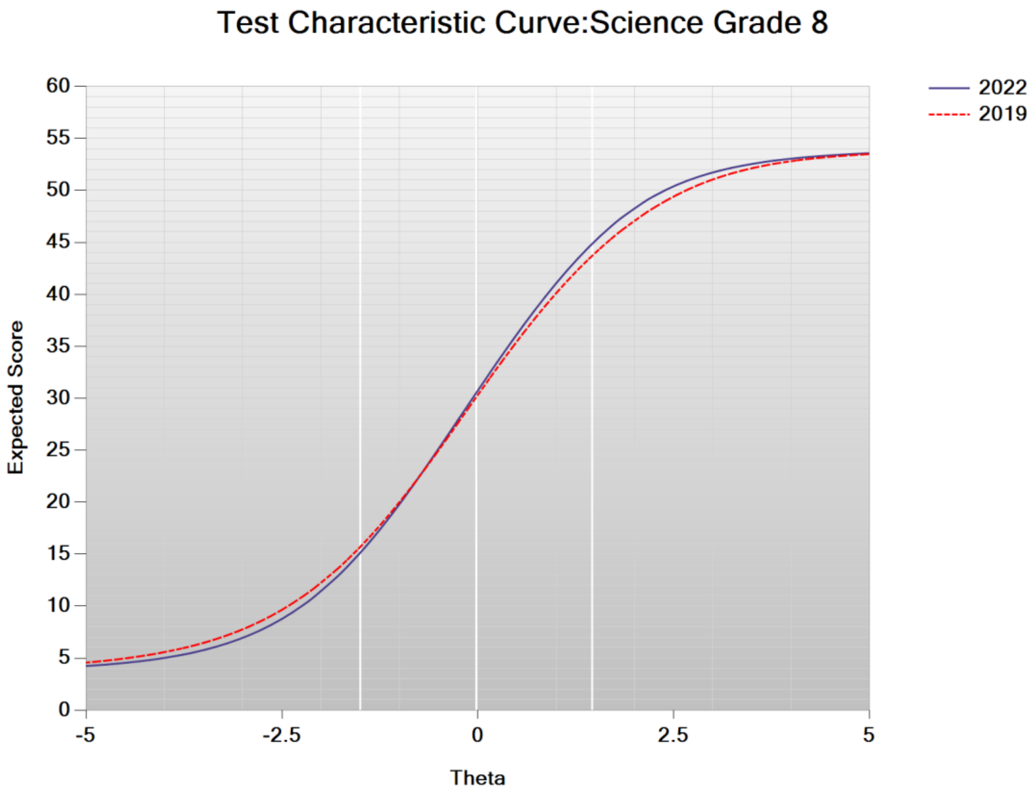



A/A Plot: Science Grade 8
MC Retained
CR Retained
Identity Line
Previous Values
2022 Values
0
1
2
3


B/B Plot: Science Grade 8
MC Retained
MC Flagged
CR Retained
CR Flagged
Identity Line
Previous Values
2022 Values
-3
-2
-1
0
1
2
3

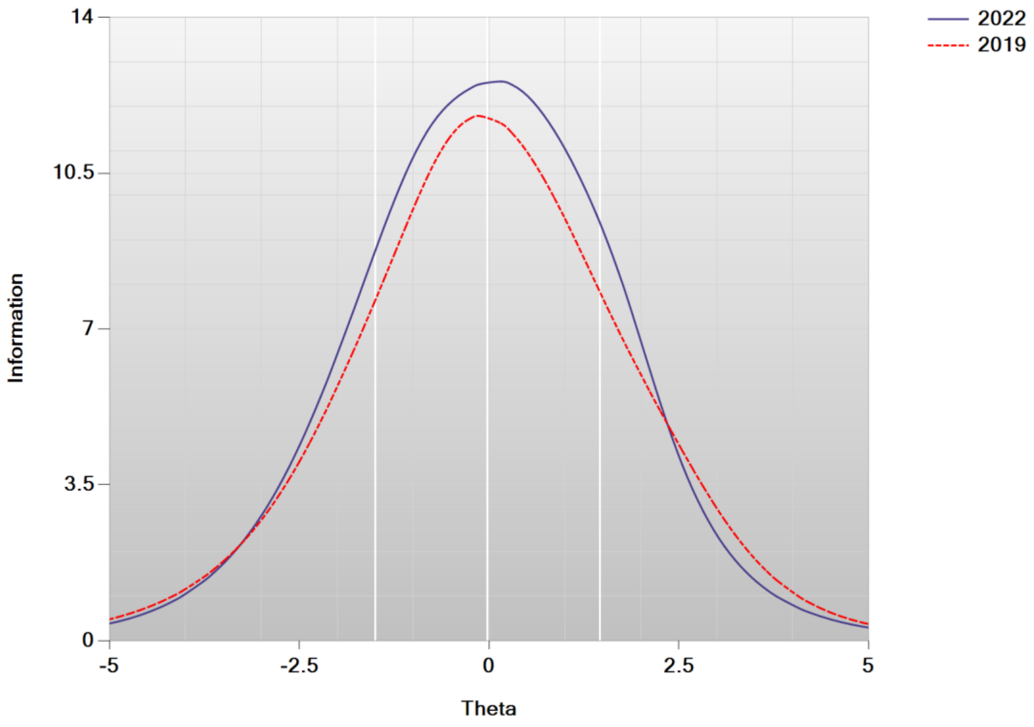


Delta Plot: Science Grade 8
MC Retained
MC Flagged
CR Retained
CR Flagged
Identity Line
Previous Values
2022 Values
0
2
4
6
8
10
12
14
16
18
20
22
24

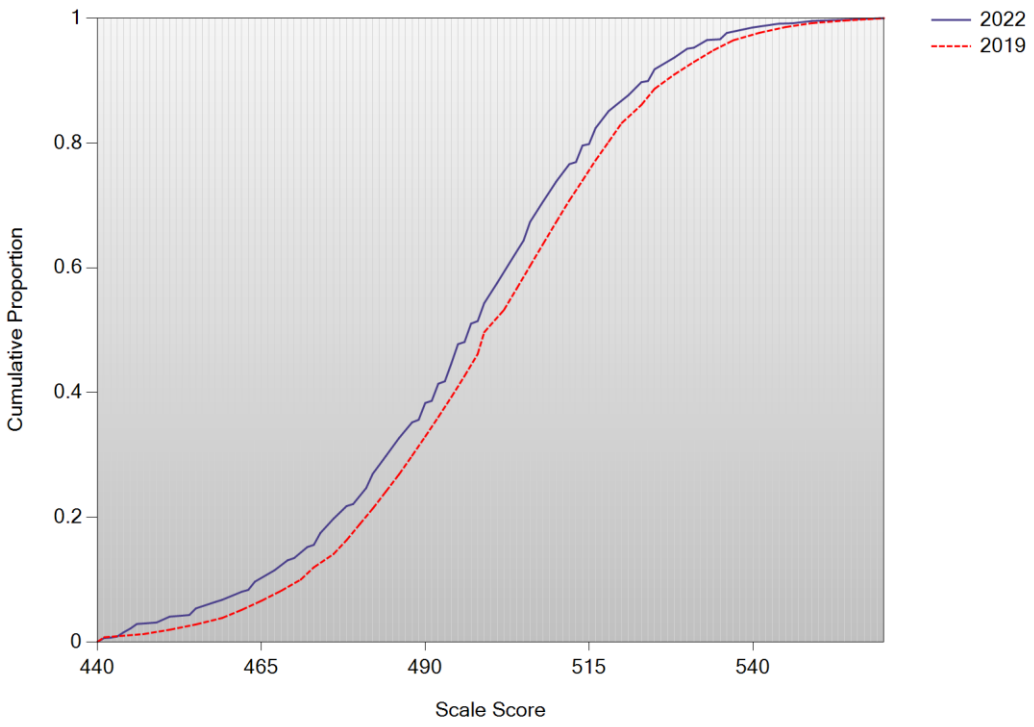


Test Characteristic Curve:Science Grade 8
2022
2019
Expected Score
Theta
0
5
10
15
20
25
30
35
40
45
50
55
60
-5
-2.5
0
2.5
5

Test Information Function: Science Grade 8



Cumulative Scale Score Distributions: Science Grade 8



Section 2.2

Lookup Tables

Table 2.2.1
Raw Score to Scale Score Lookup Table
English Language Arts Grade 3

				2022		2021	
Raw Score	Theta	Information	SE (Scale Score)	Scale Score	Achievement Levels	Scale Score	Achievement Levels
0	-3.173	1.77	10.0	440	1	440	1
1	-3.123	1.87	10.0	441	1	443	1
2	-3.073	1.97	10.0	442	1	446	1
3	-3.022	2.07	10.0	443	1	448	1
4	-2.972	2.18	10.0	444	1	451	1
5	-2.922	2.30	10.0	445	1	463	1
6	-2.871	2.43	10.0	446	1	471	2
7	-2.821	2.56	10.0	447	1	476	2
8	-2.526	3.51	10.0	452	1	481	2
9	-2.292	4.50	8.9	457	1	485	2
10	-2.096	5.49	8.0	460	1	489	2
11	-1.927	6.44	7.4	463	1	492	2
12	-1.776	7.33	7.0	466	1	495	2
13	-1.639	8.13	6.6	469	1	499	2
14	-1.511	8.84	6.3	471	2	502	3
15	-1.390	9.45	6.1	474	2	506	3
16	-1.275	9.97	6.0	476	2	510	3
17	-1.163	10.38	5.8	478	2	514	3
18	-1.054	10.69	5.8	480	2	518	3
19	-0.946	10.91	5.7	482	2	524	3
20	-0.838	11.03	5.7	484	2	530	4
21	-0.730	11.05	5.7	486	2	540	4
22	-0.621	10.98	5.7	488	2	555	4
23	-0.511	10.81	5.7	490	2	560	4
24	-0.398	10.57	5.8	492	2	N/A	N/A
25	-0.281	10.25	5.9	494	2	N/A	N/A
26	-0.161	9.86	6.0	497	2	N/A	N/A
27	-0.036	9.43	6.1	499	2	N/A	N/A
28	0.095	8.94	6.3	502	3	N/A	N/A
29	0.232	8.43	6.5	504	3	N/A	N/A
30	0.377	7.88	6.7	507	3	N/A	N/A
31	0.531	7.31	7.0	510	3	N/A	N/A
32	0.695	6.73	7.3	513	3	N/A	N/A
33	0.872	6.13	7.6	516	3	N/A	N/A
34	1.063	5.52	8.0	520	3	N/A	N/A
35	1.270	4.90	8.5	524	3	N/A	N/A
36	1.498	4.31	9.1	528	3	N/A	N/A
37	1.749	3.75	9.7	533	4	N/A	N/A
38	2.029	3.24	10.0	538	4	N/A	N/A
39	2.343	2.79	10.0	544	4	N/A	N/A
40	2.702	2.37	10.0	551	4	N/A	N/A
41	3.128	1.93	10.0	559	4	N/A	N/A
42	3.196	1.86	10.0	560	4	N/A	N/A
43	3.196	1.86	10.0	560	4	N/A	N/A
44	3.196	1.86	10.0	560	4	N/A	N/A

Table 2.2.2
Raw Score to Scale Score Lookup Table
English Language Arts Grade 4

				2022		2021	
Raw Score	Theta	Information	SE (Scale Score)	Scale Score	Achievement Levels	Scale Score	Achievement Levels
0	-3.153	1.64	10.0	440	1	440	1
1	-3.137	1.68	10.0	440	1	443	1
2	-3.121	1.71	10.0	441	1	446	1
3	-3.105	1.75	10.0	441	1	448	1
4	-3.089	1.78	10.0	441	1	451	1
5	-3.073	1.82	10.0	442	1	461	1
6	-3.057	1.86	10.0	442	1	469	1
7	-3.041	1.90	10.0	442	1	474	2
8	-2.694	2.97	10.0	449	1	479	2
9	-2.434	4.09	9.3	454	1	482	2
10	-2.222	5.17	8.3	458	1	486	2
11	-2.042	6.20	7.6	461	1	489	2
12	-1.883	7.16	7.0	464	1	492	2
13	-1.739	8.02	6.7	467	1	495	2
14	-1.606	8.78	6.4	469	1	498	2
15	-1.482	9.43	6.1	471	2	501	3
16	-1.363	9.96	6.0	474	2	504	3
17	-1.249	10.36	5.9	476	2	508	3
18	-1.138	10.66	5.8	478	2	512	3
19	-1.030	10.85	5.7	480	2	516	3
20	-0.922	10.97	5.7	482	2	522	3
21	-0.816	11.03	5.7	484	2	528	3
22	-0.710	11.05	5.7	486	2	536	4
23	-0.603	11.04	5.7	488	2	549	4
24	-0.496	11.01	5.7	490	2	560	4
25	-0.389	10.95	5.7	492	2	N/A	N/A
26	-0.279	10.85	5.7	494	2	N/A	N/A
27	-0.168	10.69	5.8	496	2	N/A	N/A
28	-0.055	10.46	5.8	498	2	N/A	N/A
29	0.062	10.13	5.9	501	3	N/A	N/A
30	0.184	9.70	6.1	503	3	N/A	N/A
31	0.310	9.20	6.2	505	3	N/A	N/A
32	0.443	8.63	6.4	508	3	N/A	N/A
33	0.583	8.02	6.7	510	3	N/A	N/A
34	0.732	7.42	6.9	513	3	N/A	N/A
35	0.893	6.82	7.2	516	3	N/A	N/A
36	1.066	6.25	7.5	520	3	N/A	N/A
37	1.256	5.67	7.9	523	3	N/A	N/A
38	1.466	5.05	8.4	527	3	N/A	N/A
39	1.705	4.38	9.0	532	4	N/A	N/A
40	1.987	3.65	9.9	537	4	N/A	N/A
41	2.333	2.90	10.0	543	4	N/A	N/A
42	2.789	2.13	10.0	552	4	N/A	N/A
43	3.215	1.52	10.0	560	4	N/A	N/A
44	3.215	1.52	10.0	560	4	N/A	N/A

Table 2.2.3
Raw Score to Scale Score Lookup Table
English Language Arts Grade 5

				2022		2021	
Raw Score	Theta	Information	SE (Scale Score)	Scale Score	Achievement Levels	Scale Score	Achievement Levels
0	-3.360	2.18	10.0	440	1	440	1
1	-3.308	2.33	10.0	441	1	442	1
2	-3.256	2.48	10.0	442	1	443	1
3	-3.204	2.64	10.0	443	1	445	1
4	-3.152	2.82	10.0	444	1	446	1
5	-3.101	3.01	10.0	445	1	455	1
6	-3.049	3.21	9.9	446	1	461	1
7	-2.796	4.44	8.4	450	1	466	1
8	-2.595	5.76	7.4	454	1	470	2
9	-2.426	7.13	6.6	457	1	474	2
10	-2.280	8.49	6.1	459	1	477	2
11	-2.149	9.77	5.7	461	1	481	2
12	-2.029	10.94	5.3	464	1	484	2
13	-1.918	11.96	5.0	466	1	487	2
14	-1.813	12.80	4.9	467	1	491	2
15	-1.713	13.47	4.7	469	1	494	2
16	-1.616	13.96	4.7	471	2	498	2
17	-1.521	14.29	4.7	472	2	502	3
18	-1.428	14.47	4.6	474	2	505	3
19	-1.336	14.53	4.6	476	2	510	3
20	-1.244	14.48	4.6	477	2	514	3
21	-1.152	14.33	4.7	479	2	519	3
22	-1.059	14.10	4.7	481	2	524	3
23	-0.965	13.81	4.8	482	2	530	4
24	-0.869	13.48	4.8	484	2	537	4
25	-0.772	13.11	4.9	486	2	546	4
26	-0.672	12.72	5.0	487	2	559	4
27	-0.569	12.33	5.0	489	2	560	4
28	-0.464	11.94	5.1	491	2	N/A	N/A
29	-0.356	11.57	5.2	493	2	N/A	N/A
30	-0.244	11.21	5.3	495	2	N/A	N/A
31	-0.130	10.86	5.4	497	2	N/A	N/A
32	-0.011	10.52	5.5	499	2	N/A	N/A
33	0.111	10.16	5.5	501	3	N/A	N/A
34	0.237	9.78	5.7	504	3	N/A	N/A
35	0.368	9.36	5.8	506	3	N/A	N/A
36	0.505	8.89	5.9	508	3	N/A	N/A
37	0.649	8.36	6.1	511	3	N/A	N/A

Table 2.2.3 (continued)
Raw Score to Scale Score Lookup Table
English Language Arts Grade 5

				2022		2021	
Raw Score	Theta	Information	SE (Scale Score)	Scale Score	Achievement Levels	Scale Score	Achievement Levels
38	0.801	7.80	6.3	514	3	N/A	N/A
39	0.965	7.23	6.6	516	3	N/A	N/A
40	1.141	6.68	6.8	520	3	N/A	N/A
41	1.334	6.18	7.1	523	3	N/A	N/A
42	1.547	5.70	7.4	527	3	N/A	N/A
43	1.787	5.16	7.8	531	4	N/A	N/A
44	2.065	4.45	8.4	536	4	N/A	N/A
45	2.411	3.52	9.4	542	4	N/A	N/A
46	2.883	2.52	10.0	550	4	N/A	N/A
47	3.430	1.91	10.0	560	4	N/A	N/A
48	3.430	1.91	10.0	560	4	N/A	N/A

Table 2.2.4
Raw Score to Scale Score Lookup Table
English Language Arts Grade 6

				2022		2021	
Raw Score	Theta	Information	SE (Scale Score)	Scale Score	Achievement Levels	Scale Score	Achievement Levels
0	-3.171	3.24	10.0	440	1	440	1
1	-3.154	3.30	10.0	440	1	442	1
2	-3.137	3.35	10.0	441	1	443	1
3	-3.120	3.41	10.0	441	1	445	1
4	-3.102	3.47	10.0	441	1	446	1
5	-3.085	3.52	10.0	442	1	448	1
6	-3.068	3.58	10.0	442	1	456	1
7	-3.051	3.64	9.9	442	1	462	1
8	-3.033	3.70	9.9	443	1	467	1
9	-3.016	3.77	9.8	443	1	472	2
10	-2.797	4.60	8.9	447	1	476	2
11	-2.606	5.38	8.2	451	1	481	2
12	-2.435	6.08	7.7	454	1	484	2
13	-2.279	6.69	7.3	457	1	488	2
14	-2.133	7.21	7.1	460	1	492	2
15	-1.996	7.64	6.9	462	1	496	2
16	-1.864	7.97	6.7	465	1	499	2
17	-1.736	8.23	6.6	467	1	503	3
18	-1.611	8.42	6.5	469	1	507	3
19	-1.489	8.55	6.5	472	2	510	3
20	-1.369	8.66	6.5	474	2	514	3
21	-1.249	8.74	6.4	476	2	519	3
22	-1.131	8.83	6.4	479	2	523	3
23	-1.013	8.92	6.4	481	2	528	3
24	-0.896	9.02	6.3	483	2	534	4
25	-0.779	9.13	6.3	485	2	540	4
26	-0.662	9.23	6.2	488	2	547	4
27	-0.545	9.31	6.2	490	2	557	4
28	-0.428	9.36	6.2	492	2	560	4
29	-0.311	9.36	6.2	494	2	560	4
30	-0.191	9.29	6.2	497	2	N/A	N/A
31	-0.070	9.15	6.3	499	2	N/A	N/A
32	0.054	8.95	6.3	501	3	N/A	N/A
33	0.182	8.68	6.4	504	3	N/A	N/A
34	0.314	8.37	6.6	506	3	N/A	N/A
35	0.452	8.04	6.7	509	3	N/A	N/A
36	0.595	7.71	6.8	512	3	N/A	N/A
37	0.745	7.40	7.0	514	3	N/A	N/A

Table 2.2.4 (continued)
Raw Score to Scale Score Lookup Table
English Language Arts Grade 6

Raw Score	Theta	Information	SE (Scale Score)	2022 Scale Score	2022 Achievement Levels	2021 Scale Score	2021 Achievement Levels
38	0.903	7.11	7.1	517	3	N/A	N/A
39	1.068	6.82	7.3	520	3	N/A	N/A
40	1.244	6.49	7.5	524	3	N/A	N/A
41	1.431	6.09	7.7	527	3	N/A	N/A
42	1.634	5.60	8.0	531	4	N/A	N/A
43	1.859	5.01	8.5	535	4	N/A	N/A
44	2.112	4.38	9.1	540	4	N/A	N/A
45	2.403	3.75	9.8	546	4	N/A	N/A
46	2.744	3.15	10.0	552	4	N/A	N/A
47	3.150	2.63	10.0	560	4	N/A	N/A
48	3.150	2.63	10.0	560	4	N/A	N/A
49	3.150	2.63	10.0	560	4	N/A	N/A
50	3.150	2.63	10.0	560	4	N/A	N/A

Table 2.2.5
Raw Score to Scale Score Lookup Table
English Language Arts Grade 7

				2022		2021	
Raw Score	Theta	Information	SE (Scale Score)	Scale Score	Achievement Levels	Scale Score	Achievement Levels
0	-3.131	3.09	10.0	440	1	440	1
1	-3.111	3.18	10.0	440	1	442	1
2	-3.091	3.26	10.0	441	1	443	1
3	-3.070	3.35	10.0	441	1	445	1
4	-3.050	3.43	10.0	442	1	447	1
5	-3.030	3.52	10.0	442	1	448	1
6	-3.010	3.62	10.0	442	1	455	1
7	-2.990	3.71	9.9	443	1	461	1
8	-2.970	3.81	9.8	443	1	465	1
9	-2.731	5.10	8.5	448	1	469	1
10	-2.534	6.34	7.6	451	1	473	2
11	-2.363	7.46	7.0	455	1	477	2
12	-2.210	8.44	6.6	458	1	480	2
13	-2.071	9.23	6.3	460	1	483	2
14	-1.940	9.84	6.1	463	1	487	2
15	-1.816	10.26	6.0	465	1	490	2
16	-1.696	10.53	5.9	467	1	494	2
17	-1.580	10.69	5.8	469	1	497	2
18	-1.466	10.77	5.8	472	2	501	3
19	-1.354	10.84	5.8	474	2	504	3
20	-1.244	10.92	5.8	476	2	508	3
21	-1.134	11.06	5.7	478	2	512	3
22	-1.027	11.26	5.7	480	2	517	3
23	-0.920	11.51	5.6	482	2	522	3
24	-0.815	11.79	5.6	484	2	528	3
25	-0.711	12.07	5.5	486	2	534	4
26	-0.608	12.30	5.4	488	2	543	4
27	-0.506	12.47	5.4	490	2	555	4
28	-0.403	12.54	5.4	492	2	560	4
29	-0.300	12.52	5.4	494	2	N/A	N/A
30	-0.196	12.40	5.4	496	2	N/A	N/A
31	-0.091	12.23	5.5	498	2	N/A	N/A
32	0.017	12.02	5.5	500	3	N/A	N/A
33	0.127	11.81	5.6	502	3	N/A	N/A
34	0.240	11.63	5.6	504	3	N/A	N/A
35	0.356	11.49	5.6	507	3	N/A	N/A
36	0.475	11.35	5.7	509	3	N/A	N/A
37	0.597	11.20	5.7	511	3	N/A	N/A

Table 2.2.5 (continued)
Raw Score to Scale Score Lookup Table
English Language Arts Grade 7

				2022		2021	
Raw Score	Theta	Information	SE (Scale Score)	Scale Score	Achievement Levels	Scale Score	Achievement Levels
38	0.724	10.96	5.8	514	3	N/A	N/A
39	0.857	10.59	5.9	516	3	N/A	N/A
40	0.996	10.04	6.0	519	3	N/A	N/A
41	1.146	9.32	6.3	522	3	N/A	N/A
42	1.309	8.44	6.6	525	3	N/A	N/A
43	1.489	7.51	7.0	528	3	N/A	N/A
44	1.690	6.58	7.4	532	4	N/A	N/A
45	1.920	5.68	8.0	536	4	N/A	N/A
46	2.187	4.87	8.7	542	4	N/A	N/A
47	2.500	4.26	9.3	548	4	N/A	N/A
48	2.882	3.63	10.0	555	4	N/A	N/A
49	3.153	2.94	10.0	560	4	N/A	N/A
50	3.153	2.94	10.0	560	4	N/A	N/A

Table 2.2.6
Raw Score to Scale Score Lookup Table
English Language Arts Grade 8

				2022		2021	
Raw Score	Theta	Information	SE (Scale Score)	Scale Score	Achievement Levels	Scale Score	Achievement Levels
0	-2.964	4.57	9.3	440	1	440	1
1	-2.958	4.60	9.3	440	1	441	1
2	-2.953	4.62	9.3	440	1	441	1
3	-2.947	4.65	9.2	440	1	442	1
4	-2.942	4.68	9.2	440	1	443	1
5	-2.936	4.71	9.2	441	1	444	1
6	-2.931	4.73	9.1	441	1	444	1
7	-2.925	4.76	9.1	441	1	451	1
8	-2.920	4.79	9.1	441	1	457	1
9	-2.914	4.82	9.1	441	1	462	1
10	-2.909	4.85	9.0	441	1	466	1
11	-2.724	5.96	8.2	445	1	470	2
12	-2.561	7.22	7.4	448	1	474	2
13	-2.413	8.61	6.8	451	1	478	2
14	-2.279	10.06	6.3	454	1	481	2
15	-2.156	11.47	5.9	456	1	485	2
16	-2.041	12.73	5.6	458	1	489	2
17	-1.932	13.76	5.4	461	1	492	2
18	-1.828	14.49	5.2	463	1	496	2
19	-1.726	14.88	5.2	465	1	499	2
20	-1.626	14.97	5.1	467	1	503	3
21	-1.526	14.81	5.2	469	1	507	3
22	-1.426	14.52	5.2	471	2	511	3
23	-1.325	14.21	5.3	473	2	516	3
24	-1.222	13.98	5.3	475	2	521	3
25	-1.118	13.91	5.3	477	2	527	3
26	-1.014	14.00	5.3	479	2	535	4
27	-0.909	14.18	5.3	481	2	545	4
28	-0.803	14.35	5.3	483	2	559	4
29	-0.697	14.40	5.2	485	2	560	4
30	-0.589	14.25	5.3	487	2	N/A	N/A
31	-0.479	13.89	5.3	489	2	N/A	N/A
32	-0.365	13.38	5.4	492	2	N/A	N/A
33	-0.247	12.85	5.6	494	2	N/A	N/A
34	-0.125	12.45	5.6	497	2	N/A	N/A
35	0.002	12.30	5.7	499	2	N/A	N/A
36	0.131	12.38	5.7	502	3	N/A	N/A
37	0.263	12.51	5.6	504	3	N/A	N/A

Table 2.2.6 (continued)
Raw Score to Scale Score Lookup Table
English Language Arts Grade 8

Raw Score	Theta	Information	SE (Scale Score)	2022 Scale Score	2022 Achievement Levels	2021 Scale Score	2021 Achievement Levels
38	0.398	12.44	5.6	507	3	N/A	N/A
39	0.539	11.96	5.8	510	3	N/A	N/A
40	0.689	11.01	6.0	513	3	N/A	N/A
41	0.853	9.76	6.4	516	3	N/A	N/A
42	1.035	8.57	6.8	520	3	N/A	N/A
43	1.239	7.68	7.2	524	3	N/A	N/A
44	1.463	6.97	7.5	528	3	N/A	N/A
45	1.713	6.14	8.0	533	4	N/A	N/A
46	1.999	5.47	8.5	539	4	N/A	N/A
47	2.321	5.26	8.7	545	4	N/A	N/A
48	2.703	4.30	9.6	553	4	N/A	N/A
49	3.066	2.59	10.0	560	4	N/A	N/A
50	3.066	2.59	10.0	560	4	N/A	N/A

Table 2.2.7
Raw Score to Scale Score Lookup Table
English Language Arts Grade 10

				2022		2021	
Raw Score	Theta	Information	SE (Scale Score)	Scale Score	Achievement Levels	Scale Score	Achievement Levels
0	-3.157	3.73	10.0	440	1	440	1
1	-3.132	3.83	10.0	441	1	441	1
2	-3.106	3.94	10.0	441	1	441	1
3	-3.081	4.05	10.0	442	1	442	1
4	-3.056	4.18	10.0	442	1	442	1
5	-3.031	4.30	10.0	443	1	443	1
6	-3.006	4.44	10.0	443	1	443	1
7	-2.981	4.58	9.8	444	1	444	1
8	-2.956	4.73	9.7	444	1	444	1
9	-2.931	4.89	9.5	445	1	445	1
10	-2.733	6.50	8.2	449	1	449	1
11	-2.564	8.55	7.2	452	1	453	1
12	-2.419	10.95	6.3	455	1	456	1
13	-2.291	13.56	5.7	458	1	459	1
14	-2.178	16.25	5.2	461	1	461	1
15	-2.075	18.90	4.8	463	1	464	1
16	-1.980	21.39	4.5	465	1	466	1
17	-1.892	23.51	4.3	467	1	468	1
18	-1.808	25.10	4.2	468	1	469	1
19	-1.727	26.02	4.1	470	2	472	2
20	-1.649	26.33	4.1	472	2	474	2
21	-1.571	26.22	4.1	473	2	475	2
22	-1.494	25.99	4.1	475	2	477	2
23	-1.418	25.90	4.1	477	2	479	2
24	-1.342	26.10	4.1	478	2	481	2
25	-1.266	26.60	4.1	480	2	482	2
26	-1.191	27.26	4.0	481	2	484	2
27	-1.117	27.85	4.0	483	2	486	2
28	-1.042	28.11	4.0	484	2	487	2
29	-0.967	27.88	4.0	486	2	489	2
30	-0.890	27.15	4.0	488	2	491	2
31	-0.812	26.11	4.1	489	2	493	2
32	-0.731	25.08	4.2	491	2	495	2
33	-0.647	24.40	4.3	493	2	497	2
34	-0.562	24.26	4.3	494	2	499	2
35	-0.475	24.56	4.2	496	2	501	3
36	-0.387	24.92	4.2	498	2	503	3
37	-0.297	24.82	4.2	500	3	505	3

Table 2.2.7 (continued)
Raw Score to Scale Score Lookup Table
English Language Arts Grade 10

				2022		2021	
Raw Score	Theta	Information	SE (Scale Score)	Scale Score	Achievement Levels	Scale Score	Achievement Levels
38	-0.203	23.83	4.3	502	3	508	3
39	-0.104	21.84	4.5	504	3	510	3
40	0.004	19.25	4.8	506	3	513	3
41	0.123	16.73	5.1	509	3	516	3
42	0.254	14.85	5.4	512	3	519	3
43	0.400	13.38	5.7	515	3	523	3
44	0.565	11.46	6.2	518	3	527	3
45	0.762	8.60	7.2	522	3	531	4
46	1.019	5.85	8.7	528	3	537	4
47	1.347	5.51	8.9	535	4	543	4
48	1.685	7.73	7.6	542	4	550	4
49	2.016	7.85	7.5	549	4	559	4
50	2.538	2.44	10.0	559	4	560	4
51	2.559	2.29	10.0	560	4	560	4

Table 2.2.8
Raw Score to Scale Score Lookup Table
Mathematics Grade 3

				2022		2021	
Raw Score	Theta	Information	SE (Scale Score)	Scale Score	Achievement Levels	Scale Score	Achievement Levels
0	-2.782	3.18	10.0	440	1	440	1
1	-2.771	3.21	10.0	440	1	441	1
2	-2.761	3.25	10.0	440	1	442	1
3	-2.751	3.28	10.0	441	1	443	1
4	-2.740	3.32	10.0	441	1	455	1
5	-2.730	3.35	10.0	441	1	462	1
6	-2.719	3.39	10.0	441	1	468	1
7	-2.445	4.44	10.0	447	1	473	2
8	-2.224	5.45	9.1	452	1	478	2
9	-2.039	6.42	8.4	456	1	482	2
10	-1.876	7.35	7.9	459	1	485	2
11	-1.731	8.24	7.4	462	1	489	2
12	-1.600	9.08	7.1	465	1	492	2
13	-1.478	9.88	6.8	468	1	496	2
14	-1.364	10.63	6.5	470	2	499	2
15	-1.257	11.34	6.3	473	2	503	3
16	-1.155	12.00	6.2	475	2	506	3
17	-1.057	12.62	6.0	477	2	510	3
18	-0.963	13.19	5.9	479	2	515	3
19	-0.872	13.70	5.8	481	2	519	3
20	-0.783	14.17	5.7	483	2	525	3
21	-0.696	14.57	5.6	485	2	532	4
22	-0.611	14.92	5.5	486	2	541	4
23	-0.526	15.20	5.5	488	2	555	4
24	-0.443	15.41	5.4	490	2	560	4
25	-0.359	15.56	5.4	492	2	N/A	N/A
26	-0.276	15.63	5.4	494	2	N/A	N/A
27	-0.193	15.63	5.4	495	2	N/A	N/A
28	-0.109	15.56	5.4	497	2	N/A	N/A
29	-0.025	15.42	5.4	499	2	N/A	N/A
30	0.062	15.21	5.5	501	3	N/A	N/A
31	0.149	14.92	5.5	503	3	N/A	N/A
32	0.239	14.58	5.6	505	3	N/A	N/A
33	0.331	14.17	5.7	506	3	N/A	N/A
34	0.427	13.71	5.8	509	3	N/A	N/A
35	0.526	13.20	5.9	511	3	N/A	N/A
36	0.630	12.65	6.0	513	3	N/A	N/A
37	0.739	12.06	6.2	515	3	N/A	N/A

Table 2.2.8 (continued)
Raw Score to Scale Score Lookup Table
Mathematics Grade 3

Raw Score	Theta	Information	SE (Scale Score)	2022 Scale Score	2022 Achievement Levels	2021 Scale Score	2021 Achievement Levels
38	0.855	11.43	6.3	518	3	N/A	N/A
39	0.979	10.73	6.5	520	3	N/A	N/A
40	1.112	9.94	6.8	523	3	N/A	N/A
41	1.259	9.03	7.1	526	3	N/A	N/A
42	1.424	7.95	7.6	529	3	N/A	N/A
43	1.615	6.71	8.2	534	4	N/A	N/A
44	1.845	5.35	9.2	539	4	N/A	N/A
45	2.139	3.92	10.0	545	4	N/A	N/A
46	2.554	2.47	10.0	554	4	N/A	N/A
47	2.837	1.78	10.0	560	4	N/A	N/A
48	2.837	1.78	10.0	560	4	N/A	N/A

Table 2.2.9
Raw Score to Scale Score Lookup Table
Mathematics Grade 4

				2022		2021	
Raw Score	Theta	Information	SE (Scale Score)	Scale Score	Achievement Levels	Scale Score	Achievement Levels
0	-2.812	3.52	10.0	440	1	440	1
1	-2.808	3.53	10.0	440	1	442	1
2	-2.805	3.55	10.0	440	1	444	1
3	-2.802	3.56	10.0	440	1	446	1
4	-2.798	3.57	10.0	440	1	455	1
5	-2.795	3.58	10.0	440	1	461	1
6	-2.526	4.70	9.7	446	1	466	1
7	-2.309	5.76	8.7	451	1	470	2
8	-2.127	6.76	8.1	454	1	474	2
9	-1.967	7.72	7.5	458	1	477	2
10	-1.824	8.63	7.1	461	1	480	2
11	-1.693	9.51	6.8	463	1	484	2
12	-1.574	10.37	6.5	466	1	486	2
13	-1.462	11.21	6.3	468	1	489	2
14	-1.358	12.04	6.0	470	2	492	2
15	-1.260	12.86	5.8	472	2	495	2
16	-1.167	13.66	5.7	474	2	497	2
17	-1.078	14.46	5.5	476	2	500	3
18	-0.993	15.23	5.4	478	2	503	3
19	-0.911	15.99	5.2	480	2	506	3
20	-0.832	16.72	5.1	481	2	509	3
21	-0.755	17.41	5.0	483	2	513	3
22	-0.680	18.05	4.9	485	2	517	3
23	-0.608	18.64	4.8	486	2	522	3
24	-0.536	19.17	4.8	488	2	529	3
25	-0.466	19.62	4.7	489	2	537	4
26	-0.397	20.00	4.7	491	2	552	4
27	-0.328	20.30	4.6	492	2	560	4
28	-0.260	20.52	4.6	493	2	N/A	N/A
29	-0.192	20.66	4.6	495	2	N/A	N/A
30	-0.124	20.72	4.6	496	2	N/A	N/A
31	-0.056	20.70	4.6	498	2	N/A	N/A
32	0.013	20.60	4.6	499	2	N/A	N/A
33	0.082	20.42	4.6	501	3	N/A	N/A
34	0.152	20.17	4.7	502	3	N/A	N/A
35	0.224	19.85	4.7	504	3	N/A	N/A
36	0.297	19.45	4.7	505	3	N/A	N/A
37	0.371	18.99	4.8	507	3	N/A	N/A

Table 2.2.9 (continued)
Raw Score to Scale Score Lookup Table
Mathematics Grade 4

				2022		2021	
Raw Score	Theta	Information	SE (Scale Score)	Scale Score	Achievement Levels	Scale Score	Achievement Levels
38	0.448	18.45	4.9	508	3	N/A	N/A
39	0.527	17.85	5.0	510	3	N/A	N/A
40	0.609	17.17	5.1	512	3	N/A	N/A
41	0.695	16.43	5.2	513	3	N/A	N/A
42	0.785	15.63	5.3	515	3	N/A	N/A
43	0.879	14.77	5.4	517	3	N/A	N/A
44	0.980	13.86	5.6	519	3	N/A	N/A
45	1.088	12.89	5.8	522	3	N/A	N/A
46	1.205	11.87	6.1	524	3	N/A	N/A
47	1.333	10.78	6.4	527	3	N/A	N/A
48	1.476	9.61	6.8	529	3	N/A	N/A
49	1.640	8.34	7.3	533	4	N/A	N/A
50	1.832	6.93	8.0	537	4	N/A	N/A
51	2.072	5.35	9.0	542	4	N/A	N/A
52	2.402	3.58	10.0	549	4	N/A	N/A
53	2.920	1.77	10.0	560	4	N/A	N/A
54	2.920	1.77	10.0	560	4	N/A	N/A

Table 2.2.10
Raw Score to Scale Score Lookup Table
Mathematics Grade 5

				2022		2021	
Raw Score	Theta	Information	SE (Scale Score)	Scale Score	Achievement Levels	Scale Score	Achievement Levels
0	-3.126	2.23	10.0	440	1	440	1
1	-3.120	2.24	10.0	440	1	442	1
2	-3.114	2.26	10.0	440	1	444	1
3	-3.107	2.28	10.0	440	1	446	1
4	-3.101	2.29	10.0	440	1	457	1
5	-3.094	2.31	10.0	441	1	463	1
6	-2.702	3.50	10.0	448	1	468	1
7	-2.422	4.64	8.8	453	1	472	2
8	-2.201	5.74	7.9	458	1	475	2
9	-2.017	6.81	7.3	461	1	479	2
10	-1.858	7.87	6.8	464	1	482	2
11	-1.717	8.92	6.4	467	1	485	2
12	-1.590	9.97	6.0	469	1	487	2
13	-1.474	11.02	5.7	471	2	490	2
14	-1.367	12.07	5.5	474	2	493	2
15	-1.267	13.10	5.3	475	2	496	2
16	-1.173	14.11	5.1	477	2	498	2
17	-1.084	15.09	4.9	479	2	501	3
18	-0.999	16.03	4.8	481	2	504	3
19	-0.918	16.92	4.6	482	2	507	3
20	-0.840	17.75	4.5	484	2	510	3
21	-0.764	18.52	4.4	485	2	513	3
22	-0.690	19.22	4.3	486	2	516	3
23	-0.619	19.84	4.3	488	2	520	3
24	-0.548	20.37	4.2	489	2	524	3
25	-0.479	20.81	4.2	490	2	530	4
26	-0.410	21.16	4.1	492	2	540	4
27	-0.342	21.41	4.1	493	2	560	4
28	-0.274	21.56	4.1	494	2	N/A	N/A
29	-0.207	21.61	4.1	496	2	N/A	N/A
30	-0.139	21.58	4.1	497	2	N/A	N/A
31	-0.071	21.45	4.1	498	2	N/A	N/A
32	-0.002	21.24	4.1	499	2	N/A	N/A
33	0.068	20.96	4.2	501	3	N/A	N/A
34	0.139	20.62	4.2	502	3	N/A	N/A
35	0.211	20.21	4.2	504	3	N/A	N/A
36	0.284	19.77	4.3	505	3	N/A	N/A
37	0.359	19.28	4.3	506	3	N/A	N/A

Table 2.2.10 (continued)
Raw Score to Scale Score Lookup Table
Mathematics Grade 5

Raw Score	Theta	Information	SE (Scale Score)	2022 Scale Score	2022 Achievement Levels	2021 Scale Score	2021 Achievement Levels
38	0.436	18.76	4.4	508	3	N/A	N/A
39	0.516	18.22	4.5	509	3	N/A	N/A
40	0.598	17.65	4.5	511	3	N/A	N/A
41	0.682	17.06	4.6	513	3	N/A	N/A
42	0.771	16.43	4.7	514	3	N/A	N/A
43	0.863	15.74	4.8	516	3	N/A	N/A
44	0.961	14.98	4.9	518	3	N/A	N/A
45	1.064	14.12	5.1	520	3	N/A	N/A
46	1.175	13.15	5.3	522	3	N/A	N/A
47	1.295	12.04	5.5	524	3	N/A	N/A
48	1.429	10.78	5.8	527	3	N/A	N/A
49	1.580	9.36	6.2	529	3	N/A	N/A
50	1.758	7.77	6.8	533	4	N/A	N/A
51	1.977	6.01	7.8	537	4	N/A	N/A
52	2.274	4.08	9.4	543	4	N/A	N/A
53	2.766	2.01	10.0	552	4	N/A	N/A
54	3.176	1.09	10.0	560	4	N/A	N/A

Table 2.2.11
Raw Score to Scale Score Lookup Table
Mathematics Grade 6

				2022		2021	
Raw Score	Theta	Information	SE (Scale Score)	Scale Score	Achievement Levels	Scale Score	Achievement Levels
0	-3.028	2.54	10.0	440	1	440	1
1	-2.989	2.68	10.0	441	1	442	1
2	-2.950	2.83	10.0	442	1	443	1
3	-2.911	2.99	10.0	442	1	455	1
4	-2.872	3.15	10.0	443	1	463	1
5	-2.513	4.87	9.0	450	1	468	1
6	-2.256	6.31	7.9	455	1	473	2
7	-2.049	7.57	7.2	459	1	477	2
8	-1.874	8.72	6.7	463	1	481	2
9	-1.720	9.79	6.3	466	1	484	2
10	-1.582	10.80	6.0	469	1	487	2
11	-1.456	11.75	5.8	471	2	490	2
12	-1.340	12.63	5.6	474	2	493	2
13	-1.232	13.44	5.4	476	2	496	2
14	-1.130	14.18	5.3	478	2	498	2
15	-1.032	14.85	5.2	480	2	501	3
16	-0.940	15.46	5.1	481	2	504	3
17	-0.850	16.00	5.0	483	2	507	3
18	-0.764	16.48	4.9	485	2	510	3
19	-0.681	16.92	4.8	487	2	513	3
20	-0.600	17.32	4.8	488	2	516	3
21	-0.521	17.68	4.7	490	2	519	3
22	-0.443	18.01	4.7	491	2	523	3
23	-0.368	18.31	4.6	493	2	528	3
24	-0.293	18.59	4.6	494	2	533	4
25	-0.220	18.86	4.6	496	2	540	4
26	-0.148	19.10	4.5	497	2	553	4
27	-0.077	19.33	4.5	499	2	560	4
28	-0.007	19.54	4.5	500	3	N/A	N/A
29	0.063	19.73	4.5	501	3	N/A	N/A
30	0.132	19.90	4.5	503	3	N/A	N/A
31	0.201	20.04	4.4	504	3	N/A	N/A
32	0.269	20.15	4.4	506	3	N/A	N/A
33	0.338	20.22	4.4	507	3	N/A	N/A
34	0.407	20.26	4.4	508	3	N/A	N/A
35	0.477	20.25	4.4	510	3	N/A	N/A
36	0.547	20.19	4.4	511	3	N/A	N/A
37	0.618	20.06	4.4	512	3	N/A	N/A

Table 2.2.11 (continued)
Raw Score to Scale Score Lookup Table
Mathematics Grade 6

				2022		2021	
Raw Score	Theta	Information	SE (Scale Score)	Scale Score	Achievement Levels	Scale Score	Achievement Levels
38	0.690	19.86	4.5	514	3	N/A	N/A
39	0.764	19.57	4.5	515	3	N/A	N/A
40	0.840	19.18	4.5	517	3	N/A	N/A
41	0.918	18.68	4.6	518	3	N/A	N/A
42	1.000	18.06	4.7	520	3	N/A	N/A
43	1.085	17.30	4.8	522	3	N/A	N/A
44	1.176	16.39	4.9	524	3	N/A	N/A
45	1.273	15.32	5.1	525	3	N/A	N/A
46	1.378	14.09	5.3	528	3	N/A	N/A
47	1.495	12.69	5.6	529	3	N/A	N/A
48	1.626	11.10	6.0	532	4	N/A	N/A
49	1.779	9.34	6.5	536	4	N/A	N/A
50	1.966	7.40	7.3	539	4	N/A	N/A
51	2.209	5.29	8.6	544	4	N/A	N/A
52	2.570	3.09	10.0	551	4	N/A	N/A
53	3.011	1.59	10.0	560	4	N/A	N/A
54	3.011	1.59	10.0	560	4	N/A	N/A

Table 2.2.12
Raw Score to Scale Score Lookup Table
Mathematics Grade 7

				2022		2021	
Raw Score	Theta	Information	SE (Scale Score)	Scale Score	Achievement Levels	Scale Score	Achievement Levels
0	-2.859	1.41	10.0	440	1	440	1
1	-2.807	1.54	10.0	441	1	445	1
2	-2.755	1.69	10.0	442	1	451	1
3	-2.703	1.85	10.0	443	1	456	1
4	-2.651	2.02	10.0	444	1	465	1
5	-2.599	2.20	10.0	445	1	471	2
6	-2.164	4.31	10.0	454	1	476	2
7	-1.887	6.24	8.3	460	1	480	2
8	-1.677	7.96	7.4	465	1	483	2
9	-1.504	9.48	6.7	468	1	486	2
10	-1.355	10.78	6.3	471	2	489	2
11	-1.221	11.87	6.0	474	2	492	2
12	-1.100	12.75	5.8	477	2	495	2
13	-0.987	13.47	5.7	479	2	497	2
14	-0.881	14.06	5.5	481	2	499	2
15	-0.780	14.56	5.4	483	2	503	3
16	-0.683	15.00	5.4	485	2	505	3
17	-0.591	15.40	5.3	487	2	508	3
18	-0.502	15.78	5.2	489	2	511	3
19	-0.415	16.15	5.2	491	2	514	3
20	-0.332	16.51	5.1	492	2	517	3
21	-0.251	16.88	5.1	494	2	520	3
22	-0.172	17.26	5.0	496	2	524	3
23	-0.095	17.66	4.9	497	2	528	3
24	-0.020	18.09	4.9	499	2	534	4
25	0.053	18.54	4.8	500	3	541	4
26	0.125	19.04	4.8	502	3	552	4
27	0.195	19.57	4.7	503	3	560	4
28	0.264	20.14	4.6	505	3	N/A	N/A
29	0.332	20.73	4.6	506	3	N/A	N/A
30	0.398	21.34	4.5	508	3	N/A	N/A
31	0.464	21.96	4.4	509	3	N/A	N/A
32	0.529	22.56	4.4	510	3	N/A	N/A
33	0.593	23.14	4.3	512	3	N/A	N/A
34	0.657	23.66	4.3	513	3	N/A	N/A
35	0.721	24.12	4.2	514	3	N/A	N/A
36	0.785	24.48	4.2	516	3	N/A	N/A
37	0.849	24.72	4.2	517	3	N/A	N/A

Table 2.2.12 (continued)
Raw Score to Scale Score Lookup Table
Mathematics Grade 7

Raw Score	Theta	Information	SE (Scale Score)	2022 Scale Score	2022 Achievement Levels	2021 Scale Score	2021 Achievement Levels
38	0.914	24.82	4.2	518	3	N/A	N/A
39	0.980	24.76	4.2	520	3	N/A	N/A
40	1.047	24.52	4.2	521	3	N/A	N/A
41	1.116	24.09	4.2	523	3	N/A	N/A
42	1.188	23.45	4.3	524	3	N/A	N/A
43	1.263	22.59	4.4	526	3	N/A	N/A
44	1.342	21.51	4.5	527	3	N/A	N/A
45	1.426	20.20	4.6	529	3	N/A	N/A
46	1.517	18.67	4.8	531	4	N/A	N/A
47	1.617	16.92	5.0	533	4	N/A	N/A
48	1.729	14.95	5.4	535	4	N/A	N/A
49	1.857	12.76	5.8	538	4	N/A	N/A
50	2.011	10.36	6.4	541	4	N/A	N/A
51	2.206	7.76	7.5	545	4	N/A	N/A
52	2.480	5.00	9.3	551	4	N/A	N/A
53	2.922	2.39	10.0	560	4	N/A	N/A
54	2.922	2.39	10.0	560	4	N/A	N/A

Table 2.2.13
Raw Score to Scale Score Lookup Table
Mathematics Grade 8

				2022		2021	
Raw Score	Theta	Information	SE (Scale Score)	Scale Score	Achievement Levels	Scale Score	Achievement Levels
0	-2.983	1.94	10.0	440	1	440	1
1	-2.913	2.12	10.0	441	1	442	1
2	-2.843	2.32	10.0	443	1	445	1
3	-2.773	2.53	10.0	444	1	447	1
4	-2.704	2.75	10.0	446	1	460	1
5	-2.634	2.99	10.0	447	1	467	1
6	-2.564	3.25	10.0	448	1	473	2
7	-2.274	4.56	9.4	454	1	478	2
8	-2.051	5.86	8.3	459	1	482	2
9	-1.869	7.17	7.5	462	1	486	2
10	-1.713	8.50	6.9	466	1	489	2
11	-1.578	9.84	6.4	468	1	492	2
12	-1.457	11.17	6.0	471	2	495	2
13	-1.347	12.49	5.7	473	2	498	2
14	-1.246	13.77	5.4	475	2	500	3
15	-1.153	15.00	5.2	477	2	503	3
16	-1.065	16.15	5.0	479	2	505	3
17	-0.982	17.22	4.9	480	2	508	3
18	-0.903	18.17	4.7	482	2	510	3
19	-0.827	19.00	4.6	483	2	513	3
20	-0.754	19.71	4.5	485	2	516	3
21	-0.683	20.28	4.5	486	2	518	3
22	-0.614	20.73	4.4	488	2	522	3
23	-0.546	21.06	4.4	489	2	525	3
24	-0.479	21.28	4.4	491	2	529	3
25	-0.412	21.39	4.4	492	2	535	4
26	-0.347	21.42	4.4	493	2	544	4
27	-0.282	21.37	4.4	494	2	560	4
28	-0.217	21.26	4.4	496	2	N/A	N/A
29	-0.152	21.09	4.4	497	2	N/A	N/A
30	-0.087	20.89	4.4	498	2	N/A	N/A
31	-0.022	20.66	4.4	499	2	N/A	N/A
32	0.044	20.39	4.5	501	3	N/A	N/A
33	0.110	20.11	4.5	502	3	N/A	N/A
34	0.177	19.81	4.5	504	3	N/A	N/A
35	0.245	19.50	4.6	505	3	N/A	N/A
36	0.313	19.16	4.6	506	3	N/A	N/A
37	0.383	18.81	4.7	508	3	N/A	N/A

Table 2.2.13 (continued)
Raw Score to Scale Score Lookup Table
Mathematics Grade 8

				2022		2021	
Raw Score	Theta	Information	SE (Scale Score)	Scale Score	Achievement Levels	Scale Score	Achievement Levels
38	0.455	18.44	4.7	509	3	N/A	N/A
39	0.528	18.03	4.7	511	3	N/A	N/A
40	0.603	17.60	4.8	512	3	N/A	N/A
41	0.680	17.12	4.9	514	3	N/A	N/A
42	0.761	16.59	5.0	516	3	N/A	N/A
43	0.845	15.99	5.0	517	3	N/A	N/A
44	0.933	15.32	5.2	519	3	N/A	N/A
45	1.027	14.54	5.3	521	3	N/A	N/A
46	1.127	13.65	5.5	523	3	N/A	N/A
47	1.237	12.62	5.7	525	3	N/A	N/A
48	1.358	11.42	6.0	528	3	N/A	N/A
49	1.496	10.03	6.4	530	4	N/A	N/A
50	1.659	8.42	7.0	534	4	N/A	N/A
51	1.862	6.56	7.9	538	4	N/A	N/A
52	2.142	4.43	9.6	543	4	N/A	N/A
53	2.620	2.11	10.0	553	4	N/A	N/A
54	2.966	1.22	10.0	560	4	N/A	N/A

Table 2.2.14
Raw Score to Scale Score Lookup Table
Mathematics Grade 10

				2022		2021	
Raw Score	Theta	Information	SE (Scale Score)	Scale Score	Achievement Levels	Scale Score	Achievement Levels
0	-3.124	1.44	10.0	440	1	440	1
1	-3.074	1.57	10.0	441	1	441	1
2	-3.023	1.71	10.0	442	1	442	1
3	-2.972	1.85	10.0	443	1	443	1
4	-2.922	2.01	10.0	444	1	444	1
5	-2.871	2.19	10.0	445	1	445	1
6	-2.487	4.03	10.0	454	1	446	1
7	-2.233	5.89	8.8	459	1	447	1
8	-2.040	7.68	7.7	463	1	448	1
9	-1.883	9.38	7.0	467	1	455	1
10	-1.749	10.97	6.5	469	1	460	1
11	-1.630	12.43	6.1	472	2	464	1
12	-1.524	13.78	5.8	474	2	468	1
13	-1.426	15.02	5.5	476	2	471	2
14	-1.335	16.16	5.3	478	2	474	2
15	-1.251	17.20	5.2	480	2	476	2
16	-1.170	18.17	5.0	482	2	478	2
17	-1.094	19.05	4.9	483	2	481	2
18	-1.021	19.86	4.8	485	2	482	2
19	-0.950	20.60	4.7	486	2	484	2
20	-0.883	21.29	4.6	488	2	486	2
21	-0.817	21.91	4.6	489	2	488	2
22	-0.753	22.50	4.5	491	2	489	2
23	-0.691	23.04	4.5	492	2	491	2
24	-0.630	23.54	4.4	493	2	492	2
25	-0.570	24.02	4.4	495	2	494	2
26	-0.511	24.47	4.3	496	2	495	2
27	-0.454	24.89	4.3	497	2	496	2
28	-0.397	25.30	4.2	498	2	498	2
29	-0.340	25.68	4.2	499	2	499	2
30	-0.285	26.04	4.2	501	3	500	3
31	-0.230	26.37	4.2	502	3	501	3
32	-0.175	26.67	4.1	503	3	503	3
33	-0.120	26.92	4.1	504	3	504	3
34	-0.065	27.14	4.1	505	3	505	3
35	-0.011	27.30	4.1	507	3	506	3
36	0.044	27.39	4.1	508	3	507	3
37	0.099	27.42	4.1	509	3	508	3

Table 2.2.14 (continued)
Raw Score to Scale Score Lookup Table
Mathematics Grade 10

				2022		2021	
Raw Score	Theta	Information	SE (Scale Score)	Scale Score	Achievement Levels	Scale Score	Achievement Levels
38	0.154	27.36	4.1	510	3	510	3
39	0.210	27.22	4.1	511	3	511	3
40	0.267	26.98	4.1	512	3	512	3
41	0.325	26.64	4.1	514	3	513	3
42	0.384	26.20	4.2	515	3	514	3
43	0.444	25.64	4.2	516	3	516	3
44	0.507	24.97	4.3	518	3	517	3
45	0.571	24.19	4.3	519	3	518	3
46	0.638	23.29	4.4	520	3	520	3
47	0.708	22.28	4.5	522	3	521	3
48	0.782	21.15	4.6	523	3	523	3
49	0.861	19.92	4.8	525	3	524	3
50	0.945	18.56	5.0	527	3	526	3
51	1.035	17.09	5.2	529	3	527	3
52	1.135	15.51	5.4	531	4	529	3
53	1.245	13.82	5.7	533	4	531	4
54	1.370	12.00	6.2	536	4	534	4
55	1.516	10.07	6.7	539	4	537	4
56	1.691	8.02	7.5	543	4	540	4
57	1.916	5.89	8.8	548	4	544	4
58	2.233	3.75	10.0	555	4	551	4
59	2.490	2.58	10.0	560	4	560	4
60	2.490	2.58	10.0	560	4	560	4

Table 2.2.15
Raw Score to Scale Score Lookup Table
Science Grade 5

Raw Score	Theta	Information	SE (Scale Score)	2022 Scale Score	2022 Achievement Levels	2021 Scale Score	2021 Achievement Levels
0	-3.130	3.57	10.0	440	1	440	1
1	-3.110	3.62	10.0	440	1	441	1
2	-3.089	3.68	10.0	441	1	443	1
3	-3.069	3.73	10.0	441	1	444	1
4	-3.048	3.79	10.0	442	1	446	1
5	-3.027	3.85	10.0	442	1	447	1
6	-3.007	3.91	10.0	442	1	455	1
7	-2.986	3.96	10.0	443	1	461	1
8	-2.966	4.02	9.9	443	1	466	1
9	-2.945	4.08	9.8	444	1	471	2
10	-2.924	4.14	9.8	444	1	475	2
11	-2.730	4.73	9.1	448	1	479	2
12	-2.554	5.27	8.7	451	1	483	2
13	-2.393	5.78	8.3	455	1	487	2
14	-2.245	6.26	7.9	458	1	491	2
15	-2.105	6.69	7.7	460	1	494	2
16	-1.973	7.09	7.5	463	1	498	2
17	-1.846	7.45	7.3	466	1	502	3
18	-1.725	7.76	7.1	468	1	507	3
19	-1.608	8.03	7.0	470	2	511	3
20	-1.494	8.26	6.9	473	2	516	3
21	-1.383	8.46	6.8	475	2	521	3
22	-1.274	8.61	6.8	477	2	527	3
23	-1.167	8.74	6.7	479	2	533	4
24	-1.061	8.83	6.7	481	2	541	4
25	-0.955	8.89	6.7	483	2	551	4
26	-0.851	8.93	6.7	485	2	560	4
27	-0.746	8.95	6.6	487	2	560	4
28	-0.642	8.95	6.6	489	2	N/A	N/A
29	-0.538	8.94	6.6	492	2	N/A	N/A
30	-0.433	8.92	6.7	494	2	N/A	N/A
31	-0.327	8.89	6.7	496	2	N/A	N/A
32	-0.220	8.85	6.7	498	2	N/A	N/A
33	-0.113	8.79	6.7	499	2	N/A	N/A
34	-0.003	8.73	6.7	502	3	N/A	N/A
35	0.108	8.64	6.8	504	3	N/A	N/A
36	0.222	8.52	6.8	507	3	N/A	N/A
37	0.338	8.36	6.9	509	3	N/A	N/A

Table 2.2.15 (continued)
Raw Score to Scale Score Lookup Table
Science Grade 5

				2022		2021	
Raw Score	Theta	Information	SE (Scale Score)	Scale Score	Achievement Levels	Scale Score	Achievement Levels
38	0.458	8.16	7.0	511	3	N/A	N/A
39	0.582	7.91	7.1	514	3	N/A	N/A
40	0.712	7.60	7.2	516	3	N/A	N/A
41	0.848	7.22	7.4	519	3	N/A	N/A
42	0.992	6.78	7.6	522	3	N/A	N/A
43	1.146	6.29	7.9	525	3	N/A	N/A
44	1.313	5.75	8.3	528	3	N/A	N/A
45	1.495	5.18	8.7	532	4	N/A	N/A
46	1.696	4.61	9.3	536	4	N/A	N/A
47	1.921	4.04	9.9	540	4	N/A	N/A
48	2.178	3.49	10.0	545	4	N/A	N/A
49	2.474	2.96	10.0	551	4	N/A	N/A
50	2.826	2.45	10.0	558	4	N/A	N/A
51	2.907	2.34	10.0	560	4	N/A	N/A
52	2.907	2.34	10.0	560	4	N/A	N/A
53	2.907	2.34	10.0	560	4	N/A	N/A
54	2.907	2.34	10.0	560	4	N/A	N/A

Table 2.2.16
Raw Score to Scale Score Lookup Table
Science Grade 8

				2022		2021	
Raw Score	Theta	Information	SE (Scale Score)	Scale Score	Achievement Levels	Scale Score	Achievement Levels
0	-2.978	2.87	10.0	440	1	440	1
1	-2.941	2.97	10.0	441	1	441	1
2	-2.905	3.07	10.0	441	1	442	1
3	-2.869	3.17	10.0	442	1	443	1
4	-2.832	3.28	10.0	443	1	444	1
5	-2.796	3.39	10.0	444	1	453	1
6	-2.759	3.50	10.0	444	1	460	1
7	-2.723	3.61	10.0	445	1	465	1
8	-2.687	3.73	10.0	446	1	469	1
9	-2.449	4.57	9.5	451	1	474	2
10	-2.247	5.36	8.8	455	1	477	2
11	-2.072	6.12	8.2	458	1	481	2
12	-1.915	6.82	7.8	462	1	484	2
13	-1.772	7.49	7.4	464	1	488	2
14	-1.640	8.11	7.1	467	1	491	2
15	-1.516	8.69	6.9	469	1	495	2
16	-1.400	9.22	6.7	472	2	498	2
17	-1.289	9.72	6.5	474	2	503	3
18	-1.183	10.17	6.4	476	2	507	3
19	-1.080	10.57	6.2	478	2	512	3
20	-0.981	10.93	6.1	481	2	517	3
21	-0.884	11.24	6.1	482	2	523	3
22	-0.790	11.51	6.0	484	2	530	4
23	-0.697	11.74	5.9	486	2	539	4
24	-0.605	11.93	5.9	488	2	549	4
25	-0.514	12.08	5.8	490	2	560	4
26	-0.424	12.21	5.8	492	2	560	4
27	-0.334	12.32	5.8	494	2	560	4
28	-0.245	12.41	5.8	495	2	N/A	N/A
29	-0.156	12.48	5.7	497	2	N/A	N/A
30	-0.066	12.53	5.7	499	2	N/A	N/A
31	0.023	12.56	5.7	501	3	N/A	N/A
32	0.113	12.57	5.7	503	3	N/A	N/A
33	0.204	12.55	5.7	505	3	N/A	N/A
34	0.296	12.49	5.7	506	3	N/A	N/A
35	0.389	12.40	5.8	508	3	N/A	N/A
36	0.484	12.27	5.8	510	3	N/A	N/A
37	0.580	12.10	5.8	512	3	N/A	N/A

Table 2.2.16 (continued)
Raw Score to Scale Score Lookup Table
Science Grade 8

				2022		2021	
Raw Score	Theta	Information	SE (Scale Score)	Scale Score	Achievement Levels	Scale Score	Achievement Levels
38	0.679	11.90	5.9	514	3	N/A	N/A
39	0.780	11.66	5.9	516	3	N/A	N/A
40	0.885	11.38	6.0	518	3	N/A	N/A
41	0.993	11.06	6.1	521	3	N/A	N/A
42	1.105	10.71	6.2	523	3	N/A	N/A
43	1.223	10.30	6.3	525	3	N/A	N/A
44	1.346	9.84	6.5	528	3	N/A	N/A
45	1.478	9.31	6.6	530	4	N/A	N/A
46	1.619	8.68	6.9	533	4	N/A	N/A
47	1.774	7.93	7.2	536	4	N/A	N/A
48	1.947	7.01	7.7	540	4	N/A	N/A
49	2.146	5.92	8.3	544	4	N/A	N/A
50	2.387	4.67	9.4	549	4	N/A	N/A
51	2.696	3.34	10.0	555	4	N/A	N/A
52	2.937	2.54	10.0	560	4	N/A	N/A
53	2.937	2.54	10.0	560	4	N/A	N/A
54	2.937	2.54	10.0	560	4	N/A	N/A

Section 2.3

Cumulative Scale Score Distribution Tables

Table 2.3.1
Cumulative Scale Score Distribution
English Language Arts Grade 3

Scale Score	Achievement Levels	N	Proportion	Cumulative Proportion
441	NM	3	0.00005	0.00005
442	NM	9	0.00015	0.00019
443	NM	33	0.00054	0.00073
444	NM	104	0.00169	0.00242
445	NM	196	0.00318	0.00560
446	NM	400	0.00649	0.01208
447	NM	627	0.01017	0.02226
452	NM	819	0.01329	0.03554
457	NM	996	0.01616	0.05170
460	NM	1101	0.01786	0.06956
463	NM	1181	0.01916	0.08871
466	NM	1270	0.02060	0.10931
469	NM	1173	0.01903	0.12834
471	PM	1317	0.02136	0.14970
474	PM	1267	0.02055	0.17026
476	PM	1380	0.02239	0.19264
478	PM	1387	0.02250	0.21514
480	PM	1425	0.02312	0.23826
482	PM	1496	0.02427	0.26252
484	PM	1637	0.02655	0.28908
486	PM	1811	0.02938	0.31845
488	PM	1864	0.03024	0.34869
490	PM	2051	0.03327	0.38196
492	PM	2246	0.03643	0.41839
494	PM	2379	0.03859	0.45698
497	PM	2596	0.04211	0.49909
499	PM	2640	0.04282	0.54192
502	ME	2866	0.04649	0.58841
504	ME	3055	0.04956	0.63796
507	ME	2965	0.04810	0.68606
510	ME	3052	0.04951	0.73556
513	ME	3101	0.05030	0.78586
516	ME	2845	0.04615	0.83201
520	ME	2494	0.04046	0.87247
524	ME	2108	0.03419	0.90666
528	ME	1652	0.02680	0.93346
533	EE	1315	0.02133	0.95479
538	EE	979	0.01588	0.97067
544	EE	713	0.01157	0.98224
551	EE	490	0.00795	0.99019
559	EE	328	0.00532	0.99551
560	EE	277	0.00449	1.00000

Table 2.3.2
Cumulative Scale Score Distribution
English Language Arts Grade 4

Scale Score	Achievement Levels	N	Proportion	Cumulative Proportion
441	NM	105	0.00169	0.00169
442	NM	934	0.01504	0.01673
449	NM	665	0.01071	0.02744
454	NM	816	0.01314	0.04058
458	NM	1016	0.01636	0.05694
461	NM	1130	0.01820	0.07514
464	NM	1204	0.01939	0.09452
467	NM	1299	0.02092	0.11544
469	NM	1301	0.02095	0.13639
471	PM	1417	0.02282	0.15921
474	PM	1525	0.02456	0.18377
476	PM	1651	0.02659	0.21035
478	PM	1710	0.02754	0.23789
480	PM	1768	0.02847	0.26636
482	PM	1887	0.03039	0.29675
484	PM	2059	0.03316	0.32990
486	PM	2155	0.03470	0.36461
488	PM	2174	0.03501	0.39961
490	PM	2246	0.03617	0.43578
492	PM	2436	0.03923	0.47501
494	PM	2494	0.04016	0.51517
496	PM	2530	0.04074	0.55591
498	PM	2648	0.04264	0.59855
501	ME	2605	0.04195	0.64050
503	ME	2669	0.04298	0.68348
505	ME	2604	0.04193	0.72541
508	ME	2588	0.04167	0.76709
510	ME	2506	0.04035	0.80744
513	ME	2429	0.03911	0.84655
516	ME	2019	0.03251	0.87907
520	ME	1901	0.03061	0.90968
523	ME	1624	0.02615	0.93583
527	ME	1359	0.02188	0.95771
532	EE	991	0.01596	0.97367
537	EE	758	0.01221	0.98588
543	EE	493	0.00794	0.99382
552	EE	278	0.00448	0.99829
560	EE	106	0.00171	1.00000

Table 2.3.3
Cumulative Scale Score Distribution
English Language Arts Grade 5

Scale Score	Achievement Levels	N	Proportion	Cumulative Proportion
441	NM	2	0.00003	0.00003
442	NM	14	0.00022	0.00025
443	NM	46	0.00072	0.00097
444	NM	108	0.00170	0.00267
445	NM	208	0.00327	0.00594
446	NM	301	0.00473	0.01067
450	NM	490	0.00770	0.01837
454	NM	569	0.00894	0.02732
457	NM	667	0.01048	0.03780
459	NM	699	0.01099	0.04879
461	NM	738	0.01160	0.06039
464	NM	759	0.01193	0.07232
466	NM	784	0.01232	0.08464
467	NM	776	0.01220	0.09684
469	NM	890	0.01399	0.11083
471	PM	946	0.01487	0.12570
472	PM	1069	0.01680	0.14250
474	PM	1043	0.01639	0.15890
476	PM	1121	0.01762	0.17652
477	PM	1225	0.01925	0.19577
479	PM	1330	0.02091	0.21668
481	PM	1437	0.02259	0.23926
482	PM	1480	0.02326	0.26253
484	PM	1703	0.02677	0.28930
486	PM	1821	0.02862	0.31792
487	PM	1887	0.02966	0.34758
489	PM	2065	0.03246	0.38004
491	PM	2215	0.03482	0.41485
493	PM	2451	0.03853	0.45338
495	PM	2523	0.03966	0.49304
497	PM	2636	0.04143	0.53447
499	PM	2828	0.04445	0.57892
501	ME	2947	0.04632	0.62524
504	ME	2992	0.04703	0.67227
506	ME	2960	0.04653	0.71880
508	ME	2780	0.04370	0.76250
511	ME	2463	0.03871	0.80121
514	ME	2219	0.03488	0.83609
516	ME	2090	0.03285	0.86894
520	ME	1914	0.03008	0.89903
523	ME	1653	0.02598	0.92501
527	ME	1536	0.02414	0.94915
531	EE	1306	0.02053	0.96968
536	EE	916	0.01440	0.98408
542	EE	589	0.00926	0.99334
550	EE	294	0.00462	0.99796
560	EE	130	0.00204	1.00000

Table 2.3.4
Cumulative Scale Score Distribution
English Language Arts Grade 6

Scale Score	Achievement Levels	N	Proportion	Cumulative Proportion
440	NM	4	0.00006	0.00006
441	NM	168	0.00263	0.00269
442	NM	1082	0.01694	0.01963
443	NM	1496	0.02342	0.04304
447	NM	901	0.01410	0.05715
451	NM	993	0.01554	0.07269
454	NM	1007	0.01576	0.08845
457	NM	1069	0.01673	0.10519
460	NM	1113	0.01742	0.12261
462	NM	1114	0.01744	0.14004
465	NM	1230	0.01925	0.15930
467	NM	1303	0.02040	0.17969
469	NM	1330	0.02082	0.20051
472	PM	1366	0.02138	0.22189
474	PM	1483	0.02321	0.24510
476	PM	1525	0.02387	0.26897
479	PM	1545	0.02418	0.29316
481	PM	1617	0.02531	0.31847
483	PM	1741	0.02725	0.34572
485	PM	1803	0.02822	0.37394
488	PM	1898	0.02971	0.40365
490	PM	1948	0.03049	0.43414
492	PM	2021	0.03163	0.46578
494	PM	2170	0.03397	0.49974
497	PM	2270	0.03553	0.53527
499	PM	2294	0.03591	0.57118
501	ME	2345	0.03671	0.60789
504	ME	2405	0.03764	0.64553
506	ME	2455	0.03843	0.68396
509	ME	2391	0.03743	0.72138
512	ME	2275	0.03561	0.75699
514	ME	2396	0.03750	0.79450
517	ME	2233	0.03495	0.82945
520	ME	2042	0.03196	0.86141
524	ME	1862	0.02915	0.89056
527	ME	1693	0.02650	0.91706
531	EE	1470	0.02301	0.94007
535	EE	1185	0.01855	0.95861
540	EE	960	0.01503	0.97364
546	EE	679	0.01063	0.98427
552	EE	494	0.00773	0.99200
560	EE	511	0.00800	1.00000

Table 2.3.5
Cumulative Scale Score Distribution
English Language Arts Grade 7

Scale Score	Achievement Levels	N	Proportion	Cumulative Proportion
440	NM	3	0.00005	0.00005
441	NM	42	0.00064	0.00069
442	NM	613	0.00935	0.01003
443	NM	1193	0.01819	0.02822
448	NM	784	0.01195	0.04018
451	NM	894	0.01363	0.05381
455	NM	938	0.01430	0.06811
458	NM	942	0.01436	0.08247
460	NM	1052	0.01604	0.09851
463	NM	1106	0.01686	0.11538
465	NM	1145	0.01746	0.13284
467	NM	1211	0.01846	0.15130
469	NM	1395	0.02127	0.17257
472	PM	1478	0.02254	0.19511
474	PM	1459	0.02225	0.21735
476	PM	1611	0.02456	0.24192
478	PM	1712	0.02610	0.26802
480	PM	1775	0.02706	0.29509
482	PM	1836	0.02799	0.32308
484	PM	1825	0.02783	0.35091
486	PM	2010	0.03065	0.38156
488	PM	1996	0.03043	0.41199
490	PM	2061	0.03143	0.44342
492	PM	2151	0.03280	0.47621
494	PM	2144	0.03269	0.50890
496	PM	2159	0.03292	0.54182
498	PM	2211	0.03371	0.57554
500	ME	2247	0.03426	0.60980
502	ME	2240	0.03415	0.64395
504	ME	2278	0.03473	0.67869
507	ME	2226	0.03394	0.71263
509	ME	2256	0.03440	0.74703
511	ME	2147	0.03274	0.77976
514	ME	2148	0.03275	0.81252
516	ME	2033	0.03100	0.84351
519	ME	1926	0.02937	0.87288
522	ME	1746	0.02662	0.89950
525	ME	1573	0.02398	0.92349
528	ME	1373	0.02093	0.94442
532	EE	1157	0.01764	0.96206
536	EE	959	0.01462	0.97669
542	EE	668	0.01019	0.98687
548	EE	473	0.00721	0.99408
555	EE	263	0.00401	0.99809
560	EE	125	0.00191	1.00000

Table 2.3.6
Cumulative Scale Score Distribution
English Language Arts Grade 8

Scale Score	Achievement Levels	N	Proportion	Cumulative Proportion
440	NM	116	0.00171	0.00171
441	NM	2213	0.03258	0.03429
445	NM	621	0.00914	0.04343
448	NM	654	0.00963	0.05306
451	NM	630	0.00928	0.06234
454	NM	713	0.01050	0.07284
456	NM	712	0.01048	0.08332
458	NM	796	0.01172	0.09504
461	NM	850	0.01251	0.10755
463	NM	814	0.01198	0.11954
465	NM	936	0.01378	0.13332
467	NM	1015	0.01494	0.14826
469	NM	1045	0.01539	0.16365
471	PM	1165	0.01715	0.18080
473	PM	1300	0.01914	0.19994
475	PM	1300	0.01914	0.21908
477	PM	1482	0.02182	0.24090
479	PM	1634	0.02406	0.26496
481	PM	1680	0.02474	0.28970
483	PM	1856	0.02733	0.31702
485	PM	1993	0.02934	0.34637
487	PM	2151	0.03167	0.37804
489	PM	2401	0.03535	0.41339
492	PM	2453	0.03612	0.44951
494	PM	2556	0.03763	0.48714
497	PM	2642	0.03890	0.52604
499	PM	2843	0.04186	0.56790
502	ME	2901	0.04271	0.61061
504	ME	3021	0.04448	0.65509
507	ME	2981	0.04389	0.69898
510	ME	3006	0.04426	0.74324
513	ME	2849	0.04195	0.78519
516	ME	2776	0.04087	0.82606
520	ME	2587	0.03809	0.86415
524	ME	2454	0.03613	0.90028
528	ME	2179	0.03208	0.93236
533	EE	1757	0.02587	0.95823
539	EE	1325	0.01951	0.97774
545	EE	856	0.01260	0.99034
553	EE	445	0.00655	0.99689
560	EE	211	0.00311	1.00000

Table 2.3.7
Cumulative Scale Score Distribution
English Language Arts Grade 10

Scale Score	Achievement Levels	N	Proportion	Cumulative Proportion
441	NM	4	0.00006	0.00006
442	NM	52	0.00080	0.00086
443	NM	187	0.00287	0.00373
444	NM	427	0.00655	0.01028
445	NM	304	0.00466	0.01494
449	NM	290	0.00445	0.01939
452	NM	332	0.00509	0.02448
455	NM	333	0.00511	0.02959
458	NM	351	0.00538	0.03497
461	NM	393	0.00603	0.04100
463	NM	393	0.00603	0.04703
465	NM	401	0.00615	0.05318
467	NM	461	0.00707	0.06025
468	NM	473	0.00726	0.06751
470	PM	506	0.00776	0.07527
472	PM	498	0.00764	0.08291
473	PM	611	0.00937	0.09228
475	PM	645	0.00989	0.10217
477	PM	679	0.01042	0.11259
478	PM	777	0.01192	0.12451
480	PM	835	0.01281	0.13732
481	PM	933	0.01431	0.15163
483	PM	980	0.01503	0.16666
484	PM	1171	0.01796	0.18462
486	PM	1266	0.01942	0.20404
488	PM	1373	0.02106	0.22510
489	PM	1492	0.02289	0.24799
491	PM	1667	0.02557	0.27356
493	PM	1782	0.02733	0.30089
494	PM	2017	0.03094	0.33183
496	PM	2270	0.03482	0.36665
498	PM	2383	0.03655	0.40320
500	ME	2467	0.03784	0.44104
502	ME	2803	0.04300	0.48404
504	ME	2967	0.04551	0.52955
506	ME	3271	0.05017	0.57972
509	ME	3345	0.05131	0.63103
512	ME	3598	0.05519	0.68622
515	ME	3725	0.05714	0.74336
518	ME	3848	0.05902	0.80239
522	ME	3621	0.05554	0.85793
528	ME	3374	0.05175	0.90968
535	EE	2832	0.04344	0.95312
542	EE	1920	0.02945	0.98257
549	EE	906	0.01390	0.99647
559	EE	209	0.00321	0.99968
560	EE	21	0.00032	1.00000

Table 2.3.8
Cumulative Scale Score Distribution
Mathematics Grade 3

Scale Score	Achievement Levels	N	Proportion	Cumulative Proportion
440	NM	88	0.00165	0.00165
441	NM	1303	0.02439	0.02603
447	NM	612	0.01145	0.03749
452	NM	708	0.01325	0.05074
456	NM	752	0.01407	0.06481
459	NM	855	0.01600	0.08081
462	NM	879	0.01645	0.09726
465	NM	883	0.01653	0.11379
468	NM	971	0.01817	0.13196
470	PM	984	0.01842	0.15038
473	PM	1069	0.02001	0.17038
475	PM	1106	0.02070	0.19108
477	PM	1155	0.02162	0.21270
479	PM	1168	0.02186	0.23456
481	PM	1166	0.02182	0.25638
483	PM	1244	0.02328	0.27966
485	PM	1346	0.02519	0.30485
486	PM	1342	0.02512	0.32996
488	PM	1361	0.02547	0.35544
490	PM	1391	0.02603	0.38147
492	PM	1470	0.02751	0.40898
494	PM	1491	0.02790	0.43688
495	PM	1525	0.02854	0.46542
497	PM	1528	0.02860	0.49402
499	PM	1568	0.02935	0.52337
501	ME	1615	0.03022	0.55359
503	ME	1644	0.03077	0.58436
505	ME	1706	0.03193	0.61629
506	ME	1700	0.03182	0.64810
509	ME	1761	0.03296	0.68106
511	ME	1681	0.03146	0.71252
513	ME	1747	0.03270	0.74521
515	ME	1722	0.03223	0.77744
518	ME	1697	0.03176	0.80920
520	ME	1679	0.03142	0.84062
523	ME	1652	0.03092	0.87154
526	ME	1486	0.02781	0.89935
529	ME	1336	0.02500	0.92435
534	EE	1185	0.02218	0.94653
539	EE	1050	0.01965	0.96618
545	EE	811	0.01518	0.98136
554	EE	556	0.01041	0.99177
560	EE	440	0.00823	1.00000

Table 2.3.9
Cumulative Scale Score Distribution
Mathematics Grade 4

Scale Score	Achievement Levels	N	Proportion	Cumulative Proportion
440	NM	941	0.01756	0.01756
446	NM	383	0.00715	0.02471
451	NM	399	0.00745	0.03216
454	NM	547	0.01021	0.04237
458	NM	558	0.01041	0.05278
461	NM	589	0.01099	0.06378
463	NM	626	0.01168	0.07546
466	NM	672	0.01254	0.08800
468	NM	784	0.01463	0.10264
470	PM	804	0.01501	0.11764
472	PM	827	0.01544	0.13308
474	PM	894	0.01669	0.14977
476	PM	884	0.01650	0.16627
478	PM	977	0.01824	0.18450
480	PM	1042	0.01945	0.20395
481	PM	1042	0.01945	0.22340
483	PM	1103	0.02059	0.24399
485	PM	1085	0.02025	0.26424
486	PM	1173	0.02189	0.28613
488	PM	1244	0.02322	0.30935
489	PM	1202	0.02244	0.33178
491	PM	1262	0.02355	0.35534
492	PM	1294	0.02415	0.37949
493	PM	1288	0.02404	0.40353
495	PM	1305	0.02436	0.42789
496	PM	1272	0.02374	0.45163
498	PM	1417	0.02645	0.47808
499	PM	1360	0.02538	0.50346
501	ME	1409	0.02630	0.52976
502	ME	1407	0.02626	0.55602
504	ME	1387	0.02589	0.58191
505	ME	1457	0.02719	0.60910
507	ME	1484	0.02770	0.63680
508	ME	1445	0.02697	0.66377
510	ME	1508	0.02815	0.69192
512	ME	1521	0.02839	0.72031
513	ME	1536	0.02867	0.74898
515	ME	1516	0.02830	0.77727
517	ME	1458	0.02721	0.80449
519	ME	1434	0.02677	0.83125
522	ME	1402	0.02617	0.85742
524	ME	1371	0.02559	0.88301
527	ME	1294	0.02415	0.90716
529	ME	1264	0.02359	0.93075
533	EE	1083	0.02021	0.95097
537	EE	876	0.01635	0.96732
542	EE	749	0.01398	0.98130
549	EE	530	0.00989	0.99119
560	EE	472	0.00881	1.00000

Table 2.3.10
Cumulative Scale Score Distribution
Mathematics Grade 5

Scale Score	Achievement Levels	N	Proportion	Cumulative Proportion
440	NM	196	0.00352	0.00352
441	NM	204	0.00367	0.00719
448	NM	371	0.00667	0.01386
453	NM	522	0.00938	0.02324
458	NM	645	0.01159	0.03483
461	NM	746	0.01341	0.04824
464	NM	811	0.01458	0.06282
467	NM	1006	0.01808	0.08090
469	NM	978	0.01758	0.09848
471	PM	1121	0.02015	0.11863
474	PM	1130	0.02031	0.13894
475	PM	1208	0.02171	0.16065
477	PM	1260	0.02265	0.18330
479	PM	1217	0.02187	0.20518
481	PM	1243	0.02234	0.22752
482	PM	1255	0.02256	0.25008
484	PM	1331	0.02392	0.27400
485	PM	1337	0.02403	0.29803
486	PM	1339	0.02407	0.32210
488	PM	1362	0.02448	0.34658
489	PM	1415	0.02543	0.37201
490	PM	1366	0.02455	0.39657
492	PM	1438	0.02585	0.42241
493	PM	1495	0.02687	0.44929
494	PM	1440	0.02588	0.47517
496	PM	1391	0.02500	0.50017
497	PM	1410	0.02534	0.52551
498	PM	1411	0.02536	0.55088
499	PM	1461	0.02626	0.57714
501	ME	1448	0.02603	0.60316
502	ME	1357	0.02439	0.62755
504	ME	1443	0.02594	0.65349
505	ME	1453	0.02612	0.67961
506	ME	1395	0.02507	0.70468
508	ME	1330	0.02391	0.72859
509	ME	1304	0.02344	0.75203
511	ME	1333	0.02396	0.77599
513	ME	1240	0.02229	0.79827
514	ME	1290	0.02319	0.82146
516	ME	1214	0.02182	0.84328
518	ME	1110	0.01995	0.86323
520	ME	1028	0.01848	0.88171
522	ME	1067	0.01918	0.90089
524	ME	1072	0.01927	0.92016
527	ME	930	0.01672	0.93687
529	ME	865	0.01555	0.95242
533	EE	780	0.01402	0.96644
537	EE	707	0.01271	0.97915
543	EE	546	0.00981	0.98896
552	EE	377	0.00678	0.99574
560	EE	237	0.00426	1.00000

Table 2.3.11
Cumulative Scale Score Distribution
Mathematics Grade 6

Scale Score	Achievement Levels	N	Proportion	Cumulative Proportion
440	NM	5	0.00009	0.00009
441	NM	12	0.00021	0.00030
442	NM	196	0.00344	0.00374
443	NM	259	0.00455	0.00829
450	NM	437	0.00767	0.01596
455	NM	620	0.01089	0.02685
459	NM	721	0.01266	0.03952
463	NM	896	0.01574	0.05525
466	NM	992	0.01742	0.07267
469	NM	1115	0.01958	0.09226
471	PM	1111	0.01951	0.11177
474	PM	1277	0.02243	0.13420
476	PM	1324	0.02325	0.15745
478	PM	1334	0.02343	0.18088
480	PM	1430	0.02511	0.20599
481	PM	1506	0.02645	0.23244
483	PM	1492	0.02620	0.25865
485	PM	1468	0.02578	0.28443
487	PM	1481	0.02601	0.31044
488	PM	1470	0.02582	0.33625
490	PM	1519	0.02668	0.36293
491	PM	1499	0.02633	0.38926
493	PM	1569	0.02756	0.41681
494	PM	1526	0.02680	0.44362
496	PM	1519	0.02668	0.47029
497	PM	1484	0.02606	0.49636
499	PM	1506	0.02645	0.52281
500	ME	1513	0.02657	0.54938
501	ME	1472	0.02585	0.57523
503	ME	1397	0.02454	0.59976
504	ME	1344	0.02360	0.62337
506	ME	1427	0.02506	0.64843
507	ME	1348	0.02367	0.67211
508	ME	1301	0.02285	0.69495
510	ME	1255	0.02204	0.71700
511	ME	1268	0.02227	0.73926
512	ME	1219	0.02141	0.76067
514	ME	1212	0.02129	0.78196
515	ME	1146	0.02013	0.80209
517	ME	1151	0.02021	0.82230
518	ME	1103	0.01937	0.84167
520	ME	1019	0.01790	0.85957
522	ME	1012	0.01777	0.87734
524	ME	962	0.01690	0.89424
525	ME	886	0.01556	0.90980
528	ME	919	0.01614	0.92594
529	ME	805	0.01414	0.94008
532	EE	787	0.01382	0.95390
536	EE	701	0.01231	0.96621
539	EE	609	0.01070	0.97691
544	EE	551	0.00968	0.98658
551	EE	429	0.00753	0.99412
560	EE	335	0.00588	1.00000

Table 2.3.12
Cumulative Scale Score Distribution
Mathematics Grade 7

Scale Score	Achievement Levels	N	Proportion	Cumulative Proportion
440	NM	4	0.00007	0.00007
441	NM	38	0.00064	0.00071
442	NM	118	0.00199	0.00270
443	NM	312	0.00526	0.00796
444	NM	580	0.00978	0.01774
445	NM	932	0.01571	0.03345
454	NM	1177	0.01984	0.05330
460	NM	1439	0.02426	0.07756
465	NM	1549	0.02612	0.10367
468	NM	1627	0.02743	0.13111
471	PM	1791	0.03020	0.16130
474	PM	1865	0.03144	0.19275
477	PM	1824	0.03075	0.22350
479	PM	1915	0.03229	0.25579
481	PM	2001	0.03374	0.28952
483	PM	2005	0.03380	0.32333
485	PM	1941	0.03273	0.35606
487	PM	1893	0.03192	0.38797
489	PM	1836	0.03096	0.41893
491	PM	1745	0.02942	0.44835
492	PM	1708	0.02880	0.47715
494	PM	1661	0.02800	0.50515
496	PM	1625	0.02740	0.53255
497	PM	1476	0.02489	0.55743
499	PM	1423	0.02399	0.58143
500	ME	1368	0.02306	0.60449
502	ME	1268	0.02138	0.62587
503	ME	1276	0.02151	0.64738
505	ME	1168	0.01969	0.66708
506	ME	1133	0.01910	0.68618
508	ME	1140	0.01922	0.70540
509	ME	1100	0.01855	0.72395
510	ME	1016	0.01713	0.74108
512	ME	993	0.01674	0.75782
513	ME	994	0.01676	0.77458
514	ME	882	0.01487	0.78945
516	ME	907	0.01529	0.80474
517	ME	896	0.01511	0.81985
518	ME	802	0.01352	0.83337
520	ME	819	0.01381	0.84718
521	ME	810	0.01366	0.86084
523	ME	771	0.01300	0.87383
524	ME	775	0.01307	0.88690
526	ME	760	0.01281	0.89972
527	ME	734	0.01238	0.91209
529	ME	752	0.01268	0.92477
531	EE	695	0.01172	0.93649
533	EE	684	0.01153	0.94802
535	EE	627	0.01057	0.95859
538	EE	548	0.00924	0.96783
541	EE	593	0.01000	0.97783
545	EE	511	0.00862	0.98644
551	EE	390	0.00658	0.99302
560	EE	414	0.00698	1.00000

Table 2.3.13
Cumulative Scale Score Distribution
Mathematics Grade 8

Scale Score	Achievement Levels	N	Proportion	Cumulative Proportion
441	NM	12	0.00019	0.00019
443	NM	36	0.00058	0.00077
444	NM	112	0.00180	0.00257
446	NM	253	0.00406	0.00663
447	NM	431	0.00692	0.01354
448	NM	651	0.01045	0.02399
454	NM	957	0.01536	0.03935
459	NM	1100	0.01765	0.05700
462	NM	1214	0.01948	0.07649
466	NM	1364	0.02189	0.09838
468	NM	1345	0.02159	0.11996
471	PM	1436	0.02305	0.14301
473	PM	1407	0.02258	0.16559
475	PM	1476	0.02369	0.18928
477	PM	1425	0.02287	0.21215
479	PM	1521	0.02441	0.23656
480	PM	1506	0.02417	0.26072
482	PM	1458	0.02340	0.28412
483	PM	1513	0.02428	0.30840
485	PM	1537	0.02467	0.33307
486	PM	1610	0.02584	0.35891
488	PM	1533	0.02460	0.38351
489	PM	1569	0.02518	0.40869
491	PM	1480	0.02375	0.43244
492	PM	1507	0.02419	0.45663
493	PM	1492	0.02394	0.48057
494	PM	1508	0.02420	0.50477
496	PM	1419	0.02277	0.52755
497	PM	1490	0.02391	0.55146
498	PM	1434	0.02301	0.57447
499	PM	1434	0.02301	0.59749
501	ME	1300	0.02086	0.61835
502	ME	1346	0.02160	0.63995
504	ME	1336	0.02144	0.66139
505	ME	1246	0.02000	0.68139
506	ME	1318	0.02115	0.70254
508	ME	1256	0.02016	0.72270
509	ME	1171	0.01879	0.74149
511	ME	1165	0.01870	0.76019
512	ME	1227	0.01969	0.77988

Table 2.3.13 (continued)
Cumulative Scale Score Distribution
Mathematics Grade 8

Scale Score	Achievement Levels	N	Proportion	Cumulative Proportion
514	ME	1144	0.01836	0.79824
516	ME	1153	0.01850	0.81674
517	ME	1149	0.01844	0.83518
519	ME	1112	0.01785	0.85303
521	ME	1131	0.01815	0.87118
523	ME	1042	0.01672	0.88790
525	ME	1058	0.01698	0.90488
528	ME	1037	0.01664	0.92152
530	EE	1001	0.01606	0.93759
534	EE	1012	0.01624	0.95383
538	EE	884	0.01419	0.96802
543	EE	851	0.01366	0.98167
553	EE	724	0.01162	0.99329
560	EE	418	0.00671	1.00000

Table 2.3.14
Cumulative Scale Score Distribution
Mathematics Grade 10

Scale Score	Achievement Levels	N	Proportion	Cumulative Proportion
440	NM	1	0.00002	0.00002
441	NM	5	0.00008	0.00010
442	NM	19	0.00031	0.00041
443	NM	57	0.00093	0.00134
444	NM	145	0.00237	0.00370
445	NM	267	0.00436	0.00806
454	NM	448	0.00731	0.01537
459	NM	626	0.01021	0.02558
463	NM	755	0.01232	0.03790
467	NM	952	0.01553	0.05343
469	NM	1043	0.01702	0.07045
472	PM	1119	0.01826	0.08870
474	PM	1177	0.01920	0.10790
476	PM	1236	0.02016	0.12807
478	PM	1251	0.02041	0.14848
480	PM	1194	0.01948	0.16796
482	PM	1335	0.02178	0.18974
483	PM	1236	0.02016	0.20990
485	PM	1265	0.02064	0.23054
486	PM	1256	0.02049	0.25103
488	PM	1330	0.02170	0.27273
489	PM	1339	0.02184	0.29457
491	PM	1330	0.02170	0.31627
492	PM	1269	0.02070	0.33697
493	PM	1357	0.02214	0.35911
495	PM	1269	0.02070	0.37981
496	PM	1269	0.02070	0.40052
497	PM	1302	0.02124	0.42176
498	PM	1263	0.02060	0.44236
499	PM	1274	0.02078	0.46315
501	ME	1261	0.02057	0.48372
502	ME	1215	0.01982	0.50354
503	ME	1237	0.02018	0.52372
504	ME	1237	0.02018	0.54390
505	ME	1200	0.01958	0.56348
507	ME	1182	0.01928	0.58276
508	ME	1181	0.01927	0.60203
509	ME	1197	0.01953	0.62156
510	ME	1198	0.01954	0.64110
511	ME	1174	0.01915	0.66026

Table 2.3.14 (continued)
Cumulative Scale Score Distribution
Mathematics Grade 10

Scale Score	Achievement Levels	N	Proportion	Cumulative Proportion
512	ME	1230	0.02007	0.68032
514	ME	1153	0.01881	0.69913
515	ME	1125	0.01835	0.71749
516	ME	1129	0.01842	0.73590
518	ME	1106	0.01804	0.75395
519	ME	1082	0.01765	0.77160
520	ME	1069	0.01744	0.78904
522	ME	1123	0.01832	0.80736
523	ME	1104	0.01801	0.82537
525	ME	1048	0.01710	0.84247
527	ME	1083	0.01767	0.86014
529	ME	999	0.01630	0.87644
531	EE	962	0.01569	0.89213
533	EE	1011	0.01649	0.90862
536	EE	1030	0.01680	0.92543
539	EE	1023	0.01669	0.94212
543	EE	952	0.01553	0.95765
548	EE	814	0.01328	0.97093
555	EE	811	0.01323	0.98416
560	EE	971	0.01584	1.00000

Table 2.3.15
Cumulative Scale Score Distribution
Science Grade 5

Scale Score	Achievement Levels	N	Proportion	Cumulative Proportion
440	NM	2	0.00004	0.00004
441	NM	13	0.00023	0.00026
442	NM	156	0.00274	0.00301
443	NM	395	0.00695	0.00996
444	NM	703	0.01237	0.02232
448	NM	365	0.00642	0.02874
449	NM	136	0.00239	0.03114
451	NM	409	0.00719	0.03833
453	NM	189	0.00332	0.04166
455	NM	498	0.00876	0.05042
457	NM	195	0.00343	0.05385
458	NM	523	0.00920	0.06305
460	NM	621	0.01092	0.07397
461	NM	187	0.00329	0.07726
463	NM	673	0.01184	0.08910
464	NM	186	0.00327	0.09237
466	NM	720	0.01267	0.10504
467	NM	188	0.00331	0.10835
468	NM	778	0.01369	0.12203
470	PM	996	0.01752	0.13955
473	PM	1096	0.01928	0.15883
475	PM	959	0.01687	0.17570
476	PM	199	0.00350	0.17920
477	PM	1057	0.01859	0.19780
479	PM	1325	0.02331	0.22111
481	PM	1192	0.02097	0.24208
482	PM	221	0.00389	0.24596
483	PM	1194	0.02100	0.26697
485	PM	1491	0.02623	0.29320
487	PM	1619	0.02848	0.32168
489	PM	1562	0.02748	0.34915
490	PM	252	0.00443	0.35359
492	PM	1616	0.02843	0.38201
493	PM	231	0.00406	0.38608
494	PM	1614	0.02839	0.41447
496	PM	1966	0.03458	0.44906
498	PM	2061	0.03626	0.48531
499	PM	1747	0.03073	0.51604
501	ME	244	0.00429	0.52034
502	ME	1955	0.03439	0.55473

Table 2.3.15 (continued)
Cumulative Scale Score Distribution
Science Grade 5

Scale Score	Achievement Levels	N	Proportion	Cumulative Proportion
504	ME	2155	0.03791	0.59264
507	ME	2181	0.03837	0.63100
509	ME	2053	0.03612	0.66712
510	ME	241	0.00424	0.67136
511	ME	2050	0.03606	0.70742
514	ME	2312	0.04067	0.74809
516	ME	1924	0.03385	0.78194
517	ME	211	0.00371	0.78565
519	ME	1934	0.03402	0.81967
521	ME	227	0.00399	0.82366
522	ME	1836	0.03230	0.85596
525	ME	1825	0.03210	0.88807
528	ME	1432	0.02519	0.91326
529	ME	180	0.00317	0.91642
532	EE	1188	0.02090	0.93732
535	EE	143	0.00252	0.93984
536	EE	1063	0.01870	0.95854
540	EE	804	0.01414	0.97268
541	EE	105	0.00185	0.97453
545	EE	551	0.00969	0.98422
549	EE	79	0.00139	0.98561
551	EE	376	0.00661	0.99222
558	EE	225	0.00396	0.99618
559	EE	33	0.00058	0.99676
560	EE	184	0.00324	1.00000

Table 2.3.16
Cumulative Scale Score Distribution
Science Grade 8

Scale Score	Achievement Levels	N	Proportion	Cumulative Proportion
440	NM	13	0.00021	0.00021
441	NM	360	0.00572	0.00593
442	NM	43	0.00068	0.00661
443	NM	117	0.00186	0.00847
444	NM	427	0.00679	0.01526
445	NM	372	0.00591	0.02117
446	NM	466	0.00741	0.02857
449	NM	147	0.00234	0.03091
451	NM	592	0.00941	0.04032
454	NM	164	0.00261	0.04292
455	NM	667	0.01060	0.05352
458	NM	656	0.01042	0.06395
459	NM	207	0.00329	0.06724
462	NM	820	0.01303	0.08027
463	NM	187	0.00297	0.08324
464	NM	823	0.01308	0.09632
467	NM	1155	0.01835	0.11467
469	NM	1010	0.01605	0.13072
470	PM	218	0.00346	0.13419
472	PM	1114	0.01770	0.15189
473	PM	223	0.00354	0.15544
474	PM	1191	0.01893	0.17436
476	PM	1446	0.02298	0.19734
478	PM	1272	0.02021	0.21756
479	PM	208	0.00331	0.22086
481	PM	1623	0.02579	0.24665
482	PM	1436	0.02282	0.26948
484	PM	1784	0.02835	0.29783
486	PM	1815	0.02884	0.32667
488	PM	1584	0.02517	0.35184
489	PM	262	0.00416	0.35601
490	PM	1693	0.02690	0.38291
491	PM	222	0.00353	0.38644
492	PM	1726	0.02743	0.41387
493	PM	241	0.00383	0.41770
494	PM	1832	0.02911	0.44681
495	PM	1918	0.03048	0.47729
496	PM	219	0.00348	0.48077
497	PM	1854	0.02946	0.51023
498	PM	250	0.00397	0.51421

Table 2.3.16 (continued)
Cumulative Scale Score Distribution
Science Grade 8

Scale Score	Achievement Levels	N	Proportion	Cumulative Proportion
499	PM	1810	0.02876	0.54297
501	ME	2065	0.03282	0.57579
503	ME	2139	0.03399	0.60978
505	ME	2112	0.03356	0.64334
506	ME	1886	0.02997	0.67331
508	ME	2069	0.03288	0.70619
510	ME	2015	0.03202	0.73822
512	ME	1751	0.02783	0.76604
513	ME	202	0.00321	0.76925
514	ME	1670	0.02654	0.79579
515	ME	151	0.00240	0.79819
516	ME	1615	0.02567	0.82386
518	ME	1719	0.02732	0.85117
521	ME	1593	0.02532	0.87649
523	ME	1319	0.02096	0.89745
524	ME	119	0.00189	0.89934
525	ME	1182	0.01878	0.91813
528	ME	1174	0.01866	0.93678
530	EE	906	0.01440	0.95118
531	EE	97	0.00154	0.95272
533	EE	773	0.01228	0.96501
535	EE	81	0.00129	0.96629
536	EE	631	0.01003	0.97632
540	EE	558	0.00887	0.98519
544	EE	381	0.00605	0.99124
546	EE	37	0.00059	0.99183
549	EE	234	0.00372	0.99555
555	EE	155	0.00246	0.99801
560	EE	125	0.00199	1.00000

Section 2.4

Rescore Analysis Results

Table 2.4.1
Rescore Analysis
English Language Arts Grade 3

Item Id	Max	Old Mean	New Mean	Old StDev	New StDev	Effect Size	Discard
IA00458A	3	0.57500	0.47500	0.72595	0.64922	-0.13775	False
IA00458D	5	0.52500	0.53500	0.76963	0.72899	0.01299	False

Table 2.4.2
Rescore Analysis
English Language Arts Grade 4

Item Id	Max	Old Mean	New Mean	Old StDev	New StDev	Effect Size	Discard
IA00421A	3	1.13000	1.19000	0.99400	0.83510	0.06036	False
IA00421D	5	1.05000	0.98000	1.07857	1.07488	-0.06490	False

Table 2.4.3
Rescore Analysis
English Language Arts Grade 5

Item Id	Max	Old Mean	New Mean	Old StDev	New StDev	Effect Size	Discard
IA00509A	3	1.03000	0.99000	0.85013	0.78931	-0.04705	False
IA00509D	5	1.09000	0.99500	0.85178	0.78617	-0.11153	False
IA01676A	3	1.60000	1.59000	0.99243	0.91985	-0.01008	False
IA01676D	5	1.49500	1.42000	1.38911	1.29304	-0.05399	False

Table 2.4.4
Rescore Analysis
English Language Arts Grade 6

Item Id	Max	Old Mean	New Mean	Old StDev	New StDev	Effect Size	Discard
IA00181A	3	1.25000	1.27000	1.01620	0.94422	0.01968	False
IA00181D	5	1.45500	1.54500	1.03116	0.99646	0.08728	False
IA00531A	3	1.37500	1.26000	1.08641	0.99869	-0.10585	False
IA00531D	5	1.53000	1.46000	1.14703	1.05068	-0.06103	False

Table 2.4.5
Rescore Analysis
English Language Arts Grade 7

Item Id	Max	Old Mean	New Mean	Old StDev	New StDev	Effect Size	Discard
IA00071A	3	1.24500	1.22000	0.97968	0.82766	-0.02552	False
IA00071D	5	1.43500	1.35500	1.01039	0.78872	-0.07918	False
IA00665A	3	1.43500	1.42500	1.03009	0.98958	-0.00971	False
IA00665D	5	1.58500	1.60000	1.24923	1.06096	0.01201	False

Table 2.4.6
Rescore Analysis
English Language Arts Grade 8

Item Id	Max	Old Mean	New Mean	Old StDev	New StDev	Effect Size	Discard
IA00064A	3	1.53500	1.73500	1.05086	1.04414	0.19032	False
IA00064D	5	1.69000	1.86500	1.17934	1.04028	0.14839	False
IA00376A	3	1.56500	1.69500	1.02520	0.94681	0.12680	False
IA00376D	5	1.78500	1.76500	1.08844	0.94032	-0.01837	False

Table 2.4.7
Rescore Analysis
Mathematics Grade 3

Item Id	Max	Old Mean	New Mean	Old StDev	New StDev	Effect Size	Discard
IA01080	3	1.19500	1.13500	0.98582	0.98571	-0.06086	False
IA01081	3	1.14500	1.13000	0.92099	0.91503	-0.01629	False

Table 2.4.8
Rescore Analysis
Mathematics Grade 4

Item Id	Max	Old Mean	New Mean	Old StDev	New StDev	Effect Size	Discard
IA00789	4	1.33500	1.57000	1.18312	1.33567	0.19863	False
IA01057	4	1.94000	2.00000	1.16326	1.20718	0.05158	False

Table 2.4.9
Rescore Analysis
Mathematics Grade 5

Item Id	Max	Old Mean	New Mean	Old StDev	New StDev	Effect Size	Discard
IA01032	4	1.49000	1.51000	1.22368	1.25209	0.01634	False
IA02736	4	1.87000	1.78000	1.41176	1.40050	-0.06375	False

Table 2.4.10
Rescore Analysis
Mathematics Grade 6

Item Id	Max	Old Mean	New Mean	Old StDev	New StDev	Effect Size	Discard
IA00881	4	2.19500	2.15000	1.59679	1.60009	-0.02818	False
IA00972	4	2.88000	2.85000	1.00531	1.02604	-0.02984	False

Table 2.4.11
Rescore Analysis
Mathematics Grade 7

Item Id	Max	Old Mean	New Mean	Old StDev	New StDev	Effect Size	Discard
IA01069	4	2.04000	2.05000	1.09287	1.12866	0.00915	False
IA02722	4	1.75500	1.81000	1.54171	1.55434	0.03567	False

Table 2.4.12
Rescore Analysis
Mathematics Grade 8

Item Id	Max	Old Mean	New Mean	Old StDev	New StDev	Effect Size	Discard
IA00864	4	2.85500	2.82500	1.41917	1.46804	-0.02114	False
IA01066	4	2.11000	2.05500	1.60336	1.63872	-0.03430	False

Section 2.5

Tabled Delta Analysis Results

Table 2.5.1
Delta Analysis
English Language Arts Grade 3

Item Id	Old P	New P	Old Delta	New Delta	Max	Discard	Std Dist
IA00279 (EL308822)	0.83000	0.78000	9.18334	9.91123	1	False	-0.68367
IA00280 (EL308824)	0.73000	0.66000	10.54875	11.35015	1	False	-0.56424
IA00281 (EL308826)	0.63000	0.59000	11.67259	12.08982	1	False	-0.29825
IA00282 (EL308827)	0.71000	0.65000	10.78646	11.45872	1	False	-1.01877
IA00283 (EL308835)	0.63000	0.57000	11.67259	12.29450	1	False	-0.98369
IA00284 (EL308837)	0.74000	0.66000	10.42662	11.35015	1	False	-0.14392
IA00285 (EL308838)	0.84000	0.77000	9.02217	10.04461	1	False	0.31769
IA00286 (EL308842)	0.47000	0.41000	13.30108	13.91018	1	False	-0.78960
IA00287 (EL308855)	0.50333	0.37333	12.96658	14.29215	3	False	0.96665
IA00288 (EL308857)	0.41667	0.32000	13.84171	14.87080	3	False	-0.10746
IA00443 (EL626042844)	0.65000	0.66000	11.45872	11.35015	1	False	1.44268
IA00444 (EL626043062)	0.73000	0.67000	10.54875	11.24035	1	False	-0.93193
IA00445 (EL626043435)	0.62500	0.51500	11.72544	12.84957	2	False	0.40726
IA00446 (EL626049849)	0.66000	0.53000	11.35015	12.69892	1	False	1.19438
IA00450 (EL626050679)	0.72000	0.67000	10.66863	11.24035	1	False	-0.90876
IA00451 (EL626050927)	0.47000	0.51000	13.30108	12.89972	1	False	2.59416
IA00452 (EL626051097)	0.57000	0.55000	12.29450	12.49735	2	False	0.47739
IA00453 (EL626051328)	0.65000	0.64000	11.45872	11.56616	1	False	0.71929
IA00458A (EL626052459#SCORE_TRAIT_Conv)	0.24333	0.18667	15.78248	16.56099	3	False	-1.12656
IA00458D (EL626052459#SCORE_TRAIT_Ideadev)	0.19750	0.13750	16.40234	17.36648	4	False	-0.56262

Table 2.5.2
Delta Analysis
English Language Arts Grade 4

Item Id	Old P	New P	Old Delta	New Delta	Max	Discard	Std Dist
IA00218 (EL307705)	0.86000	0.81000	8.67872	9.48841	1	False	-1.31264
IA00219 (EL307709)	0.81000	0.77000	9.48841	10.04461	1	False	-0.31752
IA00220 (EL307710)	0.46000	0.43000	13.40173	13.70550	1	False	0.43555
IA00221 (EL307713)	0.58000	0.52000	12.19243	12.79939	1	False	-0.73624
IA00222 (EL307714)	0.82000	0.76000	9.33854	10.17479	1	False	-1.47391
IA00223 (EL307719)	0.60000	0.56000	11.98661	12.39612	1	False	0.10291
IA00224 (EL307724)	0.78000	0.75000	9.91123	10.30204	1	False	0.33978
IA00225 (EL307728)	0.56000	0.45333	12.39612	13.46898	3	False	-0.28176
IA00226 (EL307729)	0.53000	0.41667	12.69892	13.84171	3	False	0.03309
IA00289 (EL309792)	0.67000	0.64000	11.24035	11.56616	1	False	0.50906
IA00407 (EL624647403)	0.48000	0.41000	13.20061	13.91018	1	False	-1.24131
IA00408 (EL624647580)	0.61000	0.58000	11.88272	12.19243	1	False	0.52708
IA00411 (EL624652450)	0.87000	0.78000	8.49444	9.91123	1	False	0.85379
IA00412 (EL624652621)	0.94000	0.90000	6.78091	7.87379	1	False	-0.62814
IA00414 (EL624652989)	0.43000	0.43000	13.70550	13.70550	1	False	1.67903
IA00415 (EL624653348)	0.76000	0.67000	10.17479	11.24035	1	False	-0.48226
IA00416 (EL624653492)	0.79000	0.72000	9.77432	10.66863	2	False	-1.22701
IA00419 (EL624654711)	0.87000	0.80000	8.49444	9.63352	2	False	-0.30432
IA00421A (EL624655949#SCORE_TRAIT_Conv)	0.52000	0.36667	12.79939	14.36278	3	False	1.79475
IA00421D (EL624655949#SCORE_TRAIT_Ideadev)	0.38750	0.25250	14.14336	15.66657	4	False	1.73008

Table 2.5.3
Delta Analysis
English Language Arts Grade 5

Item Id	Old P	New P	Old Delta	New Delta	Max	Discard	Std Dist
IA00495 (EL626304658)	0.79000	0.75000	9.77432	10.30204	1	False	-1.10693
IA00497 (EL626304969)	0.79000	0.73000	9.77432	10.54875	1	False	-0.48551
IA00500 (EL626332335)	0.70000	0.66000	10.90240	11.35015	1	False	-0.87347
IA00501 (EL626332592)	0.88000	0.84000	8.30005	9.02217	1	False	-0.69248
IA00502 (EL626333002)	0.87000	0.82000	8.49444	9.33854	1	False	-0.28943
IA00505 (EL626355215)	0.57000	0.60000	12.29450	11.98661	1	False	1.55953
IA00506 (EL626355557)	0.60000	0.64000	11.98661	11.56616	1	False	1.93456
IA00508 (EL626356291)	0.42500	0.36500	13.75647	14.38050	2	False	-0.87892
IA00509A (EL626356806#SCORE_TRAIT_Conv)	0.46000	0.40000	13.40173	14.01339	3	False	-0.92802
IA00509D (EL626356806#SCORE_TRAIT_Ideadev)	0.36250	0.31500	14.40714	14.92691	4	False	-1.19457
IA00638 (EL627351056)	0.63000	0.66000	11.67259	11.35015	1	False	1.62228
IA01669 (EL711809263)	0.82000	0.76000	9.33854	10.17479	1	False	-0.29437
IA01670 (EL711809592)	0.81000	0.76000	9.48841	10.17479	1	False	-0.78003
IA01671 (EL711827203)	0.94000	0.90000	6.78091	7.87379	1	False	0.48082
IA01672 (EL711827807)	0.74000	0.73000	10.42662	10.54875	1	False	0.20133
IA01676A (EL711854812#SCORE_TRAIT_Conv)	0.52000	0.39000	12.79939	14.11728	3	False	1.36304
IA01676D (EL711854812#SCORE_TRAIT_Ideadev)	0.36500	0.26500	14.38050	15.51202	4	False	0.79334
IA01679 (EL711868011)	0.60000	0.49500	11.98661	13.05013	2	False	0.51261
IA01680 (EL711900602)	0.72000	0.70000	10.66863	10.90240	1	False	-0.16908
IA01691 (EL712167015)	0.50000	0.46000	13.00000	13.40173	1	False	-0.77468

Table 2.5.4
Delta Analysis
English Language Arts Grade 6

Item Id	Old P	New P	Old Delta	New Delta	Max	Discard	Std Dist
IA00173 (EL303496)	0.86000	0.74000	8.67872	10.42662	1	False	0.47764
IA00174 (EL303500)	0.69000	0.64000	11.01660	11.56616	1	False	0.42822
IA00175 (EL303504)	0.70000	0.61000	10.90240	11.88272	1	False	-1.62367
IA00176 (EL303508)	0.78000	0.71000	9.91123	10.78646	1	False	-0.52864
IA00177 (EL303510)	0.92000	0.87000	7.37971	8.49444	1	False	-0.22976
IA00178 (EL303513)	0.78000	0.66000	9.91123	11.35015	1	False	-0.32297
IA00179 (EL303514)	0.64000	0.63000	11.56616	11.67259	1	False	2.28706
IA00180 (EL303518)	0.62000	0.57000	11.77808	12.29450	1	False	0.14701
IA00181A (EL303519#SCORE_TRAIT_Conv)	0.54333	0.43667	12.56466	13.63770	3	False	-0.57456
IA00181D (EL303519#SCORE_TRAIT_Ideadev)	0.35600	0.33000	14.47669	14.75965	5	False	-0.27900
IA00515 (EL626864414)	0.90000	0.83000	7.87379	9.18334	1	False	-1.47613
IA00517 (EL626864724)	0.82000	0.69000	9.33854	11.01660	1	False	0.51906
IA00518 (EL626865003)	0.74000	0.67000	10.42662	11.24035	1	False	-0.52680
IA00520 (EL626865416)	0.55000	0.41000	12.49735	13.91018	1	False	1.05725
IA00522 (EL626865773)	0.83000	0.72000	9.18334	10.66863	1	False	-0.51950
IA00523 (EL626865942)	0.67000	0.64000	11.24035	11.56616	1	False	1.39811
IA00528 (EL626867605)	0.88500	0.77000	8.19856	10.04461	2	False	0.68027
IA00530 (EL626868748)	0.79000	0.70500	9.77432	10.84466	2	False	-1.40833
IA00531A (EL626869132#SCORE_TRAIT_Conv)	0.61667	0.47000	11.81305	13.30108	3	False	1.02795
IA00531D (EL626869132#SCORE_TRAIT_Ideadev)	0.41800	0.33000	13.82805	14.75965	5	False	-0.53320

Table 2.5.5
Delta Analysis
English Language Arts Grade 7

Item Id	Old P	New P	Old Delta	New Delta	Max	Discard	Std Dist
IA00065 (EL292160)	0.83000	0.73000	9.18334	10.54875	1	False	0.74245
IA00066 (EL292163)	0.74000	0.65000	10.42662	11.45872	1	False	-0.59540
IA00067 (EL292168)	0.59000	0.50000	12.08982	13.00000	1	False	-0.79165
IA00068 (EL292170)	0.80000	0.71000	9.63352	10.78646	1	False	-0.19338
IA00069 (EL292172)	0.67000	0.62000	11.24035	11.77808	1	False	-0.06810
IA00070 (EL292176)	0.62000	0.62000	11.77808	11.77808	1	False	2.44635
IA00071A (EL292181#SCORE_TRAIT_Conv)	0.54667	0.48333	12.53102	13.16716	3	False	-0.86518
IA00071D (EL292181#SCORE_TRAIT_Ideadev)	0.35400	0.32600	14.49817	14.80394	5	False	0.28260
IA00081 (EL293802)	0.75000	0.68000	10.30204	11.12920	1	False	-1.26412
IA00082 (EL293804)	0.64000	0.54000	11.56616	12.59827	1	False	-0.31899
IA00257 (EL308358)	0.90000	0.85000	7.87379	8.85427	1	False	-1.42919
IA00258 (EL308360)	0.80500	0.75500	9.56153	10.23876	2	False	-0.34706
IA00262 (EL308382)	0.75000	0.65000	10.30204	11.45872	1	False	-0.01287
IA00265 (EL308389)	0.92000	0.90000	7.37971	7.87379	1	False	1.08304
IA00269 (EL308397)	0.90000	0.84000	7.87379	9.02217	1	False	-0.64271
IA00655 (EL628647210)	0.78000	0.72000	9.91123	10.66863	1	False	-0.82622
IA00657 (EL628647689)	0.86000	0.77000	8.67872	10.04461	1	False	0.62241
IA00658 (EL628653398)	0.77000	0.74000	10.04461	10.42662	2	False	0.98788
IA00665A (EL628749729#SCORE_TRAIT_Conv)	0.66667	0.52667	11.27709	12.73243	3	False	1.69263
IA00665D (EL628749729#SCORE_TRAIT_Ideadev)	0.44000	0.35400	13.60388	14.49817	5	False	-0.50251

Table 2.5.6
Delta Analysis
English Language Arts Grade 8

Item Id	Old P	New P	Old Delta	New Delta	Max	Discard	Std Dist
IA00056 (EL290795)	0.84000	0.77000	9.02217	10.04461	1	False	-0.23221
IA00057 (EL290798)	0.80000	0.78000	9.63352	9.91123	1	False	0.52755
IA00058 (EL290799)	0.80000	0.75000	9.63352	10.30204	1	False	-1.34346
IA00059 (EL290800)	0.70000	0.67000	10.90240	11.24035	1	False	0.01219
IA00060 (EL290801)	0.84000	0.77000	9.02217	10.04461	1	False	-0.23221
IA00061 (EL290805)	0.65000	0.56000	11.45872	12.39612	1	False	-0.20349
IA00062 (EL290808)	0.57000	0.54000	12.29450	12.59827	1	False	-0.07316
IA00063 (EL290814)	0.49000	0.44000	13.10028	13.60388	1	False	-1.17402
IA00064A (EL290818#SCORE_TRAIT_Conv)	0.68333	0.56667	11.09184	12.32842	3	False	1.16320
IA00064D (EL290818#SCORE_TRAIT_Ideadev)	0.43800	0.36600	13.62417	14.36987	5	False	-0.73393
IA00368 (EL623873883)	0.81000	0.72000	9.48841	10.66863	1	False	0.60654
IA00371 (EL623951471)	0.63000	0.60500	11.67259	11.93476	2	False	0.23720
IA00373 (EL623952377)	0.46500	0.42000	13.35138	13.80757	2	False	-0.99198
IA00374 (EL623952612)	0.72000	0.73000	10.66863	10.54875	1	False	2.24587
IA00376A (EL623953378#SCORE_TRAIT_Conv)	0.74667	0.63000	10.34385	11.67259	3	False	1.47057
IA00376D (EL623953378#SCORE_TRAIT_Ideadev)	0.49200	0.40200	13.08022	13.99269	5	False	-0.03278
IA00378 (EL623955555)	0.60000	0.51000	11.98661	12.89972	1	False	-0.22536
IA00379 (EL623955757)	0.54000	0.54000	12.59827	12.59827	1	False	1.32676
IA00383 (EL623959265)	0.71000	0.65000	10.78646	11.45872	1	False	-1.56756
IA00699 (EL632808123)	0.81000	0.77000	9.48841	10.04461	1	False	-0.77974

Table 2.5.7
Delta Analysis
English Language Arts Grade 10

Item Id	Old P	New P	Old Delta	New Delta	Max	Discard	Std Dist
IA04110 (EL807953958)	0.67000	0.54000	11.24035	12.59827	2	False	2.99218
IA04111 (EL807957225)	0.79000	0.79000	9.77432	9.77432	1	False	0.05772
IA04132 (EL808046697)	0.90000	0.88000	7.87379	8.30005	1	False	-0.75346
IA04260 (EL811034362)	0.79000	0.73000	9.77432	10.54875	1	False	0.76744
IA04297 (EL811428116)	0.64000	0.61000	11.56616	11.88272	1	False	-0.42370
IA04412 (EL813438114)	0.80000	0.74000	9.63352	10.42662	1	False	0.80324
IA04439 (EL816956706)	0.68000	0.67000	11.12920	11.24035	1	False	-0.56883
IA04440 (EL817235657)	0.64000	0.63500	11.56616	11.61950	2	False	-0.45817
IA06626A (EL811561885#SCORE_TRAIT_Conv)	0.71333	0.74667	10.74740	10.34385	3	False	1.22181
IA06626D (EL811561885#SCORE_TRAIT_Ideadev)	0.46600	0.50000	13.34132	13.00000	5	False	0.52499
IA06629 (EL811608986)	0.76500	0.75000	10.11008	10.30204	2	False	-0.64656
IA06631 (EL811610832)	0.60000	0.59000	11.98661	12.08982	2	False	-0.70397
IA06633 (EL811612272)	0.62000	0.60000	11.77808	11.98661	1	False	-0.74446
IA06635 (EL811612951)	0.82000	0.80000	9.33854	9.63352	1	False	-0.84511
IA06636 (EL811614524)	0.84000	0.82000	9.02217	9.33854	1	False	-0.85691
IA06638 (EL811616340)	0.60000	0.62000	11.98661	11.77808	1	False	0.33700
IA06641 (EL811617473)	0.80000	0.78000	9.63352	9.91123	1	False	-0.84307
IA06642 (EL811618006)	0.82000	0.82000	9.33854	9.33854	1	False	0.13987

Table 2.5.8
Delta Analysis
Mathematics Grade 3

Item Id	Old P	New P	Old Delta	New Delta	Max	Discard	Std Dist
IA00769 (MA203641)	0.90000	0.83000	7.87379	9.18334	1	False	0.24128
IA00799 (MA260559)	0.65000	0.49000	11.45872	13.10028	1	False	2.22356
IA00834 (MA293457)	0.85000	0.79000	8.85427	9.77432	1	False	-0.87612
IA00838 (MA293524)	0.81000	0.74000	9.48841	10.42662	1	False	-0.66566
IA00850 (MA297405)	0.77000	0.69000	10.04461	11.01660	1	False	-0.41937
IA00852 (MA297438)	0.70000	0.63000	10.90240	11.67259	1	False	-0.91681
IA00924 (MA306310)	0.55000	0.46000	12.49735	13.40173	1	False	-0.08160
IA00925 (MA306315)	0.82000	0.75000	9.33854	10.30204	1	False	-0.61317
IA00930 (MA306359)	0.62000	0.66000	11.77808	11.35015	1	False	2.36721
IA00932 (MA306375)	0.48000	0.48000	13.20061	13.20061	1	False	0.55725
IA00993 (MA310834)	0.66000	0.63000	11.35015	11.67259	1	False	-0.12579
IA01019 (MA311277)	0.78000	0.74000	9.91123	10.42662	1	False	-0.45729
IA01071 (MA623063509)	0.72000	0.73000	10.66863	10.54875	1	False	1.56130
IA01080 (MA623654449)	0.36000	0.31667	14.43384	14.90816	3	False	-1.11643
IA01081 (MA623656013)	0.36000	0.28667	14.43384	15.25260	3	False	0.07367
IA02323 (MA301611A)	0.88000	0.83000	8.30005	9.18334	1	False	-1.13224
IA04760 (MA713752330)	0.85000	0.77000	8.85427	10.04461	1	False	0.05782
IA04813 (MA735572247)	0.75000	0.72000	10.30204	10.66863	1	False	-0.03420
IA04828 (MA735653938)	0.59000	0.51000	12.08982	12.89972	1	False	-0.50297
IA04844 (MA735735757)	0.65000	0.62000	11.45872	11.77808	1	False	-0.14044

Table 2.5.9
Delta Analysis
Mathematics Grade 4

Item Id	Old P	New P	Old Delta	New Delta	Max	Discard	Std Dist
IA00789 (MA250543)	0.48000	0.41500	13.20061	13.85881	4	False	-0.60787
IA00828 (MA287237)	0.78000	0.76000	9.91123	10.17479	1	False	-0.75079
IA00841 (MA293718)	0.78000	0.71000	9.91123	10.78646	1	False	0.03016
IA00861 (MA297629)	0.87000	0.89000	8.49444	8.09389	1	False	0.39855
IA00869 (MA297988)	0.24000	0.18000	15.82521	16.66146	1	False	-0.45669
IA00906 (MA301811)	0.76000	0.73000	10.17479	10.54875	1	False	-0.93059
IA00958 (MA307055)	0.57000	0.46000	12.29450	13.40173	1	False	0.29962
IA00961 (MA307081)	0.54000	0.53000	12.59827	12.69892	1	False	-0.25665
IA00963 (MA307085)	0.76000	0.67000	10.17479	11.24035	1	False	0.36951
IA01048 (MA311534)	0.56000	0.54000	12.39612	12.59827	1	False	-0.46156
IA01049 (MA311537)	0.70000	0.66000	10.90240	11.35015	1	False	-0.84275
IA01055 (MA311572)	0.64000	0.52000	11.56616	12.79939	1	False	0.58739
IA01057 (MA311581)	0.55500	0.55250	12.44678	12.47208	4	False	-0.12558
IA01093 (MA623879088)	0.70500	0.73000	10.84466	10.54875	2	False	0.36620
IA02175 (MA286769)	0.78000	0.75000	9.91123	10.30204	1	False	-0.88047
IA02819 (MA713583365)	0.42000	0.61000	13.80757	11.88272	1	False	3.63555
IA02841 (MA713774890)	0.51000	0.44000	12.89972	13.60388	1	False	-0.50043
IA02902 (MA714251321)	0.46000	0.39000	13.40173	14.11728	1	False	-0.51413
IA04661 (MA307327)	0.83000	0.74000	9.18334	10.42662	1	False	0.77293
IA04965 (MA800867144)	0.66000	0.58000	11.35015	12.19243	1	False	-0.13241

Table 2.5.10
Delta Analysis
Mathematics Grade 5

Item Id	Old P	New P	Old Delta	New Delta	Max	Discard	Std Dist
IA00771 (MA204911)	0.81000	0.73000	9.48841	10.54875	1	False	-0.34652
IA00776 (MA221207)	0.70000	0.66000	10.90240	11.35015	1	False	-0.71992
IA00803 (MA262207)	0.76000	0.72000	10.17479	10.66863	1	False	-0.80669
IA00806 (MA272292)	0.52000	0.47000	12.79939	13.30108	1	False	-1.01264
IA00826 (MA287178)	0.90000	0.85000	7.87379	8.85427	1	False	-0.69683
IA00872 (MA298003)	0.64000	0.63000	11.56616	11.67259	1	False	0.25118
IA00880 (MA298106)	0.28000	0.21000	15.33137	16.22568	1	False	-0.43489
IA00885 (MA299556)	0.79000	0.68000	9.77432	11.12920	1	False	0.55125
IA00936 (MA306420)	0.76000	0.69000	10.17479	11.01660	1	False	-0.95005
IA00943 (MA306466)	0.76000	0.62000	10.17479	11.77808	1	False	1.31941
IA00989 (MA307638)	0.91000	0.86000	7.63698	8.67872	1	False	-0.53070
IA01020 (MA311280)	0.40000	0.43000	14.01339	13.70550	1	False	1.31576
IA01028 (MA311333)	0.28000	0.20000	15.33137	16.36648	1	False	-0.01526
IA01029 (MA311337)	0.82000	0.83000	9.33854	9.18334	1	False	1.18584
IA01032 (MA311366)	0.39500	0.38500	14.06524	14.16950	4	False	0.08381
IA01149 (MA624347774)	0.42000	0.41000	13.80757	13.91018	1	False	0.10665
IA01155 (MA624357395)	0.54000	0.35000	12.59827	14.54128	2	False	2.50048
IA02552 (MA311324)	0.43000	0.38000	13.70550	14.22192	1	False	-1.11957
IA02736 (MA704359678)	0.54500	0.48500	12.54785	13.15043	4	False	-1.29584
IA04970 (MA800974344)	0.70000	0.70000	10.90240	10.90240	1	False	0.61452

Table 2.5.11
Delta Analysis
Mathematics Grade 6

Item Id	Old P	New P	Old Delta	New Delta	Max	Discard	Std Dist
IA00777 (MA221667)	0.85000	0.85000	8.85427	8.85427	1	False	0.25134
IA00778 (MA221669)	0.84000	0.80000	9.02217	9.63352	1	False	-0.44461
IA00804 (MA264305)	0.77000	0.74000	10.04461	10.42662	1	False	-0.94060
IA00817 (MA280989)	0.52000	0.47000	12.79939	13.30108	1	False	-0.70511
IA00818 (MA282268)	0.45000	0.40000	13.50265	14.01339	1	False	-0.56076
IA00819 (MA282277)	0.54000	0.47000	12.59827	13.30108	1	False	-1.00062
IA00827 (MA287186)	0.70000	0.56000	10.90240	12.39612	1	False	2.53086
IA00845 (MA296349)	0.64000	0.56000	11.56616	12.39612	1	False	-0.23874
IA00881 (MA298139)	0.47250	0.45000	13.27595	13.50265	4	False	0.49386
IA00884 (MA298279)	0.20000	0.12000	16.36648	17.69995	1	False	0.50616
IA00899 (MA301508)	0.37000	0.33000	14.32741	14.75965	1	False	-0.04240
IA00972 (MA307339)	0.75500	0.74000	10.23876	10.42662	4	False	-0.13049
IA00992 (MA309941)	0.42000	0.41000	13.80757	13.91018	1	False	1.11583
IA01058 (MA311658)	0.53000	0.42000	12.69892	13.80757	1	False	0.56327
IA02037 (MA217493)	0.64000	0.66000	11.56616	11.35015	1	False	1.79079
IA02597 (MA311693)	0.84000	0.78000	9.02217	9.91123	1	False	0.64316
IA04745 (MA703231515)	0.56500	0.50000	12.34537	13.00000	2	False	-1.12468
IA04884 (MA736365836)	0.73000	0.68000	10.54875	11.12920	1	False	-0.95589
IA05126 (MA805103779)	0.61000	0.55000	11.88272	12.49735	1	False	-1.16309
IA05135 (MA805171807)	0.65000	0.58000	11.45872	12.19243	1	False	-0.58827

Table 2.5.12
Delta Analysis
Mathematics Grade 7

Item Id	Old P	New P	Old Delta	New Delta	Max	Discard	Std Dist
IA00796 (MA259267)	0.44000	0.44000	13.60388	13.60388	1	False	-1.08470
IA00831 (MA288414)	0.75000	0.72000	10.30204	10.66863	1	False	0.07198
IA00847 (MA296358)	0.46000	0.53000	13.40173	12.69892	1	False	1.57506
IA00909 (MA301846)	0.90000	0.87000	7.87379	8.49444	1	False	0.84097
IA00910 (MA301854)	0.28000	0.35000	15.33137	14.54128	1	False	1.58436
IA00945 (MA306538)	0.70000	0.69000	10.90240	11.01660	1	False	-1.11356
IA00948 (MA306600)	0.85000	0.84000	8.85427	9.02217	1	False	-1.30809
IA00949 (MA306605)	0.51000	0.49000	12.89972	13.10028	1	False	-0.19550
IA01004 (MA311073)	0.18000	0.17000	16.66146	16.81666	1	False	0.44153
IA01006 (MA311093)	0.83000	0.85000	9.18334	8.85427	1	False	0.59409
IA01011 (MA311109)	0.42000	0.39000	13.80757	14.11728	1	False	0.58881
IA01016 (MA311125)	0.58000	0.55000	12.19243	12.49735	1	False	0.18799
IA01017 (MA311135)	0.74000	0.75000	10.42662	10.30204	1	False	-0.76888
IA01018 (MA311140)	0.37000	0.37000	14.32741	14.32741	1	False	-0.91637
IA01069 (MA316886)	0.49750	0.50750	13.02507	12.92480	4	False	-1.50102
IA01097 (MA623950280)	0.35000	0.32000	14.54128	14.87080	1	False	0.86352
IA01108 (MA624149677)	0.32500	0.38500	14.81505	14.16950	2	False	0.94559
IA02722 (MA703943185)	0.44500	0.48750	13.55322	13.12535	4	False	0.09617
IA04486 (MA227988)	0.69000	0.69000	11.01660	11.01660	1	False	-1.56024
IA04538 (MA282218)	0.65000	0.69000	11.45872	11.01660	1	False	0.65829

Table 2.5.13
Delta Analysis
Mathematics Grade 8

Item Id	Old P	New P	Old Delta	New Delta	Max	Discard	Std Dist
IA00849 (MA296757)	0.70000	0.62000	10.90240	11.77808	1	False	-0.36874
IA00858 (MA297513)	0.84000	0.76000	9.02217	10.17479	1	False	0.21929
IA00864 (MA297652)	0.79000	0.70250	9.77432	10.87358	4	False	0.17242
IA00865 (MA297656)	0.54000	0.53000	12.59827	12.69892	1	False	0.44746
IA00903 (MA301674)	0.78000	0.73000	9.91123	10.54875	1	False	-0.85562
IA00905 (MA301702)	0.53000	0.44000	12.69892	13.60388	1	False	0.03330
IA00979 (MA307472)	0.59000	0.63000	12.08982	11.67259	1	False	2.23261
IA00985 (MA307570)	0.59000	0.51000	12.08982	12.89972	1	False	-0.38220
IA01033 (MA311384)	0.64000	0.59000	11.56616	12.08982	1	False	-0.76407
IA01037 (MA311414)	0.46000	0.39000	13.40173	14.11728	1	False	-0.46822
IA01042 (MA311448)	0.69000	0.52000	11.01660	12.79939	1	False	2.62580
IA01044 (MA311463)	0.69000	0.64000	11.01660	11.56616	1	False	-0.75543
IA01066 (MA314812)	0.61000	0.55500	11.88272	12.44678	4	False	-0.95050
IA01125 (MA624247061)	0.47000	0.42500	13.30108	13.75647	2	False	-0.83571
IA02495 (MA309741)	0.42000	0.44000	13.80757	13.60388	1	False	1.23967
IA04665 (MA307399)	0.55000	0.48000	12.49735	13.20061	1	False	-0.66255
IA04678 (MA309738)	0.43000	0.39000	13.70550	14.11728	1	False	-0.76155
IA05057 (MA803856437)	0.85000	0.83000	8.85427	9.18334	1	False	0.33605
IA05059 (MA803856627)	0.75000	0.71000	10.30204	10.78646	1	False	-0.42006
IA05070 (MA804042487)	0.36000	0.29000	14.43384	15.21354	1	False	-0.08197

Table 2.5.14
Delta Analysis
Mathematics Grade 10

Item Id	Old P	New P	Old Delta	New Delta	Max	Discard	Std Dist
IA04800 (MA717740737)	0.54000	0.40000	12.59827	14.01339	1	False	1.22183
IA04810 (MA735534256)	0.37500	0.33500	14.27456	14.70459	2	False	-0.83798
IA04819 (MA735579095)	0.63000	0.57000	11.67259	12.29450	1	False	-0.61066
IA04824 (MA735632759)	0.51000	0.46000	12.89972	13.40173	1	False	-0.62330
IA04842 (MA735734830)	0.46000	0.40000	13.40173	14.01339	1	False	-1.10099
IA04846 (MA735743236)	0.86000	0.76000	8.67872	10.17479	1	False	0.21026
IA04847 (MA735745569)	0.48000	0.43000	13.20061	13.70550	1	False	-0.73017
IA04871 (MA736059227)	0.57000	0.50000	12.29450	13.00000	1	False	-1.08122
IA04913 (MA800433428)	0.60000	0.56000	11.98661	12.39612	1	False	-0.02958
IA04991 (MA801426792)	0.36000	0.33000	14.43384	14.75965	1	False	-0.55456
IA04993 (MA801434971)	0.31000	0.22000	14.98340	16.08877	1	False	0.99978
IA04997 (MA801564574)	0.41000	0.39500	13.91018	14.06524	2	False	0.16442
IA05048 (MA803762212)	0.54000	0.47000	12.59827	13.30108	1	False	-1.06858
IA05096 (MA804566054)	0.67500	0.55500	11.18495	12.44678	2	False	0.27032
IA05117 (MA804678931)	0.48000	0.35000	13.20061	14.54128	1	False	1.17788
IA05144 (MA805372590)	0.50000	0.41000	13.00000	13.91018	1	False	-0.27144
IA05145 (MA805373539)	0.30000	0.23000	15.09760	15.95539	1	False	0.24073
IA05147 (MA805376549)	0.92000	0.87000	7.37971	8.49444	1	False	-0.80227
IA05155 (MA806051920)	0.32000	0.29000	14.87080	15.21354	1	False	-0.75077
IA05165 (MA806383722)	0.41000	0.46000	13.91018	13.40173	4	False	2.29791
IA05170 (MA806408603)	0.40500	0.44250	13.96170	13.57854	4	False	1.87837

Table 2.5.15
Delta Analysis
Science Grade 5

Item Id	Old P	New P	Old Delta	New Delta	Max	Discard	Std Dist
IA05192 (SC264893)	0.32000	0.31333	14.87080	14.94570	3	False	0.17882
IA05466 (SC628483066)	0.88000	0.90000	8.30005	7.87379	1	False	2.75843
IA05523 (SC718127878)	0.69000	0.67000	11.01660	11.24035	1	False	-0.69211
IA05526 (SC735264282)	0.89000	0.86000	8.09389	8.67872	1	False	0.36853
IA05530 (SC735267831)	0.80000	0.79000	9.63352	9.77432	1	False	-0.27049
IA05545 (SC735535118)	0.50000	0.47000	13.00000	13.30108	1	False	-1.07266
IA05560 (SC736074266)	0.79000	0.78000	9.77432	9.91123	1	False	-0.24701
IA05562 (SC736074942)	0.65000	0.63000	11.45872	11.67259	2	False	-0.63094
IA05628 (SC802729980)	0.64000	0.63000	11.56616	11.67259	1	False	-0.05052
IA05630 (SC802758131)	0.79000	0.72000	9.77432	10.66863	1	False	2.00443
IA05631 (SC802758561)	0.57000	0.56000	12.29450	12.39612	1	False	-0.01152
IA05634 (SC802761427)	0.35333	0.32000	14.50535	14.87080	3	False	-0.92832
IA05657 (SC803732869)	0.42500	0.39500	13.75647	14.06524	2	False	-1.10041
IA05661 (SC803837124)	0.70000	0.67000	10.90240	11.24035	1	False	-1.01135
IA05662 (SC803844809)	0.70500	0.65000	10.84466	11.45872	2	False	0.47625
IA05664 (SC803847645)	0.81000	0.76000	9.48841	10.17479	1	False	0.89005
IA05678 (SC804048131)	0.89000	0.88000	8.09389	8.30005	1	False	-0.65019
IA05681 (SC804060300)	0.43000	0.37000	13.70550	14.32741	1	False	0.46691
IA05688 (SC804141602)	0.87000	0.84000	8.49444	9.02217	1	False	0.05387
IA05702 (SC806382697)	0.50000	0.48000	13.00000	13.20061	1	False	-0.53177

Table 2.5.16
Delta Analysis
Science Grade 8

Item Id	Old P	New P	Old Delta	New Delta	Max	Discard	Std Dist
IA05243 (SC289702)	0.44000	0.32000	13.60388	14.87080	1	False	2.98700
IA05245 (SC290144)	0.51000	0.53000	12.89972	12.69892	1	False	1.32079
IA05499 (SC633066301)	0.93000	0.91000	7.09684	7.63698	1	False	-0.39853
IA05522 (SC717662167)	0.52000	0.50000	12.79939	13.00000	1	False	-0.66116
IA05550 (SC735560046)	0.34000	0.27000	14.64985	15.45125	1	False	0.66038
IA05551 (SC735569222)	0.60000	0.52000	11.98661	12.79939	1	False	0.79721
IA05555 (SC735663104)	0.35000	0.34000	14.54128	14.64985	1	False	-0.15459
IA05581 (SC800285340)	0.40000	0.41000	14.01339	13.91018	1	False	0.87343
IA05649 (SC803174786)	0.70000	0.69000	10.90240	11.01660	1	False	-0.29268
IA05665 (SC803856876)	0.82000	0.82000	9.33854	9.33854	1	False	0.22288
IA05675 (SC803981496)	0.75000	0.72000	10.30204	10.66863	1	False	-1.35129
IA05687 (SC804132888)	0.78500	0.74000	9.84323	10.42662	2	False	-0.26864
IA05690 (SC804367702)	0.49000	0.44000	13.10028	13.60388	1	False	-0.76072
IA05693 (SC804372985)	0.69500	0.67000	10.95971	11.24035	2	False	-1.11146
IA05718 (SC807245653)	0.78000	0.74000	9.91123	10.42662	1	False	-0.60590
IA05720 (SC807247887)	0.64000	0.57000	11.56616	12.29450	1	False	0.39371
IA05727 (SC809171062)	0.50000	0.48000	13.00000	13.20061	1	False	-0.65508
IA05729 (SC809178849)	0.38000	0.35667	14.22192	14.46953	3	False	-0.84970
IA05750 (SC814258458)	0.46667	0.46667	13.33461	13.33461	3	False	0.34406
IA05777 (SC816343670)	0.63500	0.62000	11.61950	11.77808	2	False	-0.48971

Section 2.6

Tabled B/B Analysis Results

Table 2.6.1
b/b Analysis
English Language Arts Grade 3

Item Id	Old b	New b	Std Dist	Flag
IA00279 (EL308822)	-0.92977	-0.92350	-0.34105	False
IA00280 (EL308824)	-0.56172	-0.25530	-0.12732	False
IA00281 (EL308826)	0.09026	0.23710	-0.58507	False
IA00282 (EL308827)	-0.60316	-0.38590	-0.66042	False
IA00283 (EL308835)	-0.28528	-0.05590	-0.78304	False
IA00284 (EL308837)	-0.46364	-0.23490	-0.67562	False
IA00285 (EL308838)	-0.74705	-0.57560	-0.85773	False
IA00286 (EL308842)	0.73610	0.74700	0.67070	False
IA00287 (EL308855)	0.31714	0.68873	-0.26780	False
IA00288 (EL308857)	0.86123	0.97347	0.11355	False
IA00443 (EL626042844)	-1.01130	-0.60060	0.80734	False
IA00444 (EL626043062)	-0.50278	-0.27470	-0.65530	False
IA00445 (EL626043435)	-0.18325	-0.09995	-0.35759	False
IA00446 (EL626049849)	-0.18033	0.21130	0.16862	False
IA00450 (EL626050679)	-0.20396	-0.15840	-0.13392	False
IA00451 (EL626050927)	0.79202	0.46340	2.83426	False
IA00452 (EL626051097)	-0.22588	-0.19100	-0.08065	False
IA00453 (EL626051328)	-0.40439	-0.19850	-0.85589	False
IA00458A (EL626052459#SCORE_TRAIT_Conv)	1.00727	1.86193	2.32964	False
IA00458D (EL626052459#SCORE_TRAIT_Ideadev)	1.57680	2.03008	-0.54269	False

Table 2.6.2
b/b Analysis
English Language Arts Grade 4

Item Id	Old b	New b	Std Dist	Flag
IA00218 (EL307705)	-1.47899	-1.27790	-0.39470	False
IA00219 (EL307709)	-1.32580	-0.98150	-0.65224	False
IA00220 (EL307710)	0.41841	0.63720	-0.47351	False
IA00221 (EL307713)	0.06591	0.35070	-1.23660	False
IA00222 (EL307714)	-1.17271	-1.05360	0.54483	False
IA00223 (EL307719)	0.07812	0.31840	-0.73622	False
IA00224 (EL307724)	-0.71688	-0.50980	-0.41379	False
IA00225 (EL307728)	-0.26222	0.27203	1.41270	False
IA00226 (EL307729)	0.03026	0.49690	0.63529	False
IA00289 (EL309792)	-0.35621	-0.42900	2.75039	False
IA00407 (EL624647403)	0.52679	0.96940	0.33420	False
IA00408 (EL624647580)	-0.39052	-0.30030	0.91852	False
IA00411 (EL624652450)	-1.29795	-0.89500	0.00431	False
IA00412 (EL624652621)	-2.02010	-1.58150	0.45008	False
IA00414 (EL624652989)	0.70188	0.94660	-0.74666	False
IA00415 (EL624653348)	-0.69205	-0.39650	-1.23947	False
IA00416 (EL624653492)	-1.27948	-0.95205	-0.84453	False
IA00419 (EL624654711)	-1.66447	-1.35000	-0.96568	False
IA00421A (EL624655949#SCORE_TRAIT_Conv)	0.12301	0.61067	0.86534	False
IA00421D (EL624655949#SCORE_TRAIT_Ideadev)	1.04752	1.24658	-0.21225	False

Table 2.6.3
b/b Analysis
English Language Arts Grade 5

Item Id	Old b	New b	Std Dist	Flag
IA00495 (EL626304658)	-1.56540	-0.98640	0.74680	False
IA00497 (EL626304969)	-0.34409	-0.23580	0.15270	False
IA00500 (EL626332335)	-1.01730	-0.46280	0.61783	False
IA00501 (EL626332592)	-1.82150	-1.67380	0.03257	False
IA00502 (EL626333002)	-1.51485	-1.19220	-1.43580	False
IA00505 (EL626355215)	0.12400	-0.04320	2.43760	False
IA00506 (EL626355557)	-0.29694	-0.21710	0.38883	False
IA00508 (EL626356291)	0.42877	0.66250	-1.03222	False
IA00509A (EL626356806#SCORE_TRAIT_Conv)	0.00829	0.51417	0.35277	False
IA00509D (EL626356806#SCORE_TRAIT_Ideadev)	0.70574	1.12650	-0.27215	False
IA00638 (EL627351056)	-0.66376	-0.05390	1.14259	False
IA01669 (EL711809263)	-1.32010	-0.83300	-0.00235	False
IA01670 (EL711809592)	-0.82560	-0.52710	-1.40169	False
IA01671 (EL711827203)	-2.05800	-1.61940	-0.52485	False
IA01672 (EL711827807)	-0.96500	-1.02120	1.64895	False
IA01676A (EL711854812#SCORE_TRAIT_Conv)	0.08973	0.53557	-0.14822	False
IA01676D (EL711854812#SCORE_TRAIT_Ideadev)	0.79127	1.15623	-0.73636	False
IA01679 (EL711868011)	-0.28870	0.03915	-1.21165	False
IA01680 (EL711900602)	-0.46560	-0.27760	-0.51046	False
IA01691 (EL712167015)	0.45030	0.59150	-0.24489	False

Table 2.6.4
b/b Analysis
English Language Arts Grade 6

Item Id	Old b	New b	Std Dist	Flag
IA00173 (EL303496)	-1.61264	-0.64540	1.43563	False
IA00174 (EL303500)	-0.89312	-0.50140	0.94104	False
IA00175 (EL303504)	-0.65354	0.27440	2.37836	False
IA00176 (EL303508)	-1.59790	-0.80450	-0.29863	False
IA00177 (EL303510)	-2.42062	-1.51570	-0.32187	False
IA00178 (EL303513)	-1.14059	-0.45790	-0.77754	False
IA00179 (EL303514)	-0.66142	0.08200	0.50470	False
IA00180 (EL303518)	0.08389	0.40380	0.30147	False
IA00181A (EL303519#SCORE_TRAIT_Conv)	-0.28780	0.25660	-0.98253	False
IA00181D (EL303519#SCORE_TRAIT_Ideadev)	0.76188	1.12986	-1.13064	False
IA00515 (EL626864414)	-2.11926	-1.36530	-1.00323	False
IA00517 (EL626864724)	-1.13436	-0.56750	-0.49001	False
IA00518 (EL626865003)	-1.04450	-0.54760	0.09071	False
IA00520 (EL626865416)	0.88895	1.30420	-0.64283	False
IA00522 (EL626865773)	-0.88194	-0.40820	0.09747	False
IA00523 (EL626865942)	-0.72268	-0.41160	1.51704	False
IA00528 (EL626867605)	-1.82572	-1.03515	-0.64537	False
IA00530 (EL626868748)	-1.32762	-0.87075	0.89019	False
IA00531A (EL626869132#SCORE_TRAIT_Conv)	-0.49144	0.10657	-0.72579	False
IA00531D (EL626869132#SCORE_TRAIT_Ideadev)	0.67275	1.06884	-1.13818	False

Table 2.6.5
b/b Analysis
English Language Arts Grade 7

Item Id	Old b	New b	Std Dist	Flag
IA00065 (EL292160)	-1.29375	-0.61620	-0.00475	False
IA00066 (EL292163)	-1.09050	-0.39290	0.29553	False
IA00067 (EL292168)	-0.07467	0.45040	-0.28198	False
IA00068 (EL292170)	-1.12877	-0.50800	-0.31769	False
IA00069 (EL292172)	-0.45904	-0.15010	0.64222	False
IA00070 (EL292176)	-0.13875	-0.26820	3.75031	False
IA00071A (EL292181#SCORE_TRAIT_Conv)	-0.44445	0.12917	-0.18040	False
IA00071D (EL292181#SCORE_TRAIT_Ideadev)	0.65225	1.02844	-0.67667	False
IA00081 (EL293802)	-1.02931	-0.43230	-0.42656	False
IA00082 (EL293804)	-0.39273	0.23150	0.24281	False
IA00257 (EL308358)	-1.78014	-1.19520	-0.50220	False
IA00258 (EL308360)	-1.79449	-1.16810	-0.75796	False
IA00262 (EL308382)	-0.77688	-0.31480	-0.29406	False
IA00265 (EL308389)	-2.68728	-1.98410	-0.74489	False
IA00269 (EL308397)	-2.33283	-1.64890	-0.71017	False
IA00655 (EL628647210)	-1.16859	-0.57980	-0.59027	False
IA00657 (EL628647689)	-1.48855	-0.86800	-0.58045	False
IA00658 (EL628653398)	-1.59407	-1.11555	0.17369	False
IA00665A (EL628749729#SCORE_TRAIT_Conv)	-0.84178	-0.08687	0.91275	False
IA00665D (EL628749729#SCORE_TRAIT_Ideadev)	0.22706	0.76706	0.05075	False

Table 2.6.6
b/b Analysis
English Language Arts Grade 8

Item Id	Old b	New b	Std Dist	Flag
IA00056 (EL290795)	-2.03056	-1.25700	-0.59458	False
IA00057 (EL290798)	-1.86465	-1.31680	-0.47090	False
IA00058 (EL290799)	-0.98095	-0.45110	-0.62529	False
IA00059 (EL290800)	-0.49291	-0.19290	-0.86810	False
IA00060 (EL290801)	-0.94041	-0.49320	-1.07967	False
IA00061 (EL290805)	-0.42532	0.18360	0.64623	False
IA00062 (EL290808)	0.03451	0.24860	-1.07883	False
IA00063 (EL290814)	0.63593	0.70890	-1.05210	False
IA00064A (EL290818#SCORE_TRAIT_Conv)	-0.97008	-0.23157	0.68139	False
IA00064D (EL290818#SCORE_TRAIT_Ideadev)	0.18878	0.77546	1.37308	False
IA00368 (EL623873883)	-1.17975	-0.54340	-0.24604	False
IA00371 (EL623951471)	-0.60996	-0.46645	0.26522	False
IA00373 (EL623952377)	0.33642	0.41550	-0.66828	False
IA00374 (EL623952612)	-0.58072	-0.70720	1.89497	False
IA00376A (EL623953378#SCORE_TRAIT_Conv)	-1.21775	-0.46990	0.39052	False
IA00376D (EL623953378#SCORE_TRAIT_Ideadev)	0.34044	0.61200	-0.36364	False
IA00378 (EL623955555)	-0.13654	0.19740	-0.64904	False
IA00379 (EL623955757)	0.74075	0.25570	2.25383	False
IA00383 (EL623959265)	-0.72677	-0.25830	-0.64735	False
IA00699 (EL632808123)	-0.99454	-0.85620	0.83860	False

Table 2.6.7
b/b Analysis
English Language Arts Grade 10

Item Id	Old b	New b	Std Dist	Flag
IA04110 (EL807953958)	-0.77245	-0.20070	2.40311	False
IA04111 (EL807957225)	-1.75420	-1.54010	-0.73558	False
IA04132 (EL808046697)	-1.79230	-1.41200	-0.11242	False
IA04260 (EL811034362)	-1.10620	-0.60300	1.52966	False
IA04297 (EL811428116)	-0.25870	-0.15030	-1.09786	False
IA04412 (EL813438114)	-0.83710	-0.69030	-0.95800	False
IA04439 (EL816956706)	-0.49140	-0.39620	-0.81841	False
IA04440 (EL817235657)	-0.70495	-0.60000	-0.71619	False
IA06626A (EL811561885#SCORE_TRAIT_Conv)	-0.88903	-0.97790	1.09442	False
IA06626D (EL811561885#SCORE_TRAIT_Ideadev)	0.21778	0.05846	0.73424	False
IA06629 (EL811608986)	-2.50665	-2.37690	0.63571	False
IA06631 (EL811610832)	-0.50095	-0.41815	-0.70451	False
IA06633 (EL811612272)	-0.28660	-0.26040	-0.40837	False
IA06635 (EL811612951)	-1.18760	-0.74840	0.91390	False
IA06636 (EL811614524)	-1.42440	-1.10280	-0.29323	False
IA06638 (EL811616340)	-0.05610	-0.08020	-0.17991	False
IA06641 (EL811617473)	-1.28980	-1.07810	-1.11255	False
IA06642 (EL811618006)	-1.16250	-1.07460	-0.17400	False

Table 2.6.8
b/b Analysis
Mathematics Grade 3

Item Id	Old b	New b	Std Dist	Flag
IA00769 (MA203641)	-2.14981	-1.67800	0.25312	False
IA00799 (MA260559)	0.28471	0.43560	-0.45991	False
IA00834 (MA293457)	-0.89072	-0.82230	0.30856	False
IA00838 (MA293524)	-1.13737	-0.76770	0.41236	False
IA00850 (MA297405)	-0.82994	-0.59440	-1.03978	False
IA00852 (MA297438)	-0.44454	-0.31580	-1.29437	False
IA00924 (MA306310)	0.90644	1.05870	0.57053	False
IA00925 (MA306315)	-0.77521	-0.76280	0.93586	False
IA00930 (MA306359)	-0.44719	-0.53630	1.88000	False
IA00932 (MA306375)	0.68670	0.62140	-0.30940	False
IA00993 (MA310834)	-0.08713	-0.18950	1.48774	False
IA01019 (MA311277)	-1.18441	-0.72040	1.70870	False
IA01071 (MA623063509)	-1.04802	-0.91020	-0.44565	False
IA01080 (MA623654449)	0.84082	0.91940	-0.60828	False
IA01081 (MA623656013)	0.73540	0.84740	-0.29331	False
IA02323 (MA301611A)	-1.66430	-1.41770	-1.02693	False
IA04760 (MA713752330)	-1.72290	-1.26350	0.76640	False
IA04813 (MA735572247)	-0.94020	-0.82820	-0.24517	False
IA04828 (MA735653938)	-0.11790	-0.02590	-1.29064	False
IA04844 (MA735735757)	-0.23920	-0.08820	-1.30983	False

Table 2.6.9
b/b Analysis
Mathematics Grade 4

Item Id	Old b	New b	Std Dist	Flag
IA00789 (MA250543)	0.47116	0.38843	-0.32199	False
IA00828 (MA287237)	-1.05009	-0.95670	-0.07633	False
IA00841 (MA293718)	-0.50085	-0.18780	0.41742	False
IA00861 (MA297629)	-0.94584	-1.89860	2.12640	False
IA00869 (MA297988)	1.20857	1.39620	-0.88983	False
IA00906 (MA301811)	-0.55570	-0.44220	-0.31968	False
IA00958 (MA307055)	0.28365	0.36460	-0.99108	False
IA00961 (MA307081)	0.35737	0.25580	-0.32299	False
IA00963 (MA307085)	-0.44995	-0.36100	-0.48345	False
IA01048 (MA311534)	0.30497	0.20400	-0.35936	False
IA01049 (MA311537)	-0.35950	-0.21230	-0.31665	False
IA01055 (MA311572)	-0.28409	-0.05210	-0.03731	False
IA01057 (MA311581)	-0.23292	-0.22305	-0.93069	False
IA01093 (MA623879088)	-0.57251	-0.85490	-0.22696	False
IA02175 (MA286769)	-0.94805	-0.65560	0.62821	False
IA02819 (MA713583365)	0.42930	-0.54360	3.09787	False
IA02841 (MA713774890)	0.04340	0.22380	-0.44987	False
IA02902 (MA714251321)	0.31890	0.52230	-0.53981	False
IA04661 (MA307327)	-0.88210	-0.63380	0.41439	False
IA04965 (MA800867144)	-0.42060	-0.30990	-0.41830	False

Table 2.6.10
b/b Analysis
Mathematics Grade 5

Item Id	Old b	New b	Std Dist	Flag
IA00771 (MA204911)	-1.37220	-1.01110	-0.32591	False
IA00776 (MA221207)	-0.64768	-0.60030	0.07183	False
IA00803 (MA262207)	-0.59114	-0.54670	0.06351	False
IA00806 (MA272292)	0.10558	0.33060	-0.63236	False
IA00826 (MA287178)	-1.62060	-1.26820	-0.55358	False
IA00872 (MA298003)	-0.16060	-0.42590	2.54101	False
IA00880 (MA298106)	0.99954	1.21590	-0.16643	False
IA00885 (MA299556)	-0.78241	-0.36070	0.56793	False
IA00936 (MA306420)	-0.90358	-0.66450	-1.12045	False
IA00943 (MA306466)	0.11250	0.26220	-1.29415	False
IA00989 (MA307638)	-1.58309	-1.35600	-0.94954	False
IA01020 (MA311280)	0.71162	0.71090	-0.32776	False
IA01028 (MA311333)	0.93415	1.08610	-0.77563	False
IA01029 (MA311337)	-2.02305	-1.47360	0.94454	False
IA01032 (MA311366)	0.58016	0.47655	0.66178	False
IA01149 (MA624347774)	0.19357	0.44160	-0.37550	False
IA01155 (MA624357395)	0.19679	0.61235	1.10778	False
IA02552 (MA311324)	0.90100	1.08340	-0.52651	False
IA02736 (MA704359678)	-0.19382	0.04045	-0.73226	False
IA04970 (MA800974344)	-0.56790	-0.72390	1.82173	False

Table 2.6.11
b/b Analysis
Mathematics Grade 6

Item Id	Old b	New b	Std Dist	Flag
IA00777 (MA221667)	-1.51838	-1.28460	-0.18602	False
IA00778 (MA221669)	-1.11977	-0.96840	-0.90327	False
IA00804 (MA264305)	-1.39315	-1.20900	-0.63730	False
IA00817 (MA280989)	0.41930	0.42150	0.20898	False
IA00818 (MA282268)	0.85530	0.96030	-0.84286	False
IA00819 (MA282277)	0.01849	0.15890	-0.81596	False
IA00827 (MA287186)	-0.43982	-0.05650	1.41886	False
IA00845 (MA296349)	-0.11171	0.28010	1.55491	False
IA00881 (MA298139)	0.02634	0.17313	-0.75396	False
IA00884 (MA298279)	1.39727	1.57090	-0.26765	False
IA00899 (MA301508)	0.68487	0.66870	0.33911	False
IA00972 (MA307339)	-1.05234	-1.02760	0.24220	False
IA00992 (MA309941)	1.73513	1.83420	-0.92042	False
IA01058 (MA311658)	0.47245	0.71460	0.22882	False
IA02037 (MA217493)	-0.12940	-0.41140	3.00633	False
IA02597 (MA311693)	-1.23640	-0.99070	-0.02509	False
IA04745 (MA703231515)	-0.12870	0.01605	-0.79943	False
IA04884 (MA736365836)	-0.94140	-0.76930	-0.67594	False
IA05126 (MA805103779)	-0.25800	-0.20000	-0.20809	False
IA05135 (MA805171807)	-0.35000	-0.31610	0.03678	False

Table 2.6.12
b/b Analysis
Mathematics Grade 7

Item Id	Old b	New b	Std Dist	Flag
IA00796 (MA259267)	0.13145	0.49590	0.25532	False
IA00831 (MA288414)	-0.76278	-0.37770	-0.17820	False
IA00847 (MA296358)	-0.33040	-0.09490	-1.17322	False
IA00909 (MA301846)	-1.67685	-1.42370	-0.39270	False
IA00910 (MA301854)	0.38259	0.48870	-0.44303	False
IA00945 (MA306538)	-1.08666	-0.73800	-0.75332	False
IA00948 (MA306600)	-1.25261	-1.08740	0.14609	False
IA00949 (MA306605)	-0.31555	0.01500	-0.38254	False
IA01004 (MA311073)	1.08389	1.20290	-1.06002	False
IA01006 (MA311093)	-2.12289	-1.42470	1.84613	False
IA01011 (MA311109)	0.25144	0.87520	2.80998	False
IA01016 (MA311125)	0.06674	0.38630	-0.21788	False
IA01017 (MA311135)	-0.90608	-0.58700	-0.90786	False
IA01018 (MA311140)	0.32590	0.42280	-0.31536	False
IA01069 (MA316886)	-0.05988	0.02845	0.03808	False
IA01097 (MA623950280)	0.46659	0.57040	-0.48030	False
IA01108 (MA624149677)	0.24764	0.42110	-0.98951	False
IA02722 (MA703943185)	0.01352	0.06313	0.35525	False
IA04486 (MA227988)	-0.47100	-0.43920	0.86623	False
IA04538 (MA282218)	-0.70640	-0.66880	0.97683	False

Table 2.6.13
b/b Analysis
Mathematics Grade 8

Item Id	Old b	New b	Std Dist	Flag
IA00849 (MA296757)	-0.72688	-0.50130	-0.55754	False
IA00858 (MA297513)	-1.10940	-0.74620	0.09037	False
IA00864 (MA297652)	-0.95344	-0.76243	-0.74091	False
IA00865 (MA297656)	0.37275	0.34310	0.10533	False
IA00903 (MA301674)	-0.71994	-0.67580	-0.18528	False
IA00905 (MA301702)	0.08071	0.50770	0.47818	False
IA00979 (MA307472)	0.55941	-0.12930	3.31342	False
IA00985 (MA307570)	0.21467	0.61750	0.36871	False
IA01033 (MA311384)	-0.00034	0.13000	-0.65248	False
IA01037 (MA311414)	0.18734	0.31560	-0.65433	False
IA01042 (MA311448)	-0.66870	0.05440	1.87697	False
IA01044 (MA311463)	-0.70369	-0.56180	-0.66391	False
IA01066 (MA314812)	-0.38827	-0.19448	-0.69117	False
IA01125 (MA624247061)	0.17761	0.34070	-0.80498	False
IA02495 (MA309741)	0.24613	0.18770	0.25404	False
IA04665 (MA307399)	0.29860	0.60770	-0.08386	False
IA04678 (MA309738)	0.83780	1.01550	-0.69136	False
IA05057 (MA803856437)	-1.15930	-1.07330	-0.36169	False
IA05059 (MA803856627)	-0.67840	-0.60300	-0.34067	False
IA05070 (MA804042487)	0.88020	1.18680	-0.05886	False

Table 2.6.14
b/b Analysis
Mathematics Grade 10

Item Id	Old b	New b	Std Dist	Flag
IA04800 (MA717740737)	-0.13540	0.46560	0.57018	False
IA04810 (MA735534256)	0.68370	0.97265	-0.96471	False
IA04819 (MA735579095)	-0.38460	-0.24440	-0.31419	False
IA04824 (MA735632759)	0.31220	0.44630	-0.27463	False
IA04842 (MA735734830)	0.78180	1.07610	-0.93997	False
IA04846 (MA735743236)	-1.59870	-1.13510	-0.08005	False
IA04847 (MA735745569)	0.78710	0.77990	0.42185	False
IA04871 (MA736059227)	0.19690	0.31930	-0.21913	False
IA04913 (MA800433428)	0.97160	1.19720	-0.71206	False
IA04991 (MA801426792)	0.95670	1.16800	-0.64246	False
IA04993 (MA801434971)	0.92740	1.47870	0.31263	False
IA04997 (MA801564574)	0.38330	0.35160	0.53579	False
IA05048 (MA803762212)	0.13870	0.37200	-0.76135	False
IA05096 (MA804566054)	-0.49005	-0.21055	-0.99437	False
IA05117 (MA804678931)	0.08760	0.89450	1.57223	False
IA05144 (MA805372590)	-0.00030	1.10120	3.01167	False
IA05145 (MA805373539)	0.68950	0.93500	-0.81317	False
IA05147 (MA805376549)	-2.01320	-1.74720	-0.95120	False
IA05155 (MA806051920)	0.88120	1.02310	-0.30472	False
IA05165 (MA806383722)	0.16730	0.14810	0.47173	False
IA05170 (MA806408603)	0.31372	0.17118	1.07594	False

Table 2.6.15
b/b Analysis
Science Grade 5

Item Id	Old b	New b	Std Dist	Flag
IA05192 (SC264893)	0.96646	0.88227	0.63107	False
IA05466 (SC628483066)	-1.78080	-1.78970	1.27703	False
IA05523 (SC718127878)	-0.59270	-0.17020	1.07712	False
IA05526 (SC735264282)	-1.93810	-1.67580	-0.99851	False
IA05530 (SC735267831)	-0.92610	-1.12560	2.56845	False
IA05545 (SC735535118)	0.32770	0.42270	-0.66214	False
IA05560 (SC736074266)	-0.98020	-0.87770	-0.10157	False
IA05562 (SC736074942)	-0.72520	-0.47465	-0.52147	False
IA05628 (SC802729980)	-0.60710	-0.47360	-0.55732	False
IA05630 (SC802758131)	-0.89430	-0.49240	0.74851	False
IA05631 (SC802758561)	-0.48110	-0.28790	-0.91632	False
IA05634 (SC802761427)	0.98793	1.00173	-0.25406	False
IA05657 (SC803732869)	0.56765	0.66905	-0.83440	False
IA05661 (SC803837124)	-0.94170	-0.71480	-0.83647	False
IA05662 (SC803844809)	-0.93950	-0.64495	-0.23150	False
IA05664 (SC803847645)	-1.40920	-0.89190	1.53166	False
IA05678 (SC804048131)	-2.33390	-2.04230	-0.92685	False
IA05681 (SC804060300)	0.96850	1.21040	0.21393	False
IA05688 (SC804141602)	-1.70450	-1.36770	-0.22137	False
IA05702 (SC806382697)	0.47190	0.60610	-0.98578	False

Table 2.6.16
b/b Analysis
Science Grade 8

Item Id	Old b	New b	Std Dist	Flag
IA05243 (SC289702)	1.02660	1.49390	1.28855	False
IA05245 (SC290144)	0.21380	0.59400	0.22291	False
IA05499 (SC633066301)	-1.72770	-1.51790	-0.33096	False
IA05522 (SC717662167)	-0.05890	0.02520	0.10468	False
IA05550 (SC735560046)	0.68700	0.89790	-1.05208	False
IA05551 (SC735569222)	-0.13680	0.14600	-0.75218	False
IA05555 (SC735663104)	1.41100	1.78480	0.63213	False
IA05581 (SC800285340)	0.91380	0.65710	2.66343	False
IA05649 (SC803174786)	-1.15920	-1.05240	0.33589	False
IA05665 (SC803856876)	-2.60860	-1.96040	1.43705	False
IA05675 (SC803981496)	-0.87610	-0.63670	-0.91628	False
IA05687 (SC804132888)	-1.37975	-1.12320	-0.86868	False
IA05690 (SC804367702)	0.19550	0.44610	-0.90070	False
IA05693 (SC804372985)	-1.36135	-0.96775	-0.27259	False
IA05718 (SC807245653)	-1.11330	-0.86110	-0.93455	False
IA05720 (SC807247887)	-0.71690	-0.25550	0.56147	False
IA05727 (SC809171062)	0.00710	0.18160	-0.69972	False
IA05729 (SC809178849)	0.61243	0.81260	-1.15566	False
IA05750 (SC814258458)	0.19206	0.21057	0.57244	False
IA05777 (SC816343670)	-0.68805	-0.57100	0.06484	False

Section 2.7

Tabled Beta Analysis Results

Table 2.7.1
Beta Analysis
English Language Arts Grade 3

Item Id	NumScoreCats	Old Mean	New Mean	Old Form	Form	Beta	Flag Beta
IA00279 (EL308822)	2	0.83000	0.78000	02E	HR03	0.04714	False
IA00280 (EL308824)	2	0.73000	0.66000	02E	HR03	0.02771	False
IA00281 (EL308826)	2	0.63000	0.59000	02E	HR03	0.04901	False
IA00282 (EL308827)	2	0.71000	0.65000	02E	HR03	0.03836	False
IA00283 (EL308835)	2	0.63000	0.57000	02E	HR03	0.01222	False
IA00284 (EL308837)	2	0.74000	0.66000	02E	HR03	0.03017	False
IA00285 (EL308838)	2	0.84000	0.77000	02E	HR03	0.03002	False
IA00286 (EL308842)	2	0.47000	0.41000	02E	HR03	0.03706	False
IA00287 (EL308855)	4	1.51000	1.12000	ON01	HR03	-0.04308	False
IA00288 (EL308857)	4	1.25000	0.96000	ON01	HR03	-0.01667	False
IA00443 (EL626042844)	2	0.65000	0.66000	09E	HR04	0.01341	False
IA00444 (EL626043062)	2	0.73000	0.67000	09E	HR04	0.01005	False
IA00445 (EL626043435)	3	1.25000	1.03000	10E	HR04	0.03220	False
IA00446 (EL626049849)	2	0.66000	0.53000	10E	HR04	-0.01465	False
IA00450 (EL626050679)	2	0.72000	0.67000	10E	HR04	0.05721	True
IA00451 (EL626050927)	2	0.47000	0.51000	09E	HR04	0.08199	True
IA00452 (EL626051097)	3	1.14000	1.10000	10E	HR04	0.05065	True
IA00453 (EL626051328)	2	0.65000	0.64000	09E	HR04	0.04510	False
IA00458A (EL626052459#SCORE_TRAIT_Conv)	4	0.73000	0.56000	09E	HR04	-0.10309	True
IA00458D (EL626052459#SCORE_TRAIT_Ideadev)	5	0.79000	0.55000	09E	HR04	-0.03858	False

Table 2.7.2
Beta Analysis
English Language Arts Grade 4

Item Id	NumScoreCats	Old Mean	New Mean	Old Form	Form	Beta	Flag Beta
IA00218 (EL307705)	2	0.86000	0.81000	02E	HR03	0.01250	False
IA00219 (EL307709)	2	0.81000	0.77000	02E	HR03	-0.00274	False
IA00220 (EL307710)	2	0.46000	0.43000	02E	HR03	0.02193	False
IA00221 (EL307713)	2	0.58000	0.52000	02E	HR03	0.00351	False
IA00222 (EL307714)	2	0.82000	0.76000	02E	HR03	0.02396	False
IA00223 (EL307719)	2	0.60000	0.56000	02E	HR03	0.03421	False
IA00224 (EL307724)	2	0.78000	0.75000	02E	HR03	0.04965	False
IA00225 (EL307728)	4	1.68000	1.36000	ON01	HR03	-0.03822	False
IA00226 (EL307729)	4	1.59000	1.25000	ON01	HR03	-0.04049	False
IA00289 (EL309792)	2	0.67000	0.64000	02E	HR03	0.09167	True
IA00407 (EL624647403)	2	0.48000	0.41000	04	HR04	0.00816	False
IA00408 (EL624647580)	2	0.61000	0.58000	04	HR04	0.03745	False
IA00411 (EL624652450)	2	0.87000	0.78000	04	HR04	0.02336	False
IA00412 (EL624652621)	2	0.94000	0.90000	04	HR04	0.01679	False
IA00414 (EL624652989)	2	0.43000	0.43000	04	HR04	0.03299	False
IA00415 (EL624653348)	2	0.76000	0.67000	04	HR04	0.02496	False
IA00416 (EL624653492)	3	1.58000	1.44000	04	HR04	0.02304	False
IA00419 (EL624654711)	3	1.74000	1.60000	04	HR04	0.01940	False
IA00421A (EL624655949#SCORE_TRAIT_Conv)	4	1.56000	1.10000	07E	HR04	-0.03688	False
IA00421D (EL624655949#SCORE_TRAIT_Ideadev)	5	1.55000	1.01000	07E	HR04	-0.02652	False

Table 2.7.3
Beta Analysis
English Language Arts Grade 5

Item Id	NumScoreCats	Old Mean	New Mean	Old Form	Form	Beta	Flag Beta
IA00495 (EL626304658)	2	0.79000	0.75000	08E	HR03	-0.02900	False
IA00497 (EL626304969)	2	0.79000	0.73000	07E	HR03	0.00057	False
IA00500 (EL626332335)	2	0.70000	0.66000	08E	HR03	-0.01013	False
IA00501 (EL626332592)	2	0.88000	0.84000	07E	HR03	-0.00347	False
IA00502 (EL626333002)	2	0.87000	0.82000	07E	HR03	0.00167	False
IA00505 (EL626355215)	2	0.57000	0.60000	08E	HR03	0.07314	True
IA00506 (EL626355557)	2	0.60000	0.64000	07E	HR03	0.08702	True
IA00508 (EL626356291)	3	0.85000	0.73000	08E	HR03	-0.00273	False
IA00509A (EL626356806#SCORE_TRAIT_Conv)	4	1.38000	1.20000	07E	HR03	-0.04622	False
IA00509D (EL626356806#SCORE_TRAIT_Ideadev)	5	1.45000	1.26000	07E	HR03	-0.02208	False
IA00638 (EL627351056)	2	0.63000	0.66000	08E	HR03	0.01651	False
IA01669 (EL711809263)	2	0.82000	0.76000	10	HR04	0.01826	False
IA01670 (EL711809592)	2	0.81000	0.76000	09	HR04	0.03438	False
IA01671 (EL711827203)	2	0.94000	0.90000	10	HR04	-0.00077	False
IA01672 (EL711827807)	2	0.74000	0.73000	09	HR04	0.05332	True
IA01676A (EL711854812#SCORE_TRAIT_Conv)	4	1.56000	1.17000	10	HR04	-0.04367	False
IA01676D (EL711854812#SCORE_TRAIT_Ideadev)	5	1.46000	1.06000	10	HR04	0.00312	False
IA01679 (EL711868011)	3	1.20000	0.99000	10	HR04	-0.00818	False
IA01680 (EL711900602)	2	0.72000	0.70000	10	HR04	0.03978	False
IA01691 (EL712167015)	2	0.50000	0.46000	10	HR04	0.03785	False

Table 2.7.4
Beta Analysis
English Language Arts Grade 6

Item Id	NumScoreCats	Old Mean	New Mean	Old Form	Form	Beta	Flag Beta
IA00173 (EL303496)	2	0.86000	0.74000	02E	HR04	-0.01933	False
IA00174 (EL303500)	2	0.69000	0.64000	02E	HR04	0.03332	False
IA00175 (EL303504)	2	0.70000	0.61000	02E	HR04	-0.00158	False
IA00176 (EL303508)	2	0.78000	0.71000	02E	HR04	0.02063	False
IA00177 (EL303510)	2	0.92000	0.87000	02E	HR04	0.01140	False
IA00178 (EL303513)	2	0.78000	0.66000	02E	HR04	-0.03535	False
IA00179 (EL303514)	2	0.64000	0.63000	02E	HR04	0.03921	False
IA00180 (EL303518)	2	0.62000	0.57000	02E	HR04	0.04581	False
IA00181A (EL303519#SCORE_TRAIT_Conv)	4	1.63000	1.31000	01	HR04	-0.03820	False
IA00181D (EL303519#SCORE_TRAIT_Ideadev)	6	1.78000	1.65000	01	HR04	0.00153	False
IA00515 (EL626864414)	2	0.90000	0.83000	07E	HR03	0.01535	False
IA00517 (EL626864724)	2	0.82000	0.69000	08E	HR03	-0.00960	False
IA00518 (EL626865003)	2	0.74000	0.67000	08E	HR03	0.04611	False
IA00520 (EL626865416)	2	0.55000	0.41000	07E	HR03	-0.06348	True
IA00522 (EL626865773)	2	0.83000	0.72000	07E	HR03	0.01301	False
IA00523 (EL626865942)	2	0.67000	0.64000	07E	HR03	0.03690	False
IA00528 (EL626867605)	3	1.77000	1.54000	08E	HR03	0.01237	False
IA00530 (EL626868748)	3	1.58000	1.41000	07E	HR03	0.05979	True
IA00531A (EL626869132#SCORE_TRAIT_Conv)	4	1.85000	1.41000	07E	HR03	-0.05043	True
IA00531D (EL626869132#SCORE_TRAIT_Ideadev)	6	2.09000	1.65000	07E	HR03	-0.00958	False

Table 2.7.5
Beta Analysis
English Language Arts Grade 7

Item Id	NumScoreCats	Old Mean	New Mean	Old Form	Form	Beta	Flag Beta
IA00065 (EL292160)	2	0.83000	0.73000	ON01	HR04	-0.00564	False
IA00066 (EL292163)	2	0.74000	0.65000	ON01	HR04	0.00176	False
IA00067 (EL292168)	2	0.59000	0.50000	ON01	HR04	-0.00143	False
IA00068 (EL292170)	2	0.80000	0.71000	ON01	HR04	0.00747	False
IA00069 (EL292172)	2	0.67000	0.62000	ON01	HR04	0.06759	True
IA00070 (EL292176)	2	0.62000	0.62000	ON01	HR04	0.08588	True
IA00071A (EL292181#SCORE_TRAIT_Conv)	4	1.64000	1.45000	01	HR04	-0.03531	False
IA00071D (EL292181#SCORE_TRAIT_Ideadev)	6	1.77000	1.63000	01	HR04	0.00219	False
IA00081 (EL293802)	2	0.75000	0.68000	ON01	HR04	0.02847	False
IA00082 (EL293804)	2	0.64000	0.54000	ON01	HR04	-0.03078	False
IA00257 (EL308358)	2	0.90000	0.85000	04E	HR03	0.01627	False
IA00258 (EL308360)	3	1.61000	1.51000	03E	HR03	0.03733	False
IA00262 (EL308382)	2	0.75000	0.65000	04E	HR03	0.02642	False
IA00265 (EL308389)	2	0.92000	0.90000	04E	HR03	0.02498	False
IA00269 (EL308397)	2	0.90000	0.84000	03E	HR03	-0.01207	False
IA00655 (EL628647210)	2	0.78000	0.72000	03E	HR03	0.02250	False
IA00657 (EL628647689)	2	0.86000	0.77000	03E	HR03	0.02731	False
IA00658 (EL628653398)	3	1.54000	1.48000	03E	HR03	0.06602	True
IA00665A (EL628749729#SCORE_TRAIT_Conv)	4	2.00000	1.58000	03E	HR03	-0.07421	True
IA00665D (EL628749729#SCORE_TRAIT_Ideadev)	6	2.20000	1.77000	03E	HR03	-0.03241	False

Table 2.7.6
Beta Analysis
English Language Arts Grade 8

Item Id	NumScoreCats	Old Mean	New Mean	Old Form	Form	Beta	Flag Beta
IA00056 (EL290795)	2	0.84000	0.77000	ON01	HR04	-0.01586	False
IA00057 (EL290798)	2	0.80000	0.78000	ON01	HR04	0.03434	False
IA00058 (EL290799)	2	0.80000	0.75000	ON01	HR04	0.01837	False
IA00059 (EL290800)	2	0.70000	0.67000	ON01	HR04	0.05855	True
IA00060 (EL290801)	2	0.84000	0.77000	ON01	HR04	0.01385	False
IA00061 (EL290805)	2	0.65000	0.56000	ON01	HR04	-0.02065	False
IA00062 (EL290808)	2	0.57000	0.54000	ON01	HR04	0.06249	True
IA00063 (EL290814)	2	0.49000	0.44000	ON01	HR04	0.02318	False
IA00064A (EL290818#SCORE_TRAIT_Conv)	4	2.05000	1.70000	01	HR04	-0.06391	True
IA00064D (EL290818#SCORE_TRAIT_Ideadev)	6	2.19000	1.83000	01	HR04	-0.05074	True
IA00368 (EL623873883)	2	0.81000	0.72000	ON02	HR03	-0.00028	False
IA00371 (EL623951471)	3	1.26000	1.21000	ON02	HR03	0.08324	True
IA00373 (EL623952377)	3	0.93000	0.84000	ON02	HR03	0.03511	False
IA00374 (EL623952612)	2	0.72000	0.73000	ON02	HR03	0.10241	True
IA00376A (EL623953378#SCORE_TRAIT_Conv)	4	2.24000	1.89000	06E	HR03	-0.03961	False
IA00376D (EL623953378#SCORE_TRAIT_Ideadev)	6	2.46000	2.01000	06E	HR03	-0.01432	False
IA00378 (EL623955555)	2	0.60000	0.51000	ON02	HR03	-0.02026	False
IA00379 (EL623955757)	2	0.54000	0.54000	ON02	HR03	0.06045	True
IA00383 (EL623959265)	2	0.71000	0.65000	ON02	HR03	0.03113	False
IA00699 (EL632808123)	2	0.81000	0.77000	ON02	HR03	0.04208	False

Table 2.7.7
Beta Analysis
English Language Arts Grade 10

Item Id	NumScoreCats	Old Mean	New Mean	Old Form	Form	Beta	Flag Beta
IA04110 (EL807953958)	3	1.34000	1.08000	ON06	HR03	-0.11039	True
IA04111 (EL807957225)	2	0.79000	0.79000	ON12	HR03	0.01329	False
IA04132 (EL808046697)	2	0.90000	0.88000	ON05	HR03	-0.00440	False
IA04260 (EL811034362)	2	0.79000	0.73000	ON13	HR04	-0.04995	False
IA04297 (EL811428116)	2	0.64000	0.61000	ON17	HR04	-0.01091	False
IA04412 (EL813438114)	2	0.80000	0.74000	ON05	HR03	-0.04841	False
IA04439 (EL816956706)	2	0.68000	0.67000	ON10	HR04	0.01379	False
IA04440 (EL817235657)	3	1.28000	1.27000	ON10	HR04	0.01451	False
IA06626A (EL811561885#SCORE_TRAIT_Conv)	4	2.14000	2.24000	ON14	HR03	0.05104	True
IA06626D (EL811561885#SCORE_TRAIT_Ideadev)	6	2.33000	2.50000	ON11	HR03	0.03842	False
IA06629 (EL811608986)	3	1.53000	1.50000	ON18	HR03	-0.01213	False
IA06631 (EL811610832)	3	1.20000	1.18000	ON19	HR03	-0.00351	False
IA06633 (EL811612272)	2	0.62000	0.60000	ON11	HR03	-0.00266	False
IA06635 (EL811612951)	2	0.82000	0.80000	ON12	HR03	-0.02610	False
IA06636 (EL811614524)	2	0.84000	0.82000	ON20	HR03	-0.00590	False
IA06638 (EL811616340)	2	0.60000	0.62000	ON15	HR03	0.01966	False
IA06641 (EL811617473)	2	0.80000	0.78000	ON16	HR03	-0.01874	False
IA06642 (EL811618006)	2	0.82000	0.82000	ON13	HR03	0.00373	False

Table 2.7.8
Beta Analysis
Mathematics Grade 3

Item Id	NumScoreCats	Old Mean	New Mean	Old Form	Form	Beta	Flag Beta
IA00769 (MA203641)	2	0.90000	0.83000	ON19	HR19	-0.02907	False
IA00799 (MA260559)	2	0.65000	0.49000	14E	HR05	-0.02685	False
IA00834 (MA293457)	2	0.85000	0.79000	ON03	HR03	0.01190	False
IA00838 (MA293524)	2	0.81000	0.74000	15E	HR07	-0.03397	False
IA00850 (MA297405)	2	0.77000	0.69000	ON09	HR09	-0.01813	False
IA00852 (MA297438)	2	0.70000	0.63000	ON06	HR06	-0.00634	False
IA00924 (MA306310)	2	0.55000	0.46000	16	HR14	-0.00547	False
IA00925 (MA306315)	2	0.82000	0.75000	02E	HR02	-0.01064	False
IA00930 (MA306359)	2	0.62000	0.66000	13E	HR04	0.07667	True
IA00932 (MA306375)	2	0.48000	0.48000	ON13	HR13	0.03525	False
IA00993 (MA310834)	2	0.66000	0.63000	05E	HR18	0.04290	False
IA01019 (MA311277)	2	0.78000	0.74000	11E	HR17	-0.02942	False
IA01071 (MA623063509)	2	0.72000	0.73000	11E	HR16	0.02319	False
IA01080 (MA623654449)	4	1.08000	0.95000	05E	HR21	-0.00814	False
IA01081 (MA623656013)	4	1.08000	0.86000	06E	HR08	-0.01456	False
IA02323 (MA301611A)	2	0.88000	0.83000	04	HR15	-0.00122	False
IA04760 (MA713752330)	2	0.85000	0.77000	ON13	HR11	-0.03802	False
IA04813 (MA735572247)	2	0.75000	0.72000	ON13	HR12	0.02894	False
IA04828 (MA735653938)	2	0.59000	0.51000	ON07	HR10	0.00742	False
IA04844 (MA735735757)	2	0.65000	0.62000	ON05	HR20	0.02165	False

Table 2.7.9
Beta Analysis
Mathematics Grade 4

Item Id	NumScoreCats	Old Mean	New Mean	Old Form	Form	Beta	Flag Beta
IA00789 (MA250543)	5	1.92000	1.66000	06E	HR20	0.01022	False
IA00828 (MA287237)	2	0.78000	0.76000	01B	HR06	-0.02341	False
IA00841 (MA293718)	2	0.78000	0.71000	ON07	HR08	-0.03713	False
IA00861 (MA297629)	2	0.87000	0.89000	ON25	HR21	0.05761	True
IA00869 (MA297988)	2	0.24000	0.18000	ON16	HR16	-0.03097	False
IA00906 (MA301811)	2	0.76000	0.73000	ON09	HR09	-0.00165	False
IA00958 (MA307055)	2	0.57000	0.46000	ON10	HR10	-0.06288	True
IA00961 (MA307081)	2	0.54000	0.53000	ON13	HR13	0.01496	False
IA00963 (MA307085)	2	0.76000	0.67000	ON01	HR15	-0.05160	True
IA01048 (MA311534)	2	0.56000	0.54000	ON12	HR12	0.03423	False
IA01049 (MA311537)	2	0.70000	0.66000	ON18	HR18	-0.00616	False
IA01055 (MA311572)	2	0.64000	0.52000	ON21	HR19	-0.06488	True
IA01057 (MA311581)	5	2.22000	2.21000	04E	HR11	-0.00004	False
IA01093 (MA623879088)	3	1.41000	1.46000	ON14	HR14	0.07731	True
IA02175 (MA286769)	2	0.78000	0.75000	01	HR03	-0.04876	False
IA02819 (MA713583365)	2	0.42000	0.61000	05	HR17	0.21001	True
IA02841 (MA713774890)	2	0.51000	0.44000	21	HR05	-0.05503	True
IA02902 (MA714251321)	2	0.46000	0.39000	14	HR04	-0.04540	False
IA04661 (MA307327)	2	0.83000	0.74000	ON20	HR07	-0.03381	False
IA04965 (MA800867144)	2	0.66000	0.58000	ON10	HR02	-0.02696	False

Table 2.7.10

Beta Analysis

Mathematics Grade 5

Item Id	NumScoreCats	Old Mean	New Mean	Old Form	Form	Beta	Flag Beta
IA00771 (MA204911)	2	0.81000	0.73000	ON08	HR08	-0.02345	False
IA00776 (MA221207)	2	0.70000	0.66000	ON20	HR20	0.02899	False
IA00803 (MA262207)	2	0.76000	0.72000	12E	HR05	0.03116	False
IA00806 (MA272292)	2	0.52000	0.47000	06E	HR23	-0.01825	False
IA00826 (MA287178)	2	0.90000	0.85000	04E	HR06	-0.00493	False
IA00872 (MA298003)	2	0.64000	0.63000	ON07	HR07	0.03025	False
IA00880 (MA298106)	2	0.28000	0.21000	14E	HR04	-0.01759	False
IA00885 (MA299556)	2	0.79000	0.68000	ON18	HR18	-0.03049	False
IA00936 (MA306420)	2	0.76000	0.69000	10E	HR09	-0.02079	False
IA00943 (MA306466)	2	0.76000	0.62000	03E	HR11	0.00688	False
IA00989 (MA307638)	2	0.91000	0.86000	11E	HR12	-0.00454	False
IA01020 (MA311280)	2	0.40000	0.43000	10E	HR13	0.04385	False
IA01028 (MA311333)	2	0.28000	0.20000	05E	HR15	-0.00485	False
IA01029 (MA311337)	2	0.82000	0.83000	13E	HR17	-0.04782	False
IA01032 (MA311366)	5	1.58000	1.54000	ON19	HR19	0.04739	False
IA01149 (MA624347774)	2	0.42000	0.41000	14E	HR16	-0.01730	False
IA01155 (MA624357395)	3	1.08000	0.70000	02E	HR03	-0.06072	True
IA02552 (MA311324)	2	0.43000	0.38000	14	HR14	-0.02583	False
IA02736 (MA704359678)	5	2.18000	1.94000	10	HR02	-0.01704	False
IA04970 (MA800974344)	2	0.70000	0.70000	ON26	HR10	0.07383	True

Table 2.7.11
Beta Analysis
Mathematics Grade 6

Item Id	NumScoreCats	Old Mean	New Mean	Old Form	Form	Beta	Flag Beta
IA00777 (MA221667)	2	0.85000	0.85000	ON10	HR10	0.04206	False
IA00778 (MA221669)	2	0.84000	0.80000	ON11	HR11	0.01113	False
IA00804 (MA264305)	2	0.77000	0.74000	ON17	HR17	0.02724	False
IA00817 (MA280989)	2	0.52000	0.47000	ON21	HR14	0.02774	False
IA00818 (MA282268)	2	0.45000	0.40000	ON05	HR05	0.01294	False
IA00819 (MA282277)	2	0.54000	0.47000	ON06	HR03	-0.00925	False
IA00827 (MA287186)	2	0.70000	0.56000	ON09	HR09	-0.07114	True
IA00845 (MA296349)	2	0.64000	0.56000	ON16	HR16	-0.02768	False
IA00881 (MA298139)	5	1.89000	1.80000	03E	HR03	-0.01475	False
IA00884 (MA298279)	2	0.20000	0.12000	ON15	HR15	-0.02915	False
IA00899 (MA301508)	2	0.37000	0.33000	ON01	HR06	0.02427	False
IA00972 (MA307339)	5	3.02000	2.96000	01E	HR02	0.01129	False
IA00992 (MA309941)	2	0.42000	0.41000	ON02	HR02	0.01412	False
IA01058 (MA311658)	2	0.53000	0.42000	ON13	HR13	-0.04421	False
IA02037 (MA217493)	2	0.64000	0.66000	19	HR03	0.05409	True
IA02597 (MA311693)	2	0.84000	0.78000	18	HR04	-0.02842	False
IA04745 (MA703231515)	3	1.13000	1.00000	ON01	HR03	-0.01071	False
IA04884 (MA736365836)	2	0.73000	0.68000	ON16	HR12	0.01201	False
IA05126 (MA805103779)	2	0.61000	0.55000	ON13	HR07	0.00572	False
IA05135 (MA805171807)	2	0.65000	0.58000	ON20	HR08	0.01415	False

Table 2.7.12
Beta Analysis
Mathematics Grade 7

Item Id	NumScoreCats	Old Mean	New Mean	Old Form	Form	Beta	Flag Beta
IA00796 (MA259267)	2	0.44000	0.44000	O081	HR08	-0.05211	True
IA00831 (MA288414)	2	0.75000	0.72000	O182	HR18	0.00395	False
IA00847 (MA296358)	2	0.46000	0.53000	O171	HR17	-0.01739	False
IA00909 (MA301846)	2	0.90000	0.87000	O131	HR13	-0.00663	False
IA00910 (MA301854)	2	0.28000	0.35000	O071	HR07	0.00177	False
IA00945 (MA306538)	2	0.70000	0.69000	O212	HR21	-0.02017	False
IA00948 (MA306600)	2	0.85000	0.84000	O111	HR11	0.00587	False
IA00949 (MA306605)	2	0.51000	0.49000	O051	HR05	-0.04176	False
IA01004 (MA311073)	2	0.18000	0.17000	O152	HR15	-0.01328	False
IA01006 (MA311093)	2	0.83000	0.85000	O201	HR20	-0.01111	False
IA01011 (MA311109)	2	0.42000	0.39000	O122	HR12	-0.10039	True
IA01016 (MA311125)	2	0.58000	0.55000	O192	HR19	-0.03189	False
IA01017 (MA311135)	2	0.74000	0.75000	O142	HR14	0.02140	False
IA01018 (MA311140)	2	0.37000	0.37000	O102	HR10	0.01138	False
IA01069 (MA316886)	5	1.99000	2.03000	O031	HR03	0.01135	False
IA01097 (MA623950280)	2	0.35000	0.32000	O061	HR06	0.00264	False
IA01108 (MA624149677)	3	0.65000	0.77000	O042	HR04	-0.00988	False
IA02722 (MA703943185)	5	1.78000	1.95000	O022	HR02	0.03399	False
IA04486 (MA227988)	2	0.69000	0.69000	O092	HR09	0.05289	True
IA04538 (MA282218)	2	0.65000	0.69000	O161	HR16	0.04994	False

Table 2.7.13

Beta Analysis

Mathematics Grade 8

Item Id	NumScoreCats	Old Mean	New Mean	Old Form	Form	Beta	Flag Beta
IA00849 (MA296757)	2	0.70000	0.62000	ON17	HR17	-0.00764	False
IA00858 (MA297513)	2	0.84000	0.76000	ON01	HR04	-0.02869	False
IA00864 (MA297652)	5	3.16000	2.81000	02E	HR03	-0.00611	False
IA00865 (MA297656)	2	0.54000	0.53000	ON11	HR11	0.04179	False
IA00903 (MA301674)	2	0.78000	0.73000	ON13	HR13	0.01350	False
IA00905 (MA301702)	2	0.53000	0.44000	ON12	HR07	-0.03148	False
IA00979 (MA307472)	2	0.59000	0.63000	ON20	HR13	0.08385	True
IA00985 (MA307570)	2	0.59000	0.51000	ON18	HR18	-0.02689	False
IA01033 (MA311384)	2	0.64000	0.59000	ON08	HR08	0.00569	False
IA01037 (MA311414)	2	0.46000	0.39000	ON10	HR10	0.00749	False
IA01042 (MA311448)	2	0.69000	0.52000	ON05	HR05	-0.11311	True
IA01044 (MA311463)	2	0.69000	0.64000	ON15	HR15	0.01583	False
IA01066 (MA314812)	5	2.44000	2.22000	01E	HR02	-0.00685	False
IA01125 (MA624247061)	3	0.94000	0.85000	ON14	HR14	0.00126	False
IA02495 (MA309741)	2	0.42000	0.44000	01	HR15	0.05584	True
IA04665 (MA307399)	2	0.55000	0.48000	ON04	HR16	0.00249	False
IA04678 (MA309738)	2	0.43000	0.39000	ON01	HR04	0.00567	False
IA05057 (MA803856437)	2	0.85000	0.83000	ON19	HR12	0.03265	False
IA05059 (MA803856627)	2	0.75000	0.71000	ON18	HR09	0.01726	False
IA05070 (MA804042487)	2	0.36000	0.29000	ON18	HR04	-0.02723	False

Table 2.7.14
Beta Analysis
Mathematics Grade 10

Item Id	NumScoreCats	Old Mean	New Mean	Old Form	Form	Beta	Flag Beta
IA04800 (MA717740737)	2	0.54000	0.40000	ON23	ON11	-0.09150	True
IA04810 (MA735534256)	3	0.75000	0.67000	ON09	ON02	-0.00427	False
IA04819 (MA735579095)	2	0.63000	0.57000	ON03	ON10	0.01611	False
IA04824 (MA735632759)	2	0.51000	0.46000	ON06	ON17	-0.00249	False
IA04842 (MA735734830)	2	0.46000	0.40000	ON09	ON09	-0.02328	False
IA04846 (MA735743236)	2	0.86000	0.76000	ON13	ON10	-0.06256	True
IA04847 (MA735745569)	2	0.48000	0.43000	ON15	ON06	-0.00151	False
IA04871 (MA736059227)	2	0.57000	0.50000	ON05	ON03	-0.00974	False
IA04913 (MA800433428)	2	0.60000	0.56000	ON18	ON11	-0.00701	False
IA04991 (MA801426792)	2	0.36000	0.33000	ON27	ON14	0.00190	False
IA04993 (MA801434971)	2	0.31000	0.22000	ON14	ON07	-0.05312	True
IA04997 (MA801564574)	3	0.82000	0.79000	ON09	ON08	0.04890	False
IA05048 (MA803762212)	2	0.54000	0.47000	ON20	ON16	-0.01434	False
IA05096 (MA804566054)	3	1.35000	1.11000	ON03	ON05	-0.03071	False
IA05117 (MA804678931)	2	0.48000	0.35000	ON11	ON19	-0.10801	True
IA05144 (MA805372590)	2	0.50000	0.41000	ON17	ON20	-0.07884	True
IA05145 (MA805373539)	2	0.30000	0.23000	ON12	ON13	-0.03192	False
IA05147 (MA805376549)	2	0.92000	0.87000	ON27	ON12	-0.03543	False
IA05155 (MA806051920)	2	0.32000	0.29000	ON23	ON18	0.02309	False
IA05165 (MA806383722)	5	1.64000	1.84000	ON01	ON04	0.03945	False
IA05170 (MA806408603)	5	1.62000	1.77000	ON02	ON07	0.06819	True

Table 2.7.15
Beta Analysis
Science Grade 5

Item Id	NumScoreCats	Old Mean	New Mean	Old Form	Form	Beta	Flag Beta
IA05192 (SC264893)	4	0.96000	0.94000	ON16	HR16	0.01587	False
IA05466 (SC628483066)	2	0.88000	0.90000	ON03	HR17	0.03531	False
IA05523 (SC718127878)	2	0.69000	0.67000	ON08	HR08	0.00380	False
IA05526 (SC735264282)	2	0.89000	0.86000	ON02	HR09	0.00379	False
IA05530 (SC735267831)	2	0.80000	0.79000	ON16	HR02	0.00885	False
IA05545 (SC735535118)	2	0.50000	0.47000	ON06	HR19	-0.00531	False
IA05560 (SC736074266)	2	0.79000	0.78000	ON11	HR15	0.02707	False
IA05562 (SC736074942)	3	1.30000	1.26000	ON17	HR06	0.00894	False
IA05628 (SC802729980)	2	0.64000	0.63000	ON06	HR02	0.01969	False
IA05630 (SC802758131)	2	0.79000	0.72000	ON06	HR02	-0.02681	False
IA05631 (SC802758561)	2	0.57000	0.56000	ON06	HR02	0.01096	False
IA05634 (SC802761427)	4	1.06000	0.96000	ON06	HR02	-0.01221	False
IA05657 (SC803732869)	3	0.85000	0.79000	ON10	HR12	-0.00842	False
IA05661 (SC803837124)	2	0.70000	0.67000	ON12	HR14	0.00507	False
IA05662 (SC803844809)	3	1.41000	1.30000	ON18	HR18	-0.01495	False
IA05664 (SC803847645)	2	0.81000	0.76000	ON18	HR06	-0.02747	False
IA05678 (SC804048131)	2	0.89000	0.88000	ON16	HR05	0.00895	False
IA05681 (SC804060300)	2	0.43000	0.37000	ON14	HR13	-0.04778	False
IA05688 (SC804141602)	2	0.87000	0.84000	ON16	HR18	-0.00217	False
IA05702 (SC806382697)	2	0.50000	0.48000	ON13	HR10	0.00691	False

Table 2.7.16
Beta Analysis
Science Grade 8

Item Id	NumScoreCats	Old Mean	New Mean	Old Form	Form	Beta	Flag Beta
IA05243 (SC289702)	2	0.44000	0.32000	0102	HR12	-0.08936	True
IA05245 (SC290144)	2	0.51000	0.53000	0102	HR04	0.05264	True
IA05499 (SC633066301)	2	0.93000	0.91000	ON01	HR05	0.00129	False
IA05522 (SC717662167)	2	0.52000	0.50000	ON14	HR18	0.03137	False
IA05550 (SC735560046)	2	0.34000	0.27000	ON10	HR17	-0.03010	False
IA05551 (SC735569222)	2	0.60000	0.52000	ON13	HR16	-0.04013	False
IA05555 (SC735663104)	2	0.35000	0.34000	ON08	HR03	0.00127	False
IA05581 (SC800285340)	2	0.40000	0.41000	ON11	HR11	0.03559	False
IA05649 (SC803174786)	2	0.70000	0.69000	ON16	HR14	0.00857	False
IA05665 (SC803856876)	2	0.82000	0.82000	ON16	HR13	0.02197	False
IA05675 (SC803981496)	2	0.75000	0.72000	ON08	HR06	-0.00448	False
IA05687 (SC804132888)	3	1.57000	1.48000	ON06	HR10	-0.00621	False
IA05690 (SC804367702)	2	0.49000	0.44000	ON09	HR15	-0.01515	False
IA05693 (SC804372985)	3	1.39000	1.34000	ON12	HR09	0.00174	False
IA05718 (SC807245653)	2	0.78000	0.74000	ON05	HR02	-0.01084	False
IA05720 (SC807247887)	2	0.64000	0.57000	ON06	HR02	-0.04679	False
IA05727 (SC809171062)	2	0.50000	0.48000	ON05	HR02	0.00362	False
IA05729 (SC809178849)	4	1.14000	1.07000	ON06	HR02	-0.00545	False
IA05750 (SC814258458)	4	1.40000	1.40000	ON11	HR07	0.03263	False
IA05777 (SC816343670)	3	1.27000	1.24000	ON15	HR08	0.00948	False

Section 2.8

Final Item Parameters

Table 2.8.1
IRT Parameters for Dichotomous Items
English Language Arts Grade 3

Item ID	Parameters and Measures of Standard Error					
	a	SE(a)	b	SE(b)	c	SE(c)
IA06369 (EL292647)	1.28842	0.00000	-0.64920	0.00000	0.18800	0.00000
IA06370 (EL292648)	1.18671	0.00000	-0.80420	0.00000	0.21620	0.00000
IA06372 (EL292654)	1.03563	0.00000	0.27210	0.00000	0.25560	0.00000
IA06374 (EL292657)	0.42934	0.00000	-0.68960	0.00000	0.08650	0.00000
IA06690 (EL835280082)	0.97748	0.00000	0.43130	0.00000	0.26700	0.00000
IA06692 (EL835281423)	0.33792	0.00000	-0.34300	0.00000	0.02120	0.00000
IA06693 (EL835281675)	0.84456	0.00000	-0.83520	0.00000	0.16040	0.00000
IA06694 (EL835338102)	0.76290	0.00000	-1.23570	0.00000	0.00630	0.00000
IA06695 (EL835338434)	0.85720	0.00000	-1.49850	0.00000	0.05070	0.00000
IA06696 (EL835338750)	0.34080	0.00000	-1.01710	0.00000	0.01790	0.00000
IA06697 (EL835338894)	0.92069	0.00000	-0.66400	0.00000	0.14700	0.00000
IA06698 (EL835339761)	1.30417	0.00000	-1.33490	0.00000	0.21100	0.00000
IA06702 (EL835340904)	0.92116	0.00000	-0.25670	0.00000	0.19310	0.00000
IA06703 (EL835341639)	0.80082	0.00000	0.48240	0.00000	0.21900	0.00000
IA06804 (EL905643350)	0.76055	0.00000	0.43820	0.00000	0.34660	0.00000
IA07224 (EL912460887)	0.92957	0.00000	-0.56090	0.00000	0.18390	0.00000
IA07226 (EL912462780)	0.64356	0.00000	-0.99400	0.00000	0.00680	0.00000
IA07227 (EL912463130)	0.90547	0.00000	-1.16420	0.00000	0.12990	0.00000
IA07228 (EL912463283)	0.83927	0.00000	-0.80270	0.00000	0.15500	0.00000
IA07229 (EL912463417)	1.02475	0.00000	-0.62790	0.00000	0.15220	0.00000
IA07251 (EL912651426)	1.20376	0.00000	-0.16840	0.00000	0.23660	0.00000
IA07352 (EL916150555)	0.85797	0.00000	0.64890	0.00000	0.21620	0.00000
IA07370 (EL916532720)	1.03739	0.00000	-1.54450	0.00000	0.02800	0.00000
IA07373 (EL916535053)	0.54333	0.00000	-1.86090	0.00000	0.04320	0.00000

Table 2.8.2
IRT Parameters for Polytomous Items
English Language Arts Grade 3

Item ID	a	SE(a)	b	SE(b)	d0	SE(d0)	d1	SE(d1)	d2	SE(d2)
	Parameters and Measures of Standard Error									
IA06373 (EL292656)	1.35420	0.00000	-1.26400	0.00000	0.23550	0.00000	-0.23550	0.00000	0.00000	0.00000
IA06683 (EL835251909)	0.75632	0.00000	0.86217	0.00000	2.54487	0.00000	-0.36313	0.00000	-2.18173	0.00000
IA06687 (EL835276438)	0.52257	0.00000	0.75740	0.00000	2.20530	0.00000	-2.20530	0.00000	0.00000	0.00000
IA07207A (EL912362165#SCORE_TRAIT_Conv)	0.93280	0.00847	0.75540	0.01329	2.02080	0.01617	-0.46820	0.02502	-1.55260	0.03511
IA07207D (EL912362165#SCORE_TRAIT_Ideadev)	0.69306	0.00788	1.96473	0.01896	1.76433	0.02277	0.65323	0.03432	-0.67878	0.04846
IA07210 (EL912365258)	0.65685	0.00000	-1.06045	0.00000	0.57355	0.00000	-0.57355	0.00000	0.00000	0.00000
IA07215 (EL912440150)	0.55209	0.00000	-1.16310	0.00000	0.54090	0.00000	-0.54090	0.00000	0.00000	0.00000
IA07374 (EL916535595)	0.54527	0.00000	-1.04020	0.00000	1.90540	0.00000	-1.90540	0.00000	0.00000	0.00000

Item ID	d3	SE(d3)	d4	SE(d4)	d5	SE(d5)
	Parameters and Measures of Standard Error					
IA06683 (EL835251909)	0.00000	0.00000	n/a	n/a	n/a	n/a
IA07207A (EL912362165#SCORE_TRAIT_Conv)	0.00000	0.00000	n/a	n/a	n/a	n/a
IA07207D (EL912362165#SCORE_TRAIT_Ideadev)	-1.73878	0.05610	0.00000	0.00000	n/a	n/a

Table 2.8.3
IRT Parameters for Dichotomous Items
English Language Arts Grade 4

Item ID	Parameters and Measures of Standard Error					
	a	SE(a)	b	SE(b)	c	SE(c)
IA03812 (EL800937934)	1.54421	0.00000	-0.10870	0.00000	0.20220	0.00000
IA03813 (EL800938150)	0.56479	0.00000	0.15890	0.00000	0.12200	0.00000
IA03815 (EL800939230)	0.54721	0.00000	-1.05410	0.00000	0.03000	0.00000
IA03817 (EL800940688)	1.10841	0.00000	-1.31480	0.00000	0.07770	0.00000
IA03818 (EL800940863)	1.30547	0.00000	-1.19330	0.00000	0.15620	0.00000
IA03819 (EL800941423)	0.67431	0.00000	-1.32730	0.00000	0.08860	0.00000
IA03820 (EL800941788)	0.82275	0.00000	-0.68260	0.00000	0.24340	0.00000
IA03821 (EL800943061)	1.26531	0.00000	-1.35460	0.00000	0.11390	0.00000
IA03851 (EL804278958)	0.80200	0.00000	-0.58430	0.00000	0.08700	0.00000
IA06481 (EL307617)	1.03710	0.00000	-1.25970	0.00000	0.10530	0.00000
IA06484 (EL307622)	1.07860	0.00000	-0.12170	0.00000	0.24350	0.00000
IA06485 (EL307624)	0.77666	0.00000	-0.99930	0.00000	0.12070	0.00000
IA06818 (EL909145470)	1.19459	0.00000	-2.11950	0.00000	0.10750	0.00000
IA06820 (EL909147325)	0.72181	0.00000	0.45440	0.00000	0.24660	0.00000
IA06824 (EL909150609)	0.66867	0.00000	-1.17800	0.00000	0.18120	0.00000
IA06825 (EL909151025)	0.72816	0.00000	0.54560	0.00000	0.17030	0.00000
IA06832 (EL909155188)	0.23439	0.00000	-2.46600	0.00000	0.06590	0.00000
IA06834 (EL909156962)	0.84503	0.00000	-0.15680	0.00000	0.28310	0.00000
IA06835 (EL909157777)	0.65309	0.00000	0.29570	0.00000	0.23770	0.00000
IA07170 (EL911976285)	0.68977	0.00000	0.82520	0.00000	0.17650	0.00000
IA07293 (EL914243985)	0.61317	0.00000	-1.08110	0.00000	0.02540	0.00000
IA07295 (EL914273301)	1.20741	0.00000	-0.70270	0.00000	0.20160	0.00000
IA07300 (EL914444197)	1.03469	0.00000	-0.33700	0.00000	0.19420	0.00000
IA07301 (EL914444576)	0.65344	0.00000	0.83030	0.00000	0.22830	0.00000

Table 2.8.4
IRT Parameters for Polytomous Items
English Language Arts Grade 4

Item ID	Parameters and Measures of Standard Error									
	a	SE(a)	b	SE(b)	d0	SE(d0)	d1	SE(d1)	d2	SE(d2)
IA03810 (EL800853520)	0.95608	0.00000	-1.30915	0.00000	0.37905	0.00000	-0.37905	0.00000	0.00000	0.00000
IA03811 (EL800937262)	0.31323	0.00000	-2.42025	0.00000	2.87685	0.00000	-2.87685	0.00000	0.00000	0.00000
IA03825 (EL800957624)	0.78289	0.00000	0.23893	0.00000	1.79953	0.00000	-0.06997	0.00000	-1.72957	0.00000
IA06815A (EL909132428#SCORE_TRAIT_Conv)	1.17925	0.01123	0.05967	0.00756	1.37937	0.01123	-0.17383	0.01401	-1.20553	0.01906
IA06815D (EL909132428#SCORE_TRAIT_Ideadev)	1.00470	0.01023	0.82495	0.00953	1.63415	0.01238	0.69745	0.01628	-0.42675	0.02189
IA06829 (EL909153399)	0.57343	0.00000	-0.70540	0.00000	0.48810	0.00000	-0.48810	0.00000	0.00000	0.00000
IA07263 (EL913040076)	0.59671	0.00000	-0.96545	0.00000	1.03375	0.00000	-1.03375	0.00000	0.00000	0.00000
IA07281 (EL913342853)	0.55996	0.00000	-0.34750	0.00000	1.37640	0.00000	-1.37640	0.00000	0.00000	0.00000

Item ID	Parameters and Measures of Standard Error					
	d3	SE(d3)	d4	SE(d4)	d5	SE(d5)
IA03825 (EL800957624)	0.00000	0.00000	n/a	n/a	n/a	n/a
IA06815A (EL909132428#SCORE_TRAIT_Conv)	0.00000	0.00000	n/a	n/a	n/a	n/a
IA06815D (EL909132428#SCORE_TRAIT_Ideadev)	-1.90485	0.03034	0.00000	0.00000	n/a	n/a

Table 2.8.5
IRT Parameters for Dichotomous Items
English Language Arts Grade 5

Item ID	Parameters and Measures of Standard Error					
	a	SE(a)	b	SE(b)	c	SE(c)
IA03926 (EL806707883)	0.69283	0.00000	-1.84870	0.00000	0.05720	0.00000
IA03927 (EL806708176)	0.61922	0.00000	1.04040	0.00000	0.20450	0.00000
IA03930 (EL806709102)	1.16149	0.00000	-0.01970	0.00000	0.08190	0.00000
IA03931 (EL806709302)	0.32246	0.00000	-1.07250	0.00000	0.00300	0.00000
IA03932 (EL806709547)	0.94315	0.00000	-2.38030	0.00000	0.03770	0.00000
IA03933 (EL806709790)	1.08724	0.00000	-1.41830	0.00000	0.16050	0.00000
IA03934 (EL806710293)	0.90647	0.00000	-0.33050	0.00000	0.16620	0.00000
IA03938 (EL806712207)	1.19624	0.00000	-1.74490	0.00000	0.21410	0.00000
IA04462 (EL827636609)	0.97078	0.00000	-0.55900	0.00000	0.27600	0.00000
IA06434 (EL302392)	1.22863	0.00000	-1.98830	0.00000	0.13670	0.00000
IA06435 (EL302393)	1.62169	0.00000	-1.80360	0.00000	0.12220	0.00000
IA06440 (EL302401)	0.86320	0.00000	-1.28290	0.00000	0.20450	0.00000
IA06441 (EL302402)	0.54885	0.00000	-1.45450	0.00000	0.00970	0.00000
IA06661 (EL834972269)	1.00841	0.00000	-0.61200	0.00000	0.15660	0.00000
IA06662 (EL834972500)	0.94674	0.00000	-1.57130	0.00000	0.02870	0.00000
IA06665 (EL834976700)	0.90018	0.00000	-1.18980	0.00000	0.17150	0.00000
IA06666 (EL834977047)	1.03804	0.00000	-1.51720	0.00000	0.11470	0.00000
IA06667 (EL834977330)	0.57266	0.00000	-1.11420	0.00000	0.00740	0.00000
IA06669 (EL834978026)	0.94250	0.00000	-1.00050	0.00000	0.14100	0.00000
IA06671 (EL834978663)	0.85103	0.00000	-1.04010	0.00000	0.13510	0.00000
IA06672 (EL834979059)	0.63310	0.00000	-1.81080	0.00000	0.03230	0.00000
IA06673 (EL834979779)	0.96673	0.00000	-1.15710	0.00000	0.14010	0.00000
IA07231 (EL912500446)	0.66226	0.00000	-0.49580	0.00000	0.14110	0.00000
IA07238 (EL912579695)	0.97978	0.00000	-1.33460	0.00000	0.06260	0.00000

Table 2.8.6
IRT Parameters for Polytomous Items
English Language Arts Grade 5

Item ID	Parameters and Measures of Standard Error									
	a	SE(a)	b	SE(b)	d0	SE(d0)	d1	SE(d1)	d2	SE(d2)
IA03925 (EL806706594)	0.80065	0.00000	-1.44365	0.00000	0.27605	0.00000	-0.27605	0.00000	0.00000	0.00000
IA03947A (EL806746086#SCORE_TRAIT_Conv)	1.21111	0.01005	0.28040	0.00766	1.73400	0.01115	-0.19660	0.01252	-1.53740	0.02058
IA03947D (EL806746086#SCORE_TRAIT_Ideadev)	1.19289	0.00982	1.19028	0.01164	2.41958	0.01384	0.68818	0.01541	-0.65533	0.02279
IA03950 (EL806756112)	0.64280	0.00000	-0.31675	0.00000	1.22185	0.00000	-1.22185	0.00000	0.00000	0.00000
IA06654A (EL834856783#SCORE_TRAIT_Conv)	1.17343	0.01023	0.13213	0.00753	1.39743	0.01077	-0.30137	0.01599	-1.09607	0.01759
IA06654D (EL834856783#SCORE_TRAIT_Ideadev)	1.01646	0.01041	1.02170	0.00886	0.98260	0.01444	0.64050	0.01811	-0.15420	0.02015
IA06655 (EL834950831)	0.79259	0.00000	-1.91300	0.00000	0.96530	0.00000	-0.96530	0.00000	0.00000	0.00000
IA06657 (EL834952362)	0.59882	0.00000	-0.48295	0.00000	0.70025	0.00000	-0.70025	0.00000	0.00000	0.00000
IA07243 (EL912584876)	0.78865	0.00000	-1.14610	0.00000	0.19940	0.00000	-0.19940	0.00000	0.00000	0.00000

Item ID	Parameters and Measures of Standard Error					
	d3	SE(d3)	d4	SE(d4)	d5	SE(d5)
IA03947A (EL806746086#SCORE_TRAIT_Conv)	0.00000	0.00000	n/a	n/a	n/a	n/a
IA03947D (EL806746086#SCORE_TRAIT_Ideadev)	-2.45243	0.04195	0.00000	0.00000	n/a	n/a
IA06654A (EL834856783#SCORE_TRAIT_Conv)	0.00000	0.00000	n/a	n/a	n/a	n/a
IA06654D (EL834856783#SCORE_TRAIT_Ideadev)	-1.46890	0.02502	0.00000	0.00000	n/a	n/a

Table 2.8.7
IRT Parameters for Dichotomous Items
English Language Arts Grade 6

Item ID	Parameters and Measures of Standard Error					
	a	SE(a)	b	SE(b)	c	SE(c)
IA06503 (EL308506)	0.56402	0.00000	0.55000	0.00000	0.07870	0.00000
IA06505 (EL308510)	0.82481	0.00000	-0.22060	0.00000	0.16090	0.00000
IA06506 (EL308512)	0.62563	0.00000	-1.61270	0.00000	0.05230	0.00000
IA06507 (EL308513)	0.93233	0.00000	0.04470	0.00000	0.31040	0.00000
IA06510 (EL308518)	1.14638	0.00000	-1.62360	0.00000	0.25400	0.00000
IA06712 (EL835402993)	0.42698	0.00000	-0.03700	0.00000	0.21070	0.00000
IA06715 (EL835415824)	0.68765	0.00000	-1.11870	0.00000	0.17610	0.00000
IA06716 (EL835417652)	0.48995	0.00000	-1.70580	0.00000	0.01340	0.00000
IA06717 (EL835419727)	0.94474	0.00000	-0.71160	0.00000	0.24740	0.00000
IA06719 (EL835420555)	0.66590	0.00000	-1.36500	0.00000	0.14270	0.00000
IA06722 (EL835421418)	0.97978	0.00000	-1.31620	0.00000	0.33630	0.00000
IA06723 (EL835421936)	0.37166	0.00000	-0.95470	0.00000	0.03110	0.00000
IA06725 (EL835422818)	0.53416	0.00000	-1.30540	0.00000	0.14390	0.00000
IA06789 (EL903544223)	0.69442	0.00000	-1.95000	0.00000	0.10970	0.00000
IA07271 (EL913137826)	0.65844	0.00000	-0.43310	0.00000	0.18740	0.00000
IA07274 (EL913146798)	0.55338	0.00000	-0.29710	0.00000	0.06830	0.00000
IA07275 (EL913147467)	0.93880	0.00000	-0.69460	0.00000	0.32050	0.00000
IA07276 (EL913177923)	0.63063	0.00000	-2.33890	0.00000	0.00900	0.00000
IA07278 (EL913179570)	0.44680	0.00000	-1.52580	0.00000	0.04080	0.00000
IA07367 (EL916473284)	0.80917	0.00000	0.50200	0.00000	0.12380	0.00000
IA07403 (EL917825386)	1.02081	0.00000	-0.41990	0.00000	0.23070	0.00000
IA07409 (EL917861668)	0.48907	0.00000	-2.56720	0.00000	0.01490	0.00000
IA07415 (EL918180282)	0.49212	0.00000	-0.60810	0.00000	0.21360	0.00000
IA07441 (EL920039686)	1.00952	0.00000	-2.06870	0.00000	0.21690	0.00000

Table 2.8.8
IRT Parameters for Polytomous Items
English Language Arts Grade 6

Item ID	Parameters and Measures of Standard Error									
	a	SE(a)	b	SE(b)	d0	SE(d0)	d1	SE(d1)	d2	SE(d2)
IA06711 (EL835401351)	0.49812	0.00000	-1.66635	0.00000	1.37265	0.00000	-1.37265	0.00000	0.00000	0.00000
IA06720 (EL835420875)	0.54062	0.00000	-0.79505	0.00000	1.14725	0.00000	-1.14725	0.00000	0.00000	0.00000
IA07087A (EL911525969#SCORE_TRAIT_Conv)	1.15032	0.00852	-0.10730	0.00566	1.51150	0.00963	-0.06410	0.01038	-1.44740	0.01354
IA07087D (EL911525969#SCORE_TRAIT_Ideadev)	1.07202	0.00782	0.95276	0.00854	3.27116	0.01346	1.26426	0.01248	-0.13964	0.01465
IA07267A (EL913132900#SCORE_TRAIT_Conv)	1.05603	0.01117	-0.18923	0.00943	1.64127	0.01550	-0.02613	0.01696	-1.61513	0.02320
IA07267D (EL913132900#SCORE_TRAIT_Ideadev)	1.05203	0.01076	1.11532	0.01059	3.25872	0.01747	1.27652	0.01763	-0.26668	0.02307
IA07268 (EL913133585)	0.55750	0.00000	-0.52555	0.00000	0.64155	0.00000	-0.64155	0.00000	0.00000	0.00000
IA07269 (EL913135249)	0.39906	0.00000	-1.80390	0.00000	0.45520	0.00000	-0.45520	0.00000	0.00000	0.00000
IA07365 (EL916444331)	0.59342	0.00000	-0.54095	0.00000	1.41425	0.00000	-1.41425	0.00000	0.00000	0.00000

Item ID	Parameters and Measures of Standard Error					
	d3	SE(d3)	d4	SE(d4)	d5	SE(d5)
IA07087A (EL911525969#SCORE_TRAIT_Conv)	0.00000	0.00000	n/a	n/a	n/a	n/a
IA07087D (EL911525969#SCORE_TRAIT_Ideadev)	-1.50604	0.01858	-2.88974	0.03593	0.00000	0.00000
IA07267A (EL913132900#SCORE_TRAIT_Conv)	0.00000	0.00000	n/a	n/a	n/a	n/a
IA07267D (EL913132900#SCORE_TRAIT_Ideadev)	-1.53988	0.02478	-2.72868	0.04003	0.00000	0.00000

Table 2.8.9
IRT Parameters for Dichotomous Items
English Language Arts Grade 7

Item ID	Parameters and Measures of Standard Error					
	a	SE(a)	b	SE(b)	c	SE(c)
IA04337 (EL811653297)	0.79759	0.00000	-1.76150	0.00000	0.07500	0.00000
IA04338 (EL811653729)	0.45056	0.00000	-1.26350	0.00000	0.04510	0.00000
IA04340 (EL811659059)	0.85979	0.00000	-0.60050	0.00000	0.18390	0.00000
IA04342 (EL811661018)	0.41470	0.00000	-1.74630	0.00000	0.01930	0.00000
IA04348 (EL811720784)	0.60388	0.00000	-0.15710	0.00000	0.10860	0.00000
IA04349 (EL811721117)	0.83721	0.00000	0.30480	0.00000	0.30510	0.00000
IA04353 (EL811723366)	0.39830	0.00000	-1.86950	0.00000	0.00250	0.00000
IA04356 (EL811734832)	0.67643	0.00000	-1.66310	0.00000	0.02540	0.00000
IA04358 (EL811735509)	0.74239	0.00000	0.11520	0.00000	0.17670	0.00000
IA06539 (EL314056)	0.66878	0.00000	-1.05080	0.00000	0.17880	0.00000
IA06541 (EL314058)	1.20335	0.00000	-0.13100	0.00000	0.25800	0.00000
IA06544 (EL314063)	1.23251	0.00000	-0.81260	0.00000	0.23910	0.00000
IA06873 (EL909281464)	1.03186	0.00000	-1.31380	0.00000	0.30280	0.00000
IA06883 (EL909375770)	0.70200	0.00000	-0.25850	0.00000	0.10450	0.00000
IA06898 (EL909470766)	0.78230	0.00000	-1.88140	0.00000	0.06970	0.00000
IA06899 (EL909471269)	0.52357	0.00000	-0.30740	0.00000	0.23150	0.00000
IA06900 (EL909471961)	0.44356	0.00000	-1.82150	0.00000	0.01880	0.00000
IA06921 (EL909747660)	0.90441	0.00000	-1.41260	0.00000	0.15910	0.00000
IA06922 (EL909748887)	0.81264	0.00000	0.41900	0.00000	0.26340	0.00000
IA06929 (EL909752861)	0.83369	0.00000	-1.83580	0.00000	0.07900	0.00000
IA06937 (EL909764274)	0.46696	0.00000	-0.41160	0.00000	0.22020	0.00000
IA07084 (EL911458693)	0.56796	0.00000	-0.44940	0.00000	0.09450	0.00000
IA07089 (EL911550107)	0.52052	0.00000	-0.20660	0.00000	0.21370	0.00000
IA07217 (EL912448606)	0.50200	0.00000	-0.49540	0.00000	0.16690	0.00000
IA07218 (EL912450318)	1.33439	0.00000	0.42200	0.00000	0.26810	0.00000
IA07342 (EL916135715)	0.44832	0.00000	-0.24550	0.00000	0.10940	0.00000

Table 2.8.10

IRT Parameters for Polytomous Items

English Language Arts Grade 7

Item ID	Parameters and Measures of Standard Error									
	a	SE(a)	b	SE(b)	d0	SE(d0)	d1	SE(d1)	d2	SE(d2)
IA04341 (EL811660409)	0.61240	0.00000	-0.87865	0.00000	0.38885	0.00000	-0.38885	0.00000	0.00000	0.00000
IA04359 (EL811735935)	0.68730	0.00000	-0.71125	0.00000	1.64285	0.00000	-1.64285	0.00000	0.00000	0.00000
IA04362A (EL811753816#SCORE_TRAIT_Conv)	1.51311	0.01229	-0.33460	0.00490	1.28430	0.00871	-0.00240	0.00930	-1.28190	0.01123
IA04362D (EL811753816#SCORE_TRAIT_Ideadev)	1.46972	0.01141	0.67052	0.00546	2.50112	0.00969	1.00252	0.00977	-0.26708	0.01139
IA06924 (EL909749262)	0.56849	0.00000	-1.27275	0.00000	0.16035	0.00000	-0.16035	0.00000	0.00000	0.00000
IA06925A (EL909750218#SCORE_TRAIT_Conv)	1.35750	0.01088	-0.61847	0.00502	1.36943	0.01031	-0.07357	0.00987	-1.29587	0.00996
IA06925D (EL909750218#SCORE_TRAIT_Ideadev)	1.26725	0.00952	0.42786	0.00611	2.74536	0.01241	1.08046	0.01105	-0.07944	0.01063
IA07209 (EL912364723)	0.54145	0.00000	-0.38300	0.00000	1.07670	0.00000	-1.07670	0.00000	0.00000	0.00000

Item ID	Parameters and Measures of Standard Error					
	d3	SE(d3)	d4	SE(d4)	d5	SE(d5)
IA04362A (EL811753816#SCORE_TRAIT_Conv)	0.00000	0.00000	n/a	n/a	n/a	n/a
IA04362D (EL811753816#SCORE_TRAIT_Ideadev)	-1.19818	0.01273	-2.03838	0.02035	0.00000	0.00000
IA06925A (EL909750218#SCORE_TRAIT_Conv)	0.00000	0.00000	n/a	n/a	n/a	n/a
IA06925D (EL909750218#SCORE_TRAIT_Ideadev)	-1.21984	0.01232	-2.52654	0.02409	0.00000	0.00000

Table 2.8.11
IRT Parameters for Dichotomous Items
English Language Arts Grade 8

Item ID	Parameters and Measures of Standard Error					
	a	SE(a)	b	SE(b)	c	SE(c)
IA06511 (EL309393)	0.42916	0.00000	-0.11330	0.00000	0.05990	0.00000
IA06513 (EL309397)	0.47143	0.00000	-1.46000	0.00000	0.05610	0.00000
IA06514 (EL309401)	0.73157	0.00000	-0.57890	0.00000	0.17500	0.00000
IA06732 (EL836438880)	0.86508	0.00000	-1.43520	0.00000	0.24020	0.00000
IA06737 (EL836456432)	0.41752	0.00000	-1.79290	0.00000	0.04850	0.00000
IA06740 (EL836459385)	0.63539	0.00000	-1.96190	0.00000	0.03330	0.00000
IA06741 (EL836461762)	0.71276	0.00000	-1.27730	0.00000	0.12220	0.00000
IA06742 (EL836463708)	0.33880	0.00000	0.03010	0.00000	0.04440	0.00000
IA06743 (EL836464683)	0.83116	0.00000	-1.86780	0.00000	0.06000	0.00000
IA06753 (EL836547482)	0.76226	0.00000	-2.25930	0.00000	0.01780	0.00000
IA06768 (EL900353074)	0.87801	0.00000	-1.52930	0.00000	0.18250	0.00000
IA06801 (EL904652080)	0.28983	0.00000	-2.60500	0.00000	0.01900	0.00000
IA07092 (EL911558166)	0.43422	0.00000	-2.72540	0.00000	0.02270	0.00000
IA07124 (EL911657712)	0.38319	0.00000	-2.11950	0.00000	0.01380	0.00000
IA07134 (EL911763814)	0.82628	0.00000	-1.99110	0.00000	0.06200	0.00000
IA07135 (EL911764401)	0.81793	0.00000	-1.09580	0.00000	0.28020	0.00000
IA07140 (EL911862506)	0.80123	0.00000	-2.67850	0.00000	0.06910	0.00000
IA07167 (EL911946437)	0.80964	0.00000	-1.16370	0.00000	0.18250	0.00000
IA07284 (EL913447634)	0.42845	0.00000	-0.44740	0.00000	0.21880	0.00000
IA07288 (EL913755133)	0.69053	0.00000	-1.79360	0.00000	0.20990	0.00000
IA07296 (EL914324180)	0.31770	0.00000	0.42600	0.00000	0.27140	0.00000
IA07299 (EL914376798)	0.30864	0.00000	0.42260	0.00000	0.24990	0.00000
IA07393 (EL917559756)	0.79953	0.00000	-0.75140	0.00000	0.21790	0.00000
IA07429 (EL919039373)	0.54156	0.00000	-0.16030	0.00000	0.25700	0.00000

Table 2.8.12
IRT Parameters for Polytomous Items
English Language Arts Grade 8

Item ID	Parameters and Measures of Standard Error									
	a	SE(a)	b	SE(b)	d0	SE(d0)	d1	SE(d1)	d2	SE(d2)
IA06728A (EL836248600#SCORE_TRAIT_Conv)	1.74633	0.01246	-0.66283	0.00347	1.01787	0.00737	0.06687	0.00650	-1.08473	0.00693
IA06728D (EL836248600#SCORE_TRAIT_Ideadev)	1.67378	0.01099	0.36480	0.00408	2.19020	0.00819	1.10050	0.00709	-0.01250	0.00726
IA06735 (EL836448634)	0.52728	0.00000	-1.19760	0.00000	0.94040	0.00000	-0.94040	0.00000	0.00000	0.00000
IA06736 (EL836455548)	0.63768	0.00000	-1.03750	0.00000	1.17080	0.00000	-1.17080	0.00000	0.00000	0.00000
IA07125 (EL911659849)	0.81258	0.00000	-2.45295	0.00000	0.21645	0.00000	-0.21645	0.00000	0.00000	0.00000
IA07136A (EL911774388#SCORE_TRAIT_Conv)	1.78789	0.01752	-0.57950	0.00579	1.09140	0.01112	-0.05460	0.01121	-1.03680	0.01234
IA07136D (EL911774388#SCORE_TRAIT_Ideadev)	1.70623	0.01587	0.38846	0.00493	2.16676	0.01151	0.94926	0.01115	-0.07774	0.01224
IA07285 (EL913448483)	0.72205	0.00000	-0.65775	0.00000	1.23045	0.00000	-1.23045	0.00000	0.00000	0.00000
IA07289 (EL913761016)	0.51981	0.00000	-1.65520	0.00000	1.49860	0.00000	-1.49860	0.00000	0.00000	0.00000

Item ID	Parameters and Measures of Standard Error					
	d3	SE(d3)	d4	SE(d4)	d5	SE(d5)
IA06728A (EL836248600#SCORE_TRAIT_Conv)	0.00000	0.00000	n/a	n/a	n/a	n/a
IA06728D (EL836248600#SCORE_TRAIT_Ideadev)	-1.07840	0.00836	-2.19980	0.01613	0.00000	0.00000
IA07136A (EL911774388#SCORE_TRAIT_Conv)	0.00000	0.00000	n/a	n/a	n/a	n/a
IA07136D (EL911774388#SCORE_TRAIT_Ideadev)	-1.08584	0.00957	-1.95244	0.01522	0.00000	0.00000

Table 2.8.13
IRT Parameters for Dichotomous Items
English Language Arts Grade 10

Item ID	Parameters and Measures of Standard Error					
	a	SE(a)	b	SE(b)	c	SE(c)
IA06309 (EL012153811)	0.61129	0.00000	-1.69420	0.00000	0.08260	0.00000
IA06310 (EL012157583)	0.60694	0.00000	-0.71210	0.00000	0.08790	0.00000
IA06314 (EL012733933)	0.85279	0.00000	-0.83640	0.00000	0.27760	0.00000
IA06320 (EL013253097)	0.54932	0.00000	-1.76810	0.00000	0.06190	0.00000
IA06321 (EL013255897)	1.06831	0.00000	0.10830	0.00000	0.36200	0.00000
IA06323 (EL013257840)	0.52493	0.00000	-3.17880	0.00000	0.03190	0.00000
IA06324 (EL013258596)	0.96379	0.00000	-0.36760	0.00000	0.27680	0.00000
IA06327 (EL013353391)	0.56138	0.00000	-0.10290	0.00000	0.31700	0.00000
IA06340 (EL015041902)	0.79735	0.00000	-1.76050	0.00000	0.20480	0.00000
IA06917 (EL909729691)	1.10735	0.00000	-1.23380	0.00000	0.17590	0.00000
IA06930 (EL909753277)	0.80265	0.00000	-0.86800	0.00000	0.16700	0.00000
IA06933 (EL909754342)	1.46531	0.00000	-1.37260	0.00000	0.22070	0.00000
IA06936 (EL909755882)	0.84109	0.00000	-1.33360	0.00000	0.10550	0.00000
IA06984 (EL910540421)	0.52163	0.00000	-1.49470	0.00000	0.17630	0.00000
IA06990 (EL910641090)	1.69559	0.00000	-1.21380	0.00000	0.23710	0.00000
IA07008 (EL910747872)	0.71652	0.00000	-1.26400	0.00000	0.01410	0.00000
IA07035 (EL910857457)	0.90970	0.00000	-2.01080	0.00000	0.07720	0.00000
IA07044 (EL910962538)	0.89277	0.00000	-2.19500	0.00000	0.02070	0.00000
IA07046 (EL911153175)	0.26531	0.00000	-0.14790	0.00000	0.02890	0.00000
IA07055 (EL911243156)	1.00088	0.00000	-1.84970	0.00000	0.13520	0.00000
IA07056 (EL911243823)	0.47460	0.00000	-2.30180	0.00000	0.01040	0.00000

Table 2.8.14
IRT Parameters for Polytomous Items
English Language Arts Grade 10

Item ID	Parameters and Measures of Standard Error									
	a	SE(a)	b	SE(b)	d0	SE(d0)	d1	SE(d1)	d2	SE(d2)
IA06311 (EL012160579)	0.55791	0.00000	-0.82870	0.00000	1.09490	0.00000	-1.09490	0.00000	0.00000	0.00000
IA06315A (EL013138637#SCORE_TRAIT_Conv)	3.03804	0.02992	-0.99407	0.00414	0.74503	0.00822	-0.00647	0.00788	-0.73857	0.00874
IA06315D (EL013138637#SCORE_TRAIT_Ideadev)	2.58366	0.02222	-0.09594	0.00388	1.56756	0.00862	0.87676	0.00862	0.14506	0.00962
IA06338 (EL014953733)	0.58513	0.00000	-1.30090	0.00000	1.52610	0.00000	-1.52610	0.00000	0.00000	0.00000
IA06343 (EL019560241)	0.46132	0.00000	-0.66210	0.00000	0.90070	0.00000	-0.90070	0.00000	0.00000	0.00000
IA06913 (EL909560185)	0.77096	0.00000	-2.44225	0.00000	0.85685	0.00000	-0.85685	0.00000	0.00000	0.00000
IA06918 (EL909731553)	0.75450	0.00000	-0.89825	0.00000	0.38755	0.00000	-0.38755	0.00000	0.00000	0.00000
IA06983A (EL910467723#SCORE_TRAIT_Conv)	2.24915	0.02328	-1.23397	0.00712	0.80743	0.01482	-0.01197	0.01465	-0.79547	0.01319
IA06983D (EL910467723#SCORE_TRAIT_Ideadev)	1.97090	0.01799	-0.34194	0.00540	1.73976	0.01566	0.92046	0.01538	0.10036	0.01362
IA07039 (EL910860957)	0.84198	0.00000	-1.18835	0.00000	0.10755	0.00000	-0.10755	0.00000	0.00000	0.00000
IA07041 (EL910938823)	0.74139	0.00000	-2.19440	0.00000	1.11300	0.00000	-1.11300	0.00000	0.00000	0.00000

Item ID	Parameters and Measures of Standard Error					
	d3	SE(d3)	d4	SE(d4)	d5	SE(d5)
IA06315A (EL013138637#SCORE_TRAIT_Conv)	0.00000	0.00000	n/a	n/a	n/a	n/a
IA06315D (EL013138637#SCORE_TRAIT_Ideadev)	-0.55004	0.00543	-2.03934	0.01347	0.00000	0.00000
IA06983A (EL910467723#SCORE_TRAIT_Conv)	0.00000	0.00000	n/a	n/a	n/a	n/a
IA06983D (EL910467723#SCORE_TRAIT_Ideadev)	-0.70344	0.00703	-2.05714	0.01262	0.00000	0.00000

Table 2.8.15 IRT Parameters for Dichotomous Items—Mathematics Grade 3

Item ID	Parameters and Measures of Standard Error					
	a	SE(a)	b	SE(b)	c	SE(c)
IA00928 (MA306346)	1.24495	0.01662	-0.11415	0.00985	0.04240	0.00350
IA02348 (MA303411)	1.16326	0.02326	0.45257	0.01306	0.20110	0.00460
IA02506 (MA310835)	1.26178	0.01822	-0.51141	0.01273	0.09020	0.00590
IA04623 (MA303418)	0.93350	0.01492	-0.26878	0.01627	0.07170	0.00670
IA04682 (MA310877)	0.64882	0.02114	1.09335	0.02457	0.21820	0.00710
IA04818 (MA735579087)	1.12444	0.01896	0.32561	0.01162	0.10210	0.00420
IA04840 (MA735732140)	0.82409	0.01731	-1.40090	0.04516	0.14470	0.02180
IA07796 (MA900371208)	0.75674	0.01901	0.42911	0.02302	0.21200	0.00770
IA07803 (MA900374280)	1.17511	0.02310	-0.65486	0.02192	0.31480	0.00930
IA07804 (MA900374565)	0.71563	0.01482	-0.68386	0.03553	0.11260	0.01430
IA07812 (MA900379786)	1.54068	0.03973	1.13796	0.01195	0.17950	0.00280
IA07826 (MA900445883)	0.99293	0.01769	-0.00468	0.01638	0.17260	0.00640
IA07850 (MA900571833)	0.99824	0.02114	-0.68774	0.02756	0.29090	0.01120
IA07851 (MA900574704)	0.77830	0.01907	-1.31778	0.05656	0.28280	0.02250
IA08098 (MA902576979)	0.98316	0.02353	0.80058	0.01516	0.20340	0.00470
IA10310 (MA264568)	0.85441	0.01625	-1.01925	0.03520	0.22800	0.01500
IA00929 (MA306355)	0.82791	0.01020	-1.59848	0.01494	0.00000	0.00000
IA02686 (MA703080328)	0.68079	0.00760	0.84618	0.01284	0.00000	0.00000
IA04636 (MA306288)	1.20193	0.01179	-0.01830	0.00764	0.00000	0.00000
IA04638 (MA306339)	0.73544	0.00813	-0.47688	0.01029	0.00000	0.00000
IA04684 (MA310895)	0.51057	0.00653	0.18349	0.01240	0.00000	0.00000
IA04832 (MA735659609)	0.70299	0.00882	-1.60568	0.01638	0.00000	0.00000
IA04833 (MA735662802)	0.92165	0.01009	-1.17897	0.01140	0.00000	0.00000
IA04854 (MA735767424)	0.76917	0.00834	-0.58491	0.01018	0.00000	0.00000
IA04864 (MA736029388)	0.87210	0.00914	-0.68674	0.00963	0.00000	0.00000
IA07757 (MA834448527)	0.73050	0.01004	-2.33268	0.02358	0.00000	0.00000
IA07798 (MA900371363)	0.45469	0.00627	0.52441	0.01505	0.00000	0.00000
IA07809 (MA900376906)	0.90237	0.00940	-0.48230	0.00908	0.00000	0.00000
IA07818 (MA900430931)	0.66050	0.00797	0.82504	0.01306	0.00000	0.00000
IA07822 (MA900437563)	0.79594	0.00876	-0.12146	0.00930	0.00000	0.00000
IA07825 (MA900440136)	0.57627	0.00690	-0.14703	0.01107	0.00000	0.00000
IA07854 (MA900578884)	0.64133	0.00744	0.07656	0.01052	0.00000	0.00000
IA07998 (MA901139069)	0.84464	0.01041	-1.35829	0.01339	0.00000	0.00000
IA08064 (MA902238195)	0.38501	0.00611	-1.67984	0.02657	0.00000	0.00000
IA08224 (MA905135964)	0.28011	0.00563	1.56134	0.03664	0.00000	0.00000
IA10305 (MA260575)	0.72206	0.00818	-1.16115	0.01339	0.00000	0.00000

Table 2.8.16
IRT Parameters for Polytomous Items
Mathematics Grade 3

Item ID	Parameters and Measures of Standard Error									
	a	SE(a)	b	SE(b)	d0	SE(d0)	d1	SE(d1)	d2	SE(d2)
IA02172 (MA286752A)	1.00536	0.00850	0.73472	0.00693	1.21624	0.01099	0.10028	0.01151	-1.31653	0.01799
IA04859 (MA735951978)	1.14010	0.00924	0.07870	0.00546	1.15573	0.01078	-0.05022	0.00957	-1.10552	0.01224
IA07567 (MA297478A)	0.83604	0.00791	-1.23063	0.00766	0.97000	0.01930	-0.08054	0.01383	-0.88946	0.01188
IA07572 (MA300753A)	1.08115	0.00882	-0.46009	0.00521	0.85813	0.01164	-0.03070	0.00961	-0.82743	0.00990

Item ID	Parameters and Measures of Standard Error					
	d3	SE(d3)	d4	SE(d4)	d5	SE(d5)
IA02172 (MA286752A)	0.00000	0.00000	n/a	n/a	n/a	n/a
IA04859 (MA735951978)	0.00000	0.00000	n/a	n/a	n/a	n/a
IA07567 (MA297478A)	0.00000	0.00000	n/a	n/a	n/a	n/a
IA07572 (MA300753A)	0.00000	0.00000	n/a	n/a	n/a	n/a

Table 2.8.17 IRT Parameters for Dichotomous Items—Mathematics Grade 4

Item ID	Parameters and Measures of Standard Error					
	a	SE(a)	b	SE(b)	c	SE(c)
IA00990 (MA307692)	0.37768	0.01319	-0.91396	0.13430	0.07260	0.03740
IA02070 (MA247687)	0.85464	0.02349	-1.80672	0.07853	0.32680	0.03650
IA02173 (MA286765)	1.10226	0.02173	-0.33405	0.02098	0.27100	0.00910
IA04660 (MA307310)	1.00808	0.01641	-0.28274	0.01703	0.11860	0.00780
IA07867 (MA900662785)	1.31818	0.02100	-0.22260	0.01278	0.13100	0.00610
IA07918 (MA900751683)	1.09581	0.02072	0.42544	0.01340	0.17400	0.00520
IA07920 (MA900754381)	1.11952	0.01664	0.29789	0.01080	0.06840	0.00400
IA07959 (MA900843428)	1.46093	0.01998	-0.42234	0.01101	0.09910	0.00540
IA07961 (MA900845776)	0.49530	0.01064	-1.83030	0.08922	0.04130	0.03600
IA10296 (MA227395)	0.74093	0.01970	0.54977	0.02410	0.19930	0.00850
IA10356 (MA307326)	0.93518	0.02456	-1.25112	0.05266	0.38750	0.02150
IA00783 (MA227864)	0.52048	0.00724	-1.49687	0.02109	0.00000	0.00000
IA00814 (MA279790)	0.74971	0.00911	-1.40859	0.01548	0.00000	0.00000
IA01084 (MA623833763)	0.97718	0.01013	-0.28575	0.00831	0.00000	0.00000
IA02739 (MA704650142)	0.75288	0.00838	-0.50990	0.01008	0.00000	0.00000
IA02741 (MA704652242)	0.34887	0.00594	-0.09432	0.01610	0.00000	0.00000
IA02900 (MA714230904)	0.69645	0.00849	0.83936	0.01236	0.00000	0.00000
IA04572 (MA294263)	0.84994	0.01036	1.06715	0.01205	0.00000	0.00000
IA04652 (MA307066)	0.65343	0.00775	-0.03127	0.01018	0.00000	0.00000
IA04926 (MA800607912)	1.03066	0.01109	-0.84426	0.00956	0.00000	0.00000
IA04929 (MA800633803)	0.69101	0.00792	-0.56174	0.01091	0.00000	0.00000
IA04956 (MA800767155)	1.04408	0.01075	-0.51302	0.00841	0.00000	0.00000
IA07901 (MA900740880)	0.87830	0.00911	-0.09682	0.00852	0.00000	0.00000
IA07910 (MA900749728)	0.64540	0.00764	1.10236	0.01433	0.00000	0.00000
IA07915 (MA900751271)	0.54012	0.00707	-1.08358	0.01652	0.00000	0.00000
IA07922 (MA900755205)	1.03513	0.01013	0.17771	0.00800	0.00000	0.00000
IA07944 (MA900775955)	0.79250	0.00866	-0.57815	0.01008	0.00000	0.00000
IA07958 (MA900842465)	1.01612	0.01047	-0.11468	0.00800	0.00000	0.00000
IA08109 (MA903134963)	1.06021	0.01070	-0.35462	0.00810	0.00000	0.00000
IA08132 (MA903537924)	0.83562	0.00940	-0.80957	0.01059	0.00000	0.00000
IA08161 (MA903673001)	1.10798	0.01098	0.17584	0.00779	0.00000	0.00000
IA08181 (MA903757124)	0.92352	0.00928	0.63848	0.00945	0.00000	0.00000
IA08187 (MA903869200)	0.69882	0.00792	0.16556	0.00987	0.00000	0.00000
IA08237 (MA907358909)	1.16344	0.01223	0.54957	0.00810	0.00000	0.00000

Table 2.8.18
IRT Parameters for Polytomous Items
Mathematics Grade 4

Item ID	Parameters and Measures of Standard Error									
	a	SE(a)	b	SE(b)	d0	SE(d0)	d1	SE(d1)	d2	SE(d2)
IA05041 (MA803738583)	1.07787	0.00951	0.74697	0.00762	0.93249	0.01089	-0.93249	0.01514	0.00000	0.00000
IA07590 (MA302496A)	1.16412	0.00889	0.01581	0.00509	1.64595	0.01317	0.38798	0.00930	-0.44828	0.00930
IA07661 (MA311579A)	0.97831	0.00804	-0.81035	0.00552	1.15976	0.01633	0.29120	0.01186	-0.29317	0.01015
IA07912 (MA900750814)	0.94197	0.00764	-1.18604	0.00649	1.37601	0.01969	0.57165	0.01452	-0.35144	0.01121
IA08105 (MA903053494)	0.93512	0.00821	-0.62369	0.00846	1.18832	0.01655	-1.18832	0.01245	0.00000	0.00000
IA08147 (MA903574399)	1.30330	0.00985	0.03967	0.00423	1.11089	0.01007	0.44508	0.00850	-0.38183	0.00850

Item ID	Parameters and Measures of Standard Error					
	d3	SE(d3)	d4	SE(d4)	d5	SE(d5)
IA07590 (MA302496A)	-1.58565	0.01308	0.00000	0.00000	n/a	n/a
IA07661 (MA311579A)	-1.15778	0.00998	0.00000	0.00000	n/a	n/a
IA07912 (MA900750814)	-1.59622	0.01087	0.00000	0.00000	n/a	n/a
IA08147 (MA903574399)	-1.17414	0.01054	0.00000	0.00000	n/a	n/a

Table 2.8.19 IRT Parameters for Dichotomous Items—Mathematics Grade 5

Item ID	Parameters and Measures of Standard Error					
	a	SE(a)	b	SE(b)	c	SE(c)
IA00809 (MA272788)	0.58972	0.00955	-2.16726	0.05580	0.01760	0.02790
IA00815 (MA280507)	1.66649	0.04096	0.92199	0.01110	0.24880	0.00300
IA01023 (MA311301)	1.34297	0.04137	1.33652	0.01493	0.23370	0.00300
IA02549 (MA311287)	1.06757	0.02022	-0.66850	0.02341	0.22410	0.01130
IA04602 (MA301145)	1.24323	0.01882	-0.81410	0.01594	0.08320	0.00900
IA04613 (MA301831)	1.32392	0.02814	0.82593	0.01120	0.14630	0.00320
IA05000 (MA801650702)	1.30090	0.02185	-0.32884	0.01372	0.17710	0.00670
IA05004 (MA801654509)	0.91679	0.01625	-0.18192	0.01776	0.08160	0.00800
IA05009 (MA801668672)	1.28523	0.02540	-0.94649	0.02371	0.29090	0.01260
IA07868 (MA900664816)	0.87933	0.01620	-1.05840	0.03199	0.05470	0.01750
IA07969 (MA900941108)	1.29875	0.02977	0.49213	0.01382	0.32420	0.00460
IA07984 (MA901081374)	1.24148	0.02767	1.49242	0.01483	0.05280	0.00170
IA08193 (MA904134029)	1.48169	0.02866	0.24763	0.01191	0.29230	0.00450
IA10323 (MA282154)	1.46508	0.02243	-0.45124	0.01130	0.09360	0.00580
IA10340 (MA301593)	1.38020	0.02849	-0.05710	0.01443	0.32140	0.00590
IA10346 (MA303749)	1.27661	0.02395	0.49243	0.01100	0.15870	0.00390
IA10374 (MA311307)	1.35392	0.02645	-0.43803	0.01645	0.27810	0.00780
IA01146 (MA624345222)	0.93695	0.00938	-0.00826	0.00807	0.00000	0.00000
IA02917 (MA715102107)	0.61791	0.01136	-2.70247	0.03723	0.00000	0.00000
IA02925 (MA715102342)	1.30865	0.01270	-0.28051	0.00706	0.00000	0.00000
IA04630 (MA303755)	0.66277	0.00775	-0.08122	0.00989	0.00000	0.00000
IA04978 (MA801176573)	0.94505	0.00985	-0.41835	0.00817	0.00000	0.00000
IA05101 (MA804577344)	0.92850	0.00950	-0.58666	0.00858	0.00000	0.00000
IA05102 (MA804577928)	0.66219	0.00775	-0.15256	0.00989	0.00000	0.00000
IA05105 (MA804583343)	0.83150	0.00862	-0.22945	0.00848	0.00000	0.00000
IA07975 (MA900983475)	1.55877	0.01550	-0.10604	0.00666	0.00000	0.00000
IA08154 (MA903581246)	0.67320	0.00763	0.42200	0.01100	0.00000	0.00000
IA08176 (MA903733887)	1.04759	0.01055	-0.48878	0.00797	0.00000	0.00000
IA08209 (MA904333760)	1.08575	0.01124	0.51342	0.00858	0.00000	0.00000
IA08210 (MA904338797)	1.08825	0.01130	-0.63207	0.00817	0.00000	0.00000
IA08241 (MA908431377)	0.44371	0.00670	-0.99331	0.01655	0.00000	0.00000
IA10293 (MA207523)	1.05178	0.01055	-0.38051	0.00797	0.00000	0.00000
IA10325 (MA287421)	0.95565	0.01171	-1.37404	0.01282	0.00000	0.00000
IA10368 (MA310322)	0.77306	0.00880	-1.12671	0.01191	0.00000	0.00000

Table 2.8.20

IRT Parameters for Polytomous Items

Mathematics Grade 5

Item ID	Parameters and Measures of Standard Error									
	a	SE(a)	b	SE(b)	d0	SE(d0)	d1	SE(d1)	d2	SE(d2)
IA00902 (MA301608)	0.92233	0.00705	0.22834	0.00575	1.94444	0.01432	0.23024	0.00975	-0.69204	0.01162
IA02251 (MA298005)	0.89028	0.00746	-0.55288	0.00614	1.55828	0.01662	1.01429	0.01349	-0.90193	0.01071
IA05025 (MA802310847)	0.99422	0.00827	-0.71153	0.00526	1.13374	0.01498	0.37068	0.01138	-0.26110	0.00963
IA05097 (MA804575779)	0.79048	0.00746	-0.47228	0.00810	0.91275	0.01525	-0.91275	0.01271	0.00000	0.00000
IA05104 (MA804580860)	0.89232	0.00769	0.51216	0.00826	1.06946	0.01191	-1.06946	0.01637	0.00000	0.00000
IA07982 (MA901073764)	1.20000	0.00903	0.00637	0.00425	1.12763	0.01003	0.41796	0.00842	-0.49172	0.00886

Item ID	Parameters and Measures of Standard Error					
	d3	SE(d3)	d4	SE(d4)	d5	SE(d5)
IA00902 (MA301608)	-1.48265	0.01507	0.00000	0.00000	n/a	n/a
IA02251 (MA298005)	-1.67063	0.01349	0.00000	0.00000	n/a	n/a
IA05025 (MA802310847)	-1.24332	0.01032	0.00000	0.00000	n/a	n/a
IA07982 (MA901073764)	-1.05387	0.01058	0.00000	0.00000	n/a	n/a

Table 2.8.21 IRT Parameters for Dichotomous Items—Mathematics Grade 6

Item ID	Parameters and Measures of Standard Error					
	a	SE(a)	b	SE(b)	c	SE(c)
IA00898 (MA301497)	1.14925	0.02596	0.20736	0.01707	0.34030	0.00620
IA02125 (MA272301)	1.36139	0.02799	0.79493	0.01141	0.22270	0.00350
IA02273 (MA298153)	0.84794	0.01542	-0.89101	0.03091	0.07720	0.01580
IA04511 (MA272299)	0.84625	0.01304	-1.32444	0.03172	0.01620	0.01840
IA04571 (MA293850)	0.90079	0.01758	-0.25637	0.02293	0.17710	0.00980
IA04590 (MA298171)	0.89258	0.01746	-0.27991	0.02313	0.15260	0.01020
IA04723 (MA311654)	0.69667	0.01845	-0.22163	0.04121	0.24580	0.01430
IA04894 (MA736452061)	1.07888	0.01944	0.74200	0.01121	0.08460	0.00350
IA05139 (MA805276878)	0.41183	0.02270	1.17624	0.06465	0.22290	0.01720
IA07769 (MA900281418)	0.81907	0.01339	-0.77071	0.02626	0.03900	0.01290
IA07831 (MA900470149)	0.63288	0.01781	-1.11576	0.07889	0.21700	0.03020
IA07833 (MA900540139)	1.37967	0.02782	0.85453	0.01040	0.12440	0.00300
IA07834 (MA900541677)	1.54100	0.03259	1.00695	0.01040	0.13270	0.00260
IA08238 (MA908142878)	1.31029	0.03137	0.99947	0.01273	0.25170	0.00350
IA10309 (MA264407)	0.71210	0.01216	-0.20304	0.02222	0.01220	0.00930
IA02690 (MA703149118)	1.20326	0.01147	-0.01092	0.00707	0.00000	0.00000
IA02695 (MA703177677)	0.94636	0.01030	-1.00657	0.01040	0.00000	0.00000
IA02696 (MA703178216)	0.48639	0.00658	0.48695	0.01364	0.00000	0.00000
IA02697 (MA703178717)	0.76657	0.00809	0.10544	0.00899	0.00000	0.00000
IA02822 (MA713648266)	0.93478	0.01001	0.59493	0.00929	0.00000	0.00000
IA02905 (MA714280042)	0.62759	0.00722	1.16159	0.01535	0.00000	0.00000
IA04628 (MA303713)	0.96911	0.01094	-1.21394	0.01101	0.00000	0.00000
IA04726 (MA311664)	1.23102	0.01251	0.51301	0.00778	0.00000	0.00000
IA04881 (MA736363428)	0.76698	0.00850	-0.87505	0.01101	0.00000	0.00000
IA04883 (MA736365457)	0.58661	0.00803	-1.41929	0.01737	0.00000	0.00000
IA05127 (MA805104699)	1.22363	0.01286	0.60736	0.00808	0.00000	0.00000
IA07693 (MA736481231)	1.14680	0.01117	-0.20860	0.00717	0.00000	0.00000
IA07695 (MA736510525)	0.95055	0.01007	0.37473	0.00838	0.00000	0.00000
IA07744 (MA805166085)	0.31231	0.00646	2.14431	0.04556	0.00000	0.00000
IA07821 (MA900437517)	0.64720	0.00745	0.43635	0.01081	0.00000	0.00000
IA07828 (MA900454764)	1.06753	0.01152	-0.91788	0.00899	0.00000	0.00000
IA07830 (MA900462230)	0.99996	0.01024	-0.75677	0.00879	0.00000	0.00000
IA07932 (MA900763184)	1.01783	0.01042	-0.62364	0.00828	0.00000	0.00000
IA10338 (MA301231)	0.94886	0.00960	-0.03102	0.00788	0.00000	0.00000

Table 2.8.22
IRT Parameters for Polytomous Items
Mathematics Grade 6

Item ID	Parameters and Measures of Standard Error									
	a	SE(a)	b	SE(b)	d0	SE(d0)	d1	SE(d1)	d2	SE(d2)
IA02448 (MA307234)	1.14704	0.00867	-0.45688	0.00461	1.38938	0.01363	0.21899	0.00904	-0.57484	0.00853
IA02700 (MA703181586)	0.84893	0.00739	0.28281	0.00756	0.98433	0.01198	-0.98433	0.01411	0.00000	0.00000
IA02706 (MA703253363)	1.29161	0.00978	0.46655	0.00400	0.86201	0.00804	0.19666	0.00795	-0.22283	0.00875
IA07773 (MA900283851)	1.09186	0.00920	-0.72122	0.00710	0.97120	0.01396	-0.97120	0.01039	0.00000	0.00000
IA07780 (MA900337563)	1.21577	0.00890	0.31791	0.00459	1.43660	0.01010	0.20793	0.00835	-0.34682	0.00921
IA08063 (MA902139605)	1.27863	0.00925	-0.38001	0.00547	1.98978	0.01658	0.58777	0.00984	-0.76131	0.00902

Item ID	Parameters and Measures of Standard Error					
	d3	SE(d3)	d4	SE(d4)	d5	SE(d5)
IA02448 (MA307234)	-1.03353	0.00922	0.00000	0.00000	n/a	n/a
IA02706 (MA703253363)	-0.83585	0.01077	0.00000	0.00000	n/a	n/a
IA07780 (MA900337563)	-1.29772	0.01287	0.00000	0.00000	n/a	n/a
IA08063 (MA902139605)	-1.81625	0.01202	0.00000	0.00000	n/a	n/a

Table 2.8.23 IRT Parameters for Dichotomous Items—Mathematics Grade 7

Item ID	Parameters and Measures of Standard Error					
	a	SE(a)	b	SE(b)	c	SE(c)
IA02088 (MA259184)	1.36585	0.02681	-1.17005	0.02368	0.26850	0.01380
IA02278 (MA298208)	0.76839	0.01458	0.25586	0.01873	0.09170	0.00690
IA04540 (MA282220)	0.59636	0.01556	-0.42706	0.05167	0.17040	0.01770
IA04591 (MA298183)	0.59729	0.01928	0.60011	0.03649	0.27150	0.01030
IA04626 (MA303697)	1.59795	0.03173	0.88118	0.01033	0.19080	0.00270
IA04648 (MA306632)	0.83289	0.02015	0.88022	0.01722	0.18850	0.00520
IA04691 (MA311107)	1.71428	0.04609	1.07646	0.01227	0.33080	0.00280
IA05116 (MA804677297)	1.40736	0.03714	1.55312	0.01410	0.13830	0.00210
IA07720 (MA801363142)	0.81978	0.02015	0.94351	0.01733	0.18410	0.00510
IA07725 (MA801653090)	0.77806	0.02294	0.57805	0.02594	0.34020	0.00740
IA07840 (MA900554929)	1.02283	0.01698	-0.06450	0.01475	0.11760	0.00620
IA07841 (MA900556478)	1.78118	0.03588	0.79840	0.00969	0.19560	0.00260
IA07844 (MA900559852)	1.39277	0.03217	0.84103	0.01281	0.29910	0.00340
IA08110 (MA903153837)	1.62821	0.04320	1.12404	0.01195	0.27610	0.00280
IA08196 (MA904158907)	0.48332	0.01212	-0.65226	0.06674	0.03870	0.02290
IA10294 (MA208377)	1.12774	0.02015	-1.82326	0.03789	0.07170	0.02950
IA10295 (MA219513)	1.02715	0.01595	-1.42927	0.02885	0.05270	0.01880
IA10299 (MA250531)	1.41866	0.03282	0.58052	0.01313	0.32750	0.00390
IA10352 (MA306487)	0.87003	0.02081	0.55350	0.01927	0.25810	0.00610
IA00951 (MA306625)	1.11873	0.01207	1.30392	0.01163	0.00000	0.00000
IA01102 (MA624047703)	0.79526	0.00803	0.09729	0.00883	0.00000	0.00000
IA02707 (MA703857670)	1.12053	0.01174	-1.53519	0.01130	0.00000	0.00000
IA02708 (MA703872935)	0.84370	0.00879	-0.68284	0.00915	0.00000	0.00000
IA02877 (MA713848070)	0.98477	0.00972	0.42648	0.00861	0.00000	0.00000
IA04733 (MA314790)	1.15925	0.01256	0.98625	0.00980	0.00000	0.00000
IA05090 (MA804458974)	0.81989	0.00797	0.38073	0.00937	0.00000	0.00000
IA07838 (MA900553374)	1.18181	0.01174	0.74985	0.00872	0.00000	0.00000
IA07900 (MA900740124)	1.01316	0.00994	0.45630	0.00850	0.00000	0.00000
IA07903 (MA900741988)	1.02753	0.00923	0.65103	0.00937	0.00000	0.00000
IA07955 (MA900831542)	0.78423	0.00825	-0.65022	0.00926	0.00000	0.00000
IA08111 (MA903155316)	0.96576	0.00967	-0.66712	0.00840	0.00000	0.00000
IA08202 (MA904222253)	0.80198	0.00808	-0.07667	0.00872	0.00000	0.00000
IA10353 (MA306506)	0.58746	0.00792	1.46528	0.01938	0.00000	0.00000
IA10354 (MA306559)	1.28060	0.01322	1.14794	0.01012	0.00000	0.00000

Table 2.8.24

IRT Parameters for Polytomous Items

Mathematics Grade 7

Item ID	Parameters and Measures of Standard Error									
	a	SE(a)	b	SE(b)	d0	SE(d0)	d1	SE(d1)	d2	SE(d2)
IA02888 (MA713849179)	0.83901	0.00721	0.65728	0.00793	0.89466	0.01155	-0.89466	0.01562	0.00000	0.00000
IA02958 (MA717236235)	1.37524	0.00978	0.09538	0.00404	1.13959	0.00893	0.37120	0.00789	-0.34025	0.00836
IA04642 (MA306566)	1.40768	0.01038	0.57966	0.00429	0.94547	0.00811	0.41778	0.00802	-0.24856	0.00914
IA05037 (MA802914027)	1.28901	0.00912	-0.07191	0.00417	1.10934	0.00986	0.59349	0.00852	-0.66373	0.00899
IA07907 (MA900745156)	1.12370	0.00901	0.39090	0.00611	0.65079	0.00954	-0.65079	0.01155	0.00000	0.00000
IA07967 (MA900936469)	1.56234	0.01120	0.04788	0.00369	1.01178	0.00839	0.26245	0.00753	-0.30443	0.00782

Item ID	Parameters and Measures of Standard Error					
	d3	SE(d3)	d4	SE(d4)	d5	SE(d5)
IA02958 (MA717236235)	-1.17054	0.01070	0.00000	0.00000	n/a	n/a
IA04642 (MA306566)	-1.11470	0.01239	0.00000	0.00000	n/a	n/a
IA05037 (MA802914027)	-1.03910	0.00986	0.00000	0.00000	n/a	n/a
IA07967 (MA900936469)	-0.96980	0.00917	0.00000	0.00000	n/a	n/a

Table 2.8.25 IRT Parameters for Dichotomous Items—Mathematics Grade 8

Item ID	Parameters and Measures of Standard Error					
	a	SE(a)	b	SE(b)	c	SE(c)
IA00982 (MA307538)	0.55483	0.01273	-0.25619	0.04205	0.05490	0.01520
IA02325 (MA301689)	1.14109	0.02437	0.67004	0.01270	0.21320	0.00400
IA02563 (MA311428)	0.91432	0.01511	-0.13755	0.01625	0.08220	0.00700
IA04502 (MA259251)	0.67452	0.01470	-0.03243	0.02753	0.07150	0.01080
IA04521 (MA275045)	1.05074	0.01910	-0.81636	0.02316	0.15830	0.01210
IA04708 (MA311392)	1.34083	0.03247	0.83033	0.01229	0.27600	0.00340
IA04917 (MA800475574)	0.60362	0.01065	-1.42559	0.05079	0.01680	0.02370
IA05092 (MA804466151)	0.49840	0.01551	-1.40507	0.11985	0.13930	0.04260
IA07986 (MA901135378)	1.60840	0.02848	-0.72068	0.01412	0.26250	0.00770
IA07988 (MA901135957)	1.12720	0.02188	0.60037	0.01219	0.18770	0.00390
IA07990 (MA901137084)	0.53770	0.01291	-0.17392	0.04317	0.04530	0.01530
IA07993 (MA901137701)	0.57393	0.01430	-1.35083	0.08197	0.09220	0.03440
IA07999 (MA901139314)	1.21853	0.02084	-0.25213	0.01381	0.18540	0.00630
IA08002 (MA901142533)	1.10694	0.02425	0.30337	0.01544	0.29410	0.00540
IA08006 (MA901143832)	1.51441	0.02385	-0.64460	0.01280	0.18250	0.00700
IA08067 (MA902262781)	0.91547	0.01945	0.61479	0.01473	0.16860	0.00500
IA08080 (MA902284919)	1.02614	0.01597	-0.52099	0.01534	0.04540	0.00760
IA08231 (MA905271170)	0.74270	0.01476	-0.62886	0.03423	0.13010	0.01460
IA08244 (MA908451759)	1.28665	0.03415	0.76644	0.01513	0.42130	0.00380
IA10311 (MA264730)	0.57908	0.00747	-1.34535	0.01950	0.00080	0.00620
IA10341 (MA301683)	0.92068	0.02471	0.51545	0.02011	0.34590	0.00600
IA01034 (MA311386)	0.79595	0.00793	-0.29062	0.00843	0.00000	0.00000
IA02934 (MA715919547)	0.89938	0.00862	0.16777	0.00823	0.00000	0.00000
IA04751 (MA704833889)	0.84220	0.00816	-0.09896	0.00823	0.00000	0.00000
IA04922 (MA800562180)	0.86003	0.00839	-0.67924	0.00863	0.00000	0.00000
IA05060 (MA803864446)	0.73790	0.00810	-1.29639	0.01239	0.00000	0.00000
IA07703 (MA800475031)	0.78096	0.00862	-1.05485	0.01036	0.00000	0.00000
IA08005 (MA901143488)	0.87195	0.00822	-0.04573	0.00823	0.00000	0.00000
IA08008 (MA901248805)	1.35941	0.01314	-1.03393	0.00833	0.00000	0.00000
IA08009 (MA901252301)	1.24776	0.01146	-0.41769	0.00691	0.00000	0.00000
IA08079 (MA902283272)	0.96513	0.00990	-1.10655	0.00965	0.00000	0.00000
IA08086 (MA902305954)	0.79098	0.00810	-0.05051	0.00904	0.00000	0.00000
IA08089 (MA902359126)	1.17529	0.01088	-0.24512	0.00701	0.00000	0.00000
IA08235 (MA905906652)	0.67655	0.00735	-0.25599	0.00924	0.00000	0.00000

Table 2.8.26
IRT Parameters for Polytomous Items
Mathematics Grade 8

Item ID	Parameters and Measures of Standard Error									
	a	SE(a)	b	SE(b)	d0	SE(d0)	d1	SE(d1)	d2	SE(d2)
IA04781 (MA715920050)	1.05716	0.00770	-0.84508	0.00485	1.20284	0.01359	0.49763	0.01062	-0.27747	0.00886
IA07658 (MA311459)	1.37793	0.00990	0.45321	0.00404	1.20569	0.00818	0.21800	0.00791	-0.39103	0.00880
IA08071 (MA902268353)	0.82200	0.00689	0.66771	0.00804	0.89099	0.01150	-0.89099	0.01598	0.00000	0.00000
IA08077 (MA902281251)	0.99066	0.00845	-0.68340	0.00612	0.51649	0.01142	-0.51649	0.00969	0.00000	0.00000
IA08095 (MA902400539)	1.30731	0.00938	0.41170	0.00394	0.96945	0.00795	0.18420	0.00786	-0.25530	0.00867
IA10357 (MA307515)	1.52650	0.01140	0.29029	0.00351	0.66705	0.00730	0.24167	0.00721	-0.16828	0.00775

Item ID	Parameters and Measures of Standard Error					
	d3	SE(d3)	d4	SE(d4)	d5	SE(d5)
IA04781 (MA715920050)	-1.42300	0.00973	0.00000	0.00000	n/a	n/a
IA07658 (MA311459)	-1.03266	0.01093	0.00000	0.00000	n/a	n/a
IA08095 (MA902400539)	-0.89835	0.01052	0.00000	0.00000	n/a	n/a
IA10357 (MA307515)	-0.74043	0.00904	0.00000	0.00000	n/a	n/a

Table 2.8.27
IRT Parameters for Dichotomous Items
Mathematics Grade 10

Item ID	Parameters and Measures of Standard Error					
	a	SE(a)	b	SE(b)	c	SE(c)
IA04551 (MA287432)	1.61259	0.02782	-1.02085	0.01579	0.13960	0.01070
IA04558 (MA287734)	1.32137	0.02028	0.18893	0.01016	0.12620	0.00390
IA04676 (MA308751)	0.71116	0.02005	0.01323	0.03751	0.31070	0.01180
IA04737 (MA315444)	1.15512	0.02011	-0.45252	0.01760	0.20570	0.00850
IA07953 (MA900784138)	0.53100	0.01508	-1.02125	0.08911	0.11130	0.03310
IA08030 (MA901373728)	0.57467	0.01736	-0.15704	0.05602	0.22500	0.01750
IA08140 (MA903566809)	1.37848	0.01935	-1.45693	0.02021	0.02880	0.01640
IA08151 (MA903579407)	0.85771	0.01578	-1.06138	0.03510	0.07280	0.01940
IA08168 (MA903681943)	1.29436	0.03186	0.82203	0.01328	0.30220	0.00370
IA10301 (MA250982)	1.27279	0.02613	0.28276	0.01368	0.31640	0.00490
IA10317 (MA281578)	1.66573	0.03174	0.36613	0.00965	0.22370	0.00350
IA10322 (MA281661)	1.46908	0.03250	0.61384	0.01177	0.31430	0.00360
IA10331 (MA294292)	1.21691	0.01812	-0.48249	0.01358	0.09230	0.00710
IA10369 (MA311209)	1.51345	0.02321	0.28356	0.00875	0.11200	0.00310
IA10370 (MA311237)	0.87372	0.01847	-1.09688	0.04244	0.18710	0.02160
IA10371 (MA311240)	0.51236	0.01643	0.04732	0.05733	0.12490	0.01840
IA10382 (MA314948)	0.78487	0.01502	-0.76922	0.03460	0.10440	0.01640
IA10383 (MA315404)	0.99145	0.01420	-1.09829	0.02313	0.01710	0.01410
IA10384 (MA315448)	1.05604	0.01824	-1.23085	0.03017	0.12140	0.01900
IA10385 (MA315696)	0.94936	0.02210	-0.81669	0.03751	0.35600	0.01540
IA02769 (MA713335046)	1.26426	0.01175	-0.98907	0.00855	0.00000	0.00000
IA02863 (MA713829689)	1.14647	0.01081	-0.20542	0.00724	0.00000	0.00000
IA04793 (MA717348780)	0.70432	0.00731	0.22312	0.00955	0.00000	0.00000
IA07750 (MA805405196)	0.50797	0.00649	-0.18007	0.01136	0.00000	0.00000
IA07949 (MA900779724)	1.63434	0.01526	0.01001	0.00644	0.00000	0.00000
IA08028 (MA901372985)	0.41696	0.00590	-0.20119	0.01307	0.00000	0.00000
IA08048 (MA901700241)	0.65867	0.00737	-0.72487	0.01056	0.00000	0.00000
IA08057 (MA901762643)	0.91067	0.00883	0.12547	0.00825	0.00000	0.00000
IA08058 (MA901767462)	0.97660	0.00982	0.36503	0.00835	0.00000	0.00000
IA08130 (MA903470727)	1.15051	0.01029	-0.38685	0.00744	0.00000	0.00000
IA10315 (MA274106)	0.82480	0.00824	-0.11711	0.00835	0.00000	0.00000
IA10355 (MA307124)	0.89623	0.00894	0.49517	0.00925	0.00000	0.00000

Table 2.8.28

IRT Parameters for Polytomous Items

Mathematics Grade 10

Item ID	Parameters and Measures of Standard Error									
	a	SE(a)	b	SE(b)	d0	SE(d0)	d1	SE(d1)	d2	SE(d2)
IA02774 (MA713346383)	1.61300	0.01456	0.50030	0.00510	0.21814	0.00837	-0.21814	0.00927	0.00000	0.00000
IA02862 (MA713808299)	1.20995	0.00859	-0.40636	0.00428	1.26228	0.01177	0.22699	0.00859	-0.37936	0.00824
IA07653 (MA311223)	1.54279	0.01175	-0.68047	0.00385	0.77365	0.01049	0.13995	0.00838	-0.21940	0.00776
IA08026 (MA901364620)	1.07340	0.00783	-0.73598	0.00510	1.38824	0.01469	0.53690	0.01083	-0.41340	0.00885
IA08031 (MA901375276)	0.95872	0.00807	1.16608	0.00829	0.62727	0.01205	-0.62727	0.01634	0.00000	0.00000
IA08033 (MA901378123)	1.41571	0.01146	0.02112	0.00491	0.30981	0.00826	-0.30981	0.00875	0.00000	0.00000
IA08125 (MA903452431)	0.74536	0.00707	0.52479	0.00775	0.72336	0.01162	-0.72336	0.01503	0.00000	0.00000
IA08126 (MA903457147)	1.11461	0.00900	0.36221	0.00595	0.59116	0.00937	-0.59116	0.01117	0.00000	0.00000
IA08158 (MA903658309)	0.98935	0.00848	-0.45312	0.00629	0.63451	0.01161	-0.63451	0.01013	0.00000	0.00000
IA10343 (MA302066)	1.47417	0.01052	0.10553	0.00381	0.80787	0.00818	0.42942	0.00765	-0.07988	0.00757

Item ID	Parameters and Measures of Standard Error					
	d3	SE(d3)	d4	SE(d4)	d5	SE(d5)
IA02862 (MA713808299)	-1.10991	0.00929	0.00000	0.00000	n/a	n/a
IA07653 (MA311223)	-0.69420	0.00750	0.00000	0.00000	n/a	n/a
IA08026 (MA901364620)	-1.51175	0.01039	0.00000	0.00000	n/a	n/a
IA10343 (MA302066)	-1.15741	0.01038	0.00000	0.00000	n/a	n/a

Table 2.8.29
IRT Parameters for Dichotomous Items
Science Grade 5

Item ID	Parameters and Measures of Standard Error					
	a	SE(a)	b	SE(b)	c	SE(c)
IA03049 (SC294474)	0.36202	0.00846	-1.42688	0.09203	0.01700	0.02600
IA03060 (SC299518)	0.55167	0.01520	-0.46593	0.05474	0.18210	0.01680
IA03094 (SC315783)	0.60800	0.01515	-0.61678	0.04794	0.16950	0.01610
IA03115 (SC315960)	0.60935	0.01240	-1.18401	0.04964	0.05590	0.01980
IA03160 (SC629544010)	1.13607	0.02314	0.49014	0.01292	0.19990	0.00420
IA03225 (SC632355523)	0.83946	0.01717	-0.21955	0.02267	0.18670	0.00830
IA05409 (SC315963)	0.55867	0.00934	-1.43923	0.04499	0.00950	0.01790
IA05564 (SC736168952)	0.68607	0.01214	-1.14434	0.03627	0.02560	0.01570
IA05754 (SC814661140)	0.76341	0.01634	-2.10835	0.06675	0.11540	0.03580
IA08420 (SC304689)	1.02527	0.01841	-1.45023	0.02958	0.14060	0.01570
IA08491 (SC630232218)	0.91416	0.01805	-0.85795	0.02867	0.23040	0.01170
IA08527 (SC804073428)	0.59021	0.01193	-2.27778	0.07899	0.04340	0.03800
IA08529 (SC804249221)	0.85450	0.02179	0.54012	0.01881	0.24510	0.00600
IA08571 (SC903846864)	0.63223	0.01312	-1.07918	0.04647	0.07290	0.01840
IA08578 (SC903852865)	0.58253	0.01395	-0.93184	0.05644	0.14580	0.01950
IA08594 (SC904133849)	0.29505	0.00991	-2.60067	0.24231	0.09380	0.05880
IA08628 (SC910555750)	0.83152	0.01369	-2.35927	0.04726	0.02820	0.02990
IA08647 (SC911434880)	0.77732	0.01862	0.76645	0.01677	0.13660	0.00530
IA08655 (SC911554259)	0.92899	0.01733	0.02525	0.01621	0.13840	0.00610
IA10615 (SC304477)	0.44191	0.01613	-0.54085	0.09667	0.15220	0.02660
IA10617 (SC304593)	0.65796	0.01494	-1.13380	0.05383	0.14230	0.02120
IA10630 (SC313116)	1.01764	0.02464	0.55055	0.01621	0.28280	0.00500
IA03140 (SC625636354)	0.24396	0.00503	0.01562	0.02187	0.00000	0.00000
IA03274 (SC710851159)	0.80284	0.00866	-0.63242	0.00986	0.00000	0.00000
IA03309 (SC718080983)	0.39491	0.00576	-0.87529	0.01677	0.00000	0.00000
IA03313 (SC718140870)	0.60997	0.00695	-1.16440	0.01360	0.00000	0.00000
IA08485 (SC625638794)	0.53969	0.00700	-0.92652	0.01439	0.00000	0.00000
IA08566 (SC903843564)	0.53170	0.00638	-0.12491	0.01156	0.00000	0.00000
IA08595 (SC904142336)	0.26128	0.00669	-4.75795	0.11095	0.00000	0.00000
IA08627 (SC910545826)	0.55115	0.00794	-2.19879	0.02425	0.00000	0.00000
IA08657 (SC911947283)	0.42603	0.00586	-0.69090	0.01462	0.00000	0.00000
IA08660 (SC911952526)	0.80242	0.00882	-1.32885	0.01213	0.00000	0.00000

Table 2.8.30
IRT Parameters for Polytomous Items
Science Grade 5

Item ID	Parameters and Measures of Standard Error									
	a	SE(a)	b	SE(b)	d0	SE(d0)	d1	SE(d1)	d2	SE(d2)
IA03144 (SC626958463)	0.63690	0.00674	-1.21223	0.01443	1.67460	0.02999	-1.67460	0.01870	0.00000	0.00000
IA03157 (SC629273289)	0.54301	0.00628	1.67622	0.02331	2.29312	0.02633	-2.29312	0.05067	0.00000	0.00000
IA03177 (SC630161361)	0.37151	0.00493	-0.47970	0.02007	1.93940	0.03717	-1.93940	0.03219	0.00000	0.00000
IA03195 (SC630756792)	0.69152	0.00669	0.20080	0.00861	1.53441	0.01610	0.07718	0.01343	-1.61159	0.02121
IA08463 (SC313154)	0.68669	0.00674	0.61583	0.01040	2.06084	0.01776	-0.14541	0.01606	-1.91543	0.02691
IA08522 (SC803880630)	0.55722	0.00597	-1.10485	0.01212	1.17146	0.02461	-1.17146	0.01659	0.00000	0.00000
IA08530 (SC804250232)	0.70542	0.00674	-0.87478	0.00929	1.00883	0.01829	-1.00883	0.01355	0.00000	0.00000
IA08580 (SC903853405)	0.73105	0.00685	0.90649	0.01195	1.94158	0.01639	0.23864	0.01655	-2.18022	0.03423
IA08662 (SC911956141)	0.74650	0.00654	0.04422	0.00803	1.60086	0.01540	0.17378	0.01228	-1.77464	0.01962

Item ID	Parameters and Measures of Standard Error					
	d3	SE(d3)	d4	SE(d4)	d5	SE(d5)
IA03195 (SC630756792)	0.00000	0.00000	n/a	n/a	n/a	n/a
IA08463 (SC313154)	0.00000	0.00000	n/a	n/a	n/a	n/a
IA08580 (SC903853405)	0.00000	0.00000	n/a	n/a	n/a	n/a
IA08662 (SC911956141)	0.00000	0.00000	n/a	n/a	n/a	n/a

Table 2.8.31
IRT Parameters for Dichotomous Items
Science Grade 8

Item ID	Parameters and Measures of Standard Error					
	a	SE(a)	b	SE(b)	c	SE(c)
IA03079 (SC310231)	0.78469	0.02071	0.06767	0.02776	0.32020	0.00890
IA03091 (SC313192)	0.38070	0.01712	1.13171	0.04934	0.06330	0.01540
IA03222 (SC632267387)	1.47809	0.07234	1.71093	0.02284	0.31040	0.00260
IA03224 (SC632268044)	0.85366	0.01897	0.11271	0.02074	0.24690	0.00740
IA03239 (SC633058958)	0.59838	0.01504	-0.59431	0.04997	0.17880	0.01690
IA05494 (SC631649634)	0.84912	0.01981	0.69445	0.01540	0.15720	0.00530
IA05497 (SC632265448)	0.93453	0.02172	-0.28307	0.02514	0.33660	0.00890
IA05541 (SC735475827)	0.42784	0.01594	0.68041	0.04871	0.10200	0.01450
IA05667 (SC803873079)	1.18476	0.03395	1.31452	0.01519	0.18370	0.00300
IA05742 (SC814037351)	1.07993	0.01953	0.39630	0.01163	0.13480	0.00430
IA08565 (SC903843363)	1.02488	0.01678	-1.18600	0.02441	0.10520	0.01320
IA08570 (SC903846698)	1.38235	0.02469	-0.78026	0.01613	0.22090	0.00830
IA08572 (SC903847508)	0.87662	0.01852	0.26713	0.01718	0.19430	0.00630
IA08637 (SC910947265)	1.36411	0.02334	0.28819	0.01016	0.16750	0.00380
IA08640 (SC910959157)	0.68043	0.01122	-1.47597	0.04096	0.01610	0.01980
IA10584 (SC265230)	0.55270	0.04046	2.44624	0.07700	0.25340	0.00670
IA10599 (SC291845)	1.32314	0.02974	1.05335	0.01184	0.14890	0.00270
IA10605 (SC294244)	0.53503	0.02318	1.57296	0.02975	0.15540	0.00800
IA10616 (SC304491)	0.80781	0.01925	0.51227	0.01833	0.20930	0.00620
IA10633 (SC313185)	1.02875	0.01605	-1.01031	0.02022	0.06500	0.01050
IA03255 (SC633724344)	0.70871	0.00769	-0.43036	0.00943	0.00000	0.00000
IA03322 (SC718682565)	0.40730	0.00640	-1.39510	0.02137	0.00000	0.00000
IA03323 (SC718684123)	0.50444	0.00662	-0.79922	0.01362	0.00000	0.00000
IA05548 (SC735551980)	0.59586	0.00657	-0.90807	0.01184	0.00000	0.00000
IA05650 (SC803361743)	0.24288	0.00511	-1.28018	0.02996	0.00000	0.00000
IA05774 (SC815762323)	0.91562	0.00960	-1.20978	0.01016	0.00000	0.00000
IA08494 (SC630748134)	0.73357	0.00752	-0.27626	0.00870	0.00000	0.00000
IA08498 (SC632267532)	1.05002	0.00993	-0.04726	0.00733	0.00000	0.00000
IA08532 (SC807303457)	0.43070	0.00623	-0.76476	0.01498	0.00000	0.00000
IA08573 (SC903849539)	0.79373	0.00780	0.15755	0.00870	0.00000	0.00000
IA08611 (SC905147343)	0.66247	0.00774	-1.34177	0.01330	0.00000	0.00000
IA08638 (SC910949833)	0.36864	0.00584	-1.34785	0.02116	0.00000	0.00000

Table 2.8.32

IRT Parameters for Polytomous Items

Science Grade 8

Item ID	Parameters and Measures of Standard Error									
	a	SE(a)	b	SE(b)	d0	SE(d0)	d1	SE(d1)	d2	SE(d2)
IA03214 (SC631744146)	0.95288	0.00791	0.25222	0.00661	1.44314	0.01195	0.02636	0.01051	-1.46950	0.01647
IA03238 (SC632843069)	0.57246	0.00578	-0.50689	0.01001	1.11386	0.01872	-1.11386	0.01582	0.00000	0.00000
IA05696 (SC804379456)	0.68043	0.00645	-1.11932	0.00996	1.03760	0.02031	-1.03760	0.01350	0.00000	0.00000
IA08533 (SC807345964)	0.86410	0.00718	-0.13473	0.00724	1.72927	0.01561	0.01467	0.01084	-1.74394	0.01635
IA08543 (SC810865313)	0.73671	0.00730	0.20034	0.00769	0.68057	0.01217	-0.68057	0.01438	0.00000	0.00000
IA08560 (SC816553266)	0.62953	0.00623	0.32276	0.01005	1.16860	0.01498	-1.16860	0.01955	0.00000	0.00000
IA08581 (SC903853728)	1.05541	0.00825	-0.25685	0.00508	0.97095	0.01034	0.16545	0.00884	-1.13640	0.01117
IA08614 (SC905636245)	0.75013	0.00668	-0.71431	0.00818	1.02660	0.01562	-1.02660	0.01256	0.00000	0.00000
IA08641 (SC911252123)	0.82010	0.00668	-0.36429	0.00743	1.65077	0.01597	0.29885	0.01128	-1.94962	0.01672

Item ID	Parameters and Measures of Standard Error					
	d3	SE(d3)	d4	SE(d4)	d5	SE(d5)
IA03214 (SC631744146)	0.00000	0.00000	n/a	n/a	n/a	n/a
IA08533 (SC807345964)	0.00000	0.00000	n/a	n/a	n/a	n/a
IA08581 (SC903853728)	0.00000	0.00000	n/a	n/a	n/a	n/a
IA08641 (SC911252123)	0.00000	0.00000	n/a	n/a	n/a	n/a

Section 2.9

Decision Accuracy and Consistency (DAC)

Table 2.9.1
DAC Results
English Language Arts Grade 3

N	Reliability	Kappa		Accuracy	Consistency	F Pos	F Neg
61648	0.90	0.59	Overall	0.81	0.73	0.10	0.09
			Cut 1	0.95	0.93	0.02	0.03
			Cut 2	0.90	0.86	0.06	0.04
			Cut 3	0.96	0.95	0.02	0.01
			Cut 4	1.00	1.00	0.00	0.00
			Perf 1	0.81	0.71		
			Perf 2	0.80	0.74		
			Perf 3	0.83	0.76		
			Perf 4	0.76	0.58		

Table 2.9.2
DAC Results
English Language Arts Grade 4

N	Reliability	Kappa		Accuracy	Consistency	F Pos	F Neg
62100	0.90	0.60	Overall	0.82	0.75	0.10	0.08
			Cut 1	0.95	0.92	0.03	0.03
			Cut 2	0.90	0.86	0.05	0.04
			Cut 3	0.97	0.96	0.02	0.01
			Cut 4	1.00	1.00	0.00	0.00
			Perf 1	0.81	0.72		
			Perf 2	0.83	0.78		
			Perf 3	0.82	0.75		
			Perf 4	0.74	0.50		

Table 2.9.3
DAC Results
English Language Arts Grade 5

N	Reliability	Kappa		Accuracy	Consistency	F Pos	F Neg
63620	0.92	0.64	Overall	0.84	0.78	0.09	0.07
			Cut 1	0.96	0.94	0.02	0.02
			Cut 2	0.91	0.88	0.05	0.04
			Cut 3	0.97	0.96	0.02	0.01
			Cut 4	1.00	1.00	0.00	0.00
			Perf 1	0.81	0.72		
			Perf 2	0.85	0.81		
			Perf 3	0.84	0.77		
			Perf 4	0.80	0.62		

Table 2.9.4
DAC Results
English Language Arts Grade 6

N	Reliability	Kappa		Accuracy	Consistency	F Pos	F Neg
63887	0.93	0.62	Overall	0.81	0.74	0.09	0.09
			Cut 1	0.94	0.92	0.03	0.03
			Cut 2	0.92	0.88	0.04	0.04
			Cut 3	0.95	0.93	0.03	0.02
			Cut 4	1.00	1.00	0.00	0.00
			Perf 1	0.87	0.79		
			Perf 2	0.81	0.74		
			Perf 3	0.80	0.74		
			Perf 4	0.74	0.59		

Table 2.9.5
DAC Results
English Language Arts Grade 7

N	Reliability	Kappa		Accuracy	Consistency	F Pos	F Neg
65584	0.93	0.65	Overall	0.84	0.77	0.08	0.08
			Cut 1	0.95	0.93	0.02	0.03
			Cut 2	0.92	0.89	0.04	0.04
			Cut 3	0.97	0.95	0.02	0.01
			Cut 4	1.00	1.00	0.00	0.00
			Perf 1	0.87	0.79		
			Perf 2	0.83	0.78		
			Perf 3	0.84	0.78		
			Perf 4	0.73	0.55		

Table 2.9.6
DAC Results
English Language Arts Grade 8

N	Reliability	Kappa		Accuracy	Consistency	F Pos	F Neg
67919	0.94	0.65	Overall	0.83	0.76	0.09	0.08
			Cut 1	0.95	0.93	0.02	0.02
			Cut 2	0.92	0.89	0.03	0.04
			Cut 3	0.96	0.94	0.03	0.02
			Cut 4	1.00	1.00	0.00	0.00
			Perf 1	0.86	0.78		
			Perf 2	0.85	0.80		
			Perf 3	0.82	0.76		
			Perf 4	0.70	0.54		

Table 2.9.7
DAC Results
English Language Arts Grade 10

N	Reliability	Kappa		Accuracy	Consistency	F Pos	F Neg
65193	0.93	0.65	Overall	0.85	0.78	0.09	0.07
			Cut 1	0.97	0.96	0.01	0.01
			Cut 2	0.92	0.89	0.04	0.03
			Cut 3	0.95	0.93	0.03	0.02
			Cut 4	1.00	1.00	0.00	0.00
			Perf 1	0.81	0.72		
			Perf 2	0.83	0.78		
			Perf 3	0.87	0.83		
			Perf 4	0.76	0.60		

Table 2.9.1
DAC Results
Mathematics Grade 3

N	Reliability	Kappa		Accuracy	Consistency	F Pos	F Neg
53433	0.93	0.63	Overall	0.83	0.75	0.09	0.09
			Cut 1	0.95	0.93	0.02	0.02
			Cut 2	0.91	0.88	0.04	0.04
			Cut 3	0.96	0.94	0.02	0.02
			Cut 4	1.00	1.00	0.00	0.00
			Perf 1	0.84	0.74		
			Perf 2	0.83	0.77		
			Perf 3	0.84	0.78		
			Perf 4	0.73	0.58		

Table 2.9.2
DAC Results
Mathematics Grade 4

N	Reliability	Kappa		Accuracy	Consistency	F Pos	F Neg
53577	0.94	0.66	Overall	0.85	0.78	0.08	0.08
			Cut 1	0.96	0.95	0.02	0.02
			Cut 2	0.92	0.89	0.04	0.04
			Cut 3	0.96	0.94	0.02	0.02
			Cut 4	1.00	1.00	0.00	0.00
			Perf 1	0.83	0.73		
			Perf 2	0.86	0.80		
			Perf 3	0.86	0.81		
			Perf 4	0.74	0.59		

Table 2.9.3
DAC Results
Mathematics Grade 5

N	Reliability	Kappa		Accuracy	Consistency	F Pos	F Neg
55635	0.94	0.68	Overall	0.86	0.80	0.07	0.07
			Cut 1	0.96	0.95	0.02	0.02
			Cut 2	0.92	0.89	0.04	0.04
			Cut 3	0.98	0.97	0.01	0.01
			Cut 4	1.00	1.00	0.00	0.00
			Perf 1	0.83	0.72		
			Perf 2	0.87	0.83		
			Perf 3	0.86	0.81		
			Perf 4	0.81	0.67		

Table 2.9.4
DAC Results
Mathematics Grade 6

N	Reliability	Kappa		Accuracy	Consistency	F Pos	F Neg
56939	0.94	0.69	Overall	0.86	0.80	0.07	0.07
			Cut 1	0.97	0.95	0.01	0.02
			Cut 2	0.92	0.89	0.04	0.04
			Cut 3	0.97	0.96	0.01	0.01
			Cut 4	1.00	1.00	0.00	0.00
			Perf 1	0.84	0.73		
			Perf 2	0.86	0.81		
			Perf 3	0.88	0.83		
			Perf 4	0.80	0.67		

Table 2.9.5
DAC Results
Mathematics Grade 7

N	Reliability	Kappa		Accuracy	Consistency	F Pos	F Neg
59311	0.94	0.68	Overall	0.85	0.79	0.08	0.07
			Cut 1	0.96	0.94	0.02	0.02
			Cut 2	0.92	0.89	0.04	0.04
			Cut 3	0.97	0.96	0.02	0.01
			Cut 4	1.00	1.00	0.00	0.00
			Perf 1	0.84	0.74		
			Perf 2	0.87	0.82		
			Perf 3	0.84	0.78		
			Perf 4	0.83	0.72		

Table 2.9.6
DAC Results
Mathematics Grade 8

N	Reliability	Kappa		Accuracy	Consistency	F Pos	F Neg
62311	0.94	0.67	Overall	0.85	0.79	0.09	0.07
			Cut 1	0.95	0.93	0.03	0.02
			Cut 2	0.93	0.89	0.04	0.03
			Cut 3	0.97	0.96	0.02	0.01
			Cut 4	1.00	1.00	0.00	0.00
			Perf 1	0.78	0.70		
			Perf 2	0.87	0.83		
			Perf 3	0.84	0.77		
			Perf 4	0.86	0.75		

Table 2.9.7
DAC Results
Mathematics Grade 10

N	Reliability	Kappa		Accuracy	Consistency	F Pos	F Neg
61296	0.95	0.69	Overall	0.86	0.80	0.07	0.07
			Cut 1	0.96	0.95	0.01	0.02
			Cut 2	0.93	0.90	0.04	0.03
			Cut 3	0.96	0.95	0.02	0.02
			Cut 4	1.00	1.00	0.00	0.00
			Perf 1	0.77	0.63		
			Perf 2	0.85	0.80		
			Perf 3	0.87	0.83		
			Perf 4	0.86	0.78		

Table 2.9.8
DAC Results
Science Grade 5

N	Reliability	Kappa		Accuracy	Consistency	F Pos	F Neg
56846	0.90	0.58	Overall	0.80	0.72	0.10	0.10
			Cut 1	0.95	0.93	0.02	0.03
			Cut 2	0.90	0.86	0.05	0.05
			Cut 3	0.95	0.93	0.03	0.02
			Cut 4	1.00	1.00	0.00	0.00
			Perf 1	0.82	0.70		
			Perf 2	0.81	0.74		
			Perf 3	0.80	0.74		
			Perf 4	0.72	0.55		

Table 2.9.9
DAC Results
Science Grade 8

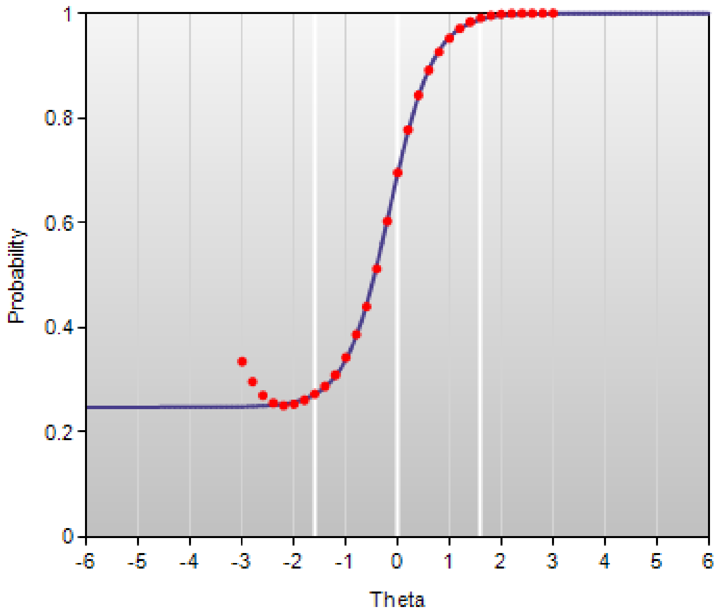
N	Reliability	Kappa		Accuracy	Consistency	F Pos	F Neg
62926	0.92	0.62	Overall	0.82	0.75	0.09	0.08
			Cut 1	0.95	0.94	0.02	0.03
			Cut 2	0.91	0.88	0.04	0.05
			Cut 3	0.95	0.94	0.03	0.01
			Cut 4	1.00	1.00	0.00	0.00
			Perf 1	0.84	0.74		
			Perf 2	0.84	0.78		
			Perf 3	0.81	0.76		
			Perf 4	0.71	0.51		

Section 2.10

Fit Plots of Watchlist Items

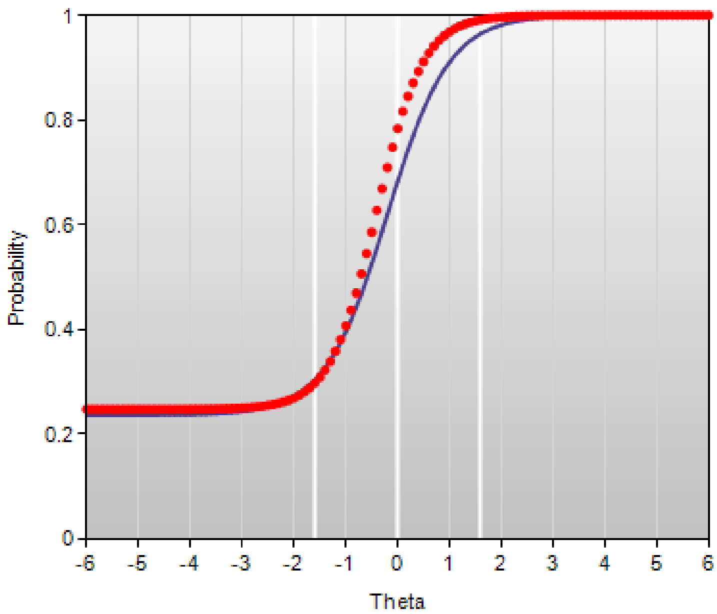
Initial Calibration

English Language Arts Grade 3: IA00450
(EL626050679)



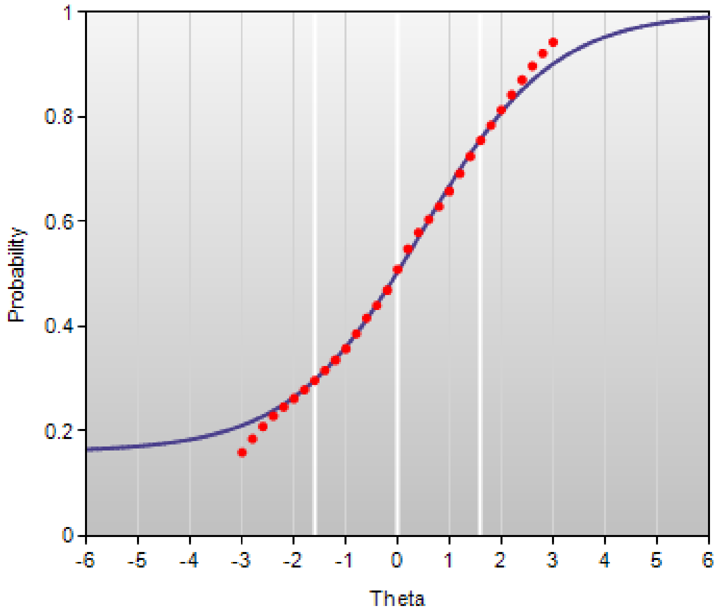
Beta Chart

English Language Arts Grade 3: IA00450
(EL626050679)



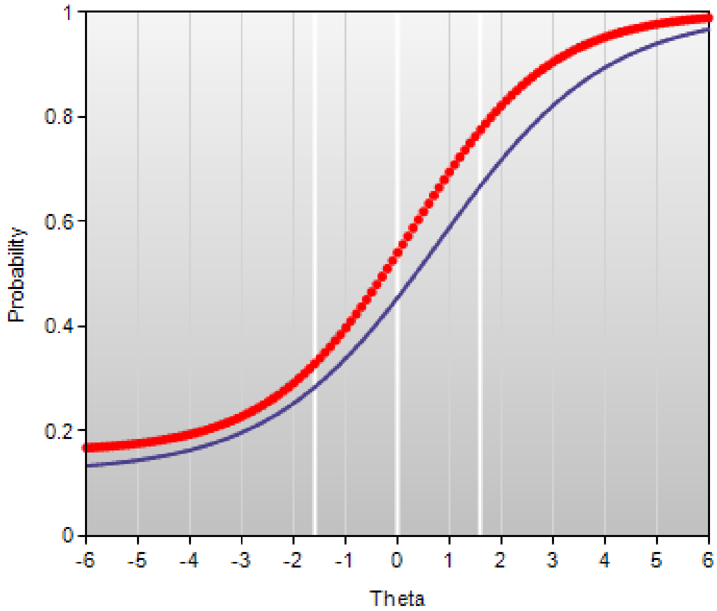
Initial Calibration

English Language Arts Grade 3: IA00451
(EL626050927)



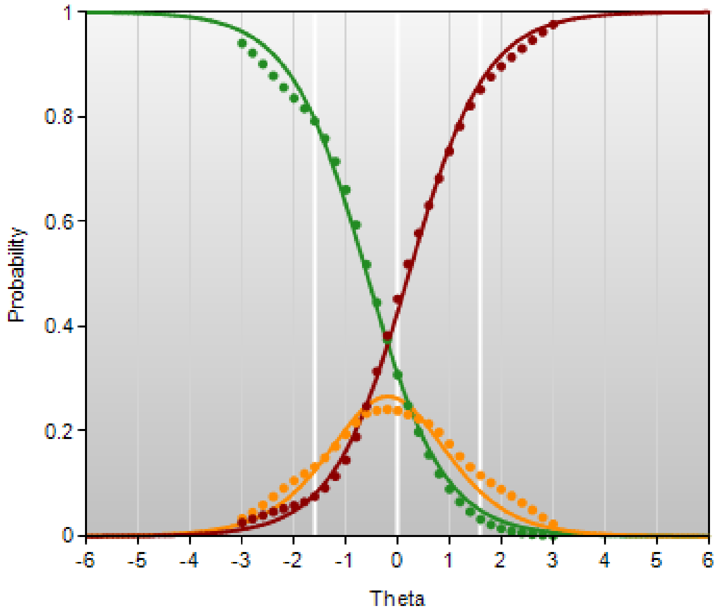
Beta Chart

English Language Arts Grade 3: IA00451
(EL626050927)



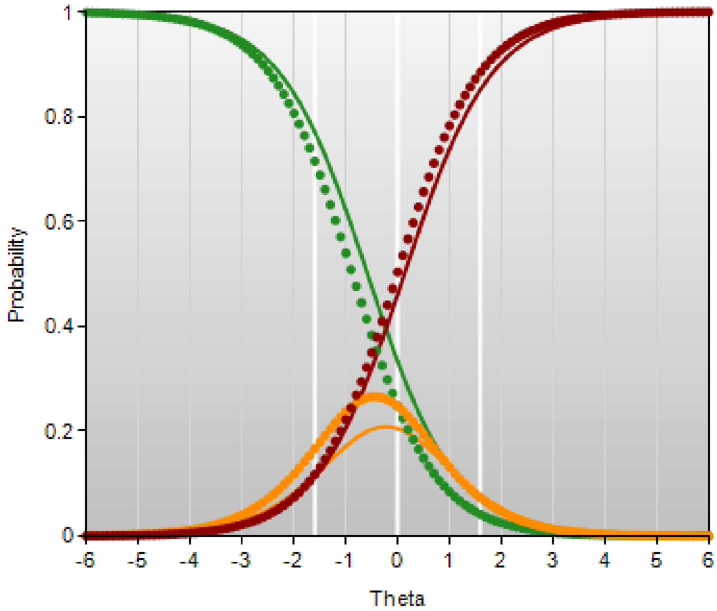
Initial Calibration

English Language Arts Grade 3: IA00452
(EL626051097)



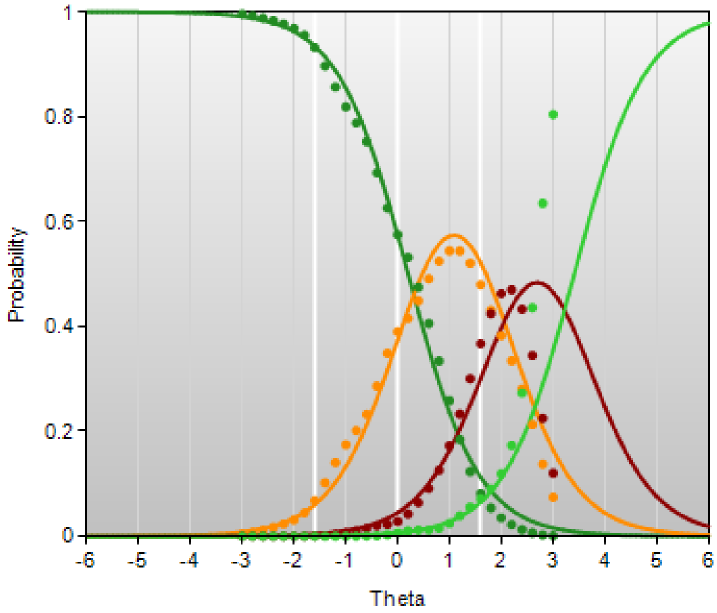
Beta Chart

English Language Arts Grade 3: IA00452
(EL626051097)



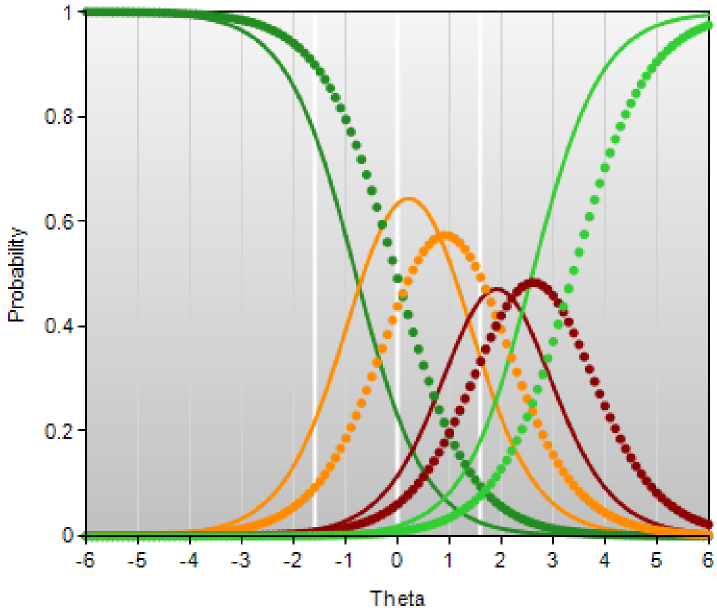
Initial Calibration

English Language Arts Grade 3: IA00458A
(EL626052459#SCORE_TRAIT_Conv)

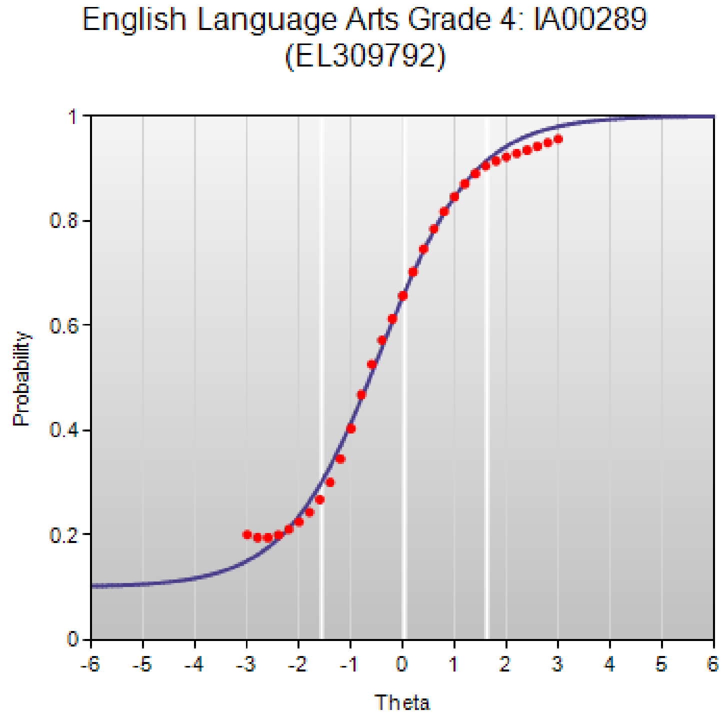


Beta Chart

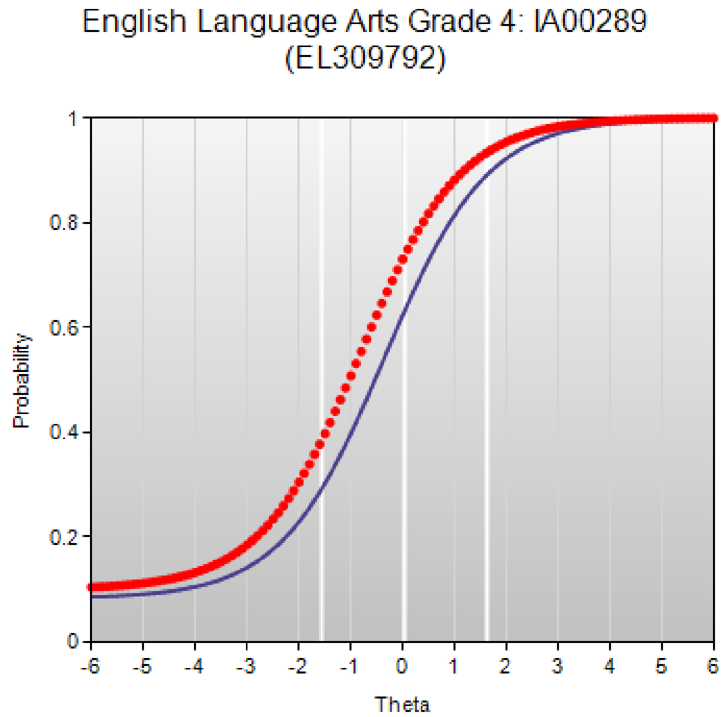
English Language Arts Grade 3: IA00458A
(EL626052459#SCORE_TRAIT_Conv)



Initial Calibration

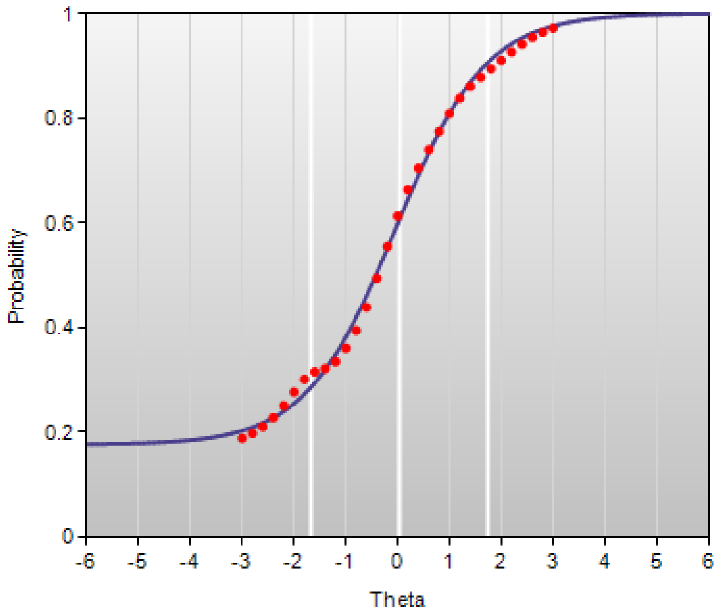


Beta Chart



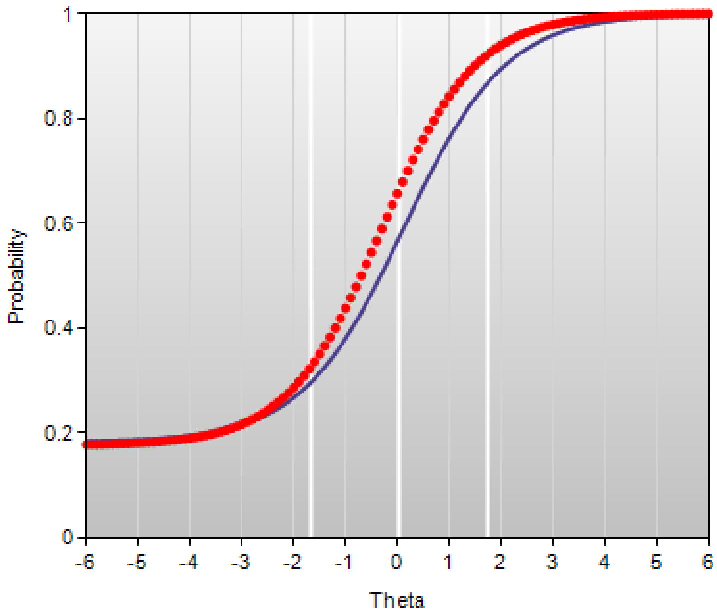
Initial Calibration

English Language Arts Grade 5: IA00505
(EL626355215)

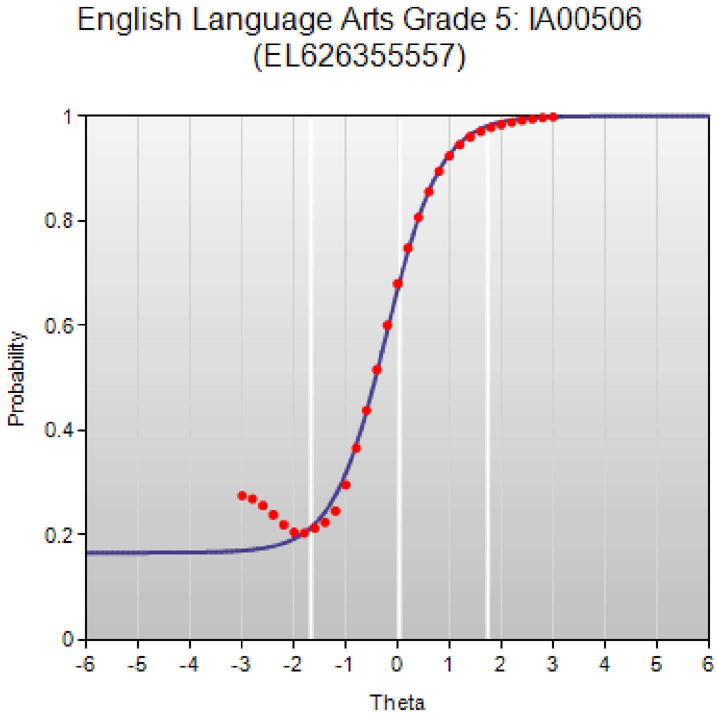


Beta Chart

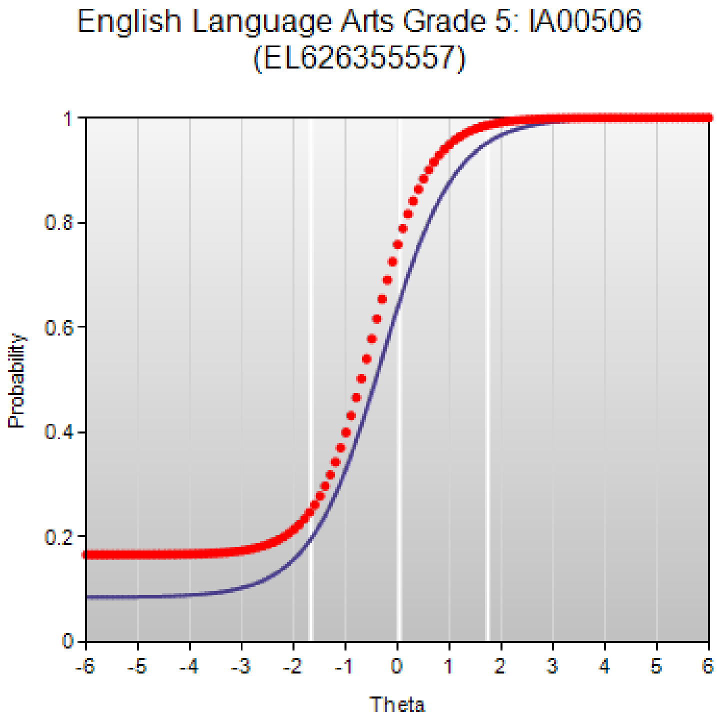
English Language Arts Grade 5: IA00505
(EL626355215)



Initial Calibration

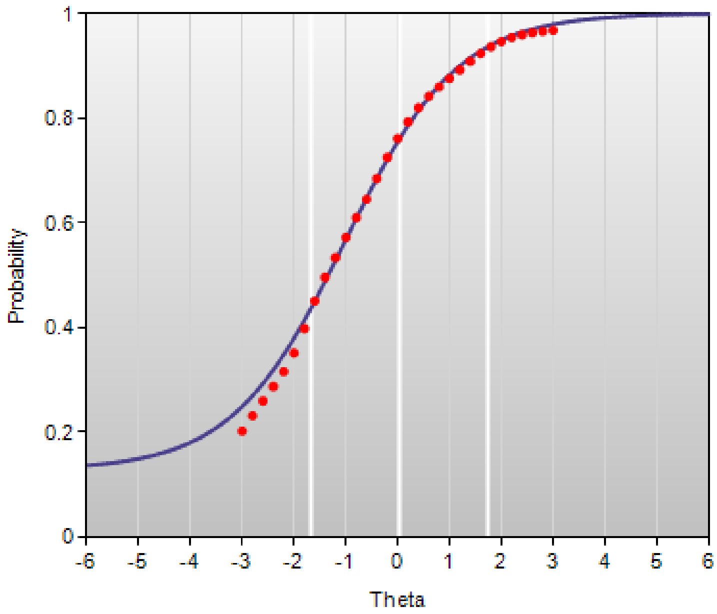


Beta Chart



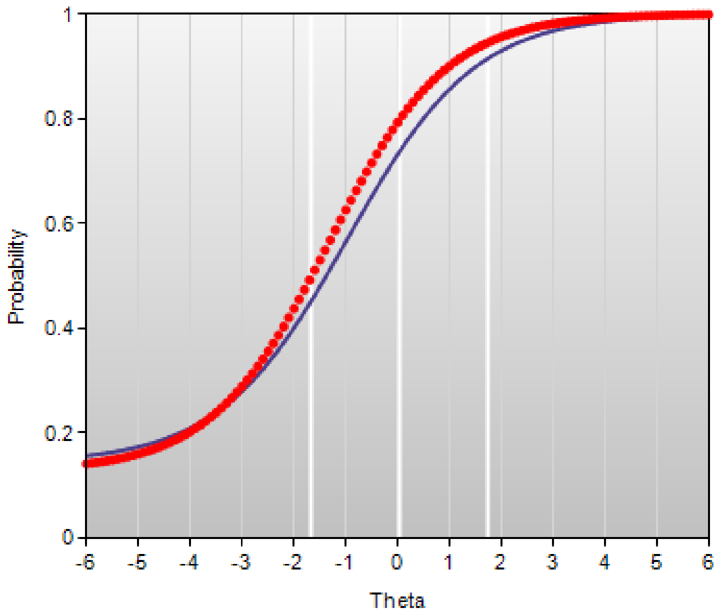
Initial Calibration

English Language Arts Grade 5: IA01672
(EL711827807)



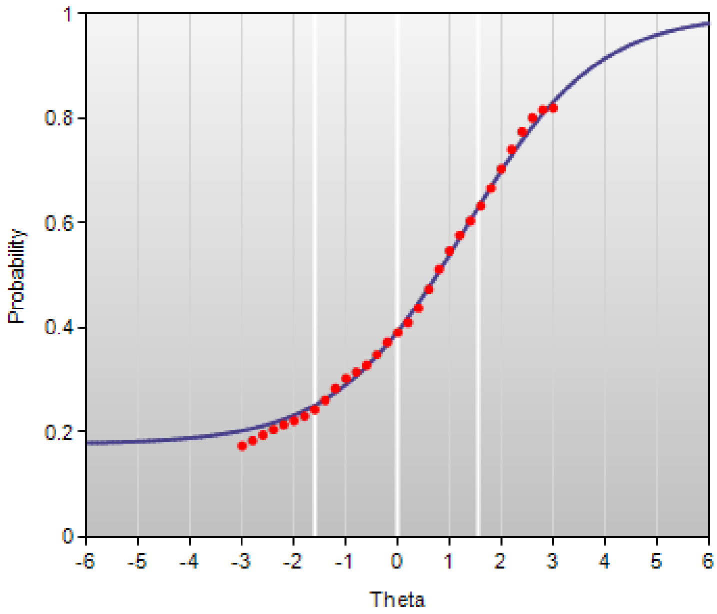
Beta Chart

English Language Arts Grade 5: IA01672
(EL711827807)



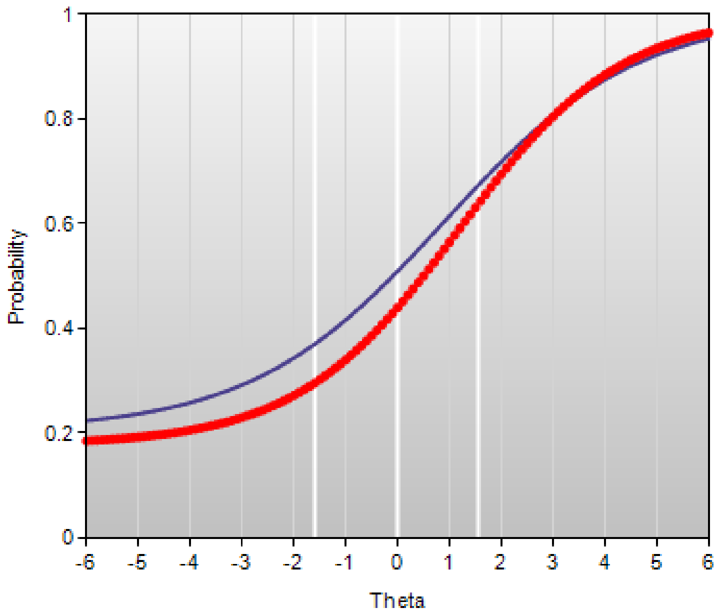
Initial Calibration

English Language Arts Grade 6: IA00520
(EL626865416)



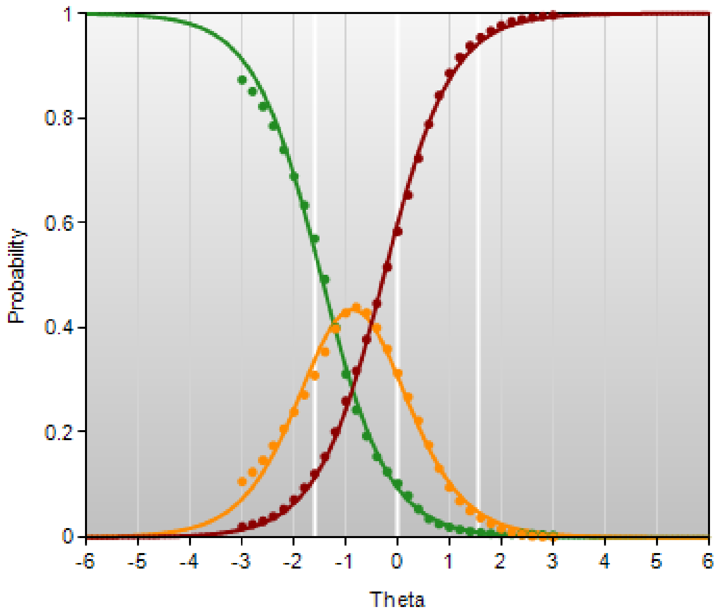
Beta Chart

English Language Arts Grade 6: IA00520
(EL626865416)



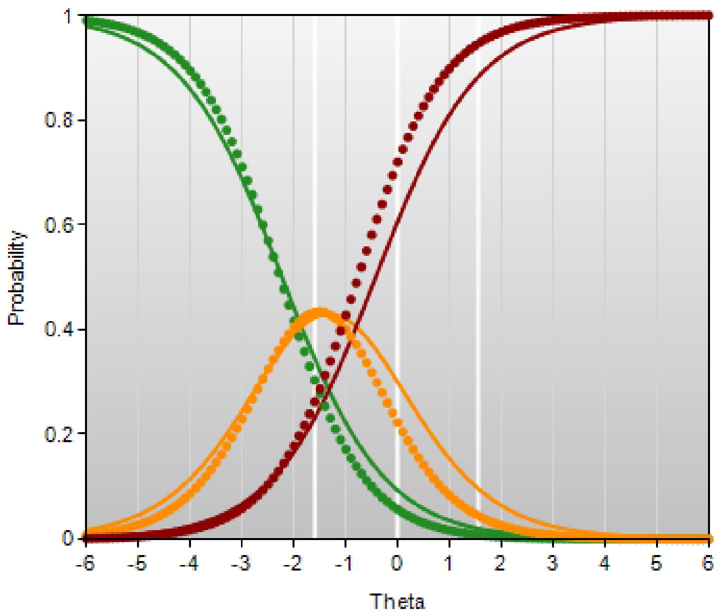
Initial Calibration

English Language Arts Grade 6: IA00530
(EL626868748)

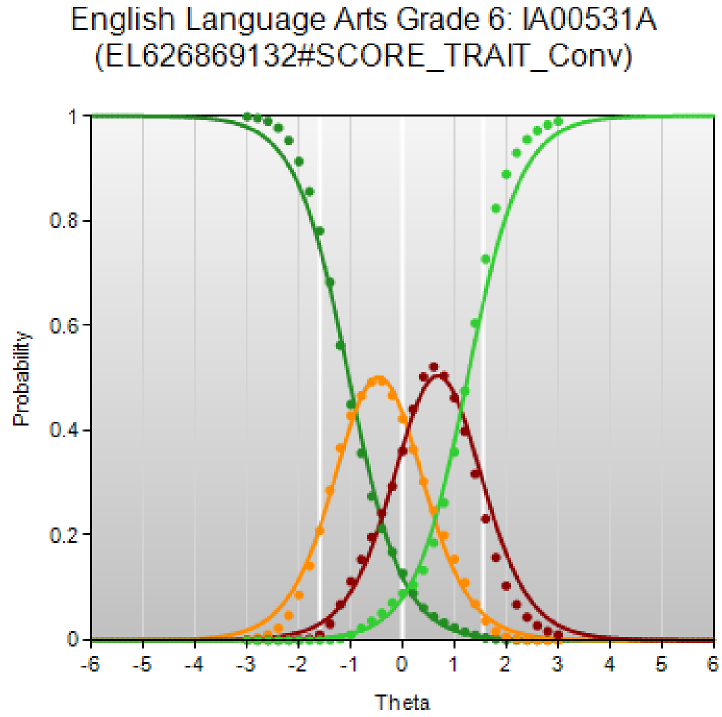


Beta Chart

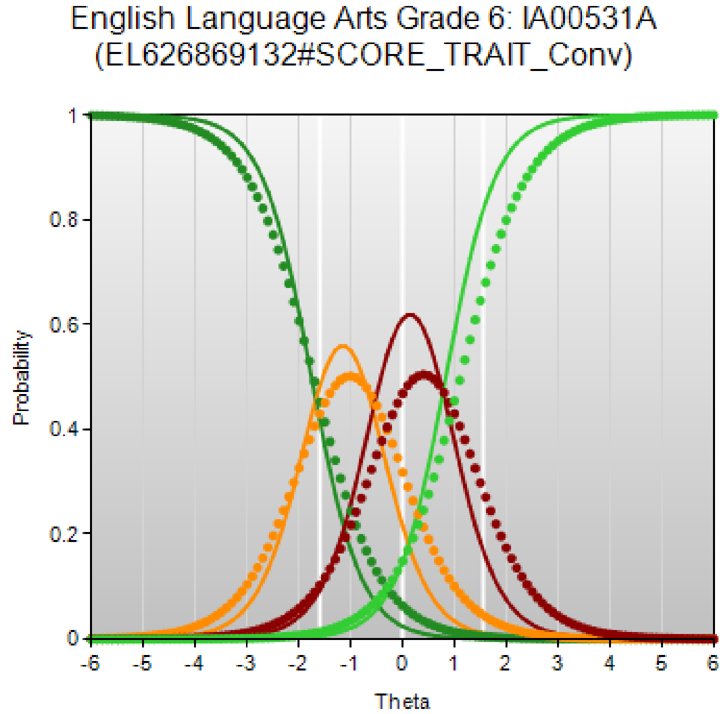
English Language Arts Grade 6: IA00530
(EL626868748)



Initial Calibration

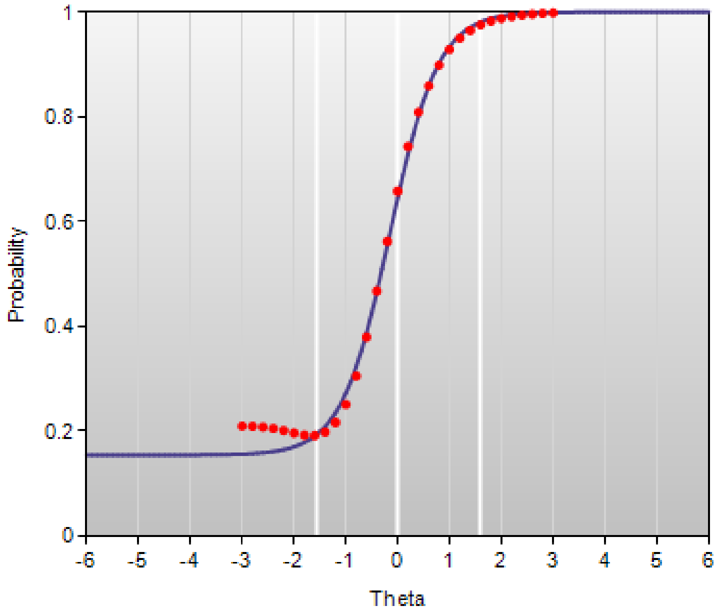


Beta Chart



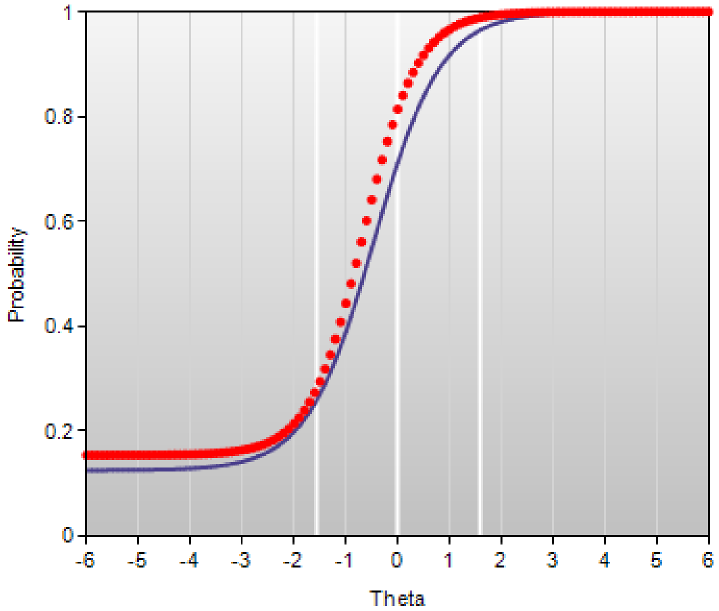
Initial Calibration

English Language Arts Grade 7: IA00069
(EL292172)

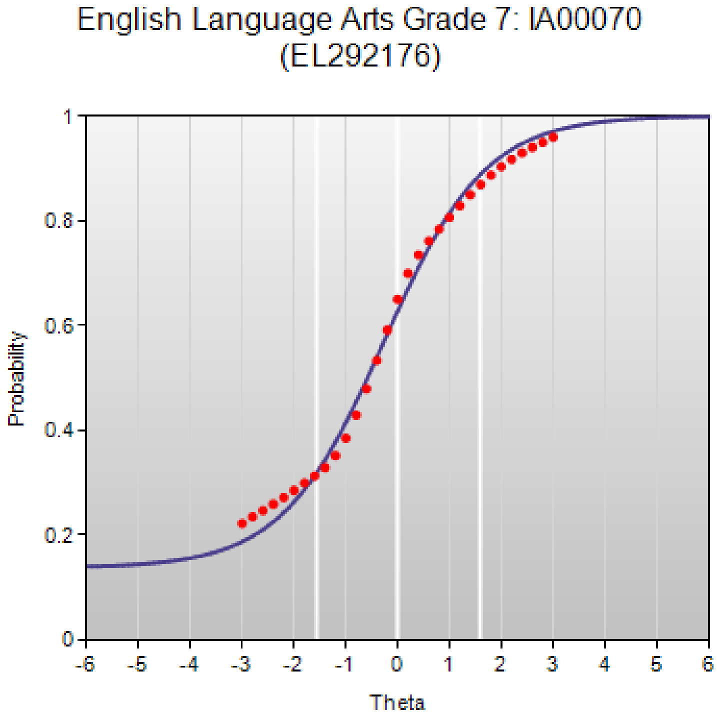


Beta Chart

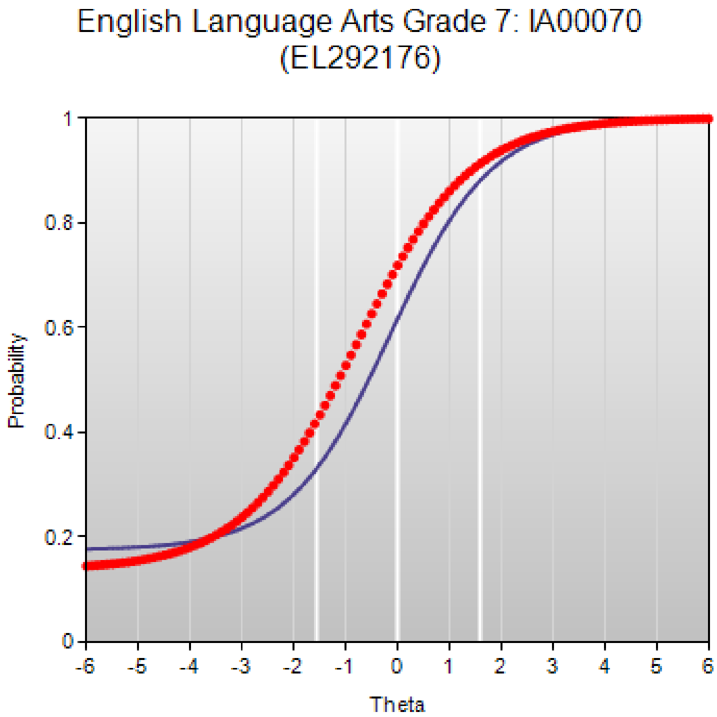
English Language Arts Grade 7: IA00069
(EL292172)



Initial Calibration

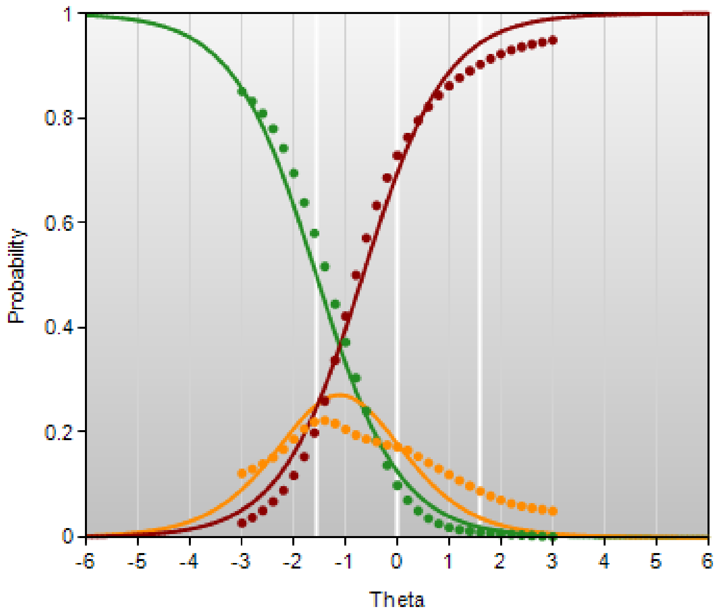


Beta Chart



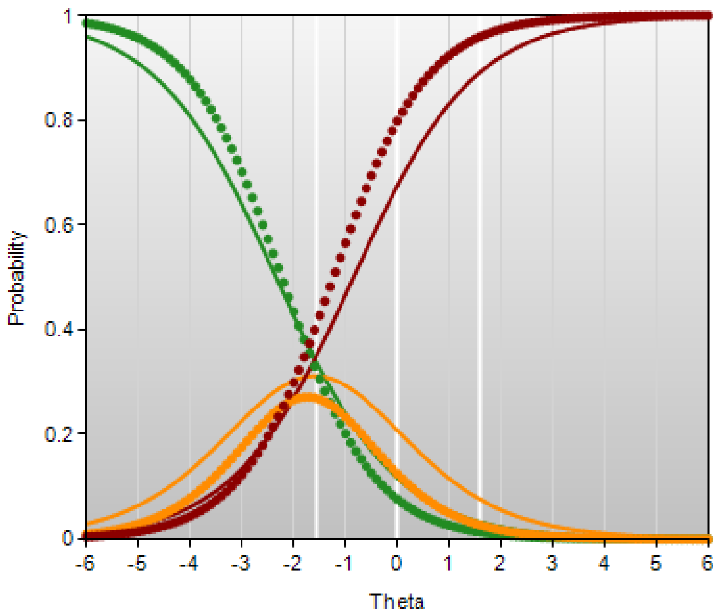
Initial Calibration

English Language Arts Grade 7: IA00658
(EL628653398)



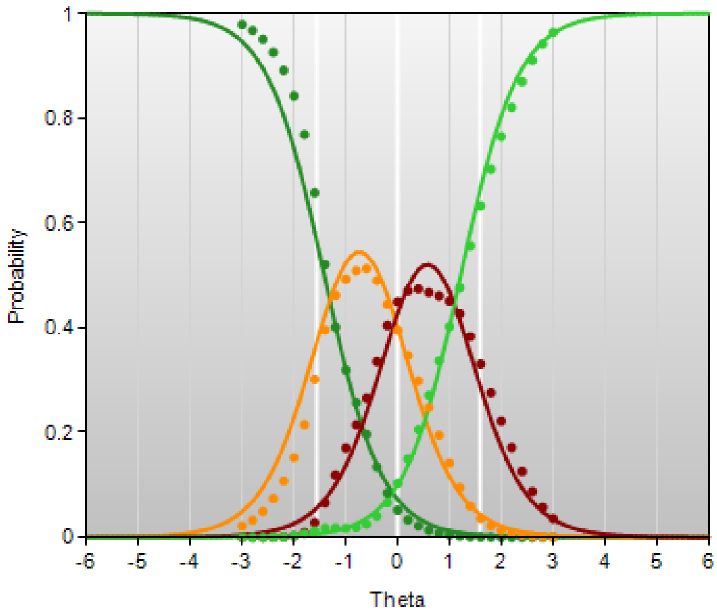
Beta Chart

English Language Arts Grade 7: IA00658
(EL628653398)



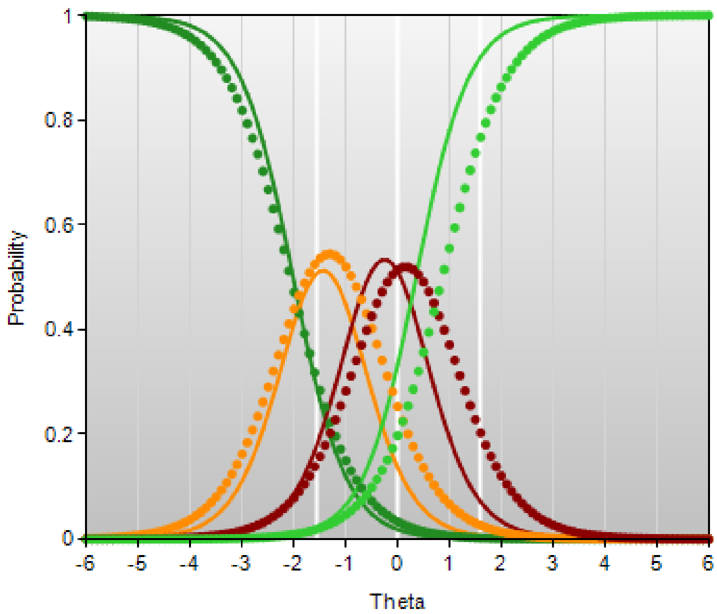
Initial Calibration

English Language Arts Grade 7: IA00665A
(EL628749729#SCORE_TRAIT_Conv)



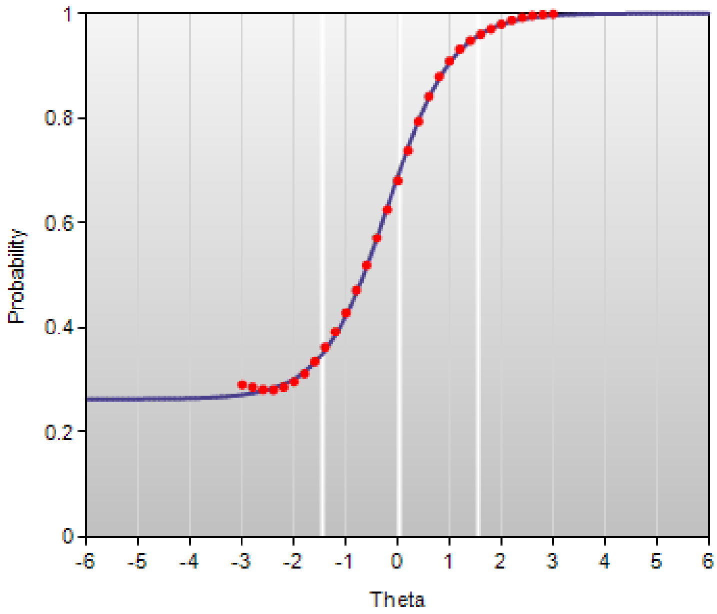
Beta Chart

English Language Arts Grade 7: IA00665A
(EL628749729#SCORE_TRAIT_Conv)



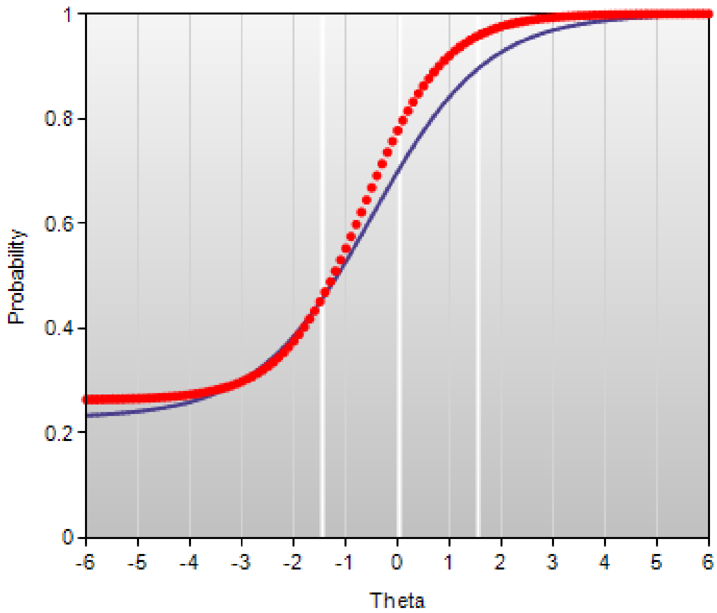
Initial Calibration

English Language Arts Grade 8: IA00059
(EL290800)



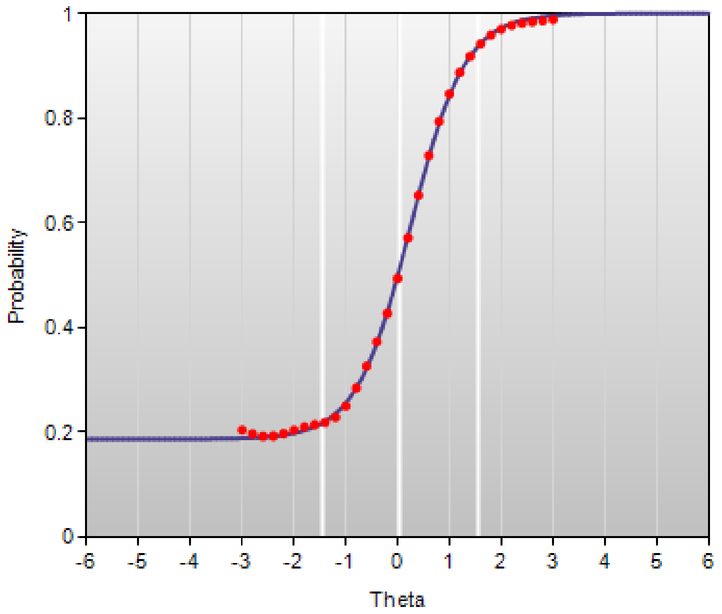
Beta Chart

English Language Arts Grade 8: IA00059
(EL290800)



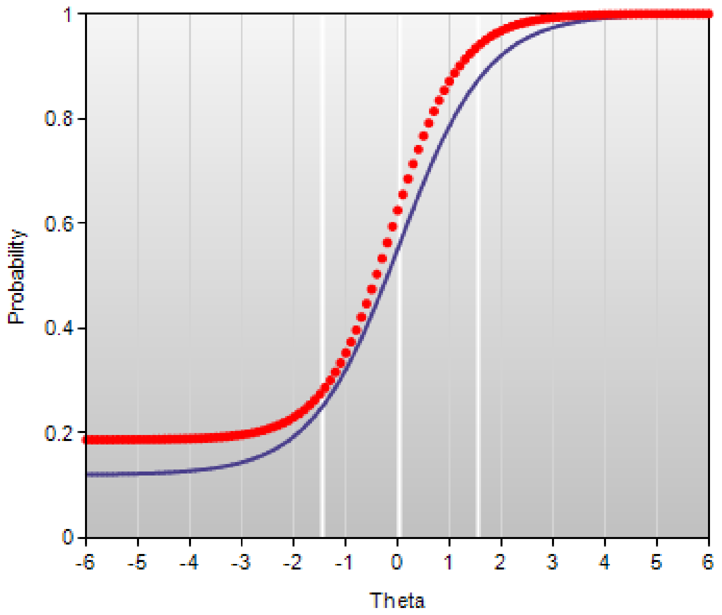
Initial Calibration

English Language Arts Grade 8: IA00062
(EL290808)

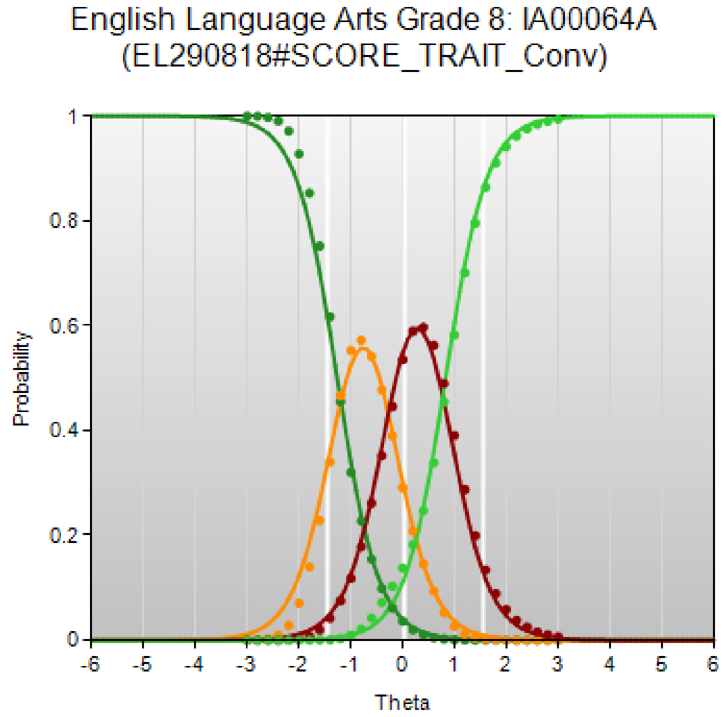


Beta Chart

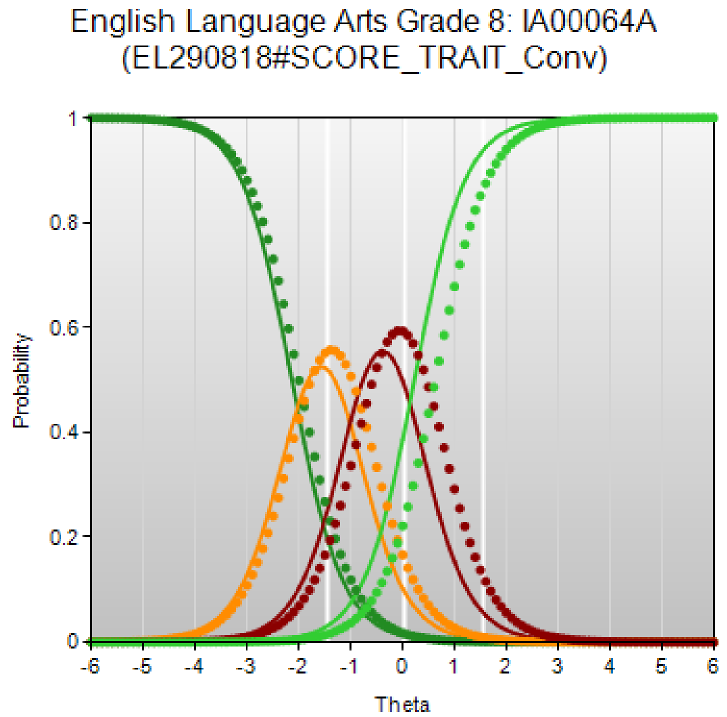
English Language Arts Grade 8: IA00062
(EL290808)



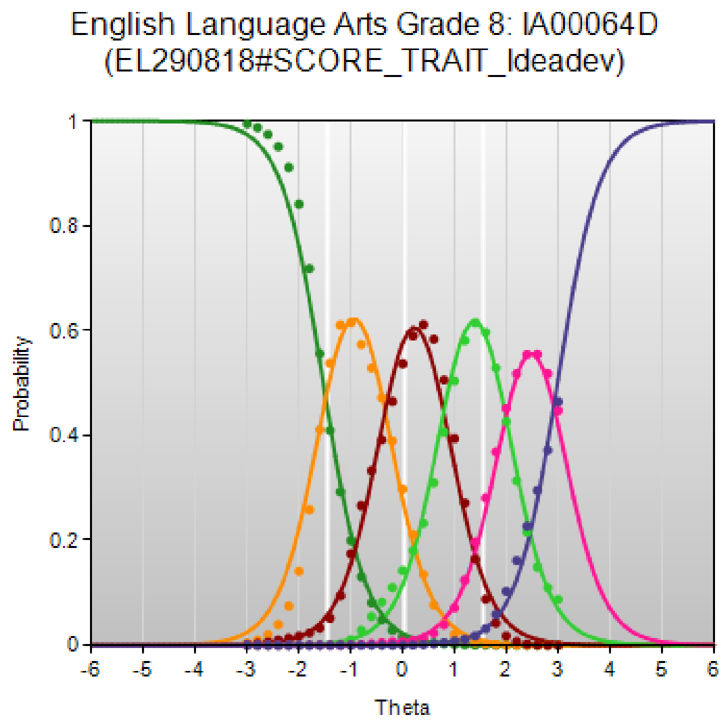
Initial Calibration



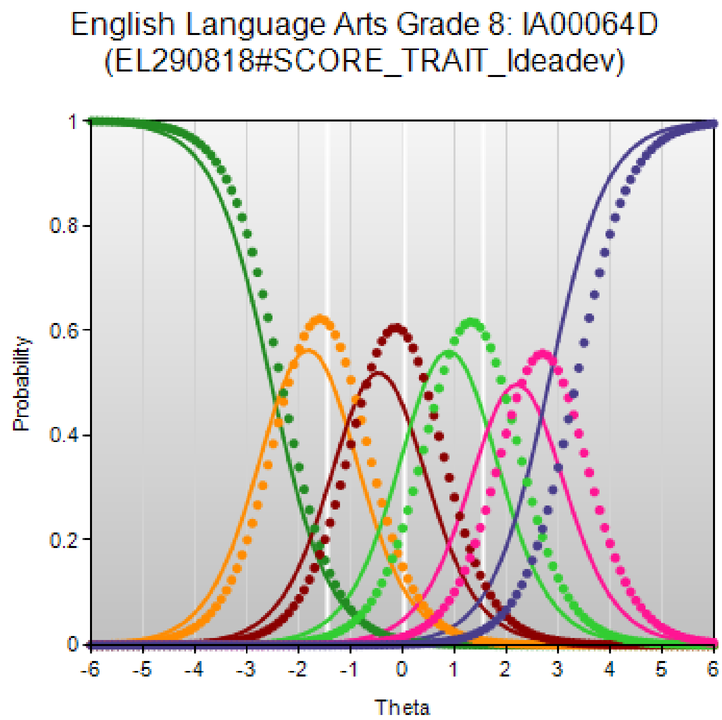
Beta Chart



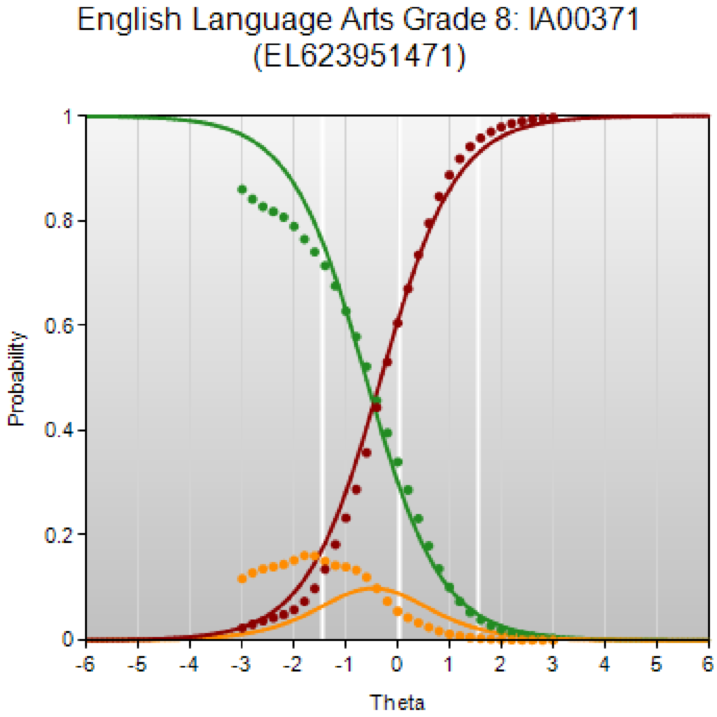
Initial Calibration



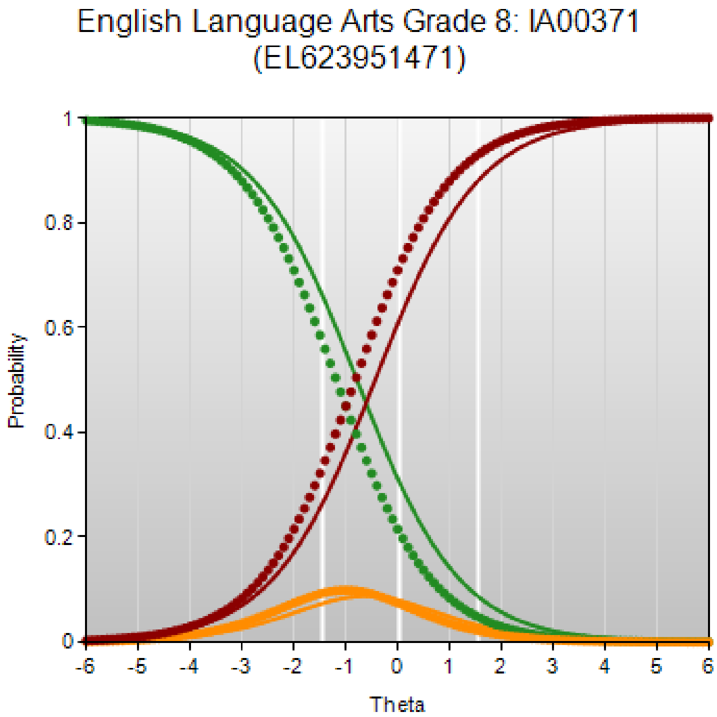
Beta Chart



Initial Calibration

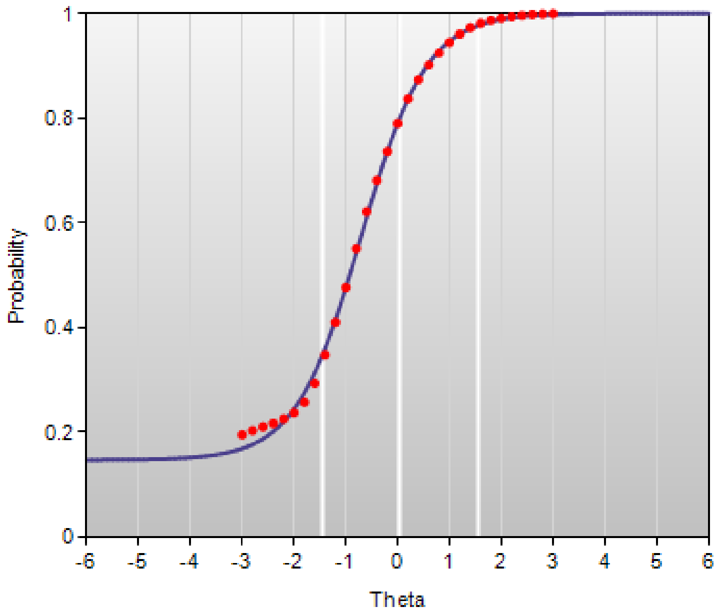


Beta Chart



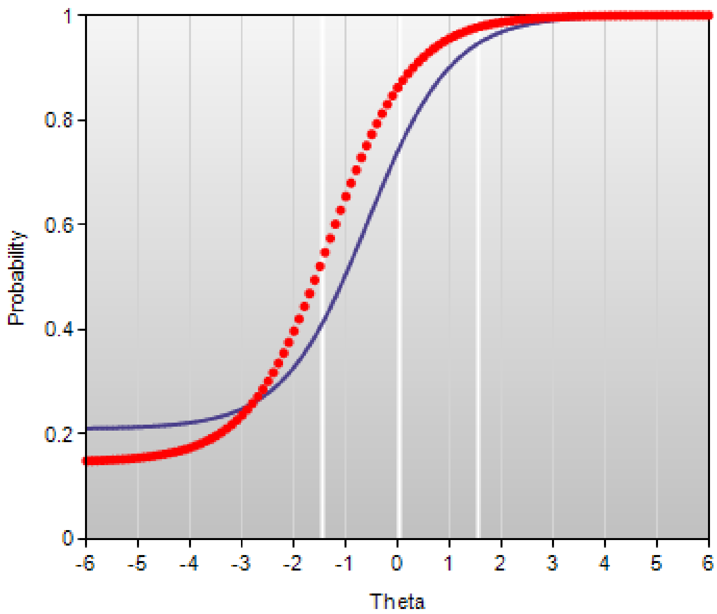
Initial Calibration

English Language Arts Grade 8: IA00374
(EL623952612)



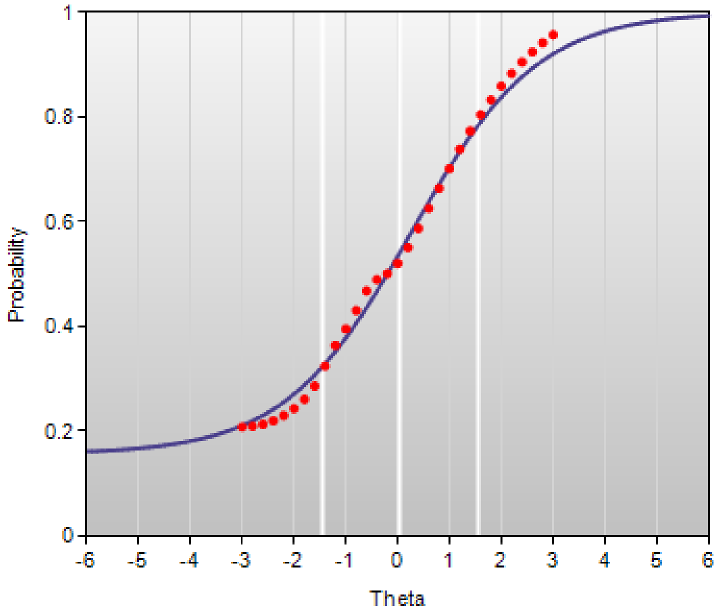
Beta Chart

English Language Arts Grade 8: IA00374
(EL623952612)



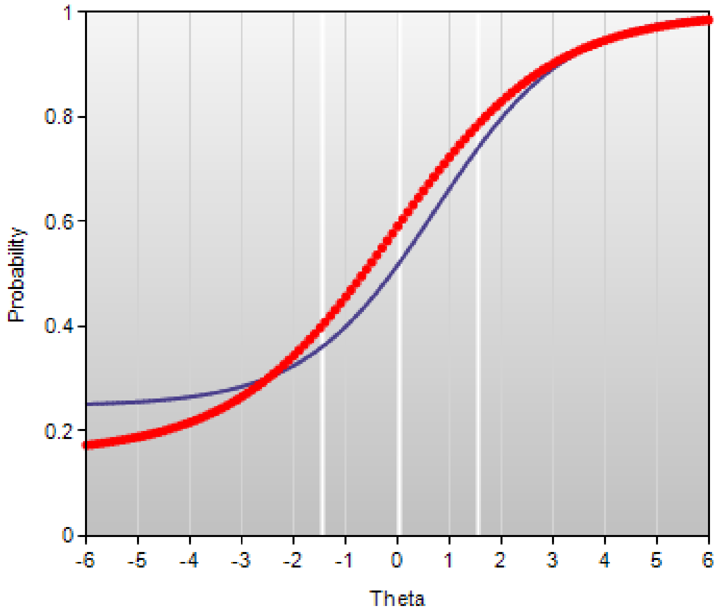
Initial Calibration

English Language Arts Grade 8: IA00379
(EL623955757)



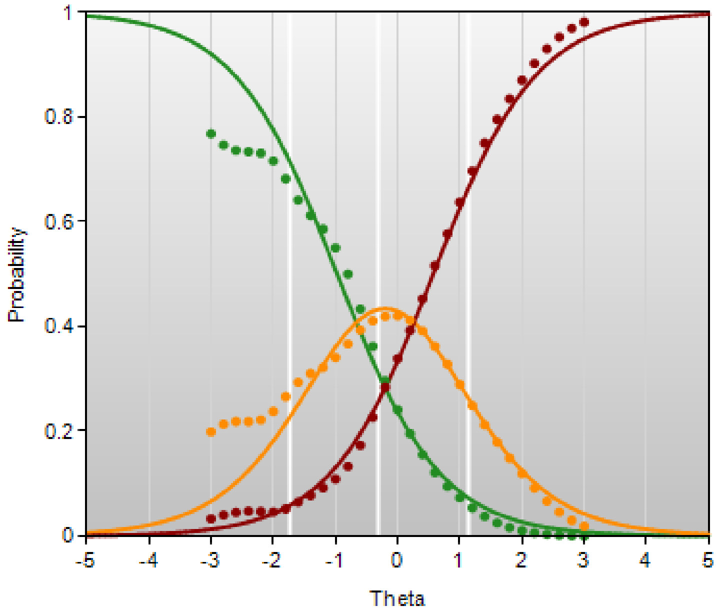
Beta Chart

English Language Arts Grade 8: IA00379
(EL623955757)



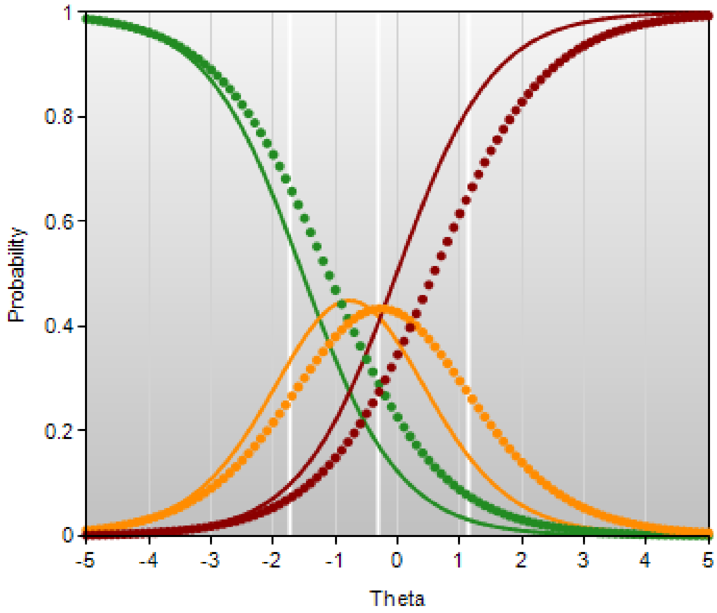
Initial Calibration

English Language Arts Grade 10: IA04110
(EL807953958)



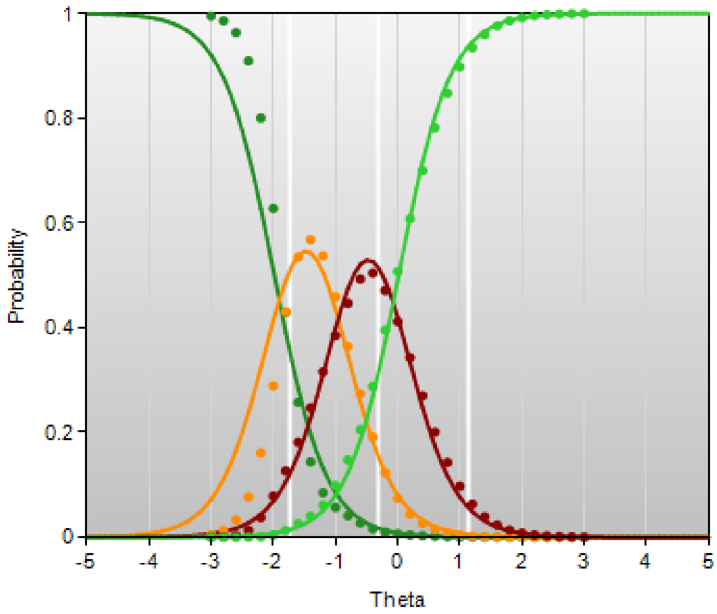
Beta Chart

English Language Arts Grade 10: IA04110
(EL807953958)



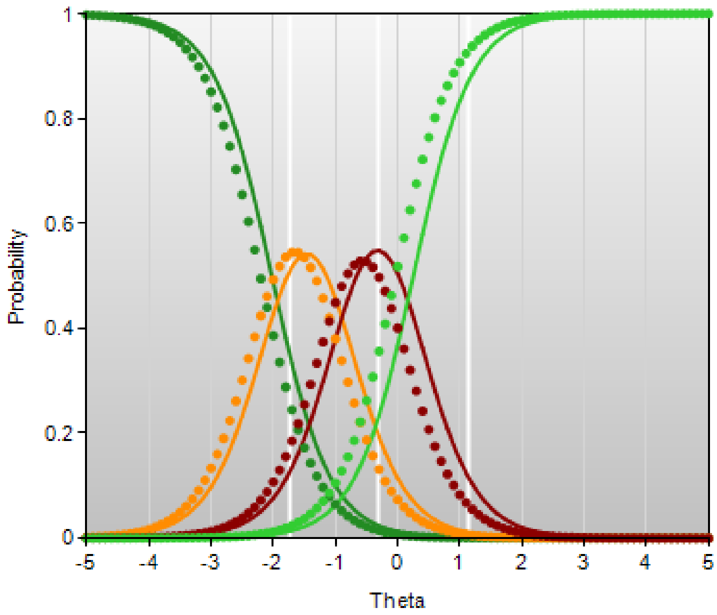
Initial Calibration

English Language Arts Grade 10: IA06626A
(EL811561885#SCORE_TRAIT_Conv)

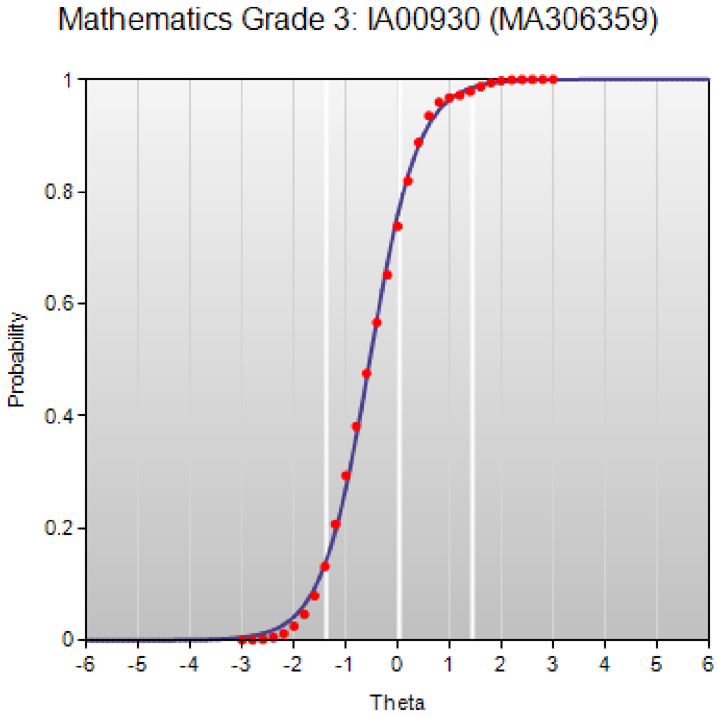


Beta Chart

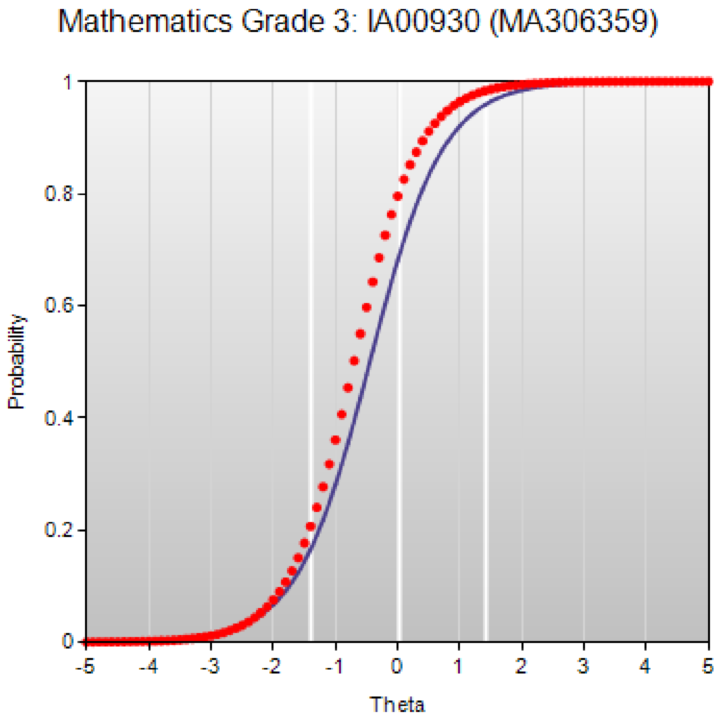
English Language Arts Grade 10: IA06626A
(EL811561885#SCORE_TRAIT_Conv)



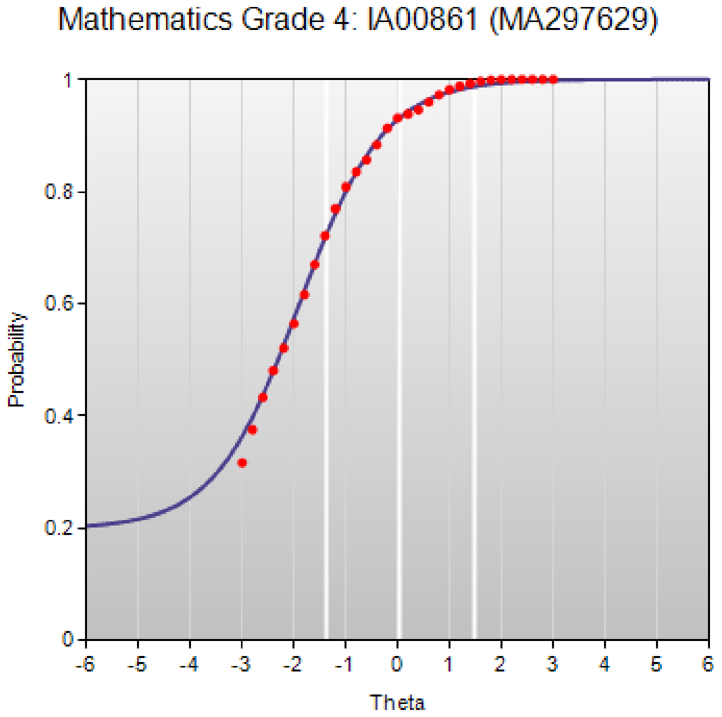
Initial Calibration



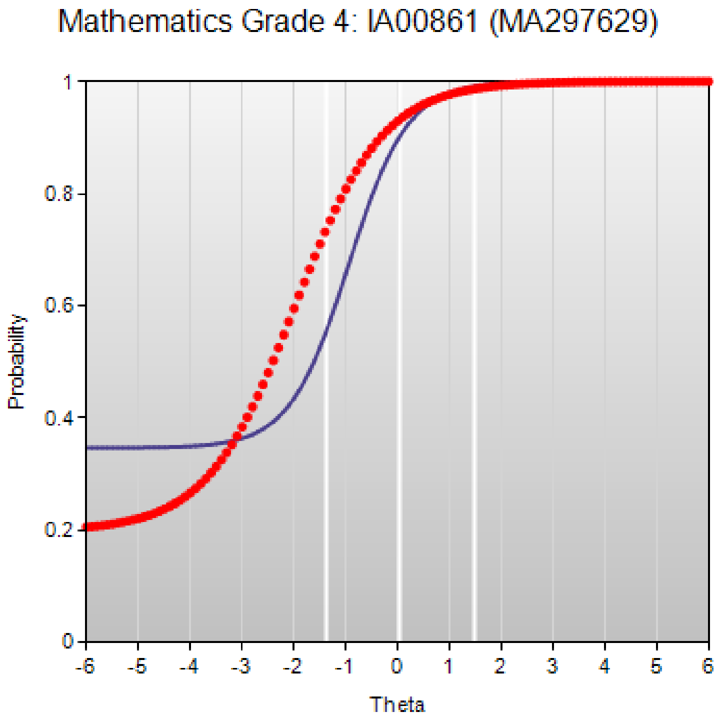
Beta Chart



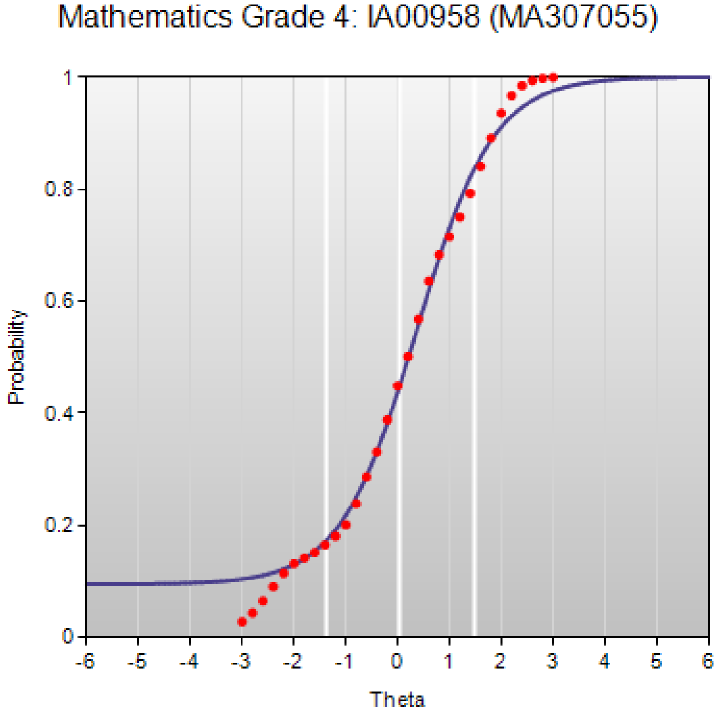
Initial Calibration



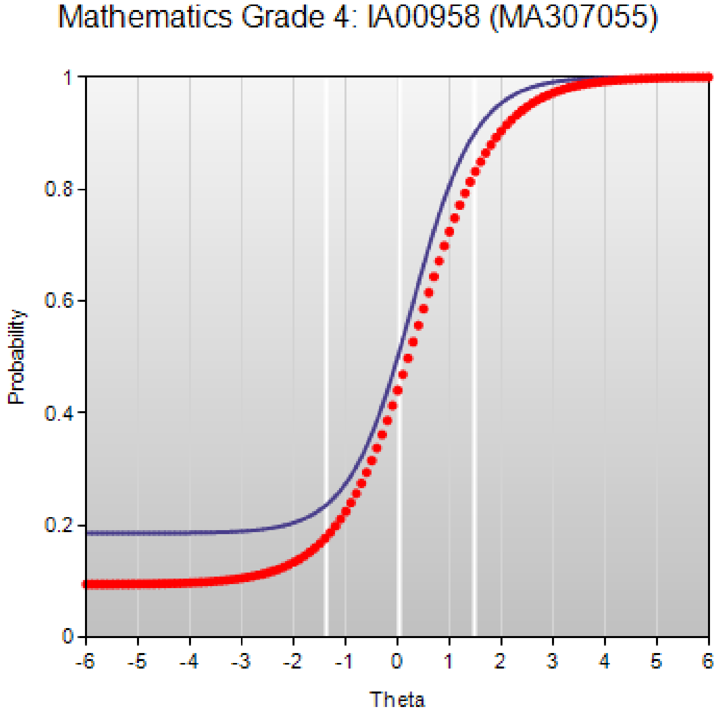
Beta Chart



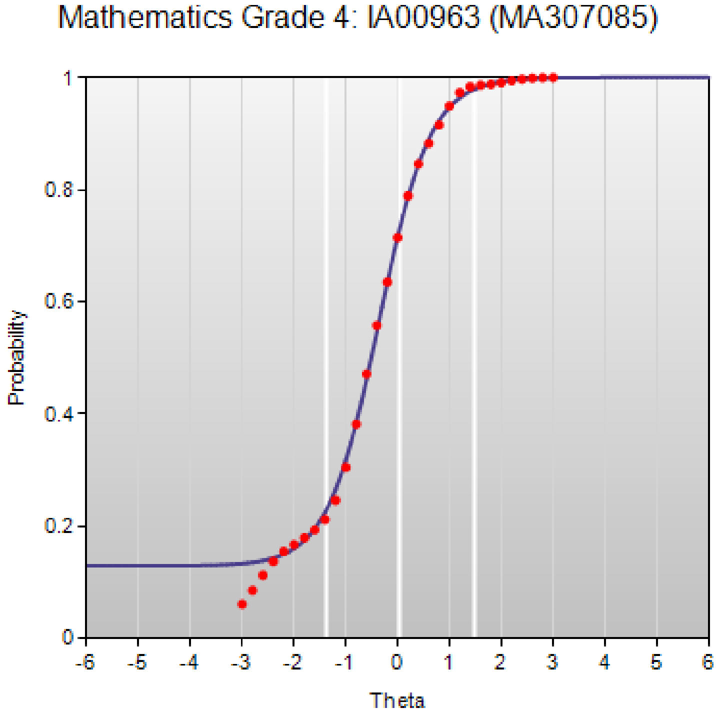
Initial Calibration



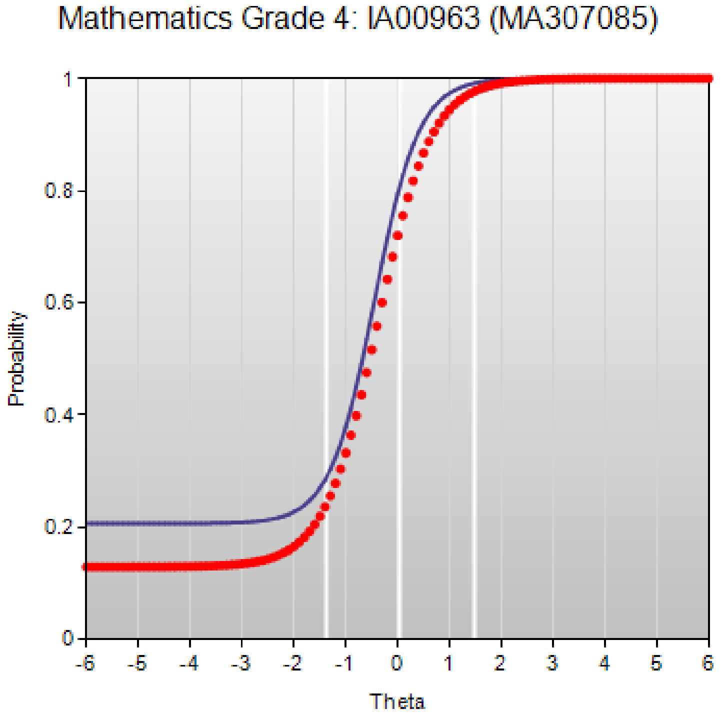
Beta Chart



Initial Calibration

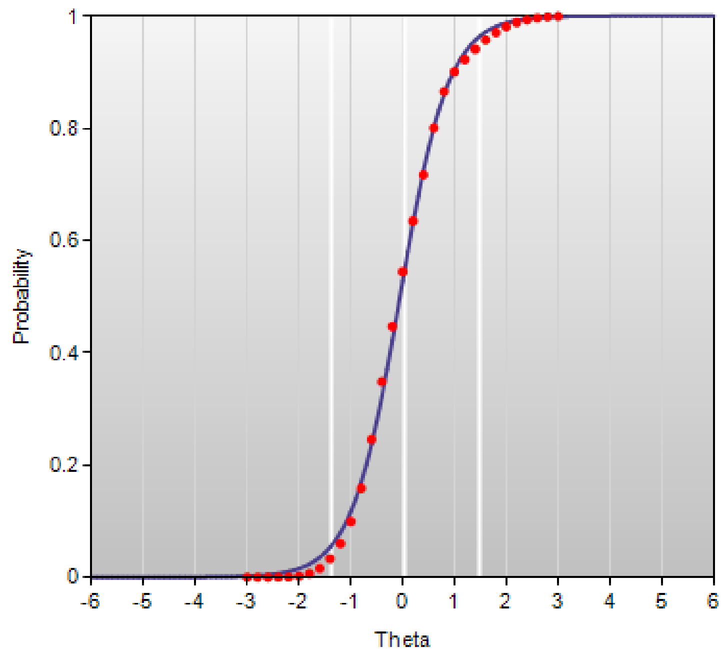


Beta Chart



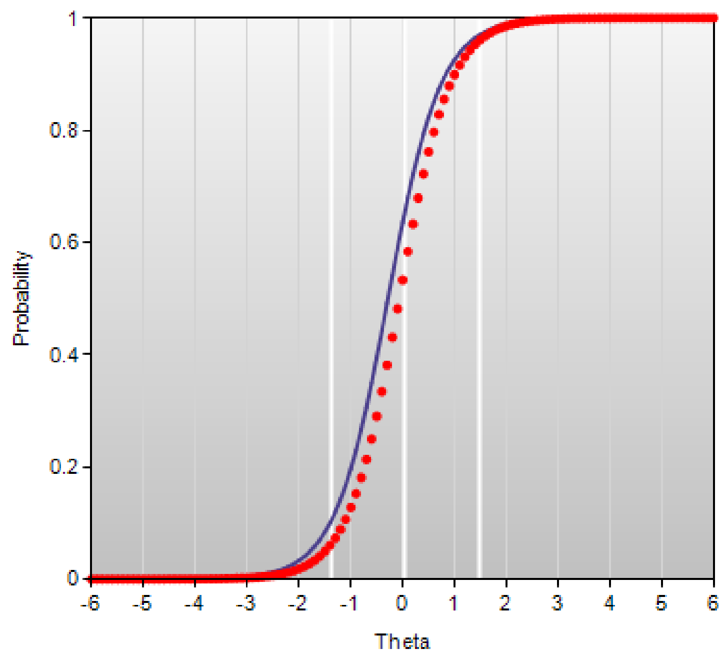
Initial Calibration

Mathematics Grade 4: IA01055 (MA311572)



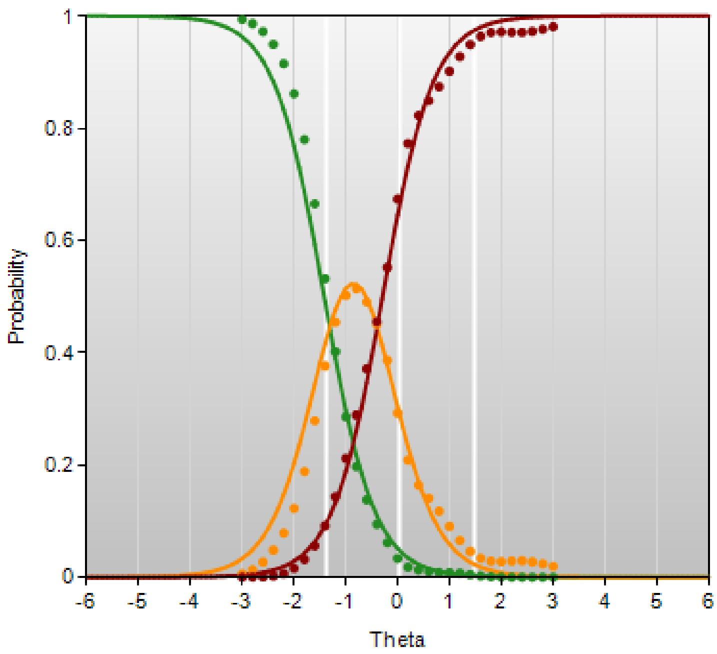
Beta Chart

Mathematics Grade 4: IA01055 (MA311572)



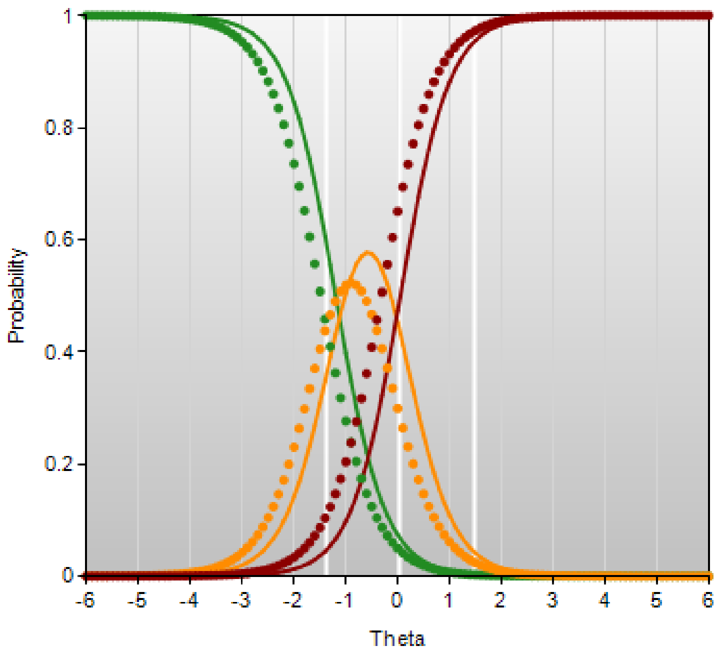
Initial Calibration

Mathematics Grade 4: IA01093 (MA623879088)



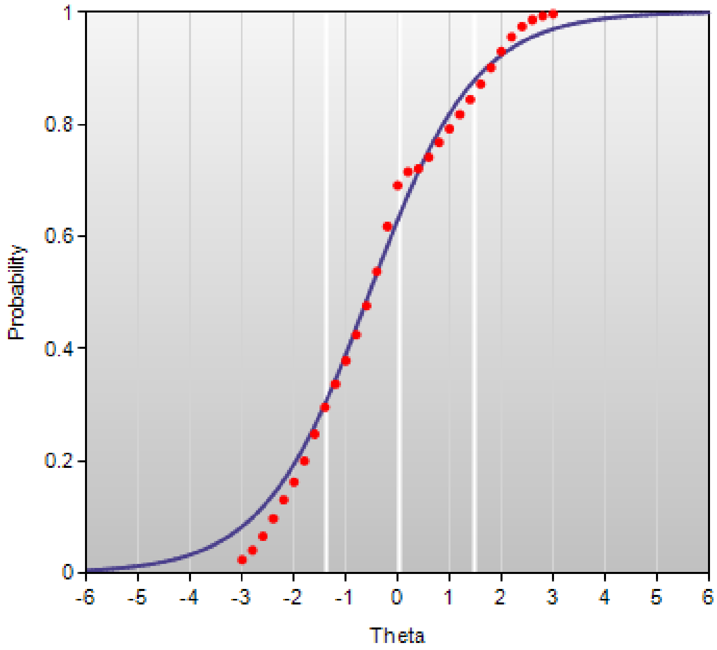
Beta Chart

Mathematics Grade 4: IA01093 (MA623879088)



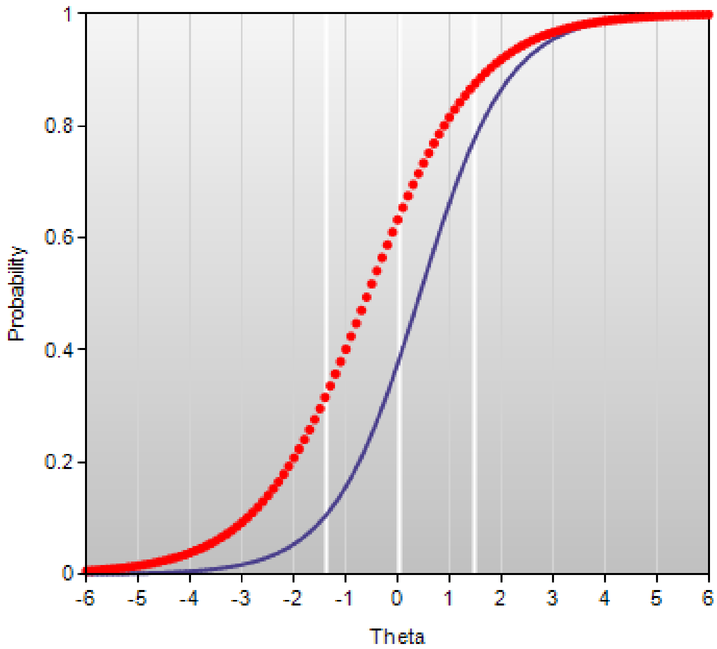
Initial Calibration

Mathematics Grade 4: IA02819 (MA713583365)

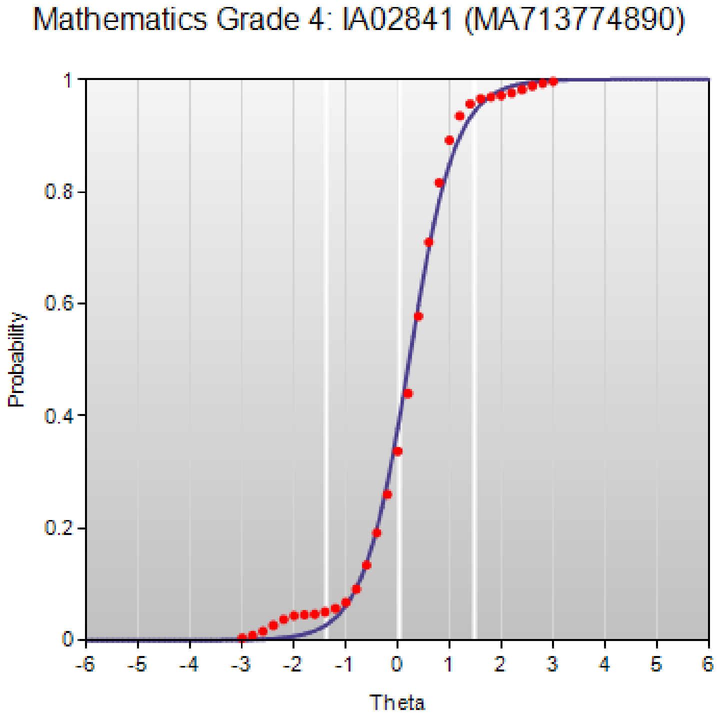


Beta Chart

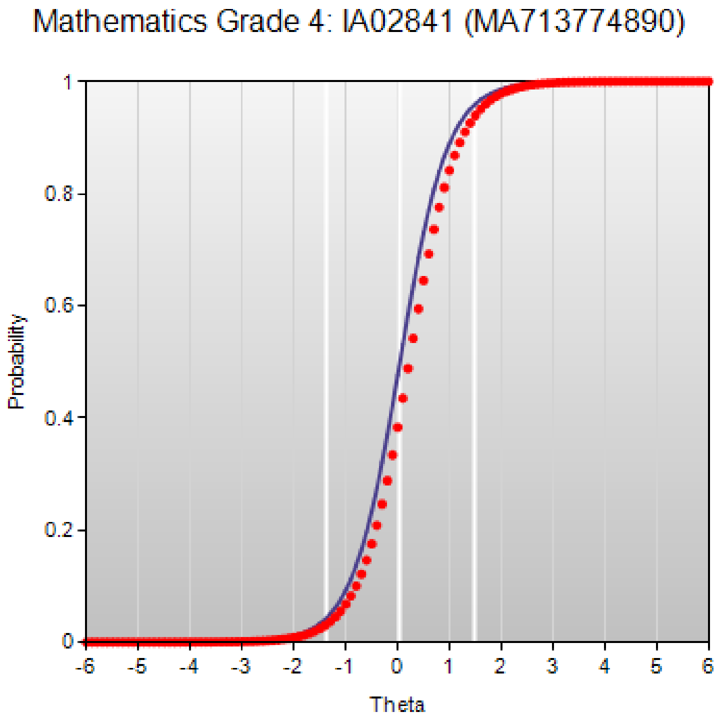
Mathematics Grade 4: IA02819 (MA713583365)



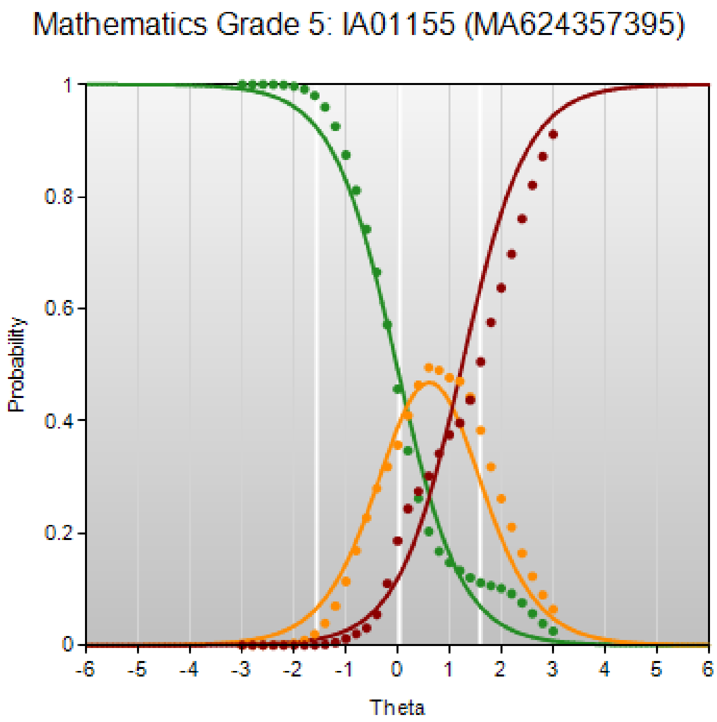
Initial Calibration



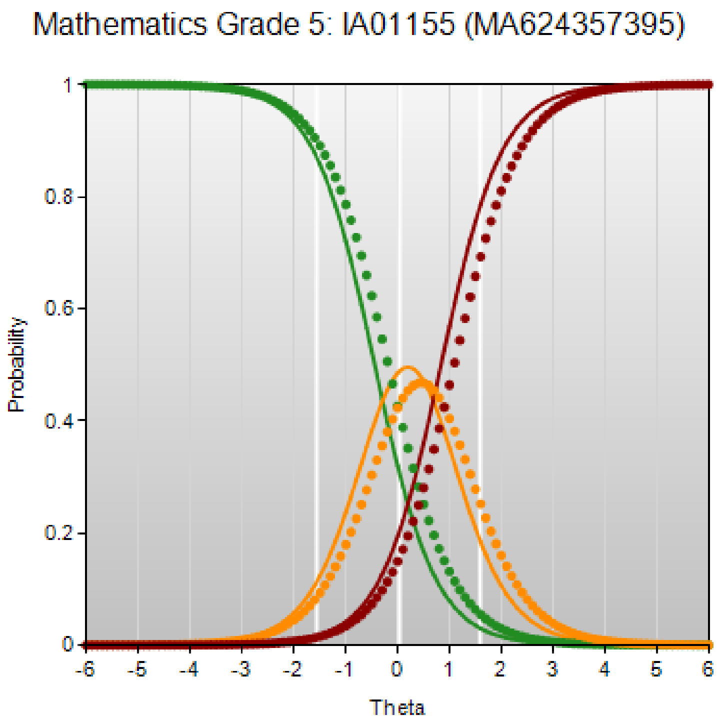
Beta Chart



Initial Calibration

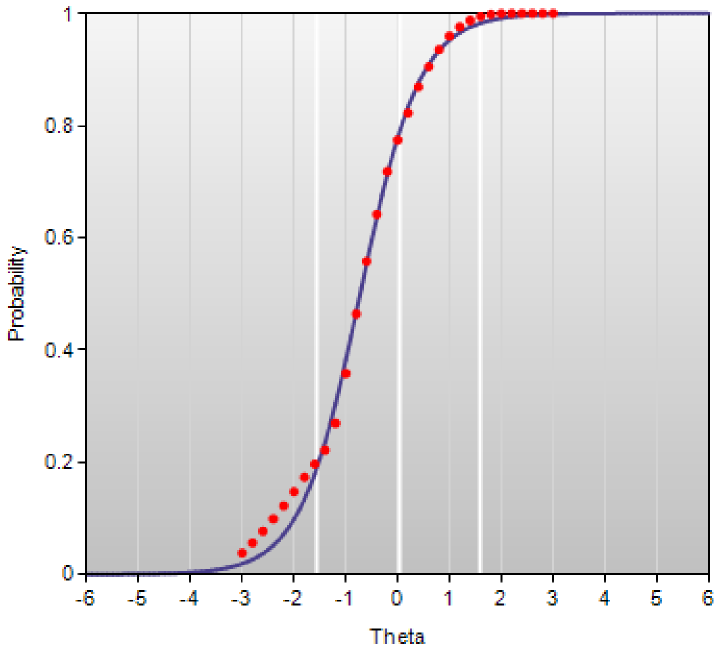


Beta Chart



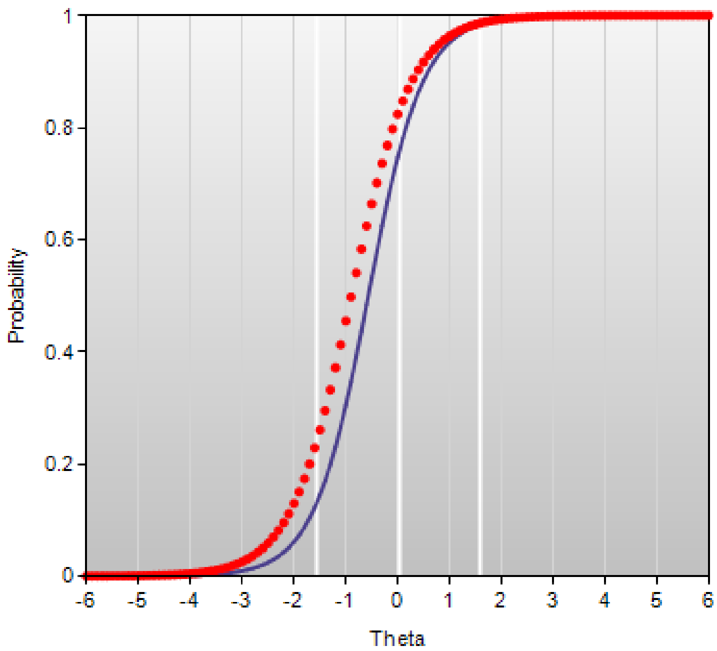
Initial Calibration

Mathematics Grade 5: IA04970 (MA800974344)



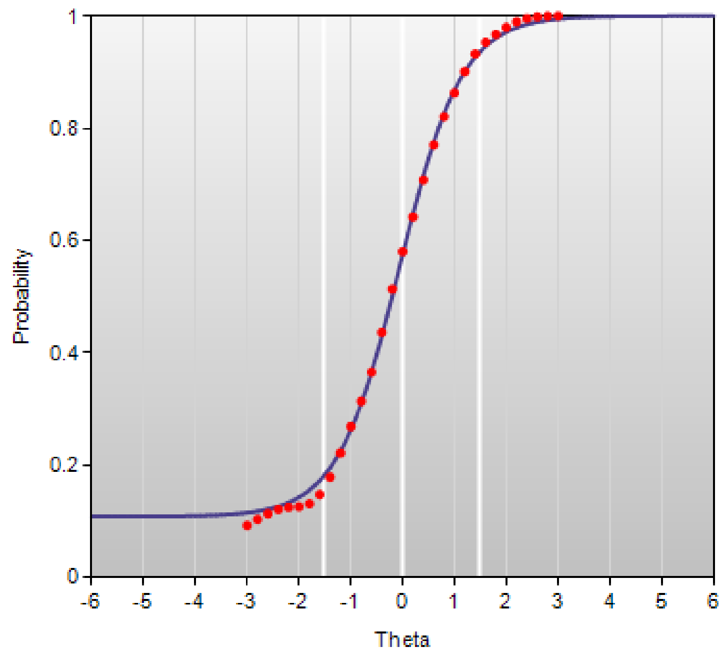
Beta Chart

Mathematics Grade 5: IA04970 (MA800974344)



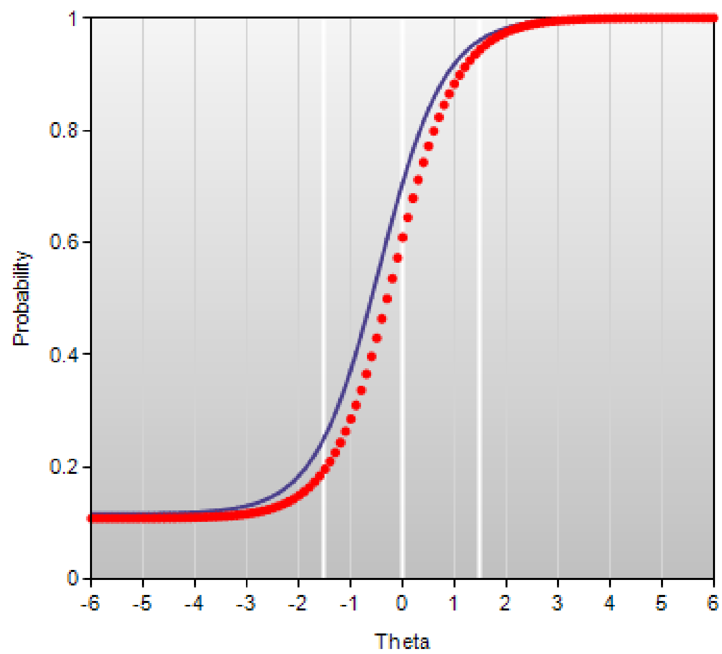
Initial Calibration

Mathematics Grade 6: IA00827 (MA287186)



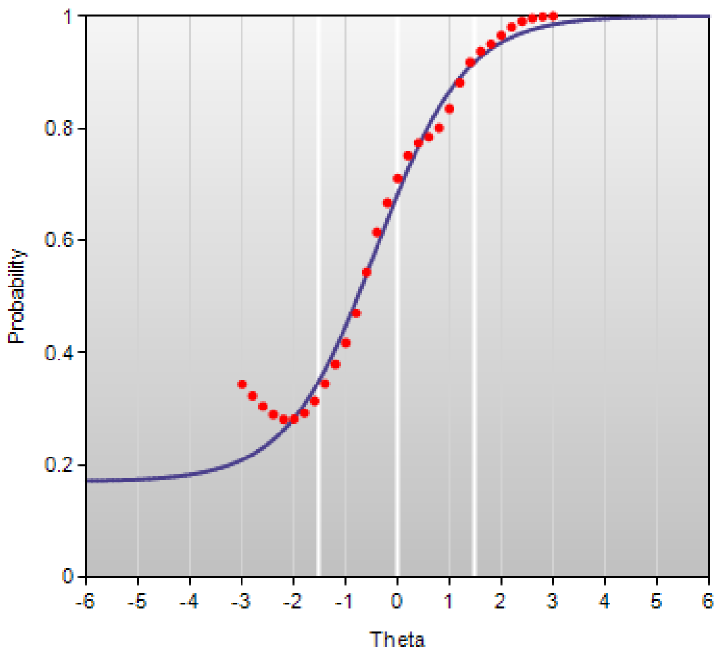
Beta Chart

Mathematics Grade 6: IA00827 (MA287186)



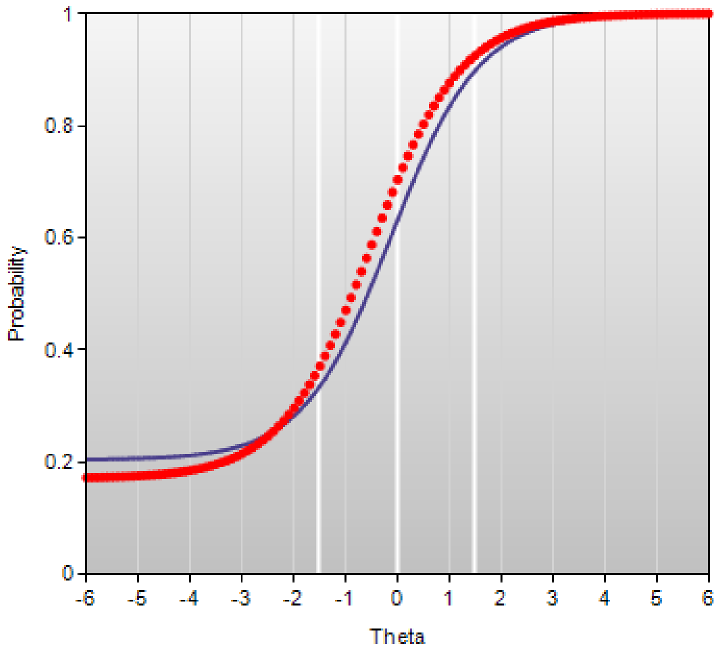
Initial Calibration

Mathematics Grade 6: IA02037 (MA217493)



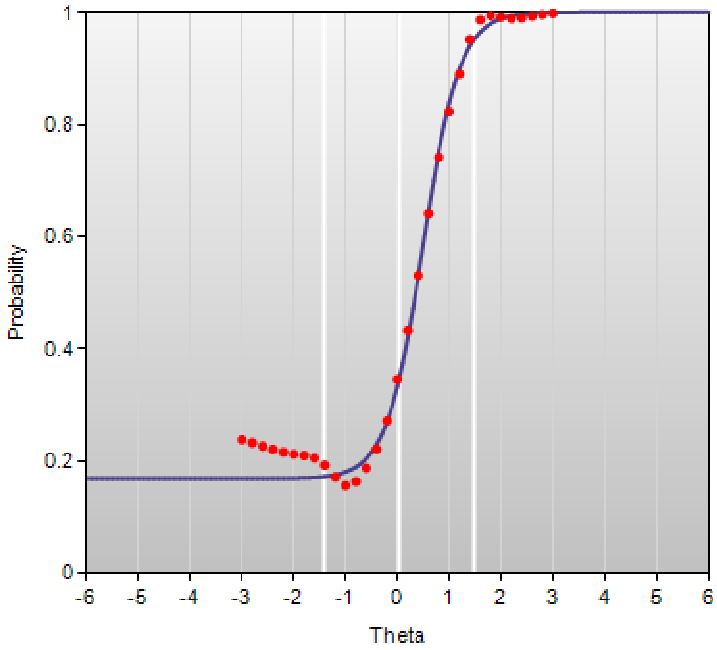
Beta Chart

Mathematics Grade 6: IA02037 (MA217493)



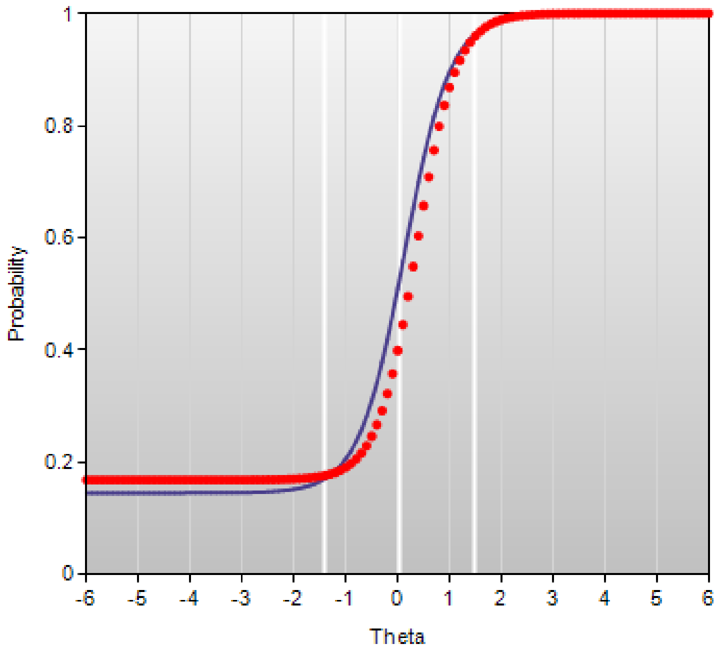
Initial Calibration

Mathematics Grade 7: IA00796 (MA259267)



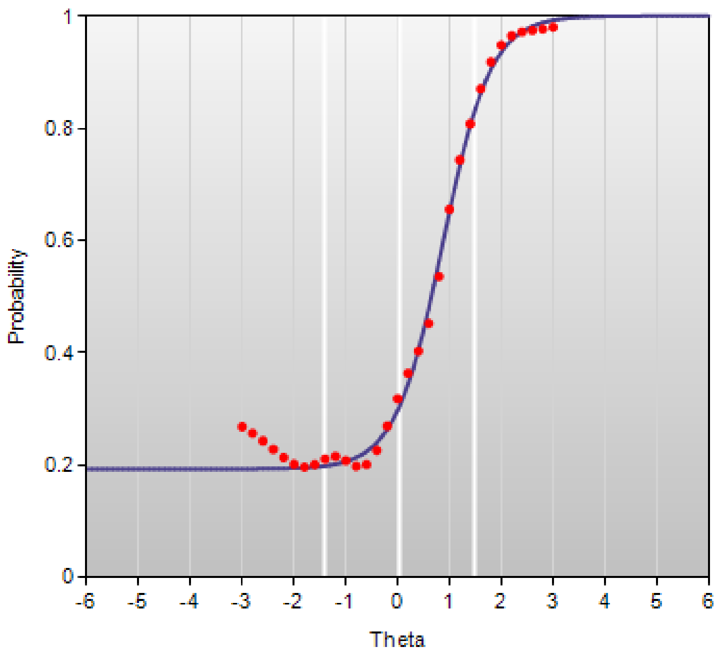
Beta Chart

Mathematics Grade 7: IA00796 (MA259267)



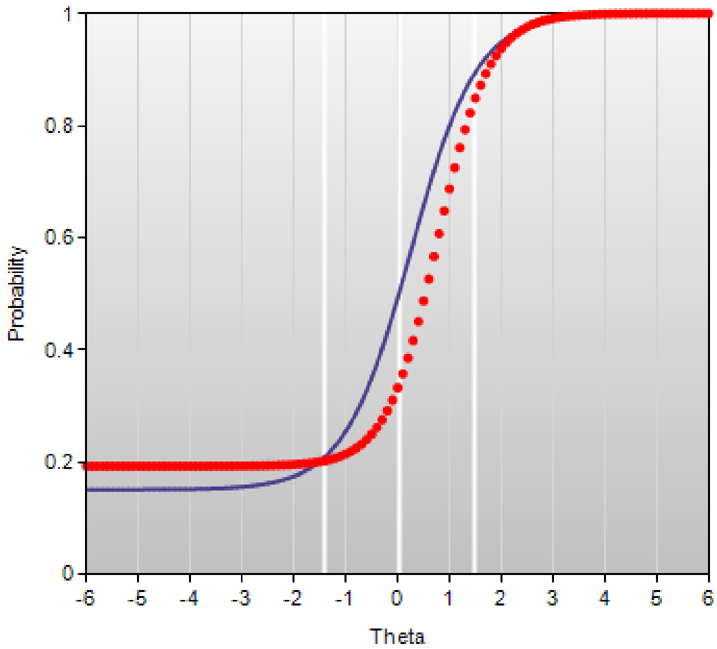
Initial Calibration

Mathematics Grade 7: IA01011 (MA311109)

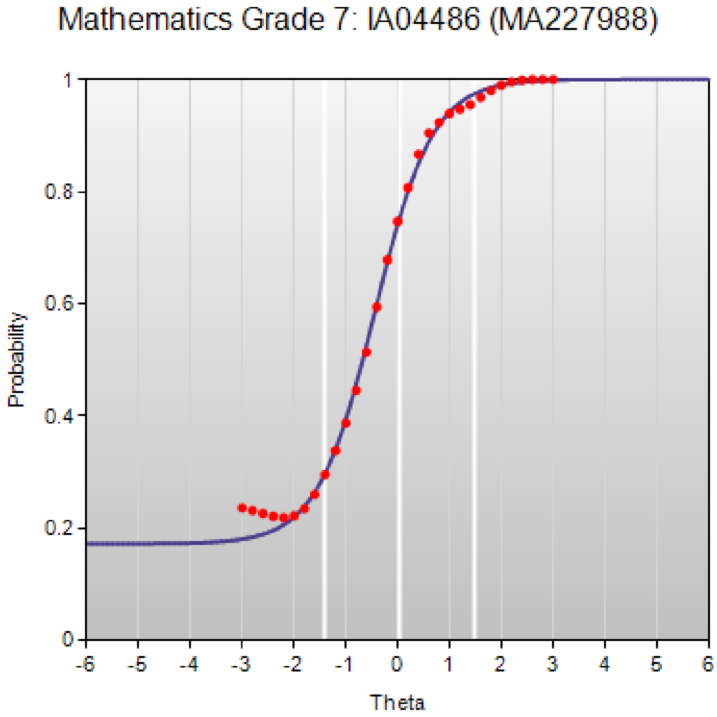


Beta Chart

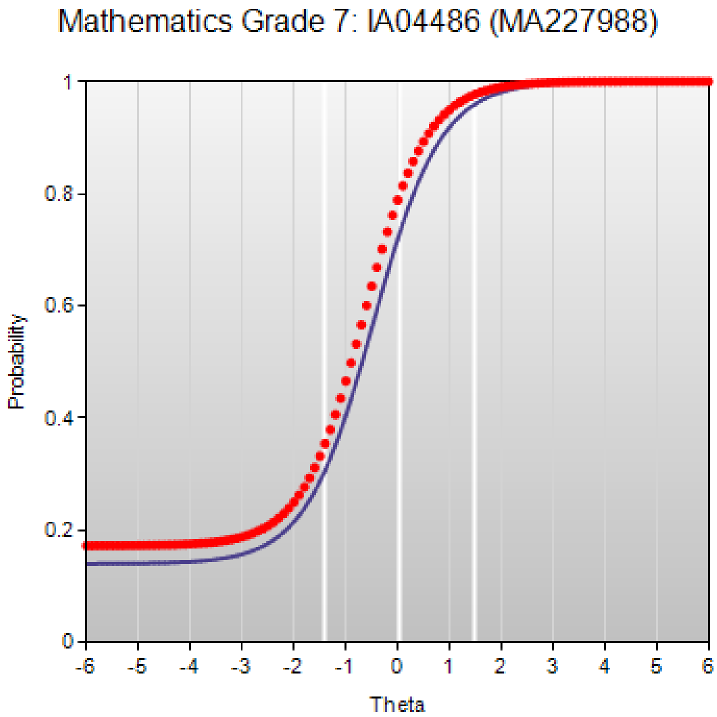
Mathematics Grade 7: IA01011 (MA311109)



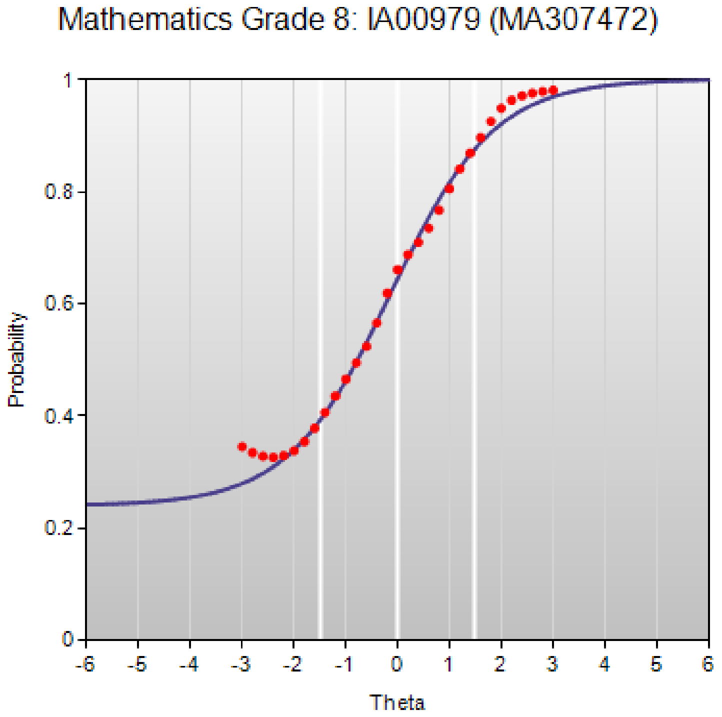
Initial Calibration



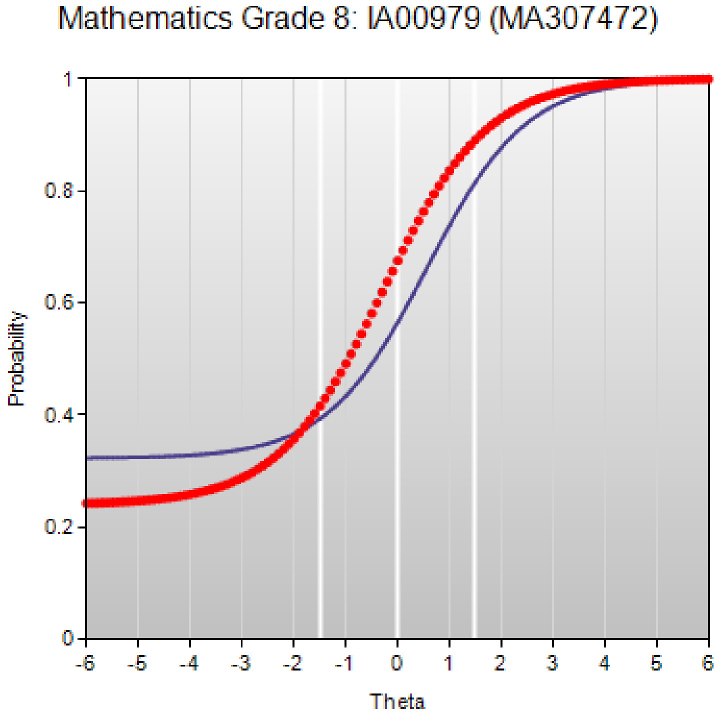
Beta Chart



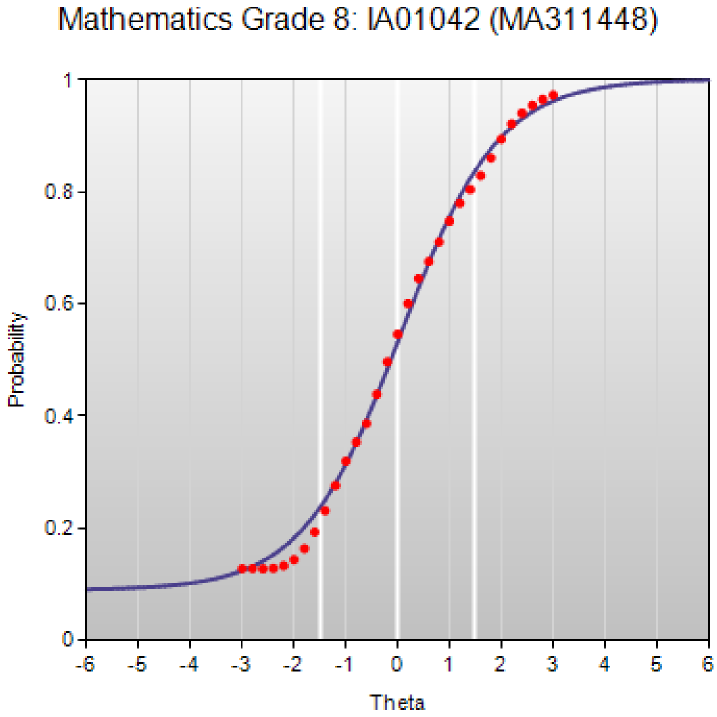
Initial Calibration



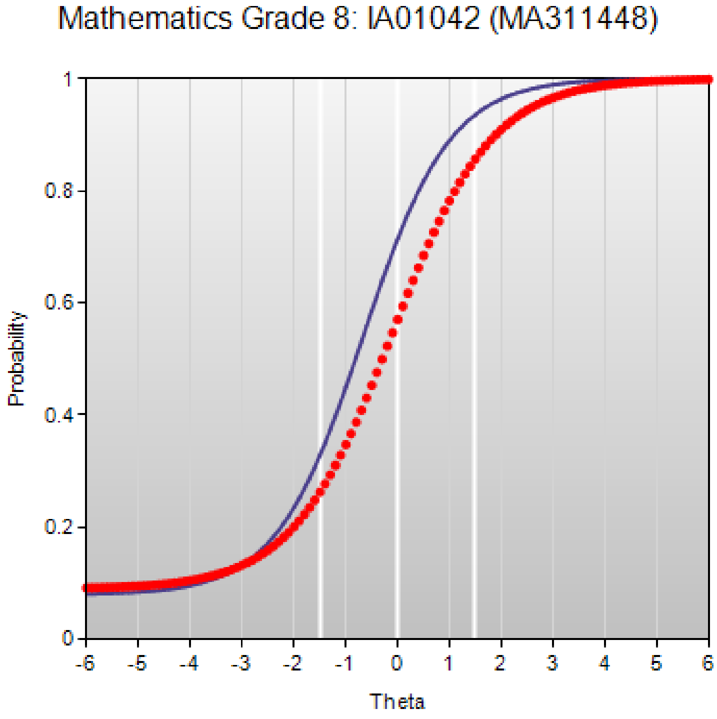
Beta Chart



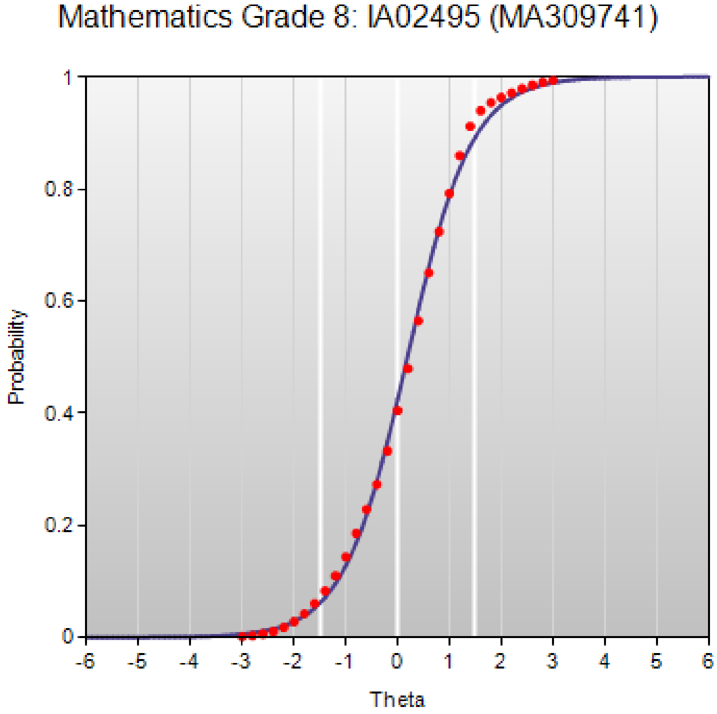
Initial Calibration



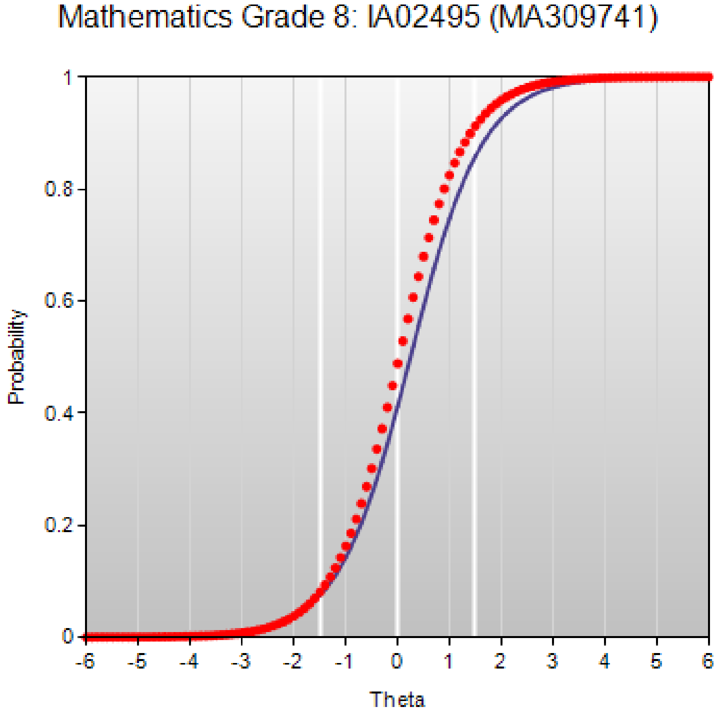
Beta Chart



Initial Calibration

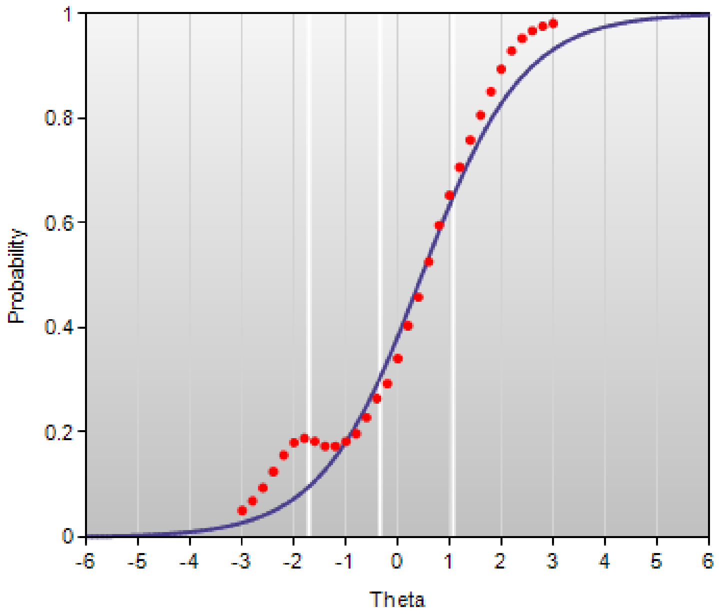


Beta Chart



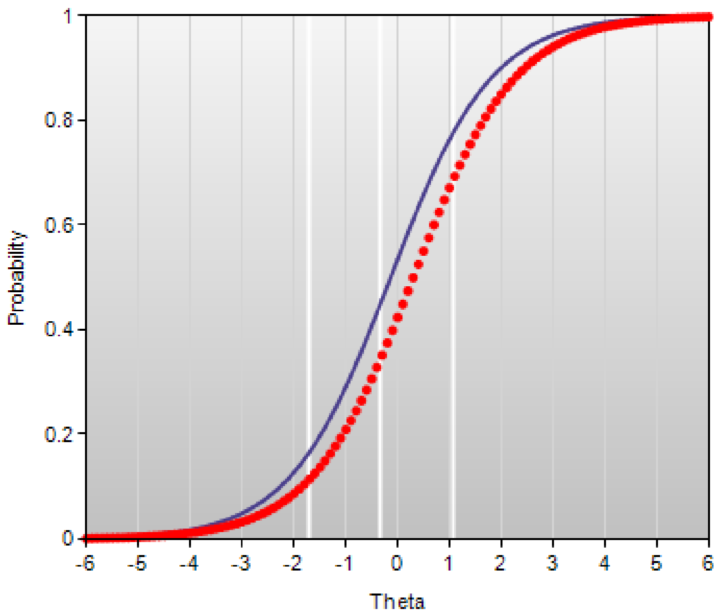
Initial Calibration

Mathematics Grade 10: IA04800 (MA717740737)



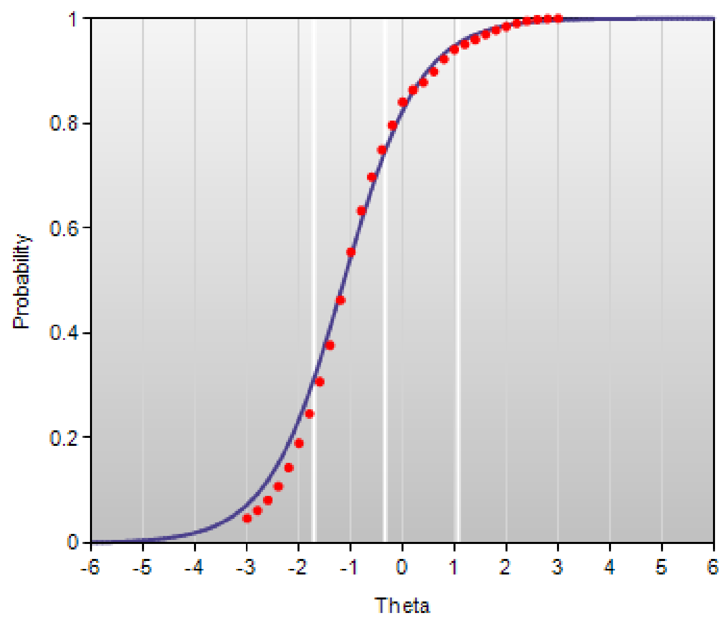
Beta Chart

Mathematics Grade 10: IA04800 (MA717740737)



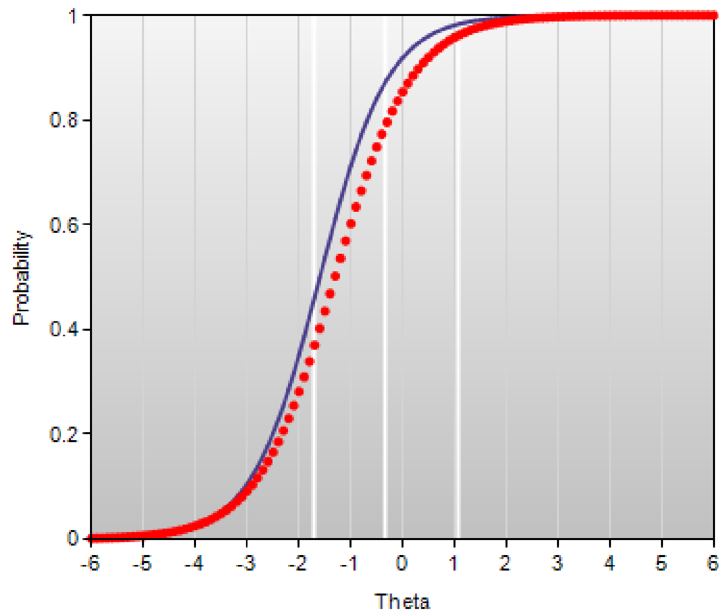
Initial Calibration

Mathematics Grade 10: IA04846 (MA735743236)

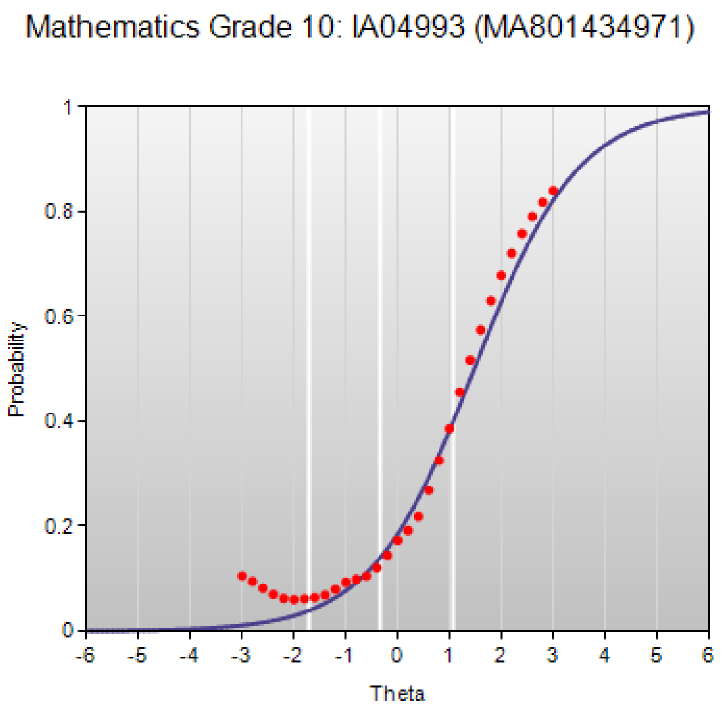


Beta Chart

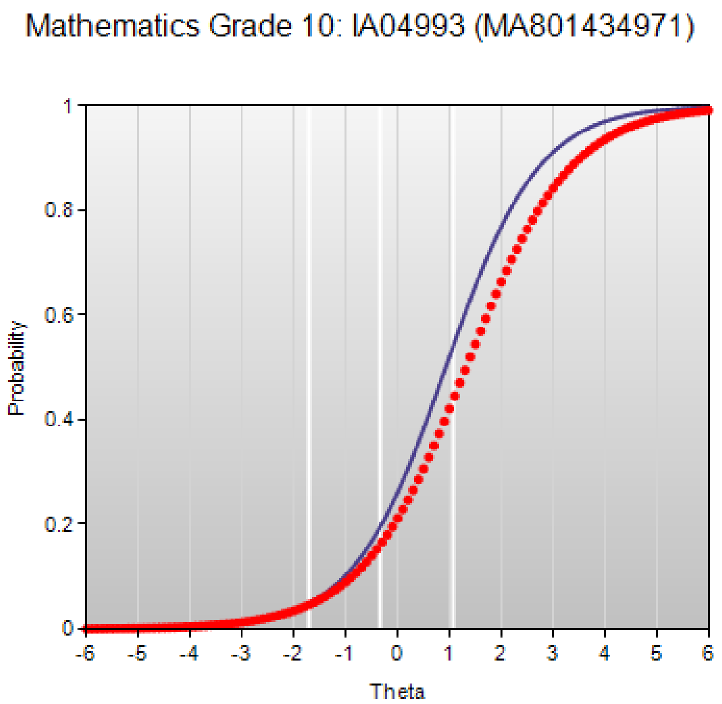
Mathematics Grade 10: IA04846 (MA735743236)



Initial Calibration

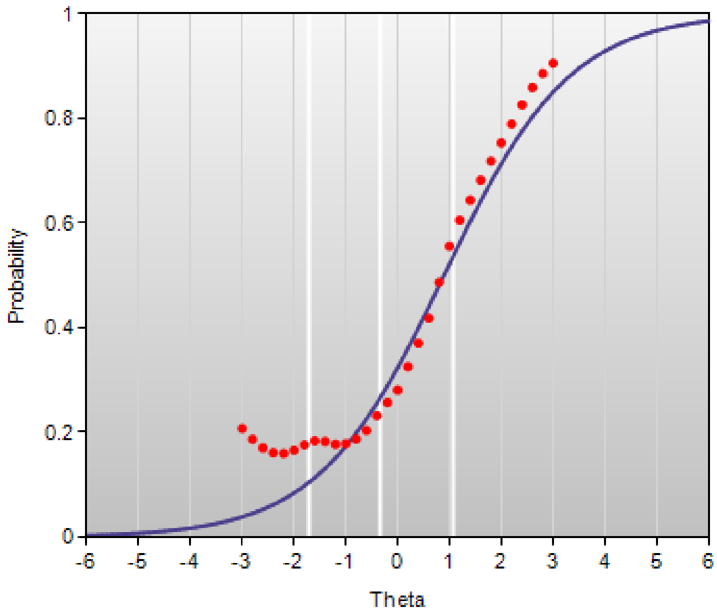


Beta Chart



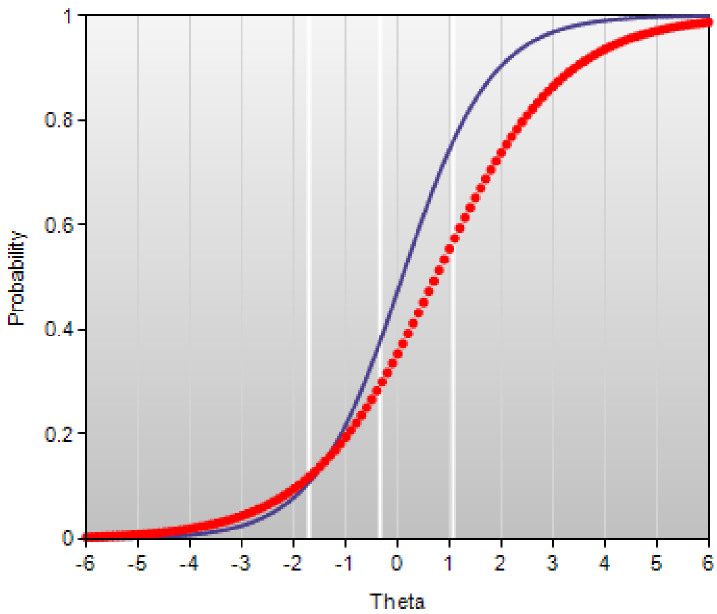
Initial Calibration

Mathematics Grade 10: IA05117 (MA804678931)

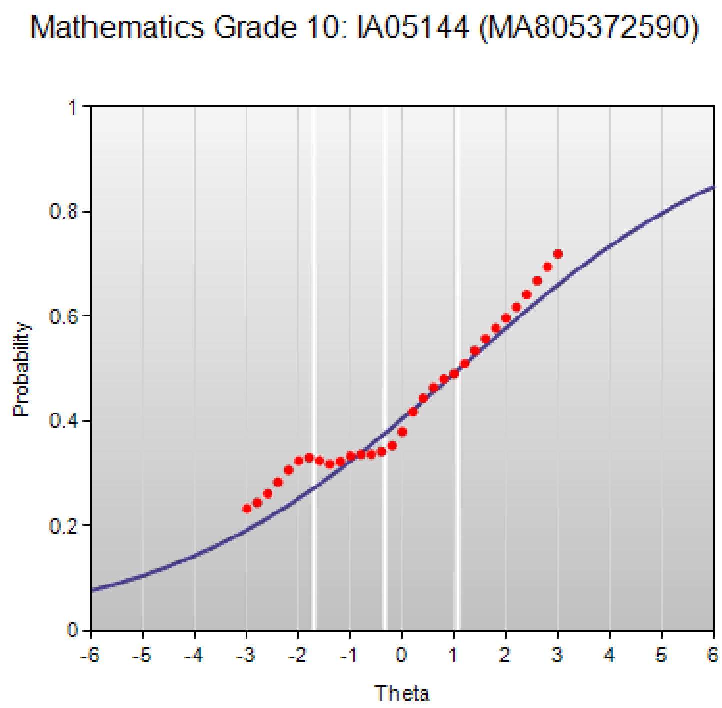


Beta Chart

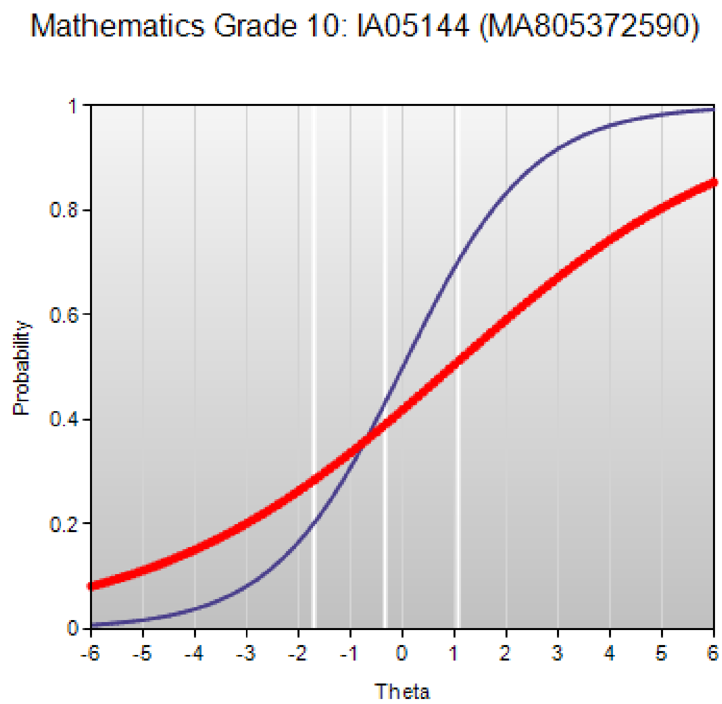
Mathematics Grade 10: IA05117 (MA804678931)



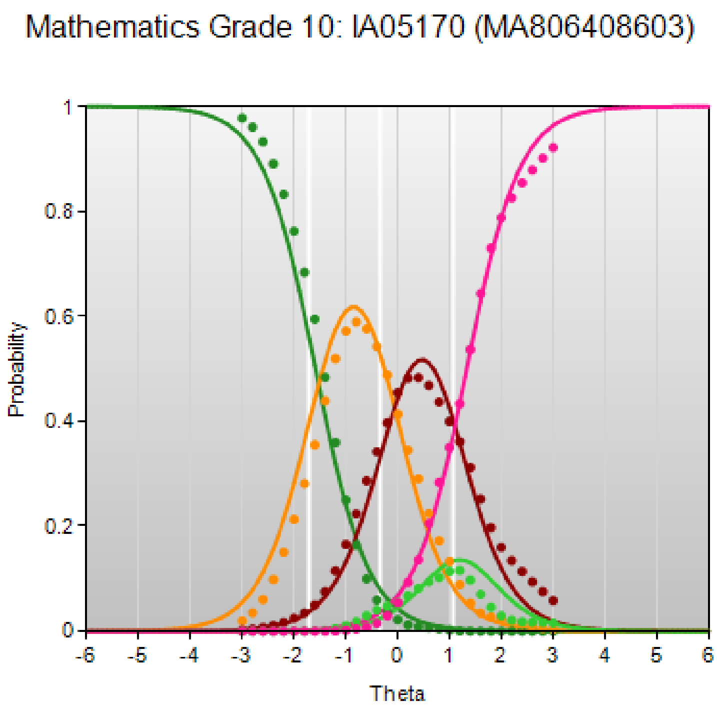
Initial Calibration



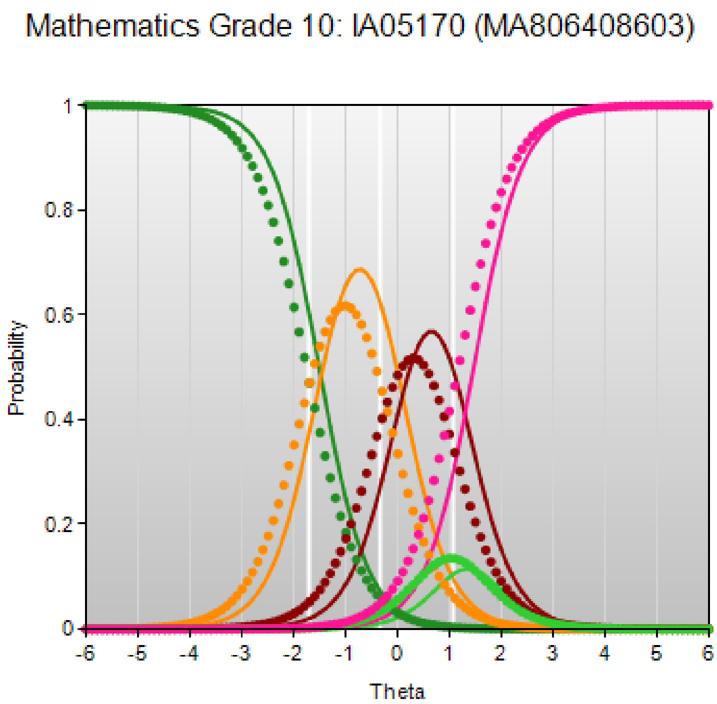
Beta Chart



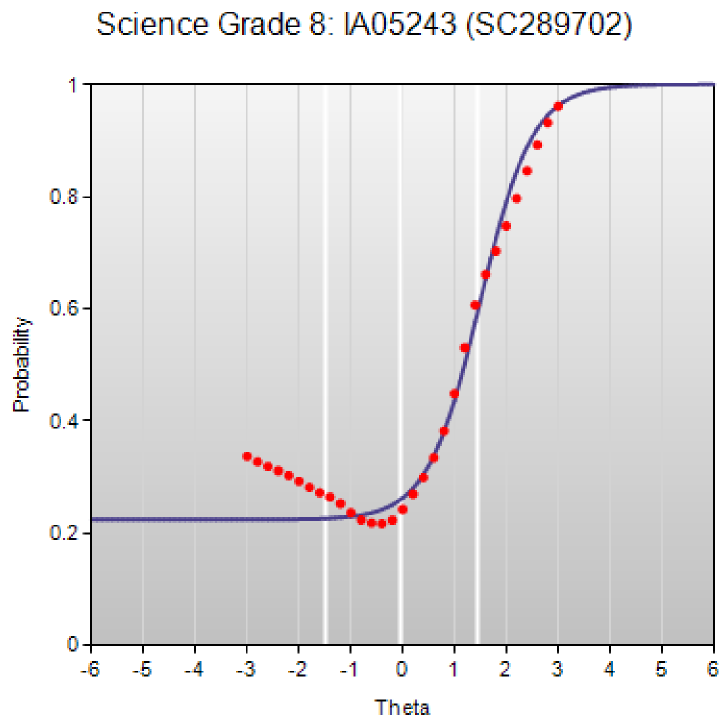
Initial Calibration



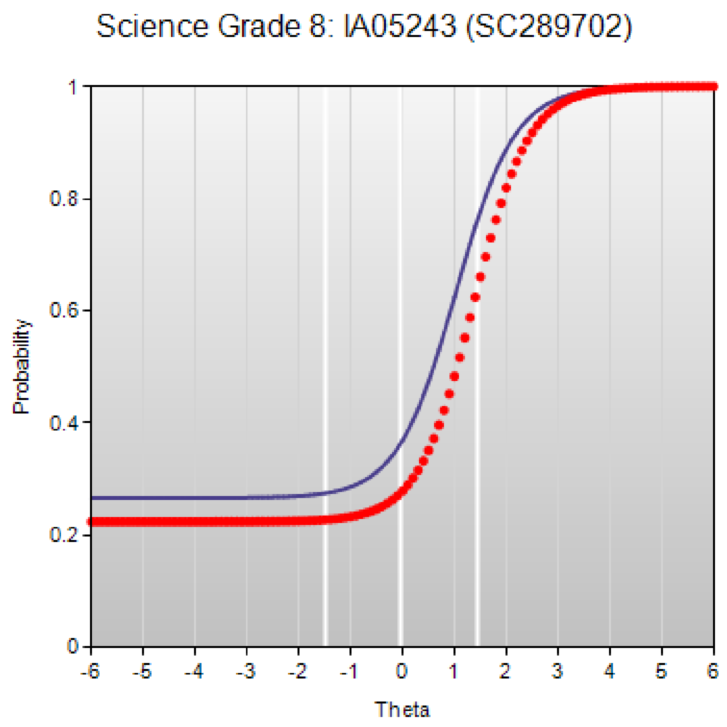
Beta Chart



Initial Calibration

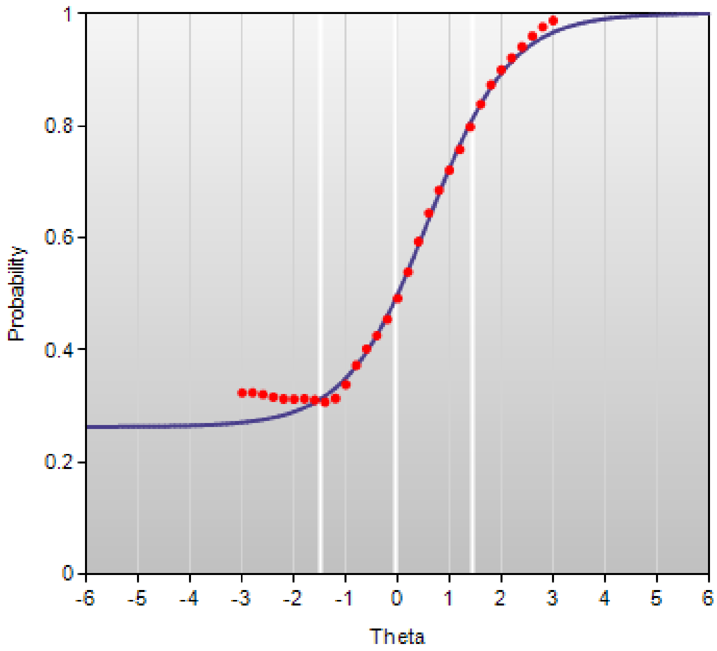


Beta Chart



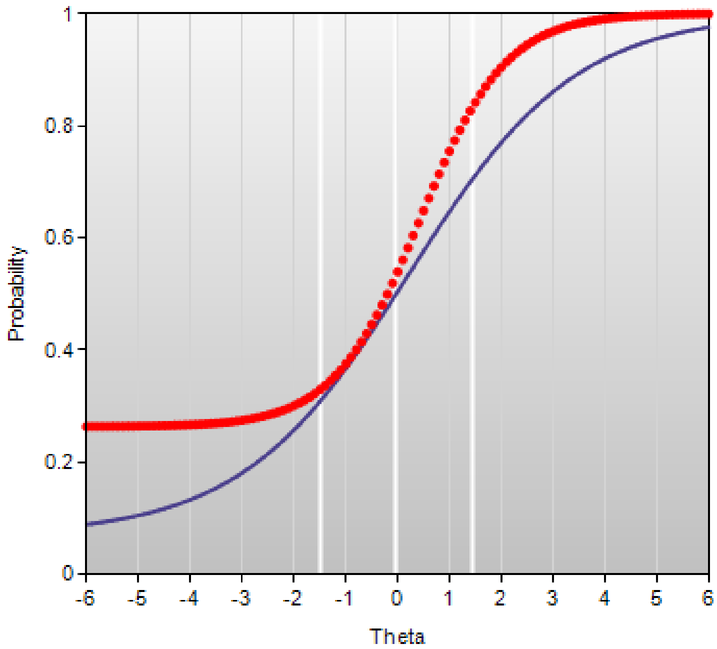
Initial Calibration

Science Grade 8: IA05245 (SC290144)



Beta Chart

Science Grade 8: IA05245 (SC290144)



Appendix M

2022 MCAS Standard Setting Report

Pearson

MCAS Standard Setting Meeting
Biology and Introductory Physics

August 2022

Pearson

Version 1.5

Table of Contents

Executive Report

MCAS Biology and Introductory Physics Standard Setting Meeting Executive Summary

August 2022

This report summarizes the process and results of setting achievement levels for the Massachusetts Comprehensive Assessment System (MCAS) assessments for Biology and Introductory Physics. The Massachusetts Department of Elementary and Secondary Education (ESE) partnered with Cognia and Pearson (the MCAS assessment contractors) to collect recommendations for cut scores associated with the achievement levels for the MCAS assessments.

MCAS Standard Setting Process and Results

Achievement levels are used to classify student achievement on an assessment. In order to classify student achievement into the four different levels, the following components are required: 1) policy-level definitions, 2) Achievement Level Descriptors (ALDs), and 3) cut scores. Policy-level definitions provide general descriptions of the knowledge, skills, and abilities students must demonstrate to be classified into each achievement level and apply to all courses or subject areas. ALDs illustrate the achievement levels in terms that are specific to a course or subject area. Cut scores represent the lowest boundary of each achievement level on the scale.

The process of recommending performance standards for the MCAS tests was based on standard setting procedures that were used for the MCAS tests for ELA, mathematics, and STE for grades 5 and 8, was in line with national best practice, and was conducted with review and approval of the MCAS Technical Advisory Committee (TAC). Results and details of the process are presented in the following sections.

Policy-level Definitions

Policy-level definitions for the MCAS achievement levels are shown in Table 1. The titles and descriptions of the achievement levels were defined to be part of a cohesive assessment system. The achievement levels indicate a student's ability to demonstrate proficiency in relation to subject- and grade-specific expectations, as indicators of a student's readiness for the next grade-level or college and career, as defined in the Massachusetts curriculum framework.

The Commissioner and the Board of Elementary and Secondary Education approved the final policy-level definitions for MCAS assessments in March 2017.

Table 1. Policy-level Definitions for MCAS Achievement Levels

Achievement Level	Policy-level Definition
Exceeding Expectations	A student who performed at this level exceeded grade-level expectations by demonstrating mastery of the subject matter.
Meeting Expectations	A student who performed at this level met grade-level expectations and is academically on track to succeed in the current grade in this subject.
Partially Meeting Expectations	A student who performed at this level partially met grade-level expectations in this subject. The school, in consultation with the student's parent/guardian, should consider whether the student needs additional academic assistance to succeed in this subject.
Not Meeting Expectations	A student who performed at this level did not meet grade-level expectations in this subject. The school, in consultation with the student's parent/guardian, should determine the coordinated academic assistance and/or additional instruction the student needs to succeed in this subject.

Achievement Level Descriptors (ALDs)

Draft sets of ALDs for the Biology and Introductory Physics, shown in Appendix A, indicate the knowledge and skills that students performing at a given achievement level should be able to demonstrate within each specific content area. Descriptors were developed for the *Partially Meeting Expectations, Meeting Expectations,* and *Exceeding Expectations* only. A student classified as *Not Meeting Expectations* has not demonstrated the knowledge, skills, and abilities necessary to achieve *Partially Meeting Expectations.*

A multi-step process was used to develop, review, and approve the ALDs for each test. Prior to the standard setting meeting, the DESE science test developers created the ALDs for each content area. Curriculum and instruction staff from DESE's Center for Instructional Support reviewed and commented on the ALDs. In addition, test developers from DESE's testing contractor, Cognia, reviewed and commented on the drafts. Finally, educators from DESE's Biology and Introductory Physics Assessment Development Committees (former and current members) reviewed and edited the drafts. These educators reviewed their content area ALDs and then reviewed the ALDs from the other content area. For example, Biology educators reviewed the Biology ALDs first and then reviewed the Introductory Physics ALDs. The educators first discussed their content area ALDs within their content area. This was followed by a whole group meeting of both sets of educators comparing the two sets of ALDs. The reason for the comparison between the content areas was to ensure similar rigor and expectations for each test at each achievement level. A final summary report of the ALD meeting will be included in the full standard setting report.

Teachers who participated in the standard setting committees had the opportunity to provide suggestions and edits to the draft set of ALDs. To produce the final ALDs, DESE science test developers will edit the draft ALDs based on suggestions generated by the participants in the standard setting meeting.

Cut Scores

The cut scores that were recommended for adoption for the MCAS assessments are based on a standardized set of procedures implemented during the standard setting meetings. General methods used during the meeting for obtaining the recommended cut scores are provided below.

Standard Setting Meeting

From August 9 to August 11, 2022, after the first year of operational administration in spring 2022, a standard setting meeting was conducted to obtain cut score recommendations for the next-generation high school science MCAS tests. There were two committees, with each recommending cut scores for one test:

1. Biology
2. Introductory Physics

Each committee was composed of 19 individuals, including teachers and non-teacher educators (e.g., administrators, curriculum specialists, professors of higher education). The participants were selected for the standard setting committee to provide content expertise during the committee meeting and to be representative of the state teaching population, including geographic region, gender, ethnicity, educational experience, community size, and community socioeconomic status.

The Extended Modified (Yes/No) Angoff method was used for the standard setting meeting (Davis & Moyer, 2015; Plake, Ferdous, Impara, & Buckendahl, 2005). This is a content- and item-based method that leads participants through a standardized process through which they consider student expectations, as defined by ALDs, and the individual items administered to students to recommend cut scores for each achievement level. The standardized process was used by the committees for each subject.

The process started with participants experiencing the test from the spring 2022 administration within the online testing system. Based on their experience with the test items and a review of the draft ALDs, panelists created borderline descriptions. During this process, participants worked within their committees to modify the draft ALDs to create descriptors of the knowledge, skills, and abilities that “borderline” students, or those students who just barely enter an achievement level, would be expected to demonstrate.

During the judgment process, participants reviewed each item on the test, referencing the borderline descriptions, and answered the following question for each achievement level:

“How many points would a student with performance at the borderline of the [specific] achievement level likely earn if he or she answered the question?”

The cut score recommendation for each individual participant was the expected raw score a borderline student at the respective achievement level would likely earn, calculated as the sum of the individual item judgments. For the purposes of the standard setting, “likely” was defined as 2 out 3 students at the borderline level. Each recommended cut score from the standard setting committee was the median of the recommendations from the individual participants in the committee.

Additionally, the percentage of students who would be classified into each achievement level based on committee recommendations—also known as impact data—was calculated. The impact data were determined using student data from the spring 2022 online administration. As part of the discussion of the round 2 judgments, the impact data were presented, based on the round 2 recommendations, so the participants could see the resulting student achievement level classifications prior to making their round 3 recommendations. This information was also presented after the round 3 cut score recommendations were calculated.

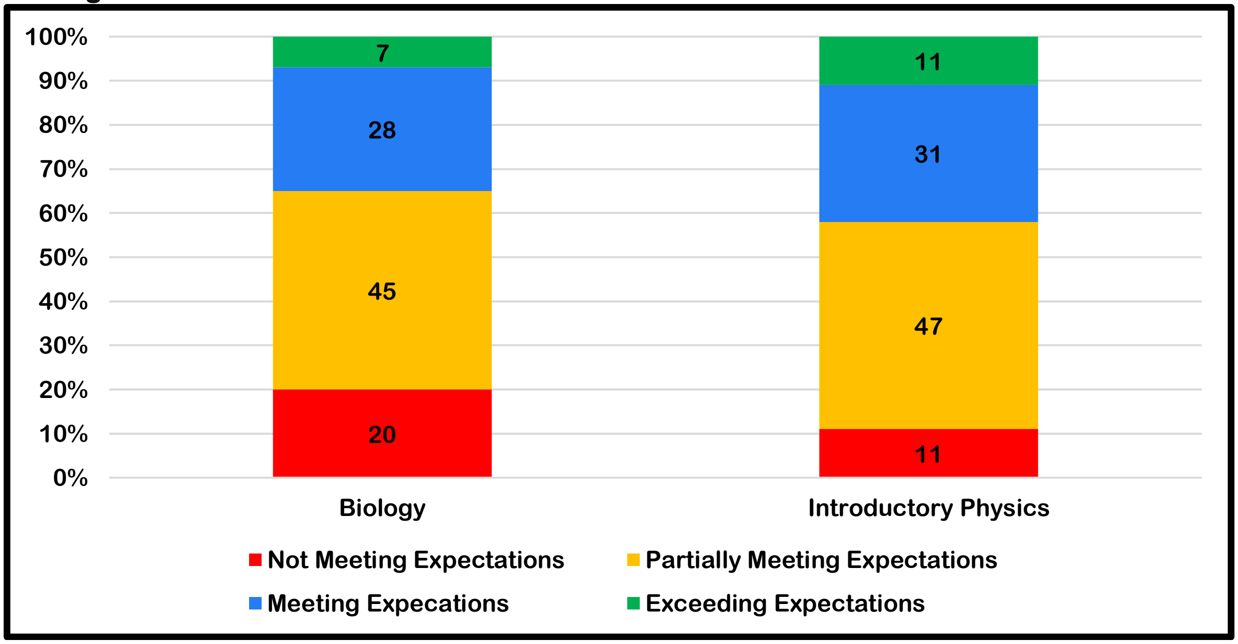
The results (Round 3 recommendations) from the standard setting meeting for the Biology and Introductory Physics panels are presented in Table 2.

Table 2. Standard Setting Recommendations for Biology and Introductory Physics (Round 3)

	Achievement Level							
	Not Meeting Expectations		Partially Meeting Expectations		Meeting Expectations		Exceeding Expectations	
Subject	Raw Score Range	% in Level	Raw Score Range	% in Level	Raw Score Range	% in Level	Raw Score Range	% in Level
Biology	0 to 16	20	17 to 36	45	37 to 51	28	52 to 60	7
Introductory Physics	0 to 15	11	16 to 36	47	37 to 50	31	51 to 60	11

Figure 1 presents the impact data from the final recommendations (Round 3) from the standard setting meeting as stacked bar graphs.

Figure 1. Impact Data for Biology and Introductory Physics Tests based on Standard Setting Recommendations from Round 3



Vertical and Horizontal Articulation Meeting

Subsequent to the standard setting meeting, on August 12, 2022, a vertical and horizontal articulation meeting was convened. The meeting consisted of one committee that reviewed the cut score recommendations from the Biology and Introductory Physics panels. The participants of the articulation meeting consisted of table leaders and other standard setting panel members selected prior to the standard setting meeting. The focus of the articulation meeting was to review the cut score recommendations from the standard setting meeting along with impact data to consider whether and to what extent adjustments to the recommended cut scores might be warranted based on both content and policy. In addition to the impact data for Biology and Introductory Physics, impact data for the Grade 8 STE test from the spring 2019 administration and matched data from 2022 Biology and Introductory Physics tests were presented to compare results both across grades and between subjects. The matched data was created using a statistical process to present impact data for both subjects based on students with statistically similar ability distributions. The adjustments to the recommendations made by the articulation committee were influenced by a desire to honor the content-based recommendations of the standard setting process, maintain high expectations for achievement across the MCAS assessments, and ensure the relationship among standards was coherent and defensible.

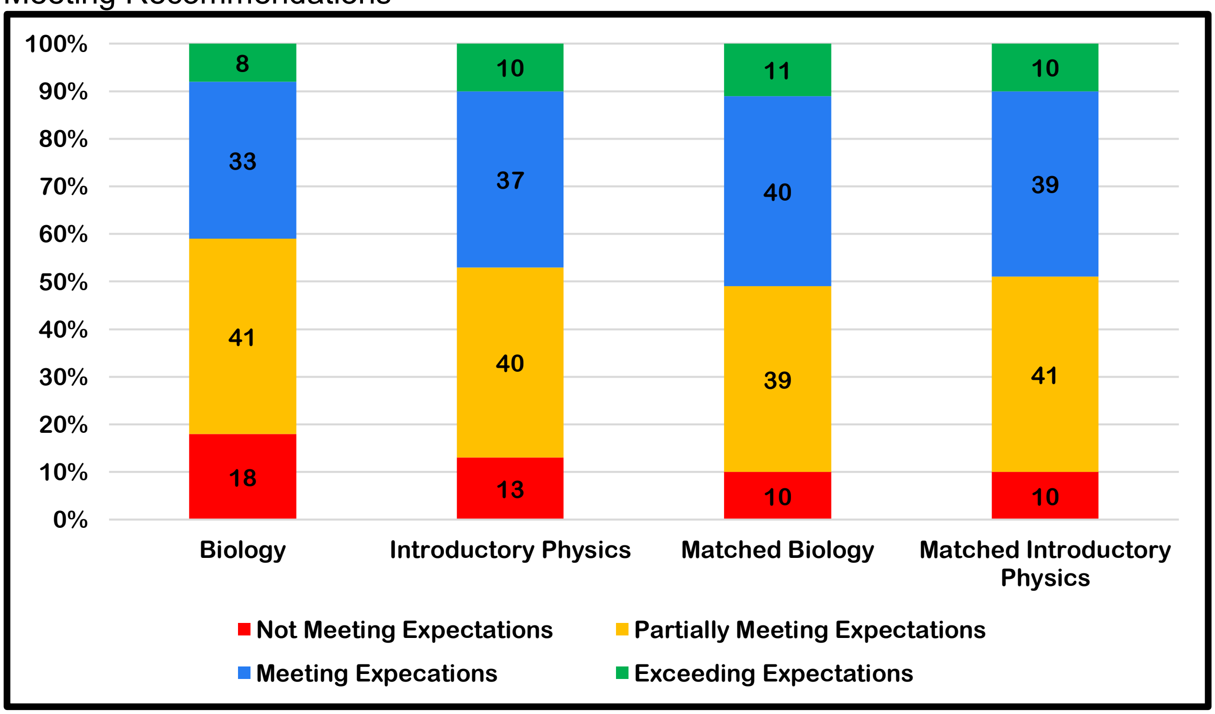
Table 3 presents the results from the vertical and horizontal articulation meeting.

Table 3. Recommendations for Biology and Introductory Physics from the Vertical and Horizontal Articulation Meeting Recommendations

	Achievement Level							
	Not Meeting Expectations		Partially Meeting Expectations		Meeting Expectations		Exceeding Expectations	
Subject	Raw Score Range	% in Level	Raw Score Range	% in Level	Raw Score Range	% in Level	Raw Score Range	% in Level
Biology	0 to 15	18	16 to 33	41	34 to 50	33	51 to 60	8
Introductory Physics	0 to 16	13	17 to 34	40	35 to 51	37	52 to 60	10

Figure 2 presents the impact data from the recommendations from the articulation meeting as stacked bar graphs, including the matched data for Biology and Introductory Physics.

Figure 2. Impact Data for Biology and Introductory Physics based on the Articulation Meeting Recommendations



Scaling

The process of determining the transformation rules from the Item Response Theory (IRT) scale to the reporting scale was guided by several principals identified by DESE:

1. The final cut scores achieved through the scaling solution should respect the cut score recommendations from the standard setting and articulation panels as closely as possible.
2. The impact data from the scaling solution should reflect a coherent assessment system across the grades.
3. The reporting scaled scores for the three achievement level cuts should be the same across grades and tests.
4. The scaling solution should involve a single linear transformation, from the IRT scale to the reporting scale.
5. The reporting scaled score range should be the same across grades and tests.

An iterative process involving Pearson, Cognia, and DESE was used to determine a scale and transformation rules for each test. First, based on the recommended raw score cuts for the three achievement levels, the IRT scale cuts were adjusted so that the differences between every two IRT scale cuts were the same, allowing for a single linear transformation rule. Based on the adjusted IRT cut scores, scaling constants for the linear transformation were determined. Using the scaling constants, look-up tables for each grade and test were created, displaying the relationship between the raw scores and reporting scaled scores. Based on the look-up tables, adjusted raw score cuts for each achievement level were determined. Finally, the resulting impact data based on the adjusted raw score cuts were calculated and reviewed to ensure a coherent system across grades.

The recommended reporting scale ranges from a lowest obtainable scale score of 440 to a highest obtainable scale score of 560. In order to create common points of reference across the assessments, the same scaled score cuts for each achievement level were defined, with a *Partially Meeting Expectations* cut of 470, a *Meeting Expectations* cut of 500, and an *Exceeding Expectations* cut of 530. While the cut scores were defined with the same scaled scores between the two tests, they are not identical, and direct comparisons through averaging and aggregation across grades should not be made without study and/or statistical adjustments. The scaled scores and distributions of students resulting from the cuts set for biology and introductory physics were not designed for direct comparison.

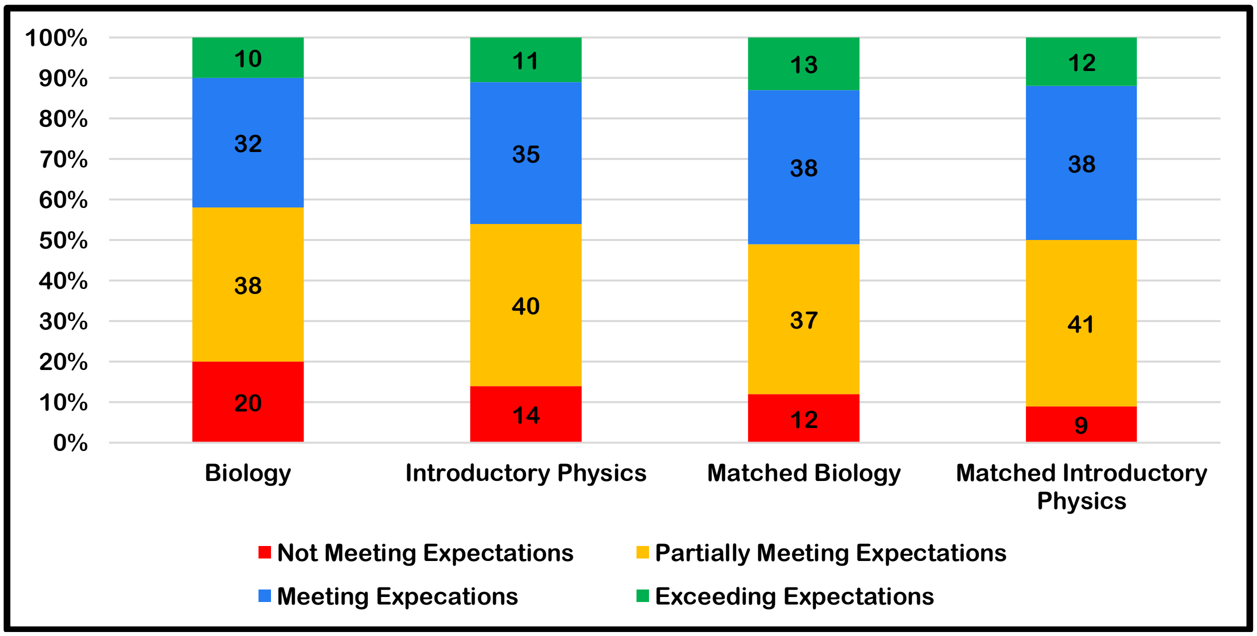
After the standard setting meeting, there was a discussion among DESE, Pearson, and Cognia staff about the results from the articulation and scaling. As a result of a need to bring the Biology more in line with content expectations from the standard setting committee, the Partially Meeting cut was raised to 17. As a result, the Exceeding cut was lowered to 50 and the Meeting cut was lowered to 34 to ensure proper scaling. Additionally, to bring the Introductory Physics more in line with the content expectations from the standard setting committee, the Partially Meeting cut was changed to 17. Table 4 presents the achievement level cut scores based on these changes.

Table 4. Final Recommendations for Biology and Introductory Physics Tests

Subject	Achievement Level							
	Not Meeting Expectations		Partially Meeting Expectations		Meeting Expectations		Exceeding Expectations	
	Raw Score Range	% in Level	Raw Score Range	% in Level	Raw Score Range	% in Level	Raw Score Range	% in Level
Biology	0 to 16	20	17 to 33	38	34 to 49	32	50 to 60	10
Introductory Physics	0 to 16	14	17 to 34	40	35 to 50	35	51 to 60	11

Figure 3 presents the impact data from the final recommendations as stacked bar graphs.

Figure 3. Impact Data for Biology and Introductory Physics based on Final Recommendations



The final approved result from this standard setting will be used for future administrations of the MCAS Biology and Introductory Physics tests to classify student results into achievement levels for reporting until it is determined that new standards need to be established for the MCAS by the DESE. To assist in this, the achievement level cut scores as raw scores are translated into achievement level cut scores on the item response theory (IRT) ability scale, as shown in Table 5. These values are uses to establish the scaling constants, A and B, to translate student scores on the IRT ability scale to the reporting scale.

Table 5. Achievement Level Cut Scores and Scaling Constants

	Cut Scores (Raw Score)			Cut Scores (IRT)			Scaling Constants	
Subject	**PME**	**ME**	**EE**	**PME**	**ME**	**EE**	**A**	**B**
Biology	17	34	50	-0.8500	0.2100	1.3000	27.90698	493.7209
Introductory Physics	17	35	51	-1.0100	0.1200	1.2600	26.43172	496.6960

Note: PME – Partially Meeting Expectations; ME – Meeting Expectations; EE – Exceeding Expectations

Interim Legacy Achievement Cut Score Validation

On the previous ("legacy") version of the Biology and Introductory Physics MCAS tests, a student was required for graduation to earn a Competency Determination (CD) by receiving a minimum scaled score of 220. As part of the transition to the next-generation MCAS, the Board of Elementary and Secondary Education voted to establish an interim CD standard for high school graduation. Interim standards would be defined as a similar level of achievement to the required standards on the legacy tests. Students in the classes of 2022 through 2025 taking the next-generation MCAS would be evaluated against the interim standards on each test.

The interim legacy achievement level standards were first identified through a statistical linking process. An equipercentile linking method was used to statistically establish an association between the raw scores from the spring 2019 and spring 2022 administrations of the MCAS tests. This was accomplished through determining the raw scores on the spring 2022 administration of the next-generation MCAS which would result in percentiles equal to those associated with the raw scores for each of the achievement levels from the spring 2019 administration of the legacy MCAS tests. Using the result of the equipercentile analysis, standard errors of measures for the raw scores, and statistical results from the test construction process, recommended ranges for raw scores associated were determined for each achievement level cut score.

After the standard setting panels completed their cut score recommendations, a subset of panelists was convened to recommend interim legacy MCAS achievement level cut scores from recommended ranges. The panelists reviewed the performance of students from the spring 2019 administration on the legacy MCAS to determine general descriptions of the achievement of students at the borderline of each legacy achievement level. The general descriptions were then used by the panelists to review the performance of students within the raw score ranges from the spring 2022 administration on the next-generation MCAS. Based on their review, the panelists completed a judgment survey where they answered the following question:

"Based on your review, which raw score within the recommended range for the achievement level on the Next-Generation MCAS test most closely represents a similar achievement level on the legacy assessment?"

Panelists provided individual recommendations for each achievement level, Needs Improvement, Proficient, and Advanced. The median of the committee recommendations was used as the committee recommendation for the achievement level. Table 6 displays the interim cut score recommendations for the legacy achievement levels on the next-generation MCAS.

Table 6. Recommended Cut Scores for the Legacy Achievement Levels

Subject	Legacy Achievement Levels		
	Needs Improvement	Proficient	Advanced
Biology	16	29	46
Introductory Physics	17	29	47

References

Davis, L. L., & Moyer, E. L. (2015). *PARCC performance level setting technical report.* Available from Partnership for Assessment of Readiness for College and Careers (PARCC), Washington, D.C.

Plake, B. S., Ferdous, A. A., Impara, J. C., & Buckendahl, C. W. (2005). *Setting multiple performance standards using the Yes/No method: An alternative item mapping method.* Meeting of the National Council on Measurement in Education. Montreal, Canada.

Chapter 1 – Overview of the Standard Setting Process

This chapter provides an overview of the standard setting process used for the MCAS ELA and mathematics assessments for grade 10 and STE assessments for grades 5 and 8, and includes the following sections:

3. Goals of setting cut scores
4. MCAS achievement levels
5. MCAS cut score setting process

Goals of the Standard Setting Meeting

Once students are administered an assessment, various groups, including students, parents, educators, administrators and policy makers, want to know how the students performed on the assessment and how to interpret that performance. By establishing achievement levels associated with different student performance on the assessment, a frame of reference is developed for interpreting student scores. Setting the level of achievement on an assessment sufficient for student performance to be classified into each achievement level is one of the most critical steps in developing an assessment program.

For a criterion standards-based assessment, such as the next-generation MCAS program, achievement on the assessment is compared to a set of predefined content standards. The standards communicated within the *Massachusetts Curriculum Framework* define a set of knowledge, skills, and abilities the students taking the assessment are expected to demonstrate upon completion of each course or grade. The cut scores established represent the level of competence students are expected to demonstrate on the assessment to be classified into each achievement level.

MCAS Achievement Levels

Federal statute requires that any statewide assessment used for accountability purposes includes at least three achievement levels. The achievement levels relate student performance on the MCAS assessments directly to what students are expected to learn, based on the standards in the *Massachusetts Curriculum Framework*. Student achievement on all MCAS assessments is classified into four achievement levels that delineate the knowledge, skills, and abilities for which students are able to demonstrate mastery.

The policy-level ALDs for the achievement levels provide general expectations for student achievement on the MCAS assessments to be classified into each achievement level. These do not differentiate student performance between content areas and grade levels. The achievement levels and policy ALDs for the next-generation MCAS assessments were developed with input from the Standard Setting Policy Committee. This 14-person committee is comprised of Massachusetts educators and policy makers representing K–12 education and higher education constituency groups (including MASS PTA, MASC and BESE, among others). Language for these levels was refined by the Massachusetts BESE at its monthly meeting in December 2016, and after eliciting public feedback, final Next-Generation MCAS Achievement Levels and Descriptors were adopted by BESE in March 2017.

The four achievement levels with their respective policy description are shown in Table 1.

Table 1. Policy Level Achievement Level Descriptors for the Next-Generation MCAS Tests

Label	Description
Exceeding Expectations	A student who performed at this level exceeded grade-level expectations by demonstrating mastery of the subject matter.
Meeting Expectations	A student who performed at this level met grade-level expectations and is academically on-track to succeed in the current grade in this subject.
Partially Meeting Expectations	A student who performed at this level partially met grade-level expectations in this subject. The school, in consultation with the student's parent/guardian, should consider whether the student needs additional academic assistance to succeed in this subject.
Not Meeting Expectations	A student who performed at this level did not meet grade-level expectations in this subject. The school, in consultation with the student's parent/guardian, should determine the coordinated academic assistance and/or additional instruction the student needs to succeed in this subject.

The MCAS Standard Setting Process

The recommendations by the standard setting committees represent the level of competence students are expected to demonstrate to be classified into each of the achievement levels. To establish the achievement levels for each assessment, the Extended Modified (Yes/No) Angoff Method (Davis & Moyer, 2015; Plake, Ferdous, Impara, & Buckendahl, 2005) was used to guide participants as they determined their achievement level cut score recommendations. This standard setting procedure is a systematic method for combining various considerations into the process for recommending cut scores for the different achievement levels, including content standards and educator judgments about what students should know based on the *Massachusetts Curriculum Framework* and be able to demonstrate at each achievement level.

The following steps were used for the MCAS standard setting process.

1. Pre-meeting development – In anticipation of the standard setting meetings, various tasks were completed, including the development of draft ALDs for each grade and subject assessed, the development of materials for the participants, preparation of the Pearson standard setting website for participants and facilitators, presentation materials for the facilitators, and development of data analysis sources and procedures.
2. Standard setting meetings – Committees of participants referenced the grade- and subject-specific ALDs to make recommendations for cut scores that define the different achievement levels for each assessment.
3. Articulation meeting – The recommended cut scores for each assessment were reviewed for reasonableness and alignment of achievement-level expectations across the courses, Biology Introductory Physics, and with expectations from Grade 8 STE, by select members of the standard setting committees.
4. Competency determination validation meeting – The statistically determined cut scores associated with the previous MCAS assessments for Biology and Introductory Physics were reviewed for consistency of content expectations by select members of the standard setting committees.

5. Linear scaling – Using the recommended cut scores from the articulation meeting, a scaling transformation process was conducted to transform the IRT scale scores to MCAS scale scores.

The following chapters will describe the specific procedures and activities that occurred during each of these steps.

Chapter 2 – Pre-meeting Development

This chapter provides an overview of the work that was completed prior to the standard setting meetings for the next-generation MCAS Biology and Introductory Physics assessments, and includes the following sections:

6. MCAS achievement level descriptors
7. Development of participant materials
8. Development of presentation materials
9. Facilitator training
10. Preparation for data analysis during the meetings

MCAS Achievement Level Descriptors

ALDs are statements that articulate the knowledge, skills, and abilities that students classified into a particular achievement level should be able to do to demonstrate competency at that achievement level. All assessments within MCAS have four achievement levels, as defined in Table 1. The achievement levels range from Not Meeting Expectations, representing the lowest level of student achievement, to Exceeding Expectations, representing the highest level of student achievement. ALDs were not developed for the lowest achievement level, Not Meeting Expectations. The most accurate way to describe performance classified into the “Not Meeting Expectations” achievement level is as a student who has not demonstrated the knowledge and skills necessary to achieve “Partially Meeting Expectations.”

The ALDs are associated with the achievement levels in the following way.

1. *Achievement levels* indicate a student’s level of competency of the standards defined in the *Massachusetts Curriculum Framework* through classification of their achievement on an assessment for a specific grade and subject as *Not Meeting Expectations*, *Partially Meeting Expectations*, *Meeting Expectations*, and *Exceeding Expectations*.
2. *Achievement level descriptors* indicate the knowledge, skills, and abilities expected of students to demonstrate competency within each specific content area and at each grade level to be classified in each achievement level.
3. *Cut scores* partition the test scale and represent the minimum test score that a student must earn on an assessment for each subject and grade level to be classified into a given achievement level.

The use of a well-defined set of ALDs is critical to ensuring the validity of the standard setting process.

The ALDs were developed by DESE test development staff, in consultation with staff in the Center for Instructional Support and Cognia test development staff. In addition, educators from the Biology and Introductory Physics Assessment Development Committees (ADCs) were convened to review drafts of the ALDs prior to the standard setting meeting. The educators first reviewed ALDs for their specific content area in terms of the appropriateness of the abilities for each achievement level, and the clarity and logic of the progression across the achievement levels. After the validation or editing of the draft ALDs, the educators reviewed the ALDs from the other content area to compare the expectations of the ALDs for each performance level across the content areas. The resulting ALDs from this committee were used during the standard setting meeting.

Pearson Standard Setting Website

The Pearson standard setting website is the online platform for meeting pre-work, facilitating the standard setting meeting and collecting panelist judgments throughout the standard setting process. Because the next-generation MCAS assessments are computer-delivered and the online test form were used for the standard setting process, the standard setting website provides panelists the opportunity to access online items within Pearson's secure online testing environment, TestNav 8. During the meeting, panelists accessed the website using a notebook computer provided by Pearson and set up specifically for the meeting.

Using a similar template to the websites used for the MCAS standard setting in 2017 and 2019, specific websites were created for each committee meeting by the Pearson standard setting team. The staff at DESE had the opportunity to review the website structure prior to finalizing the websites for the meeting. Additionally, members of the Pearson staff performed reviews of the websites to verify that the content on the website was correct.

Development of Participant Materials

The MCAS standard setting required a large number of materials be prepared for use by the participants during the standard setting meetings. The Pearson standard setting team worked with the content specialists at DESE to develop the materials and to ensure that all materials provided to meeting participants communicated correct information. The following materials, displayed in Table 2, were developed for use by participants during the meeting.

Table 2. Materials Prepared for Panelists

Panelist Material	Paper	Online
Meeting agenda	✓	✓
Panelist information survey		✓
Non-disclosure agreement		✓
Next-generation MCAS test forms/items		✓
"Experience the Test" response form	✓	
Test form item map/answer key		✓
Item comment form	✓	
Practice judgment form/items		✓
Practice judgment form item map/answer key		✓
Judgment round record form	✓	
Judgment round surveys		✓
Achievement level descriptors (ALDs)	✓	✓
ALD comment form	✓	
Process evaluations		✓

Using approved templates, documents were created for each specific committee meeting by the Pearson standard setting team. All documents developed for the website were reviewed and approved by DESE staff before being finalized for publication for the meetings. A sample set of materials for a committee are provided in Appendix C.

Development of Presentation Materials

PowerPoint presentations were developed to guide facilitators through the presentation of information and materials throughout the standard setting meetings. The Pearson standard setting team developed the initial PowerPoint presentations using the DESE presentation template. Staff from DESE had the opportunity to review and provide suggested edits to the presentations, which were resolved by the Pearson standard setting team. The following PowerPoint presentations were created for the standard setting meetings.

1. Standard Setting General Session
2. Standard Setting Breakout Meeting presentations for each day
    1. Biology (Day 1, Day 2, and Day 3)
    2. Introductory Physics (Day 1, Day 2, and Day 3)
1. Articulation Meeting (Day 4)
    1. Biology and Introductory Physics with Grades 8 STE
    2. Biology with Introductory Physics
1. Competency Determination Validation Meetings (Day 4)
    1. Biology
    2. Introductory Physics

The PowerPoint presentations for the breakout meetings, Day 1 and Day 2, were customized to reflect the specific information for the subject and grades for each committee. Additionally, specific information was added to the notes section within each presentation to guide the facilitators through the presentations.

Facilitator Training

Procedures employed in the standard setting meeting are specific to the goals and objectives of the project. So, even though the facilitators for the MCAS standard setting meeting had prior experience in facilitating standard setting meetings, a training session was held to discuss the unique aspects of the MCAS standard setting and to walk through the process utilized for this meeting, demonstrate the use of the Pearson Standard Setting website, and display and discuss the PowerPoint presentations used during the standard setting meetings. The facilitator training meetings were held for 90 minutes each on July 15, 2022, and August 3, 2022. Additionally, there was a final training and discussion held on August 8, 2022, just prior to the meeting, to address any final topics.

Preparation for Data Analysis during the Meetings

Creation and testing of analysis programs and the calculation of impact data lookup tables were conducted prior to the standard setting meeting. To facilitate the independent analysis for each judgment round during the meeting, each analyst independently completed the programming necessary to conduct all analysis using the SAS statistical software. A trial was run with mock-data to ensure that each independent analysis generated the same results.

Prior to the standard setting meeting various data sets were generated for use prior to and during the standard setting meeting, including both the articulation and CD meetings. Table 3 presents the data in information that was generated and the purpose of the data/information.

Table 3. Data and Information Generated for the Standard Setting Process

Data/Information	Purpose
Frequency distribution of raw scores	This data was used during the standard setting meeting to provide reference data for panelists judgments. The impact data for standard setting was based on the whole tested student population after Cognia data cleaning.
Item performance data	The item mean and score distribution was calculated for each item on the standard setting form as reference data during the standard setting meeting.
Grade 8 STE impact data	The impact data for grade 8 STE from the spring 2019 administration was used during the articulation meeting as reference information for vertical articulation.
Frequency data for Biology and Introductory Physics using matched data	A matched sample was created for Biology and Introductory Physics from the spring 2022 administration to create impact data for the articulation meeting as reference information for the horizontal articulation.
Equipercentiles for the legacy achievement levels from the spring 2018, 2019, and 2021 administrations on the new MCAS spring 2022 form	The equipercentiles for each of the legacy achievement levels on the Biology and Introductory Physics will be used to inform the creation of the reasonable range for the CD validation meetings.
Student profile data on legacy Biology and Introductory Physics from spring 2019 administration	Student performance profiles showing item mean scores and distributions for operational items on the form at the legacy achievement level raw score cuts using the spring 2019 administration data. These score profiles will be used as information for the CD validation meeting.
Student profile data on new Biology and Introductory Physics from spring 2022 administration	Student performance profiles showing item mean scores and distributions for operational items on the form using the spring 2022 administration data. These score profiles will be used as information for the CD validation meeting.

Impact data look-up data sets were created for use during the standard setting meetings. Impact data are the percent of students that fall within an achievement level based on the recommended cut scores at the given judgment round for a particular grade, subject test, and testing mode. The impact data are provided to participants during the standard setting meeting to present the expected results of their recommendations on student achievement level classifications. The analysis programs use impact data lookup tables to produce this output during the meetings, which need to be created prior to the standard setting meetings.

The impact data lookup tables were created using the data from students taking the online form of each subject and grade assessment during the spring 2022 administration. The impact data lookup tables were created using a sample of students that would be representative of the overall state student population, based on the following demographic variables:

- Gender
- Race/Ethnicity
- Economically disadvantaged
- Limited English Proficient (LEP)
- Special Education

The data analysts created the impact data lookup tables by calculating, for each possible raw score associated with the test, the percent of overall students in the sample that earned that specific raw score or greater.

As planned, a proof of concept of study was conducted with datafiles provided by DESE to evaluate the usability of matched data for the articulation meeting. Based on recommendations from the MA TAC, a bi-directional matching process was utilized, which matched both the Biology and Introductory Physics populations from the spring 2022 administration were matched to the testing population from the spring 2022 administration using a bi-directional matching process.

Bi-directional matching conducts the matching twice, each in a different direction. First of all, a subsample from the original “Biology” group is drawn to match the “Physics” group. The resulting matched sample is denoted as Physics-equivalent group. Second, a subsample from the original “Physics” group is drawn to match the original “Biology” group. The resulting matched sample is denoted as Biology-equivalent group. Then the original “Biology” group is combined with the Physics-equivalent group to form the matched “Biology” group; similarly, the original “Physics” group is combined with the Biology-equivalent group to form the matched “Online” group. To run this matching method, R package, called as “Matching” was used. The following table show the matching results of individual background variables used for R program.

Table 4. Summary Result from Bi-directional Matching Process

			Biology		Physics	
Variable	**Dummy Variable**	**Value**	**Frequency**	**Percent**	**Frequency**	**Percent**
Gender	**Female**	**0**	18734	51.51	18958	52.13
		1	17633	**48.49**	17409	**47.87**
Ethnicity	**Race_W**	**0**	11974	32.93	11925	32.79
		1	24393	**67.07**	24442	**67.21**
	Race_B	**0**	33256	91.45	33180	91.24
		1	3111	**8.55**	3187	**8.76**
	Race_A	**0**	34120	93.82	34170	93.96
		1	2247	**6.18**	2197	**6.04**
	Race_H	**0**	29394	80.83	29502	81.12
		1	6973	**19.17**	6865	**18.88**
Economic Status	**EDS**	**0**	25620	70.45	25424	69.91
		1	10747	**29.55**	10943	**30.09**
ELL Program	**ELL**	**0**	34242	94.16	34376	94.53
		1	2125	**5.84**	1991	**5.47**
Special Education	**Sp E.**	**0**	29879	82.16	29704	81.68
		1	6488	**17.84**	6663	**18.32**
Previous Science Score	**2021 Science**	**Mean**	496.50		496.56	
		SD	23.12		23.00	

Background

For the competency determination validation meetings for Biology and Introductory Physics, there were additional analyses that were performed in preparation for the meeting. Pearson worked with Cognia and DESE to statistically identify reasonable ranges around the interim cut scores for the legacy achievement levels, Needs Improvement (220), Proficient (240), and Advanced (260), for the CD validation meeting using an equipercentile process. This process determined cut scores on the next-generation MCAS tests which would result in similar impact data from the 2019 administration of the legacy MCAS.

Chapter 3 – Standard Setting Meetings

This chapter provides details about the cut score setting meeting process. The sections of this chapter include:

- Purpose of standard setting meetings
- Committee participant composition
- Standard setting meeting facilitators and staff
- Standard setting meeting proceedings
- Recommended achievement level cut scores

Purpose of the Standard Setting Meetings

Standard setting is based, to a large degree, on the judgment of educators. Committees of educators make expert recommendations about the level of performance expected for each achievement level based on their experience with different groups of students and knowledge of the assessed content. A specific process, or standard setting method, is used to capture the educator judgments and to translate these into cut scores for the achievement levels. The purpose of the next generation MCAS standard setting meetings was to gather expert recommendations from groups of educators from across Massachusetts for the cut scores that define the different achievement levels on each MCAS assessment for Biology and Introductory Physics.

Student performance on each of the MCAS assessments is classified into one of four achievement levels. Each committee was asked to recommend three cut scores that would define the boundaries between the different achievement levels. These recommended cut scores represent the performance on each assessment that a student would need to meet or exceed to be classified into the specific achievement level.

Committee Participant Composition

All participants for the standard setting committees were selected by the DESE, then recruited and invited to participate in the standard setting meeting by Cognia. The process of selecting committee participants included selecting a sample of participants that would be as representative of the state as possible, including demographic variables (gender, race, etc.), geographic representation, and background (educational experience, education, etc.). When selecting participants, DESE placed an emphasis on those educators who had relevant content knowledge as well as experience with a variety of student groups.

There was a total of 38 participants at the standard setting meetings, who were divided between two committees. Each committee focused on providing cut score recommendations for one assessment. The participants were assigned to the committee prior to the meetings based on their teaching experience. The tables in Appendix D summarize the characteristics and experience of the participants in each committee. These tables provide demographic information about the committee participants as well as information about the participant’s current positions in education, their experience working with various types of student populations, and the types of districts they represent. Participant’s responses to the gender and ethnicity questions were voluntary.

The participants in each committee were assigned to table groups. The table groups were selected prior to the meeting to ensure that, to the greatest extent possible, the participants at each table were representative of the committee. The participants were placed into table groups to facilitate discussions during the standard setting meeting and ensure that each participant had the opportunity to fully engage in the process.

Prior to the standard setting meeting, individuals were selected from the participants to serve as table leaders for each committee. One table leader was assigned to each table group. The table leaders assisted the process facilitator during the meeting by helping to facilitate the table group discussions, ensuring that all participants had the opportunity to participate and that the discussion remained relevant to the meeting. To assist the table leaders in understanding and fulfilling their role during the meeting, Eric L. Moyer, Ph.D., the lead facilitator for the meeting, provided a table leader training on the first day of the standard setting,

Standard Setting Meeting Facilitators and Staff

Staff members from DESE, Cognia, and Pearson collaborated to conduct the MCAS standard setting meeting. These staff members worked in facilitative and observational roles and did not contribute to the cut score recommendations during the meeting.

Meeting Facilitators

The lead facilitator of the standard setting meeting was Eric L. Moyer, Ph.D., from Pearson. For each of the four breakout committees there were two facilitators assigned, a process facilitator and a content facilitator. The process facilitator was a member of the Pearson psychometric staff with experience in facilitating standard setting meetings and was responsible for leading the participants through the standard setting process. The content facilitators were content specialists familiar with the content for the MCAS assessment from DESE or Cognia was responsible for leading the participants through the information associated with the development of the test and procedures for scoring the items. Table 5 presents the process and content facilitators for each standard setting committee.

Table 5: Process and Content Facilitators for Standard Setting Committees

Committee	Facilitators	
Subject	**Process Facilitator**	**Content Facilitators**
Biology	Soo Ingrisone, Ph.D.	Katie Bowler Steven Long (DESE)
Introductory Physics	Scott Strickman, Ph.D.	Isadel Eddy (DESE) Phil Durham (Cognia)

Meeting Data Analysts

For the standard setting meeting, two data analysts performed all of the analysis for all four committees. The data analysts were Brian Wrobel and Michelle Anderson. During the meeting, the analysts collected participant judgment data, performed independent analysis to verify analysis results, and prepared participants' feedback. Brian Wrobel was the lead analyst and performed the analysis onsite, while Michelle Anderson was the replicator and completed the analysis offsite.

DESE Staff

DESE staff members attended the standard setting meeting to observe the process, answer assessment and curriculum questions, and address policy questions. DESE staff also monitored the cut score recommendations for each achievement level throughout the standard setting meetings. DESE was represented at the cut score setting meeting by Michol Stapel, the Associate Commissioner for Student Assessment, and Robert Lee, the MCAS Chief Analyst. These were assisted by additional DESE staff to monitor the standard setting meeting, including content and assessment specialists.

Technical Advisors

A technical advisor, Dr. William Lorie, Ph.D., a staff member from the Center for Assessment, monitored the standard setting meetings for DESE. The technical advisor observed the standard setting meetings and gave his advice and findings to the DESE after the meeting. The technical advisor did not participate in the meeting or contribute to the cut score recommendations during the meeting.

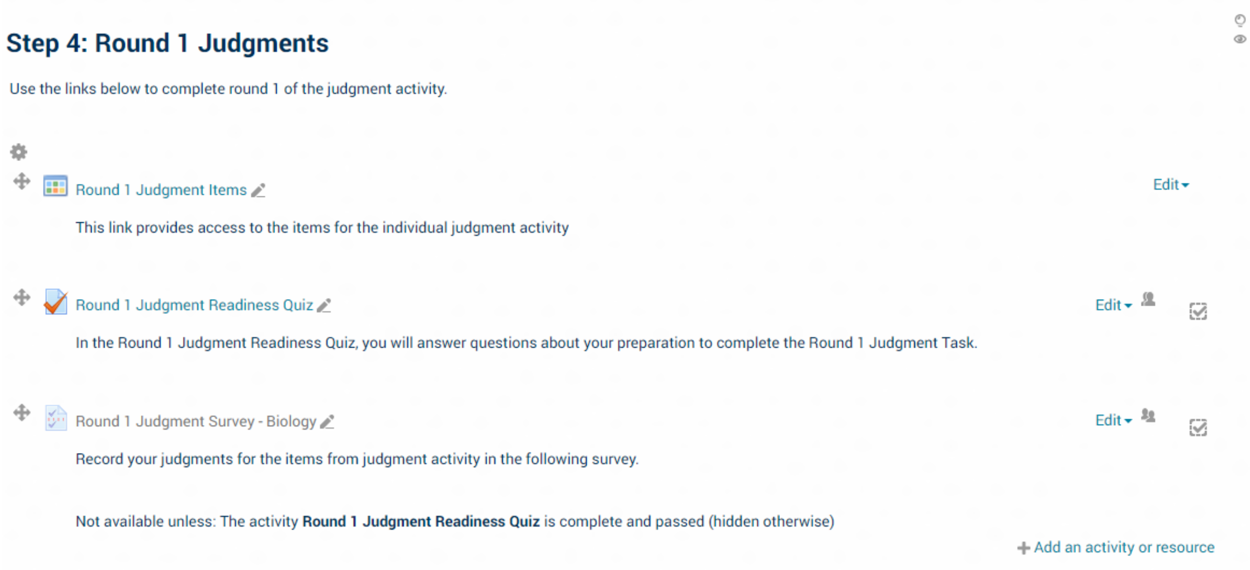
Materials

The following section describes the materials used by the committee members during the standard setting breakout sessions. Separate materials were developed for each committee.

Pearson Standard Setting Website

The Pearson standard setting website served as the online platform during the standard setting meetings. The website provided panelists access to the standard setting meeting materials and tools used to collect panelist judgments (see Figure 1). The website was built using Moodle, an online, open-source collaboration and learning tool. Each panelist was given unique login credentials that allowed secure access to the website. Panelists' access was restricted to only sections of the website associated with the standard setting meeting, as defined by their assigned subject area. Because the next-generation MCAS assessments are computer-delivered using TestNav 8, the standard setting website allowed panelists to view items as students did during the spring 2022 administration.

Figure 1. Example website interface with links to standard setting materials



The website enabled participants access to online documents that provided background information about the next-generation MCAS assessments prior to the standard setting meeting. The preparation materials on the website included:

- Standard setting orientation video
- MCAS curriculum framework for each grade level
- Subject- and grade-level ALDs

1. MCAS standard setting non-disclosure agreement

The website also provided panelists access to materials and tools necessary for completing activities during the standard setting meeting. The standard setting materials and tools on the website included:

- Subject- and grade-level ALDs
- Test item map and answer key
- Borderline descriptions worksheet
- Practice judgment activity items
- Practice judgment readiness survey
- Practice judgment survey
- Judgment items for rounds 1, 2, and 3
- Judgment readiness survey for rounds 1, 2 and 3
- Judgment survey for rounds 1, 2, and 3
- Judgment feedback folders for rounds 1, 2, and 3
- Process evaluations 1 and 2
- Participant information survey

A unique course site was created for each assessment associated with the committee in the Pearson standard setting website. The meeting facilitator controlled panelist access to each section of the website. Website access was disabled at the end of each meeting day to prevent panelists from viewing secure website materials outside of designated meeting times. Following the meetings, the online materials were archived.

Committee Panelist Folders

In addition to the online resources provided through the website, panelists were given a meeting folder to organize a variety of hard copy materials they used throughout the meeting. The materials provided to committee panelists in their folders included:

1. Meeting agenda
2. Non-disclosure agreement
1. Subject- and grade-specific ALDs
2. ALD comment form
3. “Experience the assessment” activity response form
4. Item comment form
1. Practice judgment record form
2. Rounds 1, 2, and 3 judgment record form

The panelist folders were prepared in advance of the standard setting meetings. Panelists were required to check-in at the start of each day and to return their folders and check-out at the end of each day of their meetings. Panelists were provided additional materials throughout the meeting, which they were instructed to insert into their folders.

Computers

Each participant was provided a laptop computer in his or her meeting room to access the online resources through the Pearson standard setting website. Additionally, participants were provided an external monitor, so they would be able to access the online materials with limited switching between online windows. Participants were seated in table groups in pod configuration to provide each participant with enough space to work with the computer and binder materials. The power supplies were centrally located in the middle of each table. The participants used Google Chrome to access the Moodle site, which was programmed with a whitelist of websites to restrict participants use of the computers to work associated with the cut score setting meeting.

Procedure

The Extended Modified (Yes/No) Angoff Method (Davis & Moyer, 2015; Plake, Ferdous, Impara, & Buckendahl, 2005) was used during the standard setting meeting to assist participants in recommending achievement level cut scores for each assessment. This standard-setting procedure operates as both a content- and item-based method that leads panelists through a standardized process in which they consider student expectations, as defined by the ALDs, and the individual items administered to recommend cut scores for each performance level. This method asked participants to review each item from the operational administration and answer the following question:

“How many points would a borderline student at the [specific] achievement level likely earn if he or she answered the question?”

For the standard setting meeting, “likely” was defined statistically as the student having at least a 2/3 chance of earning the number of points. The participants completed the task for each achievement level.

The same standardized process was used by all committees and resulted in cut score recommendations. Participants completed three rounds of item judgments. Between the item judgment rounds they were provided feedback information including data relative to participant agreement, student performance on the items, and student performance on the test as a whole.

Standard Setting Meeting Proceedings

The standard setting meetings were conducted across three days, August 9-11, 2022, in Wakefield, Massachusetts. Appendix E includes the complete agenda for the standard setting meetings. The following sections will describe the steps used to guide the participants through the entire standard setting process.

Standard Setting Meeting Pre-Work

The standard setting meeting participants were provided access to a set of activities prior to attending the onsite meetings. The purpose of the pre-work was to expedite the training of the participants by providing the participants an opportunity to familiarize themselves with information that would be used throughout meeting. The pre-work included:

1. Standard setting website – The pre-work was provided via documentation or links embedded within the secure website developed for the standard setting meeting. This allowed participants to access the website and gain some familiarity with navigation in the site prior to the meeting.
2. Participant information survey – Participants were provided a survey to document their demographic information as well as current teaching position, experience, and school information. Participants were able to access this survey before and during the meetings.
3. *MCAS Curriculum Framework* – Participants were provided access to the current version of the *MCAS Curriculum Framework* for the subject associated with their meeting.
4. ALDs - Participants reviewed policy level and achievement level descriptors for the specific grade and course, which is a key set of information that was used throughout the cut score setting meeting.
5. Security and Non-disclosure – Participants were provided access to the security and non-disclosure agreement for the standard setting meeting so they would be familiar with its content before signing the agreement at the meeting.

To provide the participants access to the pre-work materials prior to the meeting, they were supplied their unique login and a temporary password for the website to the email they provided when they registered for the meeting. This login provided them access to the specific section of the website associated with the standard setting meeting for which they were registered. Participant access was restricted to only the respective site for the standard setting meeting they were attending.

General Session

The purpose of the general session was to welcome the participants, provide background information about the next-generation MCAS assessment system, and introduce the standard setting process. A single general session including all 38 standard setting participants was conducted on Monday morning at the beginning of the standard setting meeting. Rob Curtin, Chief Officer for Data, Assessment, and Accountability provided a welcome to the Massachusetts educators and an overview of history of the MCAS assessment program. The official charge for the meeting along with a review of related student performance statistics was provided by Michol Stapel and Katie Bowler. An overview of the cut score setting process was provided by Eric Moyer, the lead research scientist from Pearson facilitating the standard setting process.

Breakout Session

After the general session, participants moved into subject-specific breakout sessions for the remainder of the standard setting meeting. Each committee was responsible for providing recommendations for cut scores for each of the achievement levels for the test associated with the committee. The committee provided recommendations using each of the activities described below.

Experience the Test. Participants experienced the specific operational test form that the students were administered during the spring 2022 administration. The participants experienced the test just as students did, online administered through the TestNav 8 system, which was accessed through the standard setting website.

Since the version of the online testing system used during the standard setting meetings did not store and score participant responses, participants recorded their responses on a separate item response form, provided in the participant folder. During this activity, if the participants wanted to provide any comments regarding items on the test form, they were asked to record the comments on an Item Comment Form, which was collected at the end of the meeting.

After the participants completed the Experience the Test activity, the content facilitators provided instruction on how to score the items based on the scoring rules used for MCAS. A test map document, accessed through the standard setting website, provided information about each item on the test, including a unique item number, reporting category, maximum possible score, the correct response for the item, and any specific scoring rules for the item. For open-ended items, the test map provided a reference to the open-ended item rubric and exemplar documents so the participant could see what was expected to earn each possible score point. Participants were also provided training on characteristics that make an item difficult, in addition to how to use the rubric to score responses for open-response items and how these corresponded to the student exemplar response scores.

Borderline Achievement Level Descriptions. An essential component to the standard setting process is the development of borderline descriptions. The purpose of the borderline descriptions activity was for panelists within a committee to develop a common understanding of student achievement at the threshold, or borderline, of each achievement level.

To help inform this activity during the standard setting meeting, the process facilitators reviewed the achievement levels and the achievement level descriptors for the respective grade and subject. Panelists were informed that the ALDs provided a snapshot of the typical characteristics at each achievement level, including the breadth and depth of the knowledge, skills, and abilities expected to be demonstrated by students within each level. The participants reviewed the course-specific ALDs, providing them with a common understanding of expectations for what students should demonstrate within each achievement level for the respective assessment.

The participants were then introduced to the difference between a *typical* student performance and *borderline* student performance within an achievement level. The borderline student performance was described as the performance to be minimally qualified to be classified within a particular achievement level, possessing just enough knowledge, skills, and abilities to achieve the specific achievement level classification. The facilitator then led the panelists through a modeling activity. A collaborative and guided approach was used to draft one or two borderline statements for the *Meets Expectations* achievement level that served as examples for the committee. The facilitator asked guiding questions during the modeling activity to help panelists develop an appropriate understanding of how to create borderline descriptions.

Panelists were then split into their table groups to review the ALDs for a specific reporting category within each achievement level. Each small group created draft borderline descriptions for their specific reporting category using a borderline descriptions worksheet accessed through the standard setting website. The borderline descriptions from each group were collected into a master document and reviewed/discussed together by the whole committee. Revisions to the master document were made during the whole-group discussion to create a common set of borderline descriptions.

The final list of borderline descriptions were printed and provided to each participant to place in his or her folder as a reference for subsequent activities.

Item Judgment Process Training. The process facilitator for the committee provided the participants with training on the Extended Modified (Yes/No) Angoff standard setting process (Davis & Moyer, 2015; Plake, Ferdous, Impara, & Buckendahl, 2005) and how to record their individual item judgments within the standard setting website. They were instructed to review each item from the assessment, which was accessed through the website, review the borderline descriptions, the answer key, and, if needed, the rubric and student exemplars for the item. Based on their review of the item and the related materials, the participants answered the following question for each achievement level:

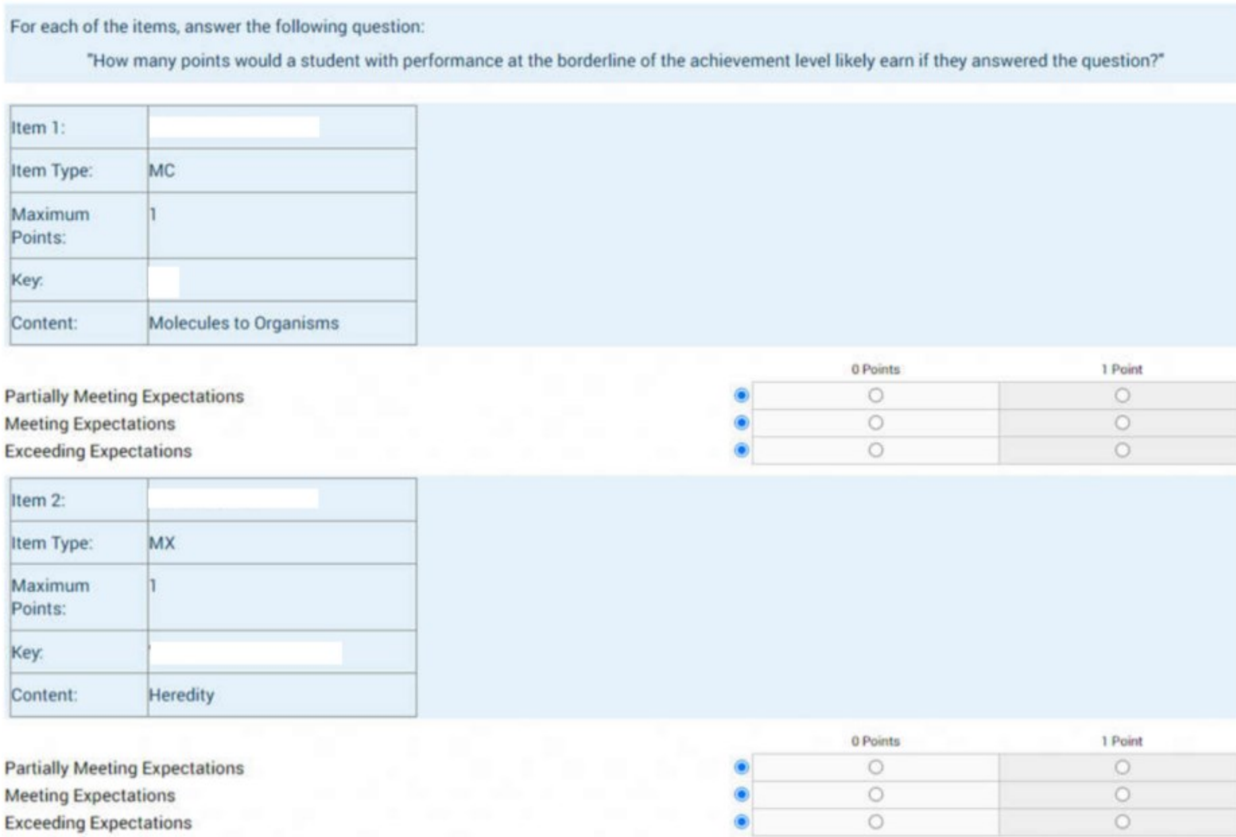
"How many points would a borderline student at the [specific] achievement level likely earn if he or she answered the question?"

Significant time was spent describing the thought process the panelists should go through using parts of the question.

1. "would…" — When envisioning expected student response to an item, the panelists were asked to consider how a student would respond. Where "should" is an aspirational expectation, "would" is a more realistic expectation of a student response to an item.
2. "...a student performing at the borderline of the [specific] performance level…" — The panelists were reminded to reference the borderline descriptions to determine how a student performing at the borderline of that performance level would be expected to respond.
3. "...likely..." — In this context, likely was defined as 2 out of 3 times, or 67%. To make this concrete for panelists, facilitators asked them to think about three students at the borderline of a performance level. If a panelist believed 2 of 3 students with performance at the borderline would correctly answer the item, they would respond "yes" to the question. If a panelist did not believe 2 of 3 students with performance at the borderline would correctly answer the item, they would respond "no" to the question.
4. "...earn if he or she answered the question." — Panelists selected the number of points a student with performance at the borderline would be expected to earn if he or she answered the item.

The response to judgment question for each item was recorded within the judgment survey within the website. Figure 2 presents an example item judgment survey within the website. Participants completed the item judgments for each achievement level for an item before moving on to the next item.

Figure 2: Example Item Judgment Survey from Pearson Standard Setting Website



The participants also kept a record of their item judgments on the Judgment Record Sheet. This document was provided to them as part of the materials in their folder. It included the unique item number, reporting category, and maximum possible points for the item. The participants were shown how to use the unique item number to ensure that they were referencing the correct item on all documents within the judgment survey and in the online system.

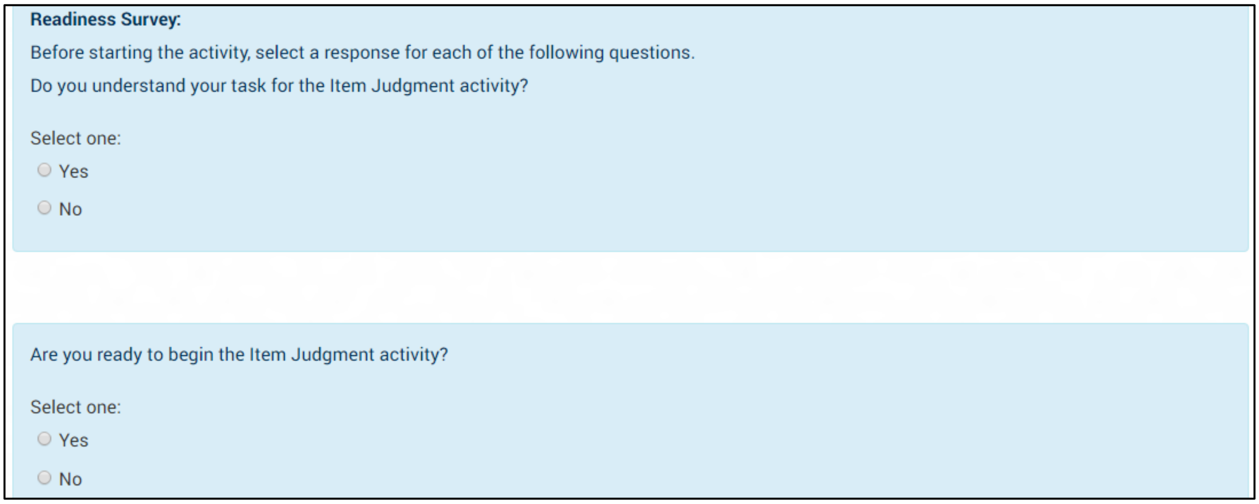
Practice Judgment Activity. Panelists completed a practice judgment activity prior to beginning the actual judgment rounds. The goals of this activity were to:

1. Give panelists experience reviewing and making judgments about different types of items.
2. Familiarize panelists with the judgment survey on the standard setting website.
3. Build confidence in panelists' understanding of the task to be completed.

The practice items selected for the activity were a subset of those panelists ultimately reviewed in the actual judgment rounds and included examples of different item types, difficulty, and score points. After all panelists completed their practice judgments, the facilitator presented item-level judgment results interactively through the standard setting website. Group discussion was initiated to review the judgment process and panelist responses, demonstrate how their judgments are used to determine a cut score recommendation, and answer any questions.

Item Judgment Rounds. After receiving training on the standard setting process, the participants participated in three rounds of judgments. Before starting each of the three judgment rounds, the participants were required to complete a readiness survey in the website indicating that they understood the task and process used to complete the item judgments. The participants had to answer “yes” to all readiness survey questions before continuing with the judgment round. If they responded “no” to any question, they were asked to notify a facilitator for additional assistance. Figure 3 presents an example of the readiness quiz participants needed to complete before starting the judgment task.

Figure 3: Example Readiness Quiz Before Judgment Task



Readiness Survey:

Before starting the activity, select a response for each of the following questions.

Do you understand your task for the Item Judgment activity?

Select one:

- Yes
- No

Are you ready to begin the Item Judgment activity?

Select one:

- Yes
- No

Each judgment round consisted of a review of the judgment process by the process facilitator, with explicit instruction on which materials would be needed to complete the task, followed by participants working independently on their item judgments. Participants were required by the website to provide judgments for each item before they could submit their judgment survey.

Judgment Feedback. Once all the participants had completed their item judgments, data analysts from Pearson collected the data from the website and performed the analysis to determine an aggregate recommendation for the committee. The participants were provided feedback after each judgment round which could be used to inform subsequent judgments. Feedback data included the following:

1. Individual item judgment record: A record of each panelists’ individual item judgments for each achievement level. This was provided for the panelists to check their individual judgments against what was recorded in the website survey.
2. Information about panelists’ cut scores for each achievement level:
    1. Individual cut scores: Judgments were summed across items to obtain a cut score for each level. The panelists were provided individual paper handouts showing their judgments and recommended cut score for each achievement level.
    2. Committee cut score recommendations and statistics: Committee-level recommendations were the median cut score across all panelists for each achievement level. Panelists were provided the committee-level cut score recommendations and cut score statistics for each achievement level.
    3. Panelist agreement data: Bar graphs showing the frequency of individual recommended cut scores for each achievement level and across adjacent achievement levels.

3. Item-level judgment agreement across panelists: Distribution of panelist judgments for each item and achievement level.
4. Item means (p-values) and score-point distributions: The average score earned by students for each item and the distribution of score points, for polytomously scored items, calculated from operational test data.
5. Impact data: Percentage of students that would be classified into each achievement level, based on the committee's current recommended cut scores and the results of students who took the assessment during the spring 2022 administration.

Table 6 displays the type of feedback that was provided to participants after each round of judgments.

Table 6: Feedback Data Provided to Participants After Each Judgment Round

Feedback	Round		
	1	2	3
Individual item-level judgment record	Yes	Yes	Yes
Individual test-level recommendations	Yes	Yes	No
Table test-level recommendations	Yes	Yes	No
Committee test-level recommendations	Yes	Yes	Yes
Item-level participant agreement	Yes	Yes	No
Test-level participant agreement	Yes	Yes	No
Item score mean and score distribution	Yes	Yes	No
Impact data	Yes	Yes	Yes

Appendix F provides examples of each of the feedback data provided to participants, along with a brief description of the feedback presented.

Before the discussions of feedback data, panelists were given guidance regarding the independence of their judgments. That is, they were encouraged to listen to other panelists and consider the rationales given for their judgments, but they should not feel pressured to reach consensus. Following Rounds 1 and 2, panelists shared the rationale for their judgments during table-group and whole-group discussions. Items with the highest level of disagreement amongst the committee were revisited for each achievement level. Committee members discussed a range of topics, such as item difficulty, student strategies when responding to the items, their individual rationale for a judgment, and, importantly, the borderline descriptions the group crafted. The goal of the discussions was to demonstrate to panelists how their judgments compared to the rest of the committee and to guide them toward a common and shared understanding of the borderline descriptions and judgment task. Since the round 3 judgments were the participants' final judgments, the feedback data was provided to facilitate the participants' evaluation of the final recommendation by the committee.

Process Evaluations. The validity of standard setting outcomes relies partially on the procedural validity of the meeting. Evidence of the procedural validity was gathered through evaluation surveys administered during the standard setting. An evaluation survey was administered within the website in each committee after the practice judgment activity and the after round 3 judgments. The purpose of these surveys was to collect information about each participants' experience in recommending cut scores for the achievement levels associated with the MCAS assessments. The survey asked participants to provide feedback on the following:

1. The level of success of the various components of the meeting
2. The usefulness of the activities conducted during the meeting
3. The adequacy of the various components of the meeting
4. The adequacy of opportunities to ask questions, etc., at the meeting
5. How confident participants were that the recommended cut scores accurately reflected student performance at each achievement level
6. Whether committee members thought that their judgments and opinions were treated with respect by facilitators and fellow participants

All participants were also allowed to provide any additional information concerning their evaluation of the process of the standard setting meeting through an open response question.

Recommended MCAS Cut Scores from Standard Setting Committees

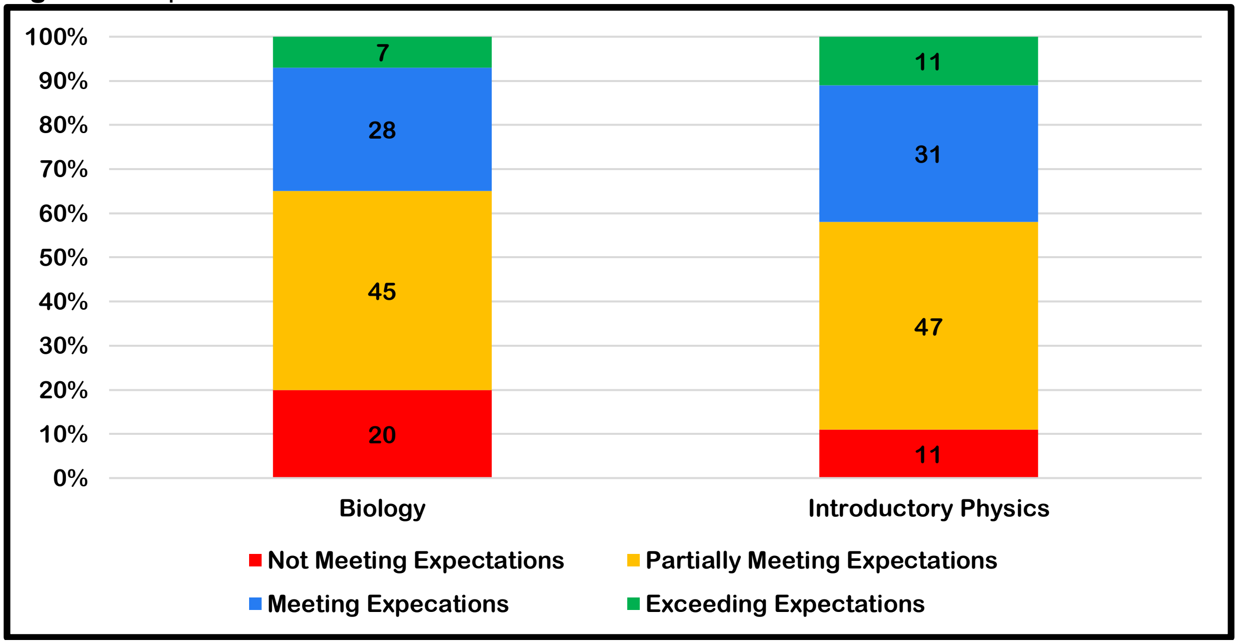
During the cut score setting meeting, it was expected that there would be variation between participants' cut score recommendations for each achievement level. To determine a single cut score recommendation for an achievement level for a committee, the cut score recommendations for the achievement level were averaged across participants. Specifically, the median cut score from a set of participants' cut score recommendations was used to determine the recommended cut score for an achievement level for the committee. The recommendation resulting from the round 3 judgments was considered as the committee's recommendation for the standard setting meeting. Table 7 displays the recommended cut scores for each achievement level based on the round 3 recommendations for each course and subject. Figures 6 and 7 display the impact data for Biology and Introductory Physics, respectively, based on the recommended cuts scores from round 3 from each committee.

The recommended cut scores for each achievement level from the three judgment rounds for each standard setting committee, represented as raw scores, are presented in Appendix G. The summary statistics for the recommended cut scores for each achievement level from the three judgment rounds for each standard setting committee are shown in Appendix H. The participant agreement data for each performance level for judgment rounds 1 and 2 for each standard setting meeting are shown in Appendix I. The estimated impact data after judgment round 3 for each achievement level for each standard setting committee are shown in Appendix J.

Table 7: Cut Score Recommendations from Standard Setting Committees

		Partially Meeting Expectations		Meeting Expectations		Exceeding Expectations	
Subject	Maximum Score	Raw Score	% Correct	Raw Score	% Correct	Raw Score	% Correct
Biology	60	17	28.33	37	61.67	52	86.67
Introductory Physics	60	16	26.67	37	61.67	51	85

Figure 4: Impact Data from Round 3 Recommendations



Chapter 4 – Post-Standard Setting

This chapter provides details about the work completed after the standard setting committee meetings. The sections of this chapter include:

- Articulation process
- Linear scaling process
- Competency Determination Validation

Articulation Process

The purpose of the articulation meeting was to review the cut score recommendations from the standard setting committees within a content area and evaluate the reasonableness of the recommendation. Where the recommendations from the standard setting committees were made with a specific focus on the respective content for this committee, the focus of the articulation committee was to view the cut score recommendations across the courses, Biology and Introductory Physics, and within a content area, including grade 8 STE, to evaluate whether the recommendation resulted in a cohesive assessment system. The participants of the articulation were guided through a specific process where they would review the recommendations from the standard setting committee and, if necessary, recommend and review changes to the recommendation, resulting in a set of recommended cut scores from the vertical articulation committee.

For the Biology and Introductory Physics committees, the vertical articulation occurred with half of the committee participants after the round 3 judgment recommendations. The lead facilitator, Eric Moyer, Ph.D., was the facilitator for the articulation meeting.

Meeting Process

The articulation process involved the following steps:

1. ALD cross-subject and grade review activity
2. Review and discussion of the cross-subject impact data
3. Review and discussion of the cross-grade impact data
4. Review and recommendation to recommended cut scores

At the beginning of the process, the participants were instructed to the purpose of the articulation process, as the opportunity to review the recommended cut scores from the standard setting meetings across courses within the same subject, ensuring that they represented a cohesive assessment system. In the previous standard setting meetings, they were focused primarily on the content related to the grade within their committees, where in this meeting they would review the recommendation from across grades from a policy perspective.

To start the vertical articulation process, the participants were provided the opportunity to independently review the ALDs across courses. The instructions for this activity were to look for differences or similarities in student expectation across courses that could be used to explain the articulation of student impact across grades. After looking at the ALDs independently, the participants had the opportunity to discuss the ALDs as table groups. During a whole group discussion, the participants discussed what their expectation would be of the articulation of the impact data across courses. The focus of this discussion was to establish a content-based expectation for the impact data across grades.

The participants were then presented with the cross-grade impact data chart reflecting the results from the round 3 judgments of all standard setting committees for Biology and Introductory Physics. Additionally, the panelists were presented with impact data using the results from the matched sample process between Physics and Introductory Physics. The panelists were instructed that the matched sample process was performed to statistical remove differences between two populations. For Biology and Introductory Physics, the participants were presented with the impact data from round 3 along with the final impact data for grade 8 for STE from the 2019 standard setting meeting. The groups had the opportunity to discuss how the results looked across grades based on their initial expectations.

Based on their expectations of student impact relative to their review of the ALDs, the participants were provided the opportunity to investigate changes to the recommended cut scores from round 3 using an interactive spreadsheet, which was accessed through the standard setting website.

The interactive spreadsheet allowed participants to investigate possible changes to the cut scores from their committee by adjusting the current cut scores and simultaneously viewing the change to the impact data. The participants were instructed to investigate changes to the recommended cuts scores if they felt that the pattern of the impact data across grades was inconsistent with what they expected, based on their review of the ALDs and their understanding of a cohesive assessment system. The changes would be made directly at the cut score level and did not involve changes to the item level judgments. The range of individual participant's cut score recommendations from round 3 were used as a guide when evaluating how much change would be reasonable to make. The participants were aware of the need to honor the work the standard setting committees had done and were judicious in making changes.

The committee had the opportunity to recommend changes to cut scores for achievement levels for the grades which they determined had inconsistent results. When a change in cut score was recommended, it was entered into a master interactive spreadsheet by the meeting facilitator for the entire committee to view the change in cut score and pattern of impact data across grades and achievement levels. One recommended change at a time was viewed, discussed, and then either accepted or rejected by the vertical articulation committee. This process was repeated until all recommended changes were discussed and the vertical articulation committee agreed with the entire set of cut score recommendation across all grades.

Participants were aware of the need to honor the work the standard setting committees had done and were selective in making changes so that the number and magnitude of changes were limited to only those changes necessary to support the articulation across grades. Table 8 displays the changes made to the recommended cut scores from the standard setting committees.

Table 8: Changes to the Cut Score Recommendations by the Vertical Articulation Process

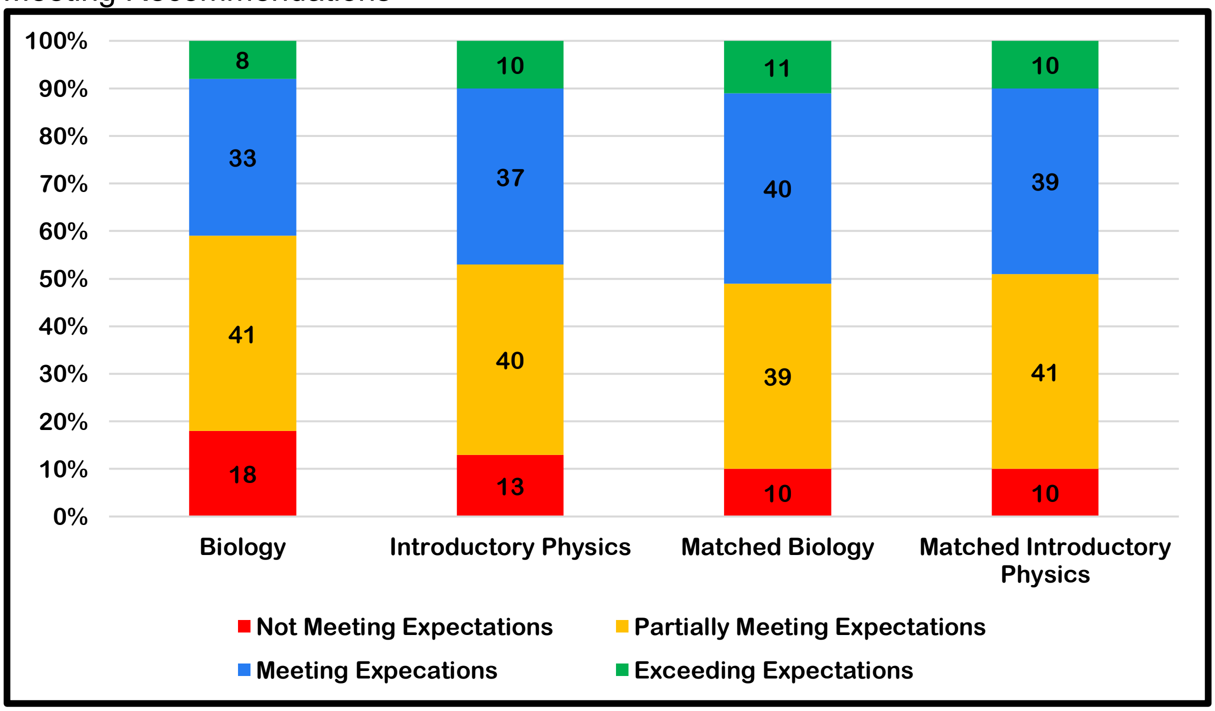
Course	Partially Meeting Expectations	Meeting Expectations	Exceeding Expectations
Biology	-1	-3	-1
Introductory Physics	+1	-2	0

Table 9 displays the recommended cut scores for each achievement level based on the final vertical articulation recommendations for each course and subject. Figure 5 displays the impact data for Biology and Physics, based on the recommended cuts scores from the vertical articulation process.

Table 9: Cut Score Recommendations from the Vertical Articulation Process

Subject	Maximum Score	Partially Meeting Expectations		Meeting Expectations		Exceeding Expectations	
		Raw Score	% Correct	Raw Score	% Correct	Raw Score	% Correct
Biology	60	16	26.67	34	56.67	51	85
Introductory Physics	60	17	28.33	35	58.33	52	86.67

Figure 5: Impact Data for Biology and Introductory Physics based on the Articulation Meeting Recommendations



Process Evaluation Survey

At the end of the vertical articulation process, participants were asked to complete a process evaluation survey within the website. The purpose of the evaluation was to collect information about each participants' experience in the vertical articulation meeting. The evaluation asked participants to provide feedback on the following:

- The level of success of the various component of the meeting

- The usefulness of the activities conducted during the meeting
- The adequacy of the various components of the meeting
- The level of support the participants had in setting the recommended cut scores for each achievement level across all grades

All participants were also allowed to provide any additional information concerning their evaluation of the process of the vertical articulation meeting through an open response question.

Linear Scaling Process

The recommendations from the standard setting and vertical articulation committees were cut scores in terms of raw scores on the test. Student results are not reported as raw scores, since the overall difficulty of tests may change from year to year, so results would not be able to be compared across years. To address this, student results on the MCAS are reported using scale scores, which are comparable across administration years. After the vertical articulation process, a method was implemented to determine the process for transforming the raw scores from the spring 2022 administration to MCAS scale scores.

The process of determining the rules for transforming the raw scores to the final MCAS reporting scale was guided by several principles identified by DESE:

- Respect the cut score recommendations provided by the vertical articulation committee by preserving the final cut scores while also establishing a coherent system of measurement across grades
- The impact data from the final scaling solution should reflect a coherent assessment system across the grades
- The reporting MCAS scaled scores for the three achievement level cuts should be the same across grades and tests
- The scaling solution should involve a single linear transformation, from the underlying IRT scale to the reporting MCAS scale
- The reporting MCAS scaled score range should be the same across grades and tests.

This process, involving Pearson, Cognia, and DESE, was used to determine a final reporting scale and transformation rules for each test. A more extensive description of the development of the scaling process will be included in the overall MCAS technical report.

The following iterative process was used to determine the final cut scores for the achievement levels for the MCAS assessments, starting with the raw score cuts recommended from the vertical articulation meeting:

- The raw score cuts for the three achievement levels were translated to cuts on the IRT scale using the raw score to theta (IRT) lookup table for the specific assessment.
- The cuts on the IRT scale were adjusted so that the differences between consecutive cuts were the same, allowing for the use of a single linear transformation rule.
- Based on the adjusted IRT cut scores, scaling constants for the linear transformation from the IRT cuts to MCAS scale score cuts were determined.
- Using the scaling constants, lookup tables for each grade and test were created, displaying the relationship between the raw scores and reporting MCAS scaled scores.
- Based on the lookup tables, adjusted raw score cuts for each achievement level were determined.
- Finally, the resulting impact data based on the adjusted raw score cuts was calculated

and reviewed to ensure a coherent system across grades.

This process was repeated several times until a final scaling solution was determined, which met, as closely as possible, DESE's requirements.

The recommended reporting scale ranges from a lowest obtainable scale score of 440 to a highest obtainable scale score of 560. In order to create common points of reference across the assessments, the same scaled score cuts for each achievement level were defined, with a *Partially Meeting Expectations* cut of 470, a *Meeting Expectations* cut of 500, and an *Exceeding Expectations* cut of 530. While the cut scores were defined with the same scaled scores between the two tests, they are not identical, and direct comparisons through averaging and aggregation across grades should not be made without study and/or statistical adjustments. The scaled scores and distributions of students resulting from the cuts set for biology and introductory physics were not designed for direct comparison. Table 10 displays the changes made to the recommended cut scores from the vertical articulation committees.

Table 10: Changes to the Cut Score Recommendations for Linear Scaling

Subject	Partially Meeting Expectations	Meeting Expectations	Exceeding Expectations
Biology	+1	0	-1
Introductory Physics	0	0	-1

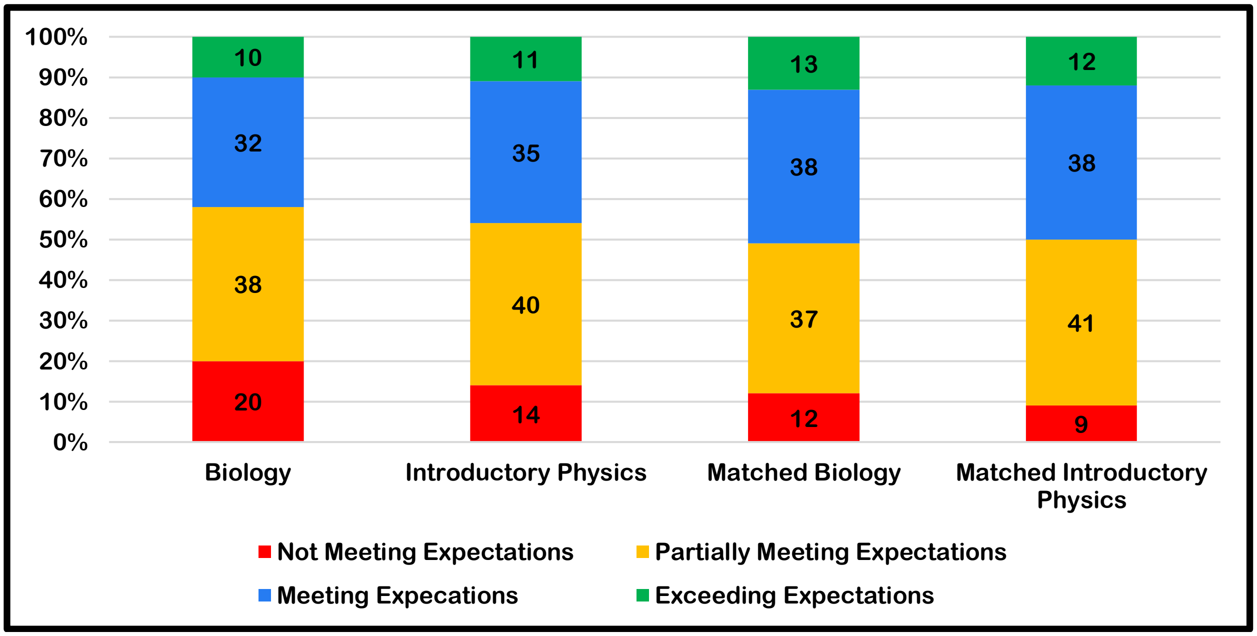
Table 11 displays the final recommended from the Linear Smoothing for each achievement level based on the results of this process for each course and subject.

Table 11: Final Cut Score Recommendations from the Linear Scaling

Subject	Maximum Score	Partially Meeting Expectations		Meeting Expectations		Exceeding Expectations	
		Raw Score	% Correct	Raw Score	% Correct	Raw Score	% Correct
Biology	60	17	28.3%	34	56.7%	50	83.3%
Introductory Physics	60	17	28.3%	35	58.3%	51	85.0%

Figure 6 presents the impact data from the final recommendations as stacked bar graphs.

Figure 6. Impact Data for Biology and Introductory Physics based on Final Recommendations



Competency Determination Validation

A competency determination validation meeting was convened to review and either validate or adjust competency determination cuts on the next-generation MCAS assessments for Biology and Introductory Physics. The competency determination cuts on the next-generation MCAS are interim cut scores that correspond to the scale score cuts for each of the achievement levels on the previous (legacy) MCAS assessments for Biology and Introductory Physics. The identification and validation of the interim competency determination cuts was legislatively mandated to provide students, parents, and educators with sufficient time to become familiar with the new assessment and expectations before the next-generation passing standards are established.

In addition to the Competency Determination (220) score, the legacy cut scores and scaled scores will be used during the transition period to determine eligibility for John and Abigail Adams Scholarship.

Prior to the competency determination meetings, the Pearson standard setting team worked to statistically identify interim cuts for the achievement levels on the legacy MCAS assessments, Needs Improvement (220), Proficient (240), and Advanced (260). An equipercentile process with a matched sample was used to statistically identify the interim cut scores for each achievement level. The statistically determined interim cut score ranges were established so they result in similar impact data on the spring 2019 administration of the next-generation MCAS and on the spring 2019 administration of the legacy MCAS. Table 12 provides the statistically defined interim cut score ranges for each subject.

Table 12: Statistically Defined Interim Cut Scores

Subject	Needs Improvement	Proficient	Advanced
Biology	15 to 19	28 to 33	44 to 50
Introductory Physics	15 to 19	25 to 32	45 to 50

There were two competency determination validation meetings, one for Biology and one for Introductory Physics. The competency determination committees were convened as a separate meeting after the standard setting committee concluded. The panelists for the competency determination meetings were a subset of the panelists from the standard setting committee, including some of the committee table leaders. The facilitators for the Biology and the Introductory Physics competency determination meeting were Soo Ingrisone and Scott Strickman, respectively.

Meeting Process

The competency determination validation process involved three steps:

1. Determine content expectations for previous (legacy) MCAS achievement levels
2. Review student performance on next-generation MCAS within reasonable ranges for the interim cut scores
3. Provide individual judgments about interim cut scores for each achievement level

For the panelists to review whether the content expectations defined by the interim cut scores on the next-generation MCAS was similar to the expectation on the legacy MCAS assessment, they first had to define the content expectations for each achievement level. Prior to the meeting, the Pearson standard setting team created score profiles for each scale score associated with the achievement level cut scores. The score profile presented student performance on each of the items for students that received the associated scale score. Figure 7 displays an example of a score profile for grade 10 ELA.

Participants reviewed the score profiles for each achievement level on the legacy MCAS in table groups to create an outline of student expectations for each achievement level. For each item on the score profile, the participants were provided item keys and scoring information, accessed through the standard setting website. Based on the panelist review of the items and the score profiles, the facilitator guided the group through a discussion to develop an outline of student expectations for each achievement level.

The panelists then reviewed score profiles for each interim cut score range on the next-generation MCAS assessment. The score profiles were based on student performance on the next-generation MCAS assessment administered in spring 2022. Access to the score profiles for the interim cut score ranges, items and scoring information for items was provided to the panelists through the standard setting website. For each score profile, the participants were comparing the expectations defined by student performance on the items and how they compared to the content expectations defined for the legacy achievement level.

Figure 7: Example student profile for legacy assessment

Scale Score: 220

Raw Score Distribution:

Raw score	21	22
Number of students	183	162
Percentile	2nd	2nd

Composition Score Distribution

Score	0	2	3	4	5	6	7	8	9	10	11	12
Topic Dev.	39%	7%	4%	31%	8%	11%	0%	0%	0%	0%	0%	0%
Conv.	39%	1%	2%	45%	6%	6%	0%	0%				

Open Repsonse Score Distribution

Item Sequence	Item ID	Max Points	0	1	2	3	4
9	EL315010	4	26%	50%	22%	3%	0%
18	EL316592	4	21%	50%	23%	5%	0%
27	EL309870	4	35%	51%	13%	1%	0%
36	EL315350	4	18%	51%	27%	4%	0%

Selected Response Score Distribution:

Item Sequence	Item ID	Max Points	% correct
Percentage of students with correct response greater than 75%			
Percentage of students with correct response between 60% and 74%			
Percentage of students with correct response between 40% and 59%			
1	EL314958	1	40%
3	EL314971	1	45%
4	EL314992	1	56%
5	EL314981	1	40%
6	EL314984	1	44%
10	EL316630	1	41%
11	EL316629	1	57%
12	EL316631	1	47%
13	EL316636	1	47%

Based on the panelists' review of the score profiles associated with each interim cut scores and the scores around them, the panelists then provided an individual judgment for each achievement level. For each achievement level, the panelist responded to the following question:

Based on your review, which raw score within the range on the Next-Generation MCAS represents similar expectations to the performance level expectations on the spring 2019 Legacy MCAS?

Panelists selected a raw score within the reasonable range for each achievement level through an online judgment survey. The median of the committee recommendations was used as the committee recommendation for the achievement level. Table 13 displays the interim cut score recommendations for the legacy achievement levels on the next-generation MCAS.

Table 13. Recommended Cut Scores for the Legacy Achievement Levels

Subject	Legacy Achievement Levels		
	Needs Improvement	Proficient	Advanced
Biology	16	29	46
Introductory Physics	17	29	47

Chapter 5 – Evidence of Procedural Validity of the Standard Setting Process

This chapter details various evidence for the validity of process used during the standard setting meetings. The sections in this chapter include the following:

- Committee representation
- Committee training
- Participants' perceived validity of the meeting
- Technical advisors' perceived validity of the meeting

Committee Representation

As part of the standard setting evaluation, participants completed a demographic survey that collected information about their background relevant to educational experience. The results of the self-reported demographic characteristics of the participants are documented in Appendix D.

As part of the survey, their current position (Table D.1) and the number of years teaching a course related to their standard setting meeting (Table D.2). A majority of the participants of each committee were teachers in grades K–12. The majority of panelists in both committees had more than 10 years of experience.

The experience of the teachers in the committees included experience teaching different populations of students, as displayed in Table D.3 A large majority of participants of each committee had experience teaching general education, mainstream special education, and English language learners.

A large majority of participants were currently working in school districts, as presented in Table D.7. The participants that worked within school districts represented the various types of districts across the state, including size, type, and socioeconomic status. Teachers representing schools from a rural area were the least represented, with only one teacher in the Biology committee from a rural school. The set of participants for this standard setting was well selected for representing the teachers across the state in this process, which was noticed consistently by the facilitators of the meeting.

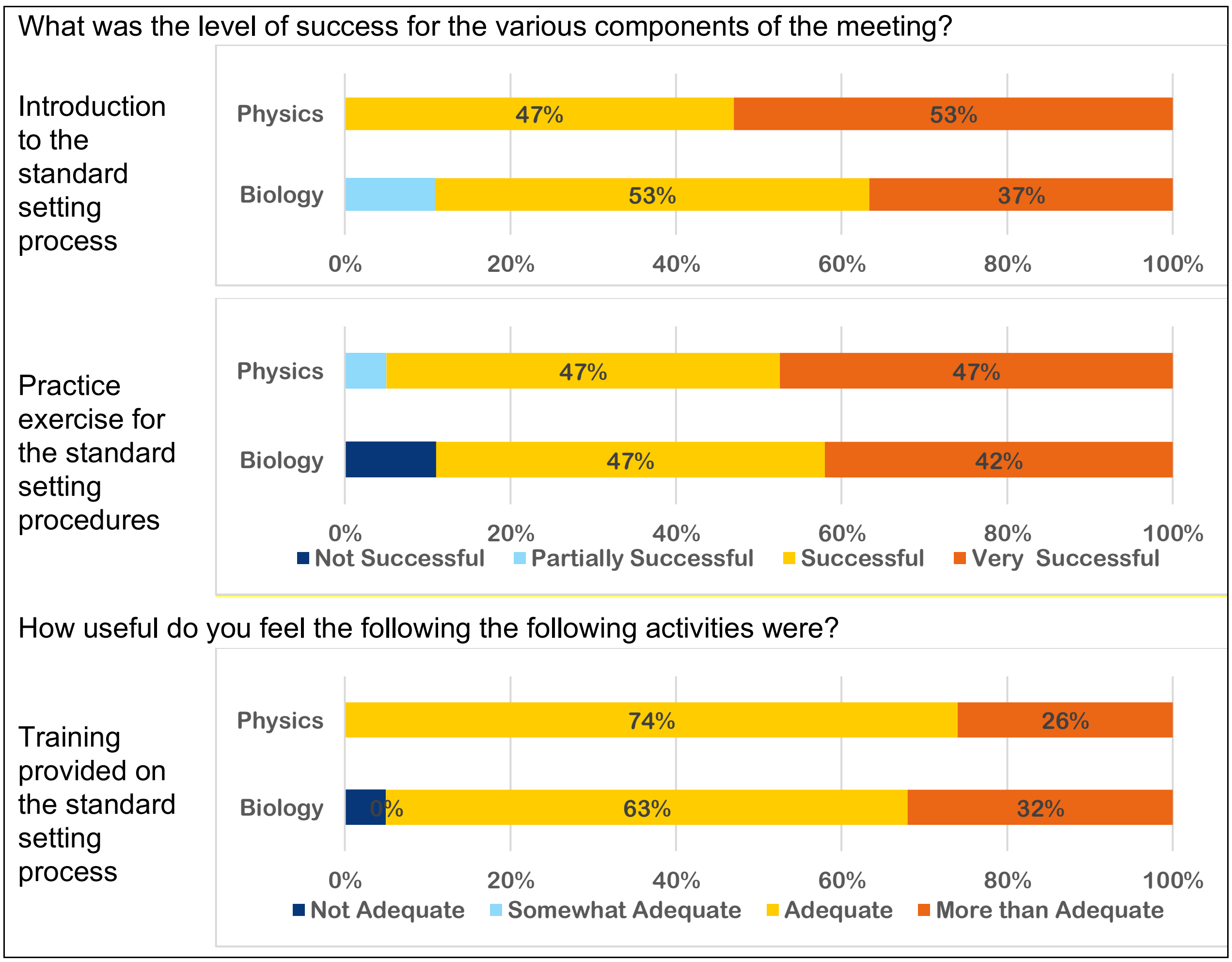
Committee Training

During the cut score setting meeting, it was essential that participants understood how to make judgments as part of the Extended Modified (Yes/No) Angoff standard setting methodology. The training on the standard setting methodology was provided during the general session and in the individual standard setting committees. The training on the implementation of the standard setting process was standardized across committees through the PowerPoint training slides.

Participants participated in a practice judgment round as an opportunity to implement the standard setting methodology without consequence, including making judgments within the standard setting website. During the practice judgment round, the participants reviewed a reduced set of items and provided judgments for the three achievement levels, *Partially Meeting Expectation*, *Meeting Expectations*, and *Exceeding Expectations*. After the practice round, the process facilitator led a whole-group discussion to identify and respond to any questions or issues participants encountered while implementing the standard setting process. Before each judgement round, participants responded to a readiness survey that asked whether participants were prepared for making their judgments. Participants were not able to continue to the judgment survey unless they answered yes to both questions on the readiness survey. They were encouraged to ask the facilitator questions if they responded “no” to either question.

At various points within the standard setting meeting, participants completed a process evaluation survey to record their impressions of the effectiveness of the materials and methods employed throughout the process. Figure 8 displays the results of the evaluation survey across subject-level committees for several questions related to the training on the standard setting process. The results of these process evaluations for each individual committee are presented in Appendix K.

Figure 8: Evaluation results on standard setting process training activities



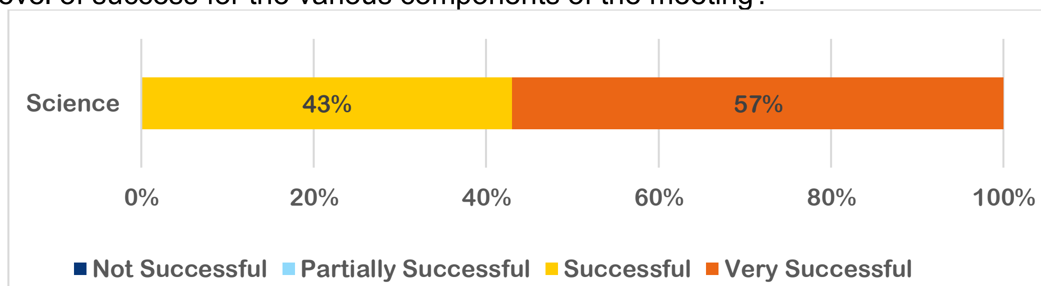
As part of the evaluation survey, the participants were specifically asked about the effectiveness of the training they received on the standard setting process. One question asked participants to rate the level of success of the initial introduction to the standard setting process during the general session. Overall, the initial introduction to the standard setting process was perceived as successful with at least 90 percent of participants in the committees responding that it was either *Successful* or *Very Successful*. The perception of the training on the standard setting process in the breakout groups was also good, where more than 90 percent of participants in the committees responded that it was either *Useful* or *Very Useful*. More than 80 percent of participants in the committees indicated that the practice judgment activity for the standard setting process was either *Successful* or *Very Successful*. These responses indicate that, overall, most participants believed that the training provided prepared them to implement the standard setting procedure, providing cut score recommendations for each assessment for which they were responsible.

During the vertical articulation meeting for Biology and Introductory Physics, the participants were provided training on the process and tools used during the meeting. At the end of the meeting, the participant completed a process evaluation form to record their opinion on the training provided. The results of this process evaluation are presented in Appendix K. All participants indicated that the introduction to the vertical articulation process was either *Successful* or *Very Successful.*

Figure 9: Evaluation results on vertical articulation process training activities

What was the level of success for the various components of the meeting?

Introduction to the vertical articulation process



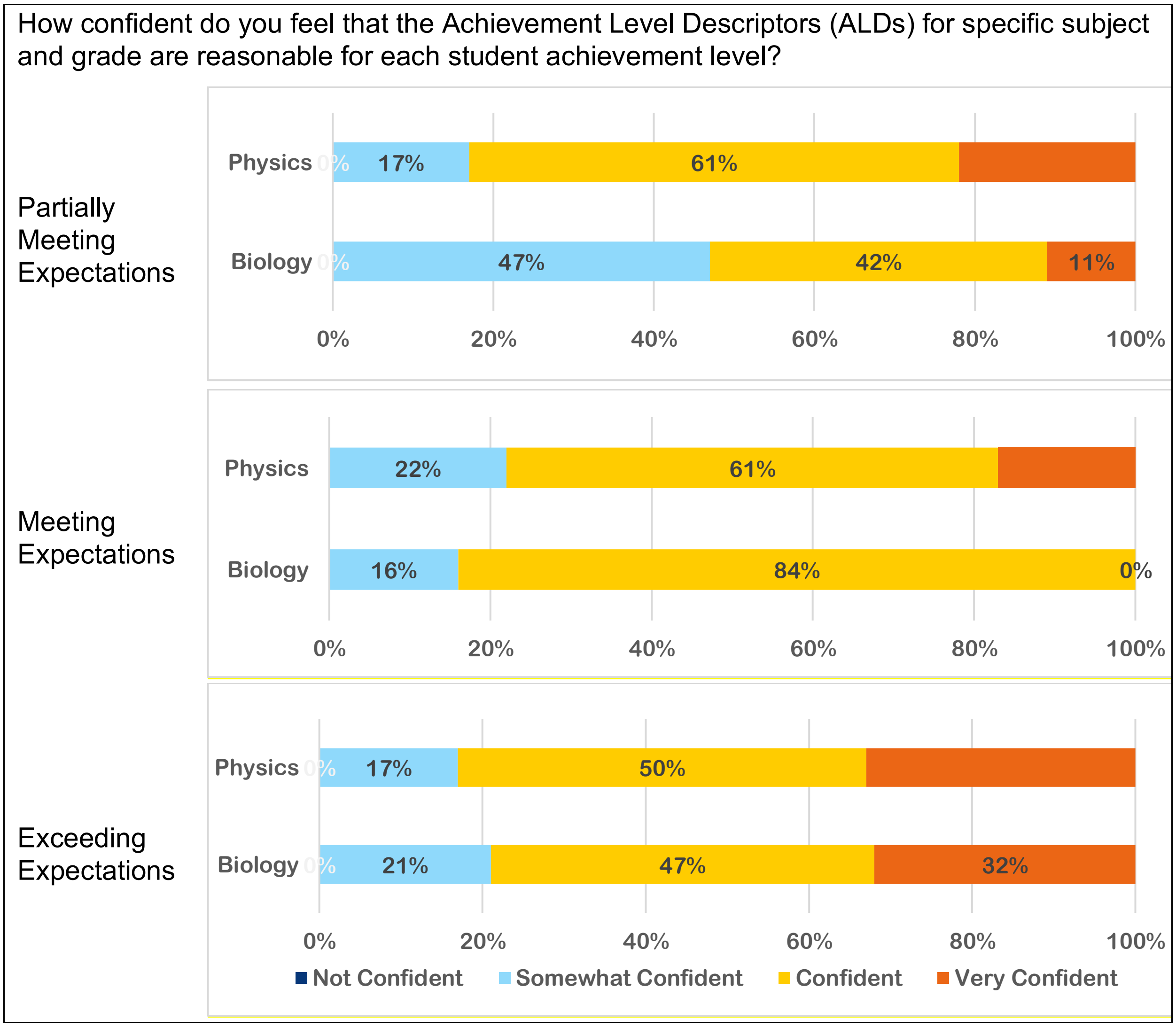
Perceived Validity of the Workshop

Participants and reviewers communicated their perceived validity of the workshop and the recommended cut scores. Participants indicated their perceived validity of the workshop as part of the workshop evaluation. Evaluations are important evidence for establishing the validity of recommended cut scores for the achievement levels.

Participant Evaluations

Generally, the participants were satisfied with their recommendations and with the workshop as a whole. As part of the process evaluation from each committee, the participants had the opportunity to indicate their confidence that the Achievement Level Descriptors were reasonable for each of the achievement levels. Figure 10 displays the results of the evaluation survey across subject-level committees and indicates that the ALDs were reasonable for each of the achievement levels. The results for each subject and grade are presented in Appendix K.

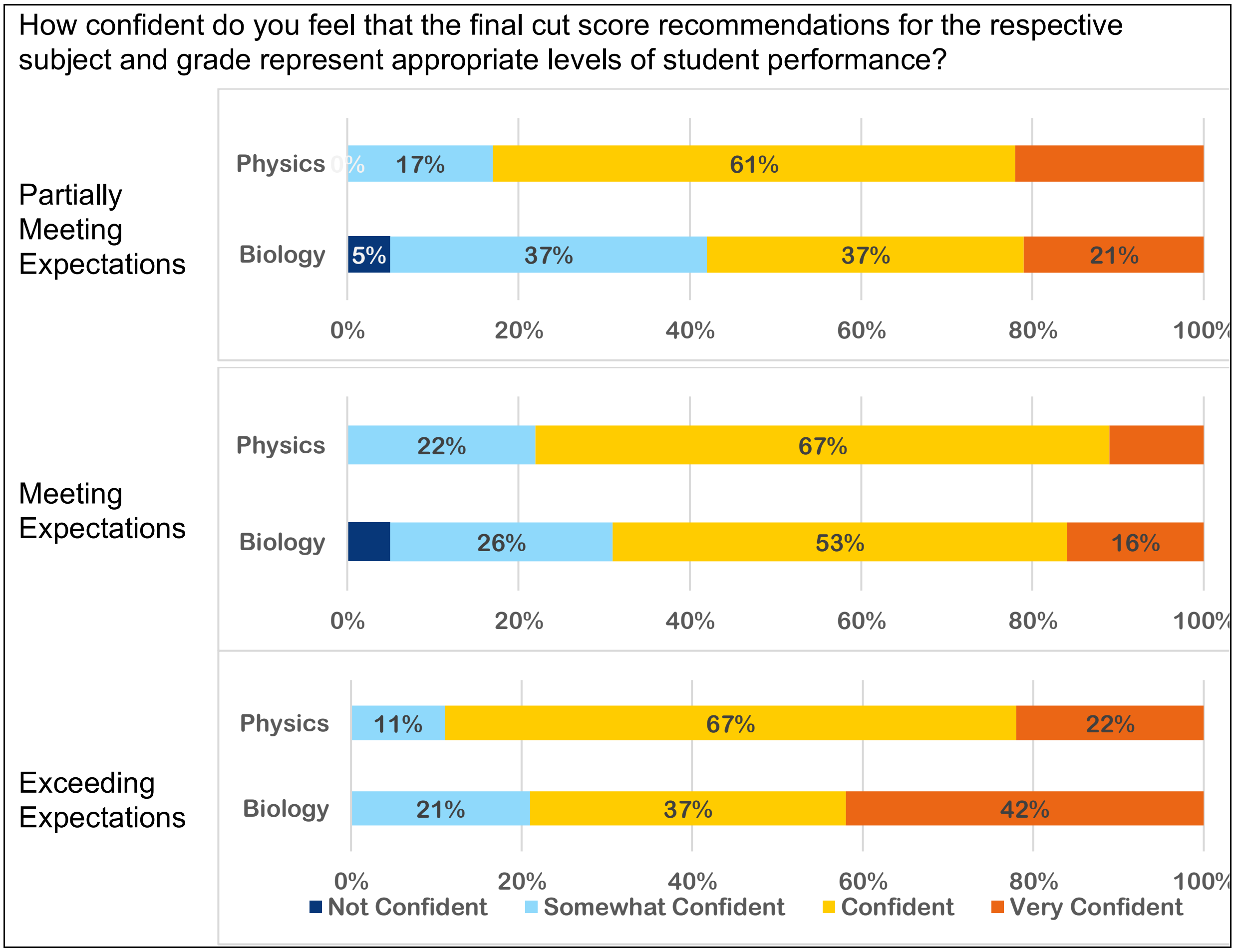
Figure 10: Evaluation results on reasonableness of the ALDs for each achievement level



Overall, the majority of panelists had at least some confidence that the ALDs were reasonable for each of the achievement levels. In the majority of committees, at least 50 percent of the participants were *Confident* or *Very Confident* that the ALDs were reasonable for the achievement levels. The panelists from the physics committee had the greatest level of confidence, with greater than 75% of the panelists indicating they were *Confident* or *Very Confident*. These responses provide evidence that, overall, the ALDs, a foundation for the standard setting process, were perceived by the participants as providing reasonable expectations for each achievement level.

The participants were also provided the opportunity to indicate their confidence in the cut scores recommended by the standard setting committees. Figure 11 displays the results of the evaluation survey across committees for their confidence in the recommended cut scores. The results for each science course are presented in Appendix K.

Figure 11: Evaluation results on reasonableness of the cut scores for each achievement level



As with the ALDs, the majority of participants indicated that they had at least some confidence that the recommended cut scores represented appropriated levels of student performance for each achievement level. There seemed to be a difference between the level of confidence in the cut score recommendations for the different subjects. The physics participants demonstrated a greater confidence in the cut score recommendations, with greater than 60 percent of panelists selecting *Confident* or *Very Confident* for all achievement levels. Although the biology panelists indicated lower confidence, at least 50 percent of panelists indicated *Confident* or *Very Confident* for Meeting Expectations and Exceeding Expectations.

Overall, this feedback from the cut score setting participants provides evidence for the validity of the cut score recommendations for each of the achievement levels from the standard setting committee.

The participants in the vertical articulation meetings were also provided the opportunity to provide their opinion concerning the cut score recommendations for each achievement level resulting from the vertical articulation process. Based on the results, shown in Appendix K, the large majority of participants, at least 90 percent of panelists from the science vertical articulation committee, indicated that they were *Very Confident* or *Confident* of the cut score recommendations from the vertical articulation process. These results provide further evidence for the validity of the process and the results used to create the cut scores for achievement levels for each assessment.

Technical Reviewer Evaluations

After the standard setting meeting, a technical advisor, William Lorie, Ph.D., provided a written review of the standard setting process used during the meetings.

References

Cizek, G. J., Bunch, M. B., & Koons, H. (2004). Setting performance standards: Contemporary methods. *Educational Measurement: Issues and Practice*, *23*(4), 31-50.

Davis, L. L., & Moyer, E. L. (2015). PARCC performance level setting technical report. Available from Partnership for Assessment of Readiness for College and Careers (PARCC), Washington, D.C.

Hambleton, R. K., & Plake, B. S. (1995). Extended Angoff procedure to set standards on complex performance assessments. *Applied Measurement in Education*, *8*, 41-56.

Iacus, S. M., King, G., & Porro, G. (2012). Causal inference without balance checking: Coarsened exact matching. *Political Analysis*, *20*(1), 1-24. doi: 10.1093/pan/mpr013.

Plake, B. S., & Cizek, G. J. (2012). Variations on a Theme. In G.J. Cizek (Ed.), *Setting performance standards* (2nd ed.). New York: Routledge.

Plake, B. S., Ferdous, A. A., Impara, J. C., & Buckendahl, C. W. (2005). *Setting multiple performance standards using the Yes/No method: An alternative item mapping method.* Meeting of the National Council on Measurement in Education. Montreal, Canada.

Appendix AA – Achievement Level Descriptors

Biology

Student results on the MCAS tests are reported according to four achievement levels: *Exceeding Expectations, Meeting Expectations, Partially Meeting Expectations,* and *Not Meeting Expectations.* The descriptors below illustrate the knowledge and skills students demonstrate on MCAS at each level. **Knowledge and skills are cumulative at each level.** No descriptors are provided for the *Not Meeting Expectations* achievement level because students work at this level, by definition, does not meet the criteria of the *Partially Meeting Expectations* level.

	Partially Meeting Expectations ***On MCAS, a student at this level:***	**Meeting Expectations** ***On MCAS, a student at this level:***	**Exceeding Expectations** ***On MCAS, a student at this level:***
Understanding and Application of Disciplinary Core Ideas	Demonstrates a partial understanding of some scientific concepts and processes by identifying and sometimes describing or providing evidence for these concepts and processes. Uses some basic scientific terms in common scientific examples.	Demonstrates a solid understanding of many scientific concepts and processes by mostly describing, explaining, and providing evidence for these concepts and processes. Mostly applies appropriate scientific terms in a variety of applications, including common science examples and some novel situations.	Demonstrates a comprehensive, in-depth understanding of many scientific concepts and processes by consistently describing, explaining, and providing evidence for these concepts and processes. Consistently applies scientific terms in appropriate contexts in both common science examples and many novel situations.
Understanding and Application of Scientific and Engineering Practices	Identifies a testable, scientific question for an investigation. Completes a simple, commonly used model. Uses simple graphs or data to draw general conclusions about a familiar scientific investigation or phenomena. Identifies evidence to support a claim.	Develops some testable, scientific questions for an investigation. Completes or uses a model and describes some strengths and weaknesses of the model. Analyzes multiple sources of data, including graphs and tables, to draw conclusions about a familiar scientific investigation or phenomena. Provides some evidence to support a claim and constructs basic explanations for	Consistently develops testable, scientific questions for an investigation. Creates a model, consistently describes the strengths and weaknesses of the model, and provides information for how to improve the model. Analyzes multiple sources of data, including graphs and tables, to draw conclusions about a novel or complex scientific investigation or phenomena. Provides several pieces of evidence to support a claim and constructs thorough

	Describes a benefit or drawback of simple design features given a familiar device or prototype.	scientific phenomena or results from an investigation. Analyzes design features of a familiar device or prototype and describes a benefit or drawback of the design.	explanations for scientific phenomena or results from an investigation. Analyzes design features of a novel device or prototype and constructs an explanation for how the design features meet criteria for success or are limited by constraints.

LS1. From Molecules to Organisms: Structures and Processes		
Partially Meeting Expectations ***On MCAS, a student at this level:***	**Meeting Expectations** ***On MCAS, a student at this level:***	**Exceeding Expectations** ***On MCAS, a student at this level:***
Identifies some of the most common elements that make up organic macromolecules. Describes a basic function of a type of organic macromolecule (carbohydrate, lipid, nucleic acid, or protein). Identifies the source of energy and the major reactants and products of photosynthesis by their names or chemical formulas. Describes ATP as a source of usable energy and that it is produced in mitochondria. Describes some major events of the cell cycle (including interphase, mitosis, cytokinesis) and their purposes. Recognizes that chromosomes are separated during mitosis and that mitosis is responsible for tissue growth and repair. Identifies complementary base pairs for a DNA sequence and for an mRNA sequence. Identifies that a gene codes for a protein and describes one function of a protein. Completes a basic model to generally describe how a body system works.	Analyzes models to classify most organic macromolecules and identifies all common elements for a given example. Analyzes models of monomers to identify some types of organic macromolecules and describes some basic functions of these macromolecules. Constructs or completes models of photosynthesis using the names or chemical formulas of reactants and products and describes the importance of photosynthesis. Constructs or completes models of cellular respiration using the names or chemical formulas of reactants and products and describes the importance of cellular respiration. Completes a model to describe how major events of the cell cycle, including DNA replication, allow a cell to grow and survive. Describe the number of chromosomes in a body cell and its daughter cells. Describes the structure of DNA and how its structure affects its function. Describes how genes code for proteins through transcription and translation and describes several functions of proteins. Recognizes that all cells within the same organism have the same genes.	Analyzes models of monomers to consistently identify their organic macromolecules and describes the functions of these molecules. Constructs an explanation about the important uses of the products of photosynthesis for both plants and animals. Analyzes data to determine the relative amount of ATP that is generated by organisms under different conditions. Explains how ATP is used in a variety of ways by both animal and plant cells. Constructs an explanation about how the sequence of events of the cell cycle allows organisms to grow and survive. Explains the importance of mitosis and cytokinesis in an organism. Describes specific functions of several proteins, including enzymes, hormones, and structural proteins. Calculates the percentage of one type of nitrogenous base for a DNA molecule using complementary base pairs. Analyzes and creates models of DNA, RNA, and amino acid chains to describe the products of replication, transcription, or translation.

Describes one way the body maintains homeostasis.	Describes several functions of proteins. Describes the functions of structures and organs of body systems. Interprets models to draw a conclusion about the way the human body maintains homeostasis.	Analyzes data to determine when a gene is expressed and to determine whether replication, transcription, or translation occurs. Constructs an explanation about why different types of cells express different genes, which results in different cell functions. Analyzes data to draw conclusions about how body systems work together to support life functions. Constructs an explanation about how body systems work to restore homeostasis through a sequence of events.

LS2. Ecosystems: Interactions, Energy, and Dynamics		
Partially Meeting Expectations ***On MCAS, a student at this level:***	**Meeting Expectations** ***On MCAS, a student at this level:***	**Exceeding Expectations** ***On MCAS, a student at this level:***
Describes birth and immigration as factors that increase population size, and death and emigration as factors that decrease population size. Identifies some basic ecological relationships (such as predation, competition, mutualism), when given an example. Interprets a basic food web to identify simple ecological relationships. Analyzes a food web to identify the trophic level of a species. Recognizes that less energy is available at higher tropic levels in an energy pyramid. Identifies some carbon cycle processes and recognizes that carbon is released or stored in the environment depending on the process. Recognizes that the biodiversity of an ecosystem is affected by the number of species in the ecosystem. Identify some characteristics of invasive species. Describes one way invasive species can impact other species in an ecosystem. Identifies human impacts (climate change, pollution, habitat destruction) on an	Describes how various biotic and abiotic factors affect a population's birth rate, death rate, immigration rate, or emigration rate. Describes several ecological relationships and determines evidence that supports claims about ecological relationships. Analyzes a food web to describe changes to populations resulting from an increase or decrease of another population. Uses an energy pyramid to calculate the amount of energy that is expected to be stored in different trophic levels. Completes a carbon cycle model showing how carbon is moved through both biotic and abiotic parts of an ecosystem. Describes how the biodiversity of an ecosystem is affected by the number of individuals within a species (genetic diversity is lower in smaller populations). Describes how characteristics of invasive species can affect other species in an ecosystem. Analyzes data to determine the human impact on an ecosystem and describes several ways to reduce the impact of human activity on the ecosystem.	Analyzes multiple factors (such as species interactions, human activities, and natural phenomena) to solve problems relating to population size and carrying capacity of an ecosystem. Analyzes complex food webs and constructs explanations about various interactions in the food web as the sizes of populations change. Constructs an explanation for why only about 10% of the energy stored in one trophic level will be available to the next higher trophic level and how having less energy available reduces the number of organisms that can be supported at higher trophic levels. Constructs an explanation for how several carbon cycle processes interact within an ecosystem and how changes in the environment can disrupt the cycle. Explains how biodiversity of an ecosystem can be impacted by both the number of species in that ecosystem as well as the number of individuals within a species. Constructs thorough explanations for how and why invasive species can affect an ecosystem. Evaluates several solutions for either reducing the impact of human activity on an ecosystem or restoring an ecosystem and explains the benefits and drawbacks of these solutions.

ecosystem and describes some ways to address them.		

LS3. Heredity		
Partially Meeting Expectations ***On MCAS, a student at this level:***	**Meeting Expectations** ***On MCAS, a student at this level:***	**Exceeding Expectations** ***On MCAS, a student at this level:***
Identifies the general purpose of meiosis, that gametes come from two parents, and that egg and sperm combine to produce offspring. Recognizes that inherited traits are a result of genetic information encoded in an organism's DNA and RNA. Completes a simple model to show how a mutation in a DNA sequence can change an mRNA codon. Identifies that only mutations in a gamete can be passed from parent to offspring and that mutations can be a source of genetic diversity. Interprets information to determine when traits show dominant-recessive and codominant inheritance patterns. Identifies genotypes for a certain trait, completes a Punnett square for a given cross, and calculates the expected percentage of offspring for a given genotype or phenotype. Identifies the genotype of an individual in a basic pedigree when the inheritance pattern is given.	Analyzes and completes a basic model of meiosis. Describes the product of fertilization as a zygote (a diploid cell) containing genetic information from both parents. Describes how mutations in DNA can lead to the production of different amino acids and therefore different proteins. Interprets a model of crossing over and concludes that genetic variability increases as a result of crossing over. Interprets information to describe how a trait is inherited by incomplete dominance, sex-linked, multiple alleles, and polygenic inheritance patterns. Constructs and completes Punnett squares and calculates the expected percentages of genotypes and phenotypes of crosses for a given scenario. Analyzes a pedigree to determine the inheritance pattern of a trait. Describes how environmental factors can influence the expression of some inherited traits.	Constructs an explanation of why meiosis is important for maintaining the number of chromosomes from one generation to the next. Explains how crossing over, independent assortment, and random pairing of gametes contribute to the genetic diversity of offspring. Constructs an explanation for how a mutation in a DNA code may or may not result in a phenotypic (trait) change. Analyzes Punnett squares to determine the expected genotype and phenotype percentages for sex-linked traits. Analyzes a complex pedigree to determine genotypes and phenotypes of individuals and to make predictions about future offspring of parents in the pedigree. Uses data to explain the likelihood that a certain trait will be more influenced by genetics or by the environment.

LS4. Evolution		
Partially Meeting Expectations ***On MCAS, a student at this level:***	**Meeting Expectations** ***On MCAS, a student at this level:***	**Exceeding Expectations** ***On MCAS, a student at this level:***
Identifies some types of evidence (genomes, amino acids, fossils, homologous structures) that support the process of evolution. Recognizes that individuals with certain traits survive and produce more offspring than individuals without those traits. Describes that, in general, two organisms from the same species are able to mate and produce offspring. Recognizes that isolated populations generally have a smaller gene pool than larger populations. Recognizes that viruses are unable to reproduce outside of a host cell and that bacteria reproduce through asexual reproduction.	Explains how evolution can be supported by evidence that demonstrates common ancestry. Completes a cladogram to show the evolutionary relationships among several species. Describes how an advantageous heritable trait allows individuals in a population to survive and reproduce more than individuals without that trait. Describes how to determine whether two organisms are closely related and/or from the same species. Describes the role of genetic drift or gene flow in the speciation or extinction of a population. Describes how bacteria and viruses adapt quickly to changing environments due to their high mutation rate and the ability to quickly reproduce.	Constructs an explanation based on a model, such as a cladogram, to support a claim about the evolutionary relatedness of species and explains why comparing genomes provides the best evidence that two species are closely related. Constructs a thorough explanation about evolution, including conditions (heritable variation, differential fitness) that need to be met for evolution to occur and how there will be changes in the frequency of alleles (or traits) within a population over time. Analyzes a situation to determine evidence of selection pressures that could influence the evolution of a population. Constructs explanations based on data for how genetic drift, gene flow, mutations, and natural selection can play a role in the speciation or extinction of a population. Analyzes the results of an investigation to determine conditions that will support the growth of bacteria or viruses.

Introductory Physics

Student results on the MCAS tests are reported according to four achievement levels: *Exceeding Expectations, Meeting Expectations, Partially Meeting Expectations,* and *Not Meeting Expectations.* The descriptors below illustrate the knowledge and skills students demonstrate on MCAS at each level. **Knowledge and skills are cumulative at each level.** No descriptors are provided for the *Not Meeting Expectations* achievement level because students work at this level, by definition, does not meet the criteria of the *Partially Meeting Expectations* level.

	Partially Meeting Expectations ***On MCAS, a student at this level:***	**Meeting Expectations** ***On MCAS, a student at this level:***	**Exceeding Expectations** ***On MCAS, a student at this level:***
Understanding and Application of Disciplinary Core Ideas	Demonstrates a partial understanding of some scientific concepts and processes by identifying and sometimes describing or providing evidence for these concepts and processes. Uses some basic scientific terms in common scientific examples.	Demonstrates a solid understanding of many scientific concepts and processes by mostly describing, explaining, and providing evidence for these concepts and processes. Mostly applies appropriate scientific terms in a variety of applications, including common science examples and some novel situations.	Demonstrates a comprehensive, in-depth understanding of many scientific concepts and processes by consistently describing, explaining, and providing evidence for these concepts and processes. Consistently applies scientific terms in appropriate contexts in both common science examples and many novel situations.

Understanding and Application of Scientific and Engineering Practices	Identifies a testable, scientific question for an investigation. Completes a simple, commonly used model. Uses simple graphs or data to draw general conclusions about a familiar scientific investigation or phenomena. Identifies evidence to support a claim. Describes a benefit or drawback of simple design features given a familiar device or prototype.	Develops some testable, scientific questions for an investigation. Completes or uses a model and describes some strengths and weaknesses of the model. Analyzes multiple sources of data, including graphs and tables, to draw conclusions about a familiar scientific investigation or phenomena. Provides some evidence to support a claim and constructs basic explanations for scientific phenomena or results from an investigation. Analyzes design features of a familiar device or prototype and describes a benefit or drawback of the design.	Consistently develops testable, scientific questions for an investigation. Creates a model, consistently describes the strengths and weaknesses of the model, and provides information for how to improve the model. Analyzes multiple sources of data, including graphs and tables, to draw conclusions about a novel or complex scientific investigation or phenomena. Provides several pieces of evidence to support a claim and constructs thorough explanations for scientific phenomena or results from an investigation. Analyzes design features of a novel device or prototype and constructs an explanation for how the design features meet criteria for success or are limited by constraints.

PS1. Matter and Its Interactions		
Partially Meeting Expectations ***On MCAS, a student at this level:***	**Meeting Expectations** ***On MCAS, a student at this level:***	**Exceeding Expectations** ***On MCAS, a student at this level:***
Interprets a model to determine that energy is released during the processes of fission, fusion, and radioactive decay.	Analyzes a model to determine whether fission, fusion, or a radioactive decay (alpha, beta, or gamma) process occurred.	Analyzes incomplete models of fission, fusion, and radioactive decay and describes the results of each in terms of energy and products.

PS2. Motion and Stability: Forces and Interactions		
Partially Meeting Expectations ***On MCAS, a student at this level:***	**Meeting Expectations** ***On MCAS, a student at this level:***	**Exceeding Expectations** ***On MCAS, a student at this level:***

Solves simple problems involving average speed, velocity, and acceleration. Interprets a position vs. time graph to determine how far an object is from its starting location. Interprets a scenario to determine the relative magnitude of a force. Determines a net force using Newton's 2nd law or by interpreting a free-body force diagram with two colinear forces. Solves simple momentum and change in momentum (impulse) problems. Interprets a model to determine whether two charges will attract or repel. Describes how the magnitude of charges or the distance between charges affects electrostatic forces. Describes how the masses of objects or the distance between objects affects gravitational forces. Solves simple problems using Ohm's Law when given two of the three variables (current, voltage, or resistance). Identifies a schematic symbol for a simple circuit element and generally explains its role.	Solves problems involving acceleration, velocity, and change in position for a given time. Analyzes motion graphs and their slopes to solve for and compare speeds, velocities, accelerations, and net forces. Analyzes free-body force diagrams to determine which diagram represents a given system. Solves for an unknown force by interpreting a model with two or more colinear forces when also given the net force. Solves for the total momentum or change in momentum of a system. Interprets a model to determine the direction an object will move after a collision. Compares the magnitude and the direction of the forces that two objects exert on each other when they collide. Compares models of pairs of masses or charges to order the magnitude of the gravitational or electrostatic forces. Completes a model to represent electrostatic forces between charges. Interprets a model to support a claim that an electric current produces a magnetic field or a claim that a changing magnetic field produces an electric current. Describes how a change to a circuit affects current, voltage, or resistance.	Solves a motion problem by analyzing a model and then applying information from the model to solve for velocity or acceleration. Explains how changing a system would affect an object's velocity or acceleration. Solves force problems by analyzing motion graphs and then models the forces involved using free-body force diagrams. Analyzes a motion graph and then applies information from the graph to solve a momentum problem. Describes that the total momentum of a system stays the same during a collision and solves for velocity or mass by applying conservation of momentum. Explains how forces involved in a collision can be minimized. Applies proportional reasoning to solve for how changing the distance between a pair of masses or a pair of charges affects the forces between the pair. Applies proportional reasoning when multiple variables are changed to determine the forces between a pair of masses or charges. Describes the effect of a gravitational or electrostatic force between two objects by solving for the force using either

	Interprets a series circuit diagram with several circuit elements and solves for current, resistance, or voltage. Interprets simple series or parallel circuit diagrams and explains which circuit elements will have the same current through them and which elements will have the same voltage drop across them.	Newton's law of gravitation or Coulomb's law. Explains that the interplay of electric and magnetic forces is the basis for electric motors and generators. Analyzes series and parallel circuit diagrams with multiple circuit elements to compare and solve for current, voltage, and resistance.

PS3. Energy		
Partially Meeting Expectations ***On MCAS, a student at this level:***	**Meeting Expectations** ***On MCAS, a student at this level:***	**Exceeding Expectations** ***On MCAS, a student at this level:***
Solves for gravitational potential energy when given the height and mass of an object. Describes an example of energy being converted from one form to another. Interprets a model to determine a location where gravitational potential energy or kinetic energy is either the greatest or the least. Solves simple problems for work when given the force and distance. Solves efficiency problems when given energy in and energy out. Interprets a simple graph to determine when thermal equilibrium is reached. Recognizes that heat flows from a substance with a higher temperature to a substance with a lower temperature. Recognizes the relationship between average molecular motion and temperature. Describes the relative amount of force between two magnets as they are moved closer together or farther apart.	Analyzes a model of a system and then uses information from the model to calculate kinetic energy or gravitational potential energy. Describes that energy cannot be created or destroyed, but energy may enter or leave a system. Compares an object's kinetic energy at two positions or an object's potential energy at two positions when mechanical energy is conserved. Analyzes data to solve mechanical energy problems. Interprets a model of a device and explains how to increase the efficiency of the device. Explains how the temperatures in two substances change as the substances reach thermal equilibrium. Describes how changing the mass of a substance affects the energy required to cause a temperature change. Analyzes electric field diagrams and determines the direction and relative strength of the electric field around two charges. Explains how the energy stored in a field between two magnets or two charges changes when they are moved different distances apart.	Constructs an explanation for how kinetic energy and potential energy change over time in a given model. Explains how the mechanical energy of a system can change, due to work being done on the system by a force, while maintaining the law of conservation of energy. Solves complex work problems, including first solving for initial and final mechanical energy. Analyzes a graph to compare the energy efficiency of multiple devices. Explains how the average molecular motion of molecules in two substances changes as the substances reach thermal equilibrium, and how energy is conserved in a system as thermal equilibrium is reached. Analyzes a model and solves problems for the amount of heat transferred in a system, the specific heat of a substance, or the initial or final temperature of a substance. Interprets a model to describe the motion of a freely moving charged particle and the energy stored in the field between two charged particles.

PS4. Waves and Their Applications in Technologies for Information Transfer		
Partially Meeting Expectations ***On MCAS, a student at this level:***	**Meeting Expectations** ***On MCAS, a student at this level:***	**Exceeding Expectations** ***On MCAS, a student at this level:***
Solves simple wave problems for velocity/speed, wavelength, or frequency when given two of these three variables. Identifies the wavelength of a wave on a model. Solves simple wave problems involving period and frequency when given one of the variables. Identifies differences between mechanical waves and electromagnetic waves. Recognizes the relationships between frequency and energy of a light particle. Identifies evidence of light behaving like a wave or light behaving like a particle. Interprets simple models of the photoelectric effect. Interprets simple models of common wave behaviors, including resonance, diffraction, refraction, and interference.	Analyzes data to determine additional information needed to solve wave problems. Describes how the particles in a medium move when a longitudinal or transverse wave travels through the medium. Describes several properties of mechanical waves and electromagnetic waves. Compares electromagnetic radiation in terms of frequency, energy, and wavelength. Analyzes a model and explains the causes of resonance and refraction. Analyzes a model of a technology or device and describes how wave behaviors or the photoelectric effect are used in the technology or device.	Analyzes models of waves and uses information from the models to solve problems. Interprets a graph with relative speeds of mechanical waves to determine the states of matter of various media. Constructs an explanation with evidence about how light can behave like a wave and how it can behave like a particle. Explains the relationship between photon energy and the electrons ejected by the photoelectric effect. Analyzes a model of constructive and destructive interference and determines the amplitude of a wave pulse that results from the interference. Analyzes how a technology or device uses waves and describes how changing the properties of the waves would influence the device.

Appendix BB – Final Recommended Cut Scores on IRT Scale and Scaling Constants

Table B.1: Final Recommended Cut Scores on IRT Scale

	Cut Scores (Raw Score)			Cut Scores (IRT)			Scaling Constants	
Subject	**PME**	**ME**	**EE**	**PME**	**ME**	**EE**	**A**	**B**
Biology	17	34	50	-0.8500	0.2100	1.3000	27.90698	493.7209
Introductory Physics	17	35	51	-1.0100	0.1200	1.2600	26.43172	496.6960

Note: PME – Partially Meeting Expectations; ME – Meeting Expectations; EE – Exceeding Expectations

Appendix CC – Participant Meeting Materials

The materials developed for the Biology standard setting committee are provided as an example of the materials developed and provided to the participants. Since the materials provided to participants contained secure information, any place where secure information would be provided, that information would be removed. Additionally, the following materials will not be provided within the appendix:

- Test form – This was presented to participants through the online testing platform used during the spring 2022 administration, TestNav 8.
- Open-ended item rubrics – These documents presented the scoring rubrics and notes and student-produced response examples for each open-ended item presented to participants.
- Practice item judgment set – This was presented to participants through the online testing platform used during the spring 2022 administration, TestNav 8.

Participant Agenda

MCAS Standard Setting Meeting
August 2022

Agenda

Day 1 – August 9, 2022

8:30 am *General Session*
Welcome
Overview of MCAS STE Assessments
Standard Setting Overview

10:00 am *Break*

10:10 am *Breakout Sessions (Biology and Introductory Physics)*

Welcome and Introductions
Experience the Assessment Activity

11:30 am *Lunch*

Experience the Assessment Activity (cont.)
Achievement Level Descriptors Discussion

1:50 pm *Break*

Borderline Descriptions Development Training
Borderline Description Development – Meeting Expectations

4:30 pm *End-of-Day*

Day 2 – August 10, 2022

8:30 am *Breakout Session (Biology and Introductory Physics)*

Borderline Descriptions Development – Partially Meeting and Exceeding

10:00 am *Break*

Achievement Level Setting Training
Practice Judgment Activity and Discussion

11:30 am *Lunch*

Round 1 Judgments

1:30 pm *Break*

Round 1 Judgment Feedback and Discussion

3:15 pm *Break*

Round 2 Judgments

4:30 pm *End-of-Day*

Day 3 – August 11, 2022

8:30 am *Breakout Session (Biology and Introductory Physics)*

Round 2 Judgment Feedback and Discussion
Round 3 Judgments

10:45 am *Break*

Round 3 Judgment Feedback and Discussion
Next Steps and Closing

12:00 pm *End-of-Day*

MCAS Non-disclosure Agreement

Massachusetts Department of Elementary and Secondary Education

75 Pleasant Street, Malden, Massachusetts 02148-4906

Telephone: (781) 338-3000
TTY: N.E.T. Relay 1-800-439-2370

Jeffrey C. Riley
Commissioner

Massachusetts Comprehensive Assessment System
NON-DISCLOSURE AGREEMENT

In order to preserve and ensure the security, validity, and integrity of Massachusetts Comprehensive Assessment System (MCAS) tests, the Massachusetts Department of Elementary and Secondary Education (the Department) requires that all individuals whom the Department authorizes to participate in the development, review, and production of MCAS tests and reports accept the terms of the following non-disclosure agreement.

- With the exception of test items released by the Department for informational purposes, all MCAS test items are deemed secure instruments. The materials are specifically excluded from the Massachusetts Public Records Law. (**G. L. c. 4, § 7(26) (l)**) As a result, I agree not to reproduce, discuss, or in any way release or distribute test items and associated materials to unauthorized persons (i.e., persons not specifically authorized by the Department to have access to secure MCAS materials and information).
- All information about MCAS English language arts passages and English language arts, mathematics, history and social science, and science and technology/engineering graphics under consideration for inclusion in current or future MCAS tests is confidential. Therefore, I agree not to share this information in any way with unauthorized persons.
- Details about MCAS test construction, including the positions of items in test forms, must be kept secure. Consequently, I agree not to share MCAS test blueprints or any information related to MCAS test blueprints with unauthorized persons.
- Discussions and materials related to all technical aspects of the MCAS program, including possible new models and future directions, are confidential. Therefore, I agree not to reveal information regarding discussions and deliberations that take place in committee meetings to unauthorized persons.
- I further understand and agree that all MCAS test items, ideas for items, and related test materials developed, reviewed, and produced by authorized persons working in collaboration with the Department are and will forever remain the exclusive property of the Massachusetts Department of Elementary and Secondary Education.

By signing below, I, as a member of the MCAS Bias and Sensitivity Committee, Standard Setting Committee, Assessment Development Committee, or Technical Advisory Committee, acknowledge and accept that I am bound by the terms of this agreement prohibiting the disclosure of information regarding secure materials and discussions. I also acknowledge and accept that my failure to abide by any term of this non-disclosure agreement will result in serious consequences, including but not limited to action to limit or revoke my Massachusetts educator license.

NAME: ____

COMMITTEE (include subject & grade): ______________________________

AFFILIATION: ____

SIGNATURE: ______________________________ **DATE:** ____________

Experience the Test Response Record Form

MCAS Standard Setting Meeting
August 2022

Experience the Assessment Notes Sheet
Biology

Sequence	Item Notes
1	
2	
3	
4	
5	
6	
7	

Note: Only the first page of this document is presented as an example.

Item Judgment Round Record Form

MCAS Standard Setting Meeting
August 2022

Massachusetts Department of Elementary and Secondary Education

Judgment Record Sheet
Biology

Seq.	Item	Item Maximum Score	Judgment Round 1			Judgment Round 2			Judgment Round 3		
			PME	ME	EE	PME	ME	EE	PME	ME	EE
1	SC626969020	1									
2	SC800159954	1									
3	SC721652006	1									
4	SC735277981	1									
5	SC801968916	1									
6	SC800133220	2									
7	SC802464161	1									
8	SC723341794	1									
9	SC316130	1									
10	SC802252224	1									

Note: Only the first page of this document is presented as an example.

Item Judgment Survey

For each of the items, answer the following question:

"How many points would a student with performance at the borderline of the achievement level likely earn if they answered the question?"

* Item 1: EL713524463

Domain: Reading

Key: [redacted]

	0 Points	1 Point
Partially Meeting Expectations		
Meeting Expectations		
Exceeding Expectations		

* Item 2: EL713480754

Domain: Reading

Key: [redacted]

Note: The survey for only the first two items is shown.

Process Evaluation #1

Process Evaluation Day 1

Next Generation Massachusetts Comprehensive Assessment System (Next-Gen MCAS)

Standard Setting Meeting

Process Evaluation Survey #1

The purpose of this evaluation is to collect information about your experience in recommending cut scores associated with the achievement levels for the MCAS assessments. Your opinions provide an important part of our evaluation of this meeting.

* Select the option that best reflects your opinion about the level of success of the various components of the meeting in which you participated. The activities were designed to help you both understand the process and be supportive of the recommendations made by the committee.

	Not Successful	Partially Successful	Successful	Very Successful
Meeting pre-work				
General session training				
Overview of the MCAS assessments				
Introduction to the standard setting process				
Experiencing the actual assessment				
Discussion of the scoring of items on the assessment				
Discussion of achievement level descriptors (ALDs)				
Development and discussion of the borderline descriptions				
Overview of the standard-setting procedure				
Practice exercise for the standard-setting procedure				

* How useful do you feel the following activities or information were in assisting you to make your recommendations?

	Very Useful	Useful	Somewhat Useful	Not Useful
Achievement Level Descriptors (ALDs)				
Borderline Descriptions				

* How adequate were the following elements of the session?

	Not Adequate	Somewhat Adequate	Adequate	More Than Adequate
Total amount of time to create and discuss borderline descriptions				
Training provided on the standard-setting process				
Amount of time spent training				
Total amount of time to discuss the practice judgment activity				

Close this window

Process Evaluation #2

Next Generation Massachusetts Comprehensive Assessment System (Next-Gen MCAS)

Standard Setting Meeting

Process Evaluation Survey #2

The purpose of this evaluation is to collect information about your experience in recommending cut scores associated with the achievement levels for the MCAS assessments. Your opinions provide an important part of our evaluation of this meeting.

* Select the option that best reflects your opinion about the level of success of the various components of the meeting in which you participated. The activities were designed to help you both understand the process and be supportive of the recommendations made by the committee.

		Not Successful	Partially Successful	Successful	Very Successful
Judgment rounds					
Judgment round feedback - committee-level statistics					
Judgment round feedback - panelist cut score agreement data					
Judgment round feedback - panelist judgment agreement data					
Judgment round feedback - impact data					
Discussions after each round					

* How useful do you feel the following activities or information were in assisting you to make your recommendations?

	Very Useful	Useful	Somewhat Useful	Not Useful
Committee-level statistics after Rounds 1 and 2				
Panelist agreement data provided after Round 1				
Panelist agreement data provided after Round 2				
Impact data after Round 2				
Discussion after each judgment round				

* How adequate were the following elements of the session?

	Not Adequate	Somewhat Adequate	Adequate	More Than Adequate
Amount of time to make judgments				
Visual presentation of the feedback provided				
Number of judgment rounds				

* In applying the standard-setting method, you were asked to recommend cut scores (separating four achievement levels) for student performance on MCAS assessments.

How confident do you feel that the Achievement Level Descriptors (ALDs) for grade 10 ELA are reasonable for each student achievement level?

	Not Confident	Somewhat Confident	Confident	Very Confident
Exceeding Expectations				
Meeting Expectations				
Partially Meeting Expectations				

* How confident do you feel that the final cut score recommendations for grade 10 ELA represent appropriate levels of student performance?

	Not Confident	Somewhat Confident	Confident	Very Confident
Exceeding Expectations				
Meeting Expectations				
Partially Meeting Expectations				

Page 2

* How adequate were the following elements of the session?

	Not Adequate	Somewhat Adequate	Adequate	More Than Adequate

Facilities used for the general session				
Facilities used for the breakout session				
Computers used during the meetings				
Standard Setting website for accessing materials and making judgments				
Materials provided in the folder				
Work space in table groups during the meeting				

* Did you have adequate opportunities during the session to:

	Not Adequate	Somewhat Adequate	Adequate	More Than Adequate
Express your opinions about student achievement levels				
Ask questions about the cut scores and how they will be used				
Ask questions about the process of making cut score recommendations				
Interact with your fellow panelists				

* Do you believe your opinions and judgments were treated with respect by:

	No	Sometimes	Yes
Fellow panelists			
Facilitators			

* Please use the space below to provide any additional comments you have regarding the standard setting process, facilitators, materials, etc.

Paragraph

Path: p

Close this window

Appendix DD – Committee Participant Composition

Table D.1: Participant Position

	STE	
	Biology	**Physics**
Teacher (K–12)	14	18
Teacher (Higher Ed.)	1	1
Administrator (School)	2	0
Administrator (District)	0	0
Coordinator/Coach	2	1
Total	19	20

Table D.2: Years of Relevant Teaching Experience

	STE	
	Biology	**Physics**
1 to 5 years	1	3
6 to 10 years	3	4
11 to 15 years	4	5
16 to 20 years	5	5
More than 20 years	6	3
Total	19	20

Table D.3: Experience Teaching Student Populations

	STE	
	Biology	**Physics**
Mainstream special education	19	18
Self-contained special education	7	2
English language learners (ELL)	19	19
General education	19	20
Vocational technical education	5	5

Table D.4: Demographic: Gender

	STE	
	Biology	**Physics**
Female	12	6
Male	7	12
Other	0	2

Table D.5: Demographic: Race and Ethnicity

	STE	
	Biology	**Physics**
Asian	1	3
Black or African American	0	1
Hispanic	0	1
Middle Eastern	0	2
White	19	14

Table D.6: Currently Work in a School District

	STE	
	Biology	**Physics**
Yes	17	19
No (Higher Ed)	2	1

Table D.7: Size of School District

	STE	
	Biology	**Physics**
Small	3	8
Medium	6	7
Large	8	4

Table D.8: Type of School District

	STE	
	Biology	**Physics**
Rural	1	0
Metropolitan/Urban	6	6
Suburban	10	13

Table D.9: Socioeconomic Status of School District

	STE	
	Biology	**Physics**
Low	7	5
Moderate	7	8
High	3	6

Appendix EE – Standard Setting Meeting Agenda

MCAS High School STE Standard Setting

Standard Setting Meeting – Agenda

Day 1 (Tuesday – August 9, 2022)

Start time	**End time**	**Activity**
8:00 am	8:30 am	Breakfast
General Session		
8:30 am	9:00 am	Welcome introductions, materials orientation, and security
9:00 am	10:00 am	Standard Setting Overview
10:00 am	10:10 am	*Break*
Breakout Session (Biology and Introductory Physics)		
10:10 am	10:30 am	Welcome, Introductions, and Orientation
10:30 am	11:30 am	Experience the Assessment Overview of Science Assessments Orientation to activity Individual Activity
11:30 am	12:15 pm	*Lunch*
12:15 pm	1:00 pm	Experience the Assessment Individual Activity (cont.)
1:00 pm	1:20 pm	Review of Scoring Materials
1:20 pm	1:50 pm	Item Difficulty Comparison
1:50 pm	2:00 pm	*Break*
2:00 pm	2:30 pm	Achievement Level Descriptors (ALDs) Introduction to ALDs Table-group discussions Whole-group discussions
2:30 pm	3:00 pm	Borderline Descriptions Training Introduction to Borderline Descriptions Modeling of borderline descriptions development
3:00 pm	4:30 pm	Borderline Descriptions Development – Meeting Expectations Table-group discussion Whole-group discussion

Day 2 (Wednesday – August 10, 2022)		
Start time	**End time**	**Activity**
8:00 am	8:30 am	Breakfast
8:30 am	10:00 am	Borderline Descriptions Development – Partially Meeting and Exceeding Table-group discussion Whole-group discussion
10:00 am	10:15 am	Break
10:15 am	10:45 am	Achievement Level Setting Training
10:45 am	11:30 am	Practice Judgment Activity Practice Judgment Activity Group Discussion
11:30 am	12:15 pm	Lunch
12:15 pm	1:30 pm	Round 1 Judgments Round 1 readiness form Independent round 1 judgments
1:30 pm	2:00 pm	Break
2:00 pm	3:15 pm	Round 1 Judgment Feedback and Discussion Introduction to feedback data Whole-group discussion
3:15 pm	3:30 pm	Break
3:30 pm	4:30 pm	Round 2 Judgments Round 2 readiness form Independent round 2 judgments

Day 3 (Thursday – August 11, 2022)		
Start time	**End time**	**Activity**
8:00 am	8:30 am	Breakfast
8:30 am	10:00 am	Round 2 Judgment Feedback and Discussion Whole-group discussion Impact data
10:00 am	10:45 am	Round 3 Judgments Round 3 readiness form Independent round 3 judgments
10:45 am	11:15 am	Break
11:15 am	11:45 am	Round 3 Judgment Feedback and Discussion
11:45 am	12:00 pm	Close-out and Evaluations

Appendix FF – Examples of Feedback Data

Feedback data was provided to participants after each judgment round. The following are examples of feedback data provided to participants.

Individual Item—Level Judgments

This provided the participant with the actual item-level judgments that were recorded in Moodle for the participant. This was provided so that the participant could check that the system recorded the judgments correctly.

Biology - Individual Rating - Round 1

Table=1 Name=

SeqNo	UIN	PME	ME	EE
1MC	SC626969020	0	1	1
2MX	SC800159954	1	1	1
3XI	SC721652006	1	1	1
4MX	SC735277981	0	1	1
5XI	SC801968916	1	1	1
6MX	SC800133220	0	1	2

Individual Test—Level Recommendation

This provided the participant with the recommendations for test-level cut scores based on their item judgments for the Partially Meeting Expectations, Meeting Expectations, and Exceeding Expectations achievement levels.

Biology - Individual Cut Scores - Round 1

Table=1 Name=

PME Raw Score	ME Raw Score	EE Raw Score
17	43	57

Overall Test—Level Recommendations

This provided the participant with the aggregate test-level recommendation, based on the individual participants in the committee, including the number of participants, the mean recommendation, the median recommendation, the minimum and maximum recommendation, and the first and third quartiles for each achievement level.

Biology Round 1 Summary Statistics - Overall

	N	Mean	Median	Min	Max	Q1	Q3
PME Raw Score	19	19.79	20.00	11.00	31.00	17.00	23.00
ME Raw Score	19	43.79	44.00	30.00	54.00	41.00	49.00
EE Raw Score	19	57.68	59.00	52.00	60.00	56.00	60.00

Item-level Judgment Agreement

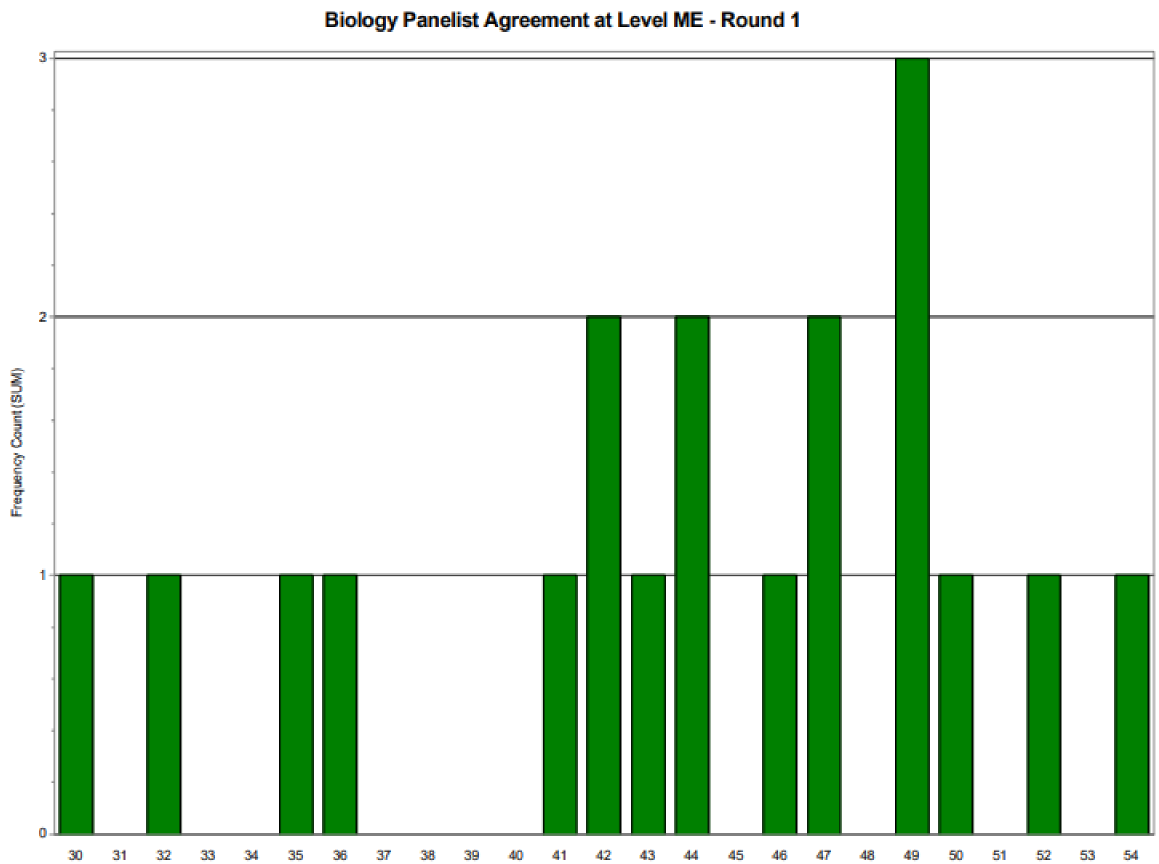
This provided the participants with item-level judgment distributions for the committee for each item. Additionally, for each achievement level, the items with the greatest level of judgment disagreement were identified.

Biology Round 1 Level ME

SeqNo	UIN	Max Points	0	1	2	3	4
1MC	SC626969020	1	.	100%	.	.	.
2MX	SC800159954	1	11%	89%	.	.	.
3XI	SC721652006	1	.	100%	.	.	.
4MX	SC735277981	1	.	100%	.	.	.
5XI	SC801968916	1	5%	95%	.	.	.
6MX	SC800133220	2	11%	68%	21%	.	.
7MC	SC802464161	1	5%	95%	.	.	.

Test-level Participant Recommendation Agreement

This feedback was presented to participants by the facilitator. It presented bar graphs displaying the distribution of participant recommendations for the cut score, by raw score, for each achievement level: Partially Meeting Expectation, Meeting Expectations, and Exceeding Expectations. Graphs displaying consecutive achievement levels (Partially Meeting Expectations and Meeting Expectations) on the scale graph were also presented.



Item Score Mean and Score Distribution

This provided, for each item, the mean score and the distribution of scores received by students during the Spring 2017 administration. The results presented were based on the sample of data used to create the impact data.

Item Performance Data

Biology

Question No	UIN	Item Type	Max Score points	Item Mean	Point Distribution				
					0 pts	1 pt	2 pts	3 pts	4 pts
1	SC626969020	MC	1	0.684	32%	68%			
2	SC800159954	MX	1	0.358	64%	36%			
3	SC721652006	XI	1	0.676	32%	68%			
4	SC735277981	MX	1	0.530	47%	53%			
5	SC801968916	XI	1	0.363	64%	36%			
6	SC800133220	MX	2	0.732	43%	42%	16%		
7	SC802464161	MC	1	0.710	29%	71%			

Appendix GG – Committee Recommended Cut Scores by Round

Table G.1: Biology

Achievement Level	Maximum Score	Rounds			Vertical Articulation
		1	2	3	
Partially Meeting Expectations	60	20	16	17	16
Meeting Expectations		44	38	37	34
Exceeding Expectations		59	53	52	51

Table G.2: Introductory Physics

Achievement Level	Maximum Score	Rounds			Vertical Articulation
		1	2	3	
Partially Meeting Expectations	60	12	16	16	17
Meeting Expectations		34	39	37	35
Exceeding Expectations		50	53	51	51

Appendix HH – Recommended Cut Score Summary Statistics

Biology

Round	Statistic	Achievement Level		
		Partially Meeting Expectations	Meeting Expectations	Exceeding Expectations
1	Mean	19.79	43.79	57.68
	Minimum	11	30	52
	Q1	17	41	56
	Median	**20**	**44**	**59**
	Q3	23	49	60
	Maximum	31	54	60
2	Mean	15.42	36.89	52.37
	Minimum	7	24	46
	Q1	13	31	50
	Median	**16**	**38**	**53**
	Q3	18	41	55
	Maximum	22	52	58
3	Mean	17	35.95	51.42
	Minimum	11	26	44
	Q1	15	33	49
	Median	**17**	**37**	**52**
	Q3	19	40	54
	Maximum	25	44	56

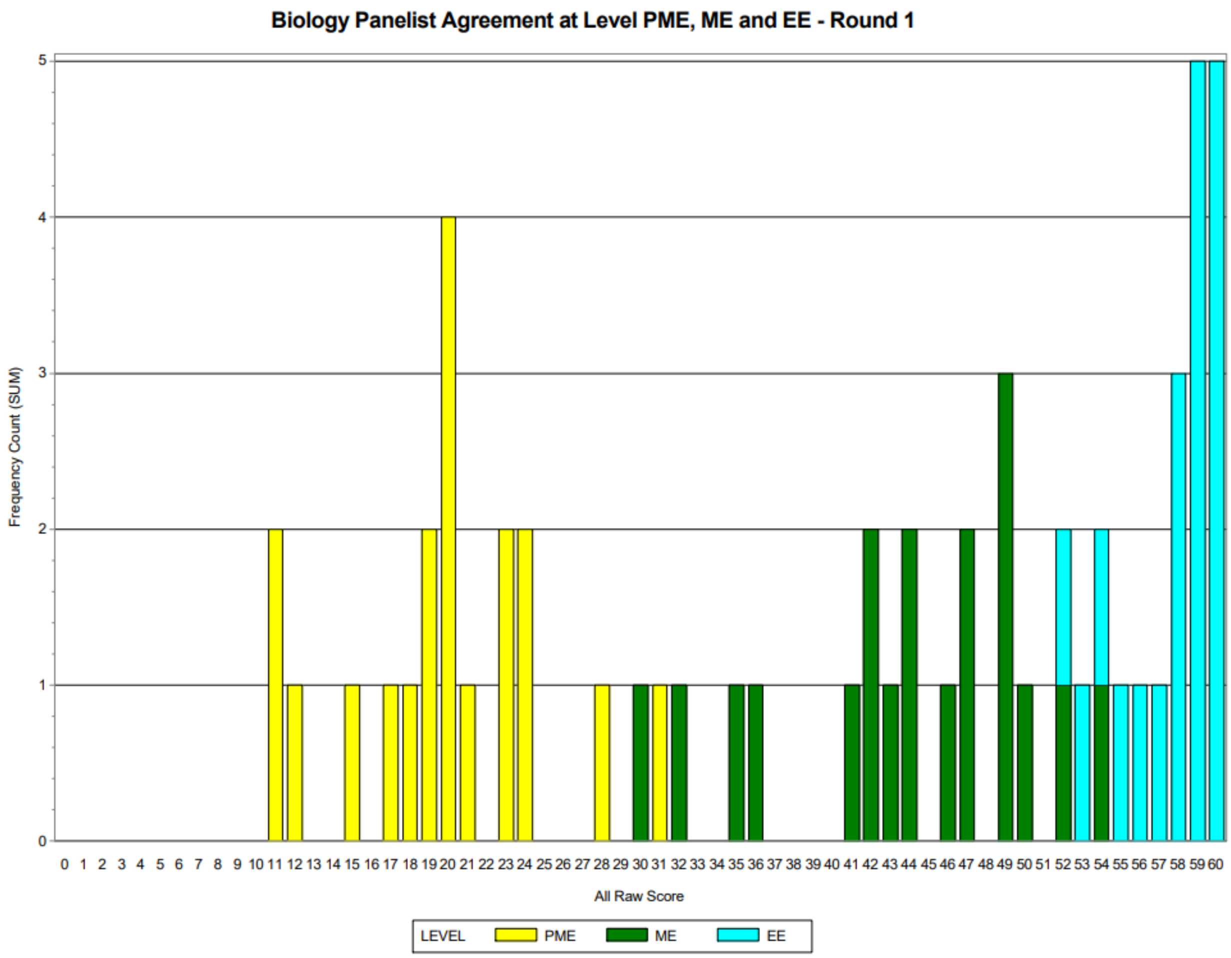
Physics

Round	Statistic	Achievement Level		
		Partially Meeting Expectations	Meeting Expectations	Exceeding Expectations
1	Mean	12.67	33.39	49.11
	Minimum	8	25	38
	Q1	10	29	45
	Median	**12**	**34**	**50**
	Q3	14	36	53
	Maximum	23	44	55
2	Mean	16.11	39.17	51.61
	Minimum	11	33	42
	Q1	15	37	50
	Median	**16**	**39**	**53**
	Q3	18	41	54
	Maximum	21	48	59
3	Mean	15.26	37.21	51.26
	Minimum	12	33	46
	Q1	13	35	49
	Median	**16**	**37**	**51**
	Q3	17	39	54
	Maximum	21	44	56

Appendix II – Test-Level Participant Judgment Agreement

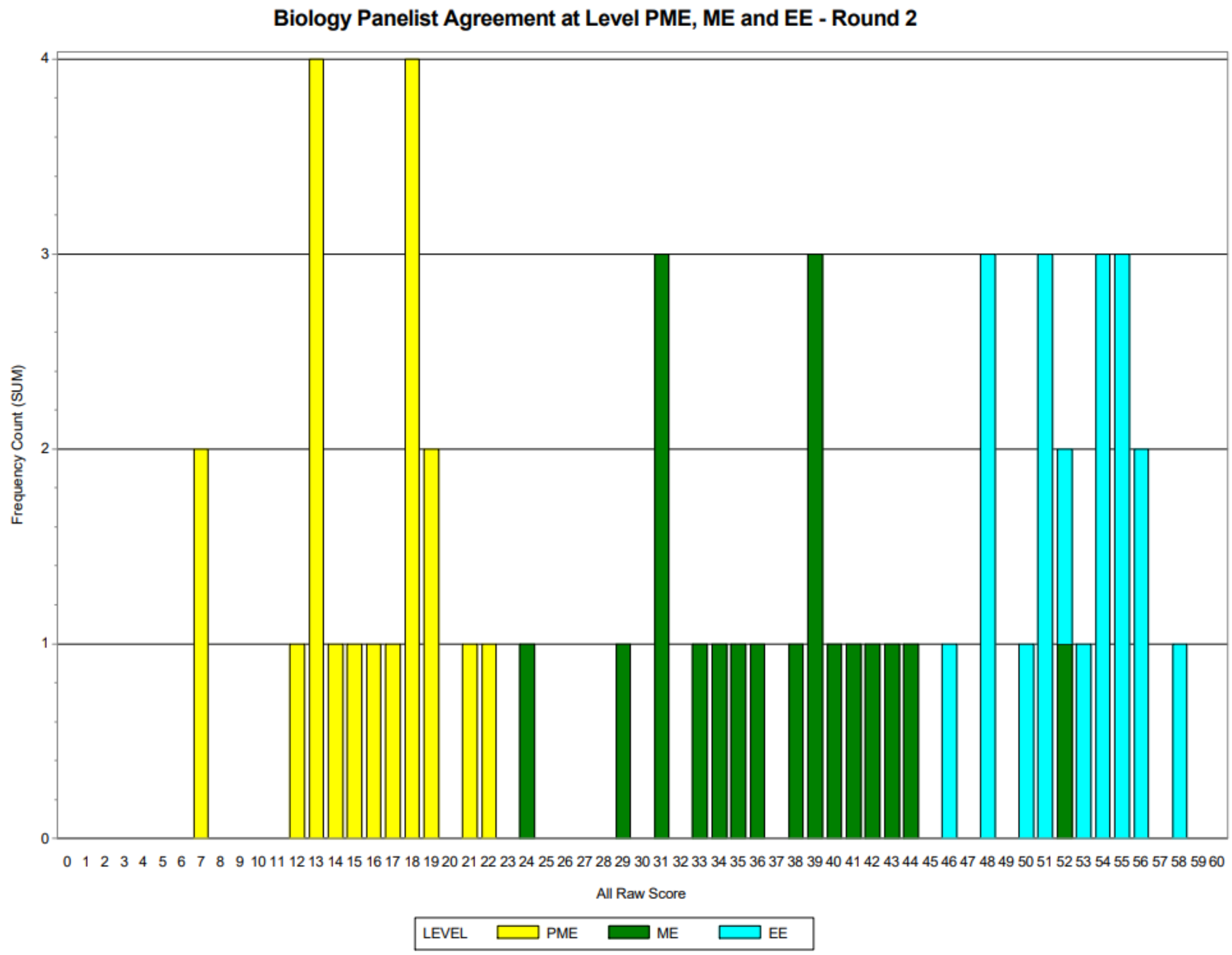
Biology

Round 1:



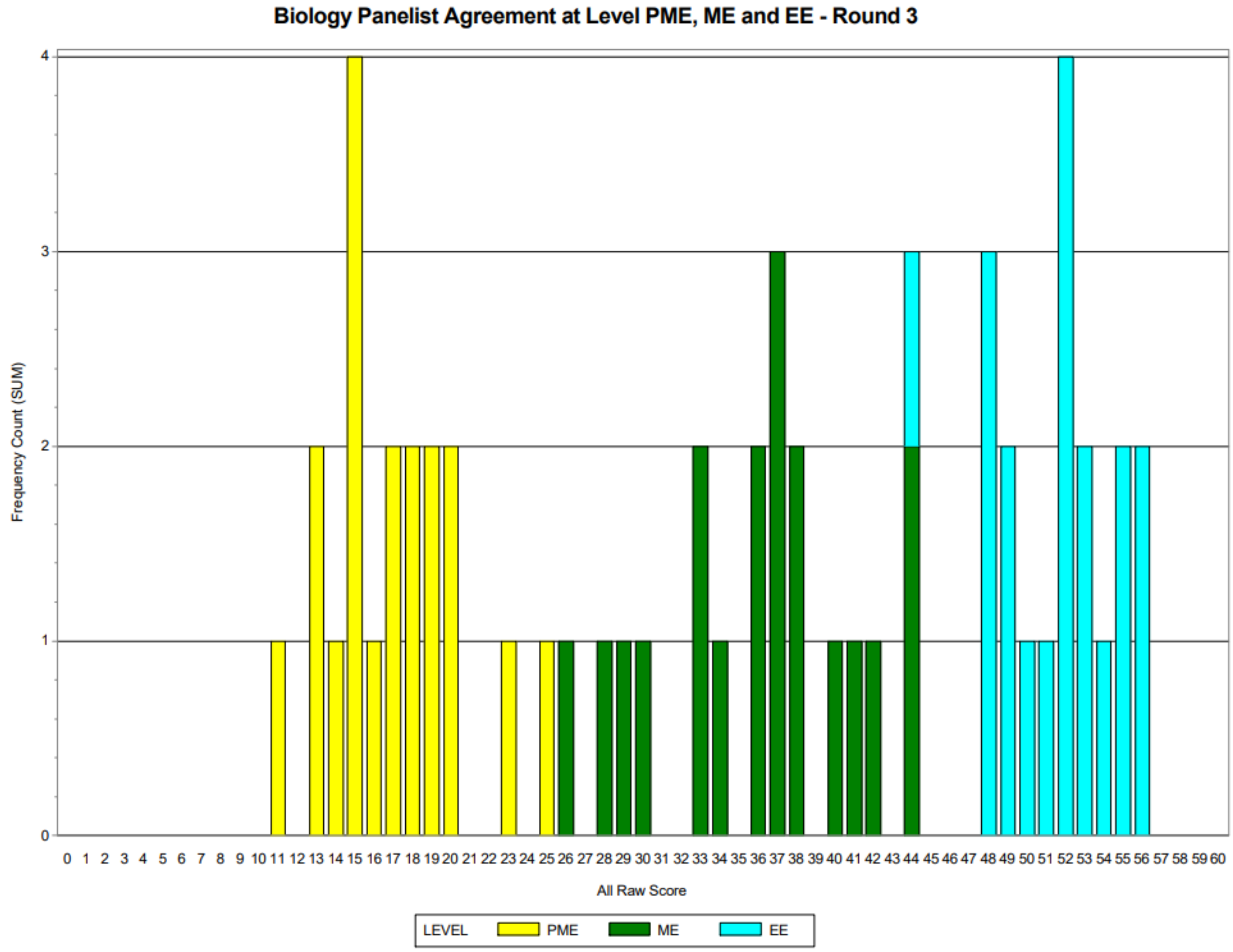
All Three Achievement Levels Concurrently

Round 2:



All Three Achievement Levels Concurrently

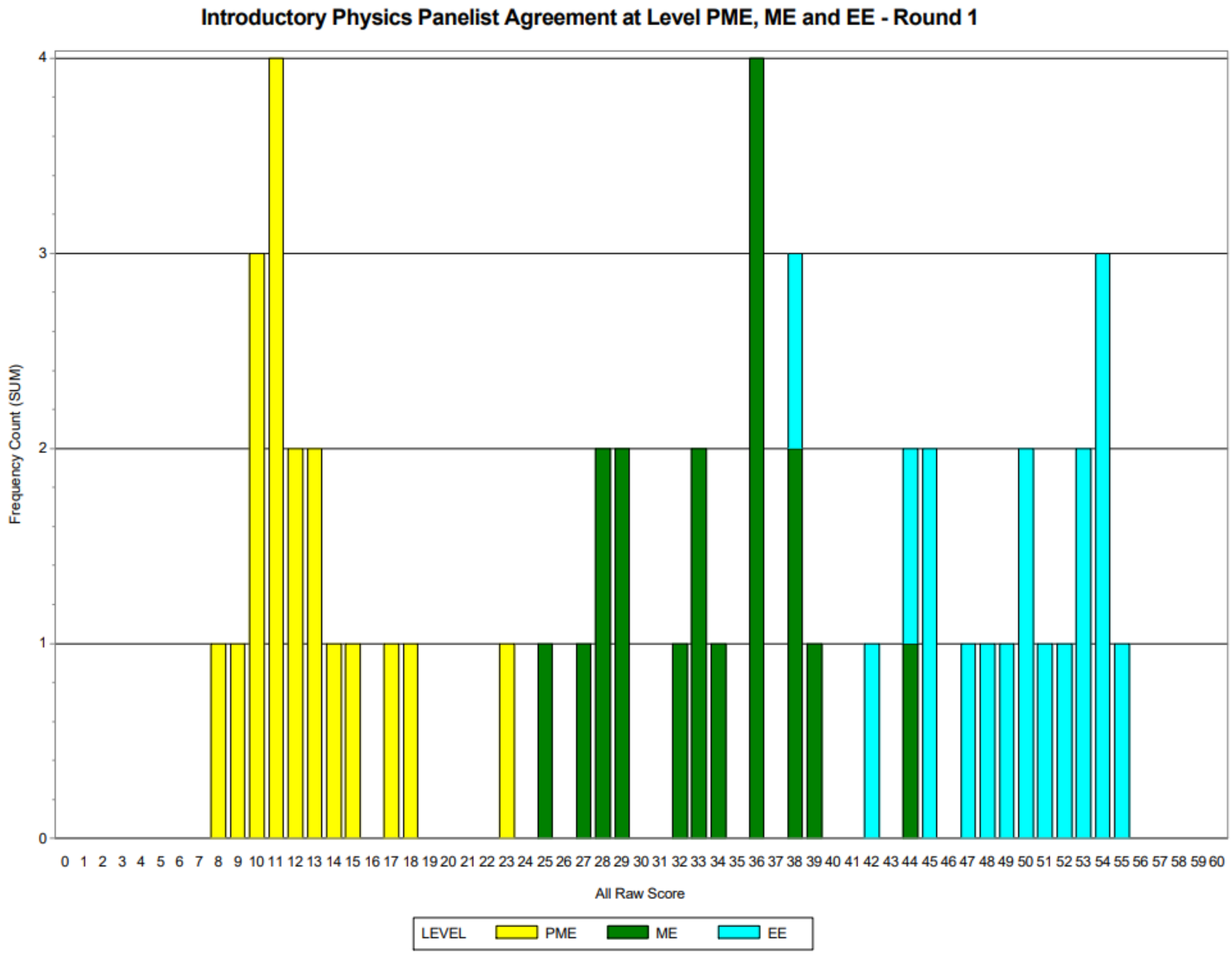
Round 3:



All Three Achievement Levels Concurrently

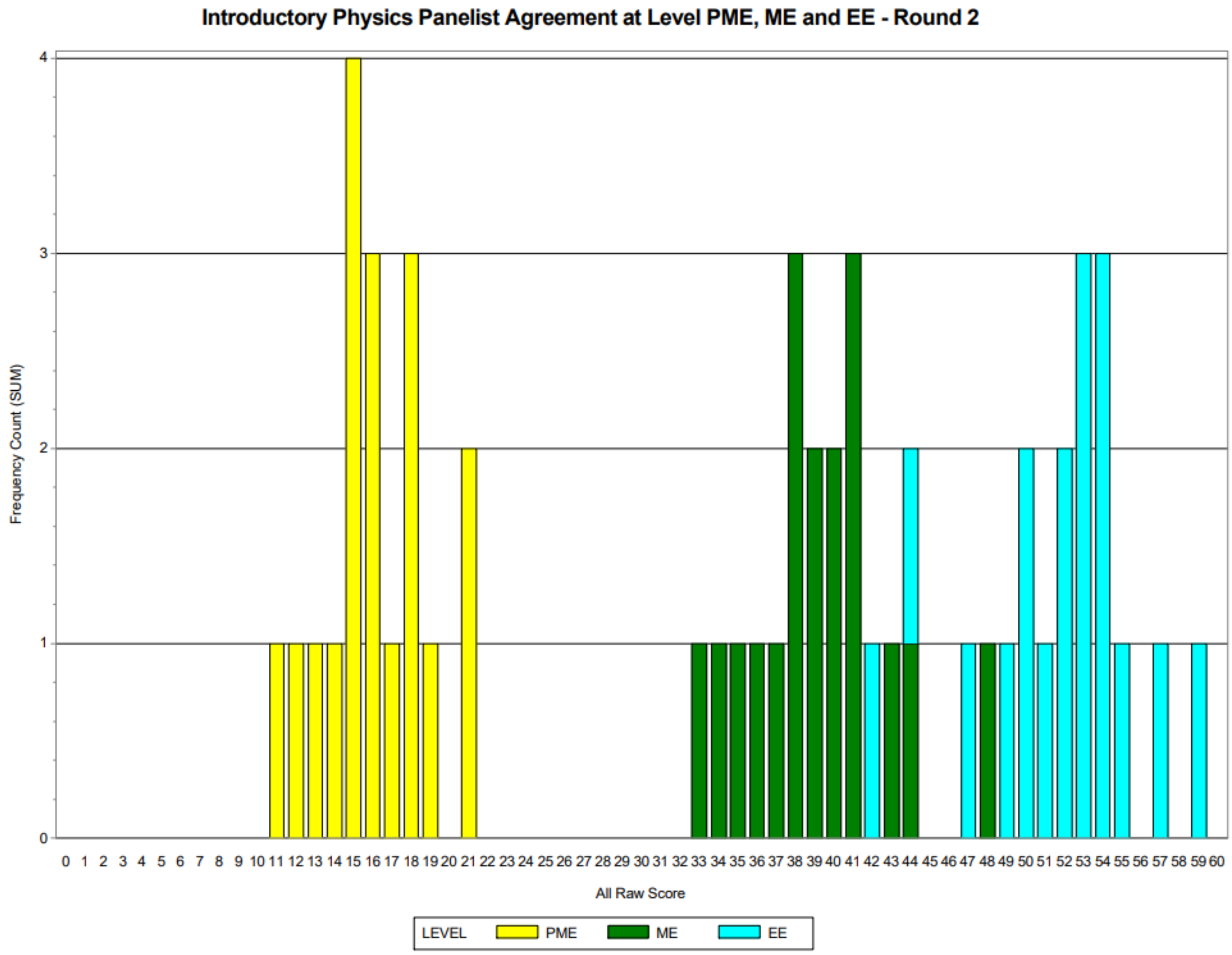
Physics

Round 1:



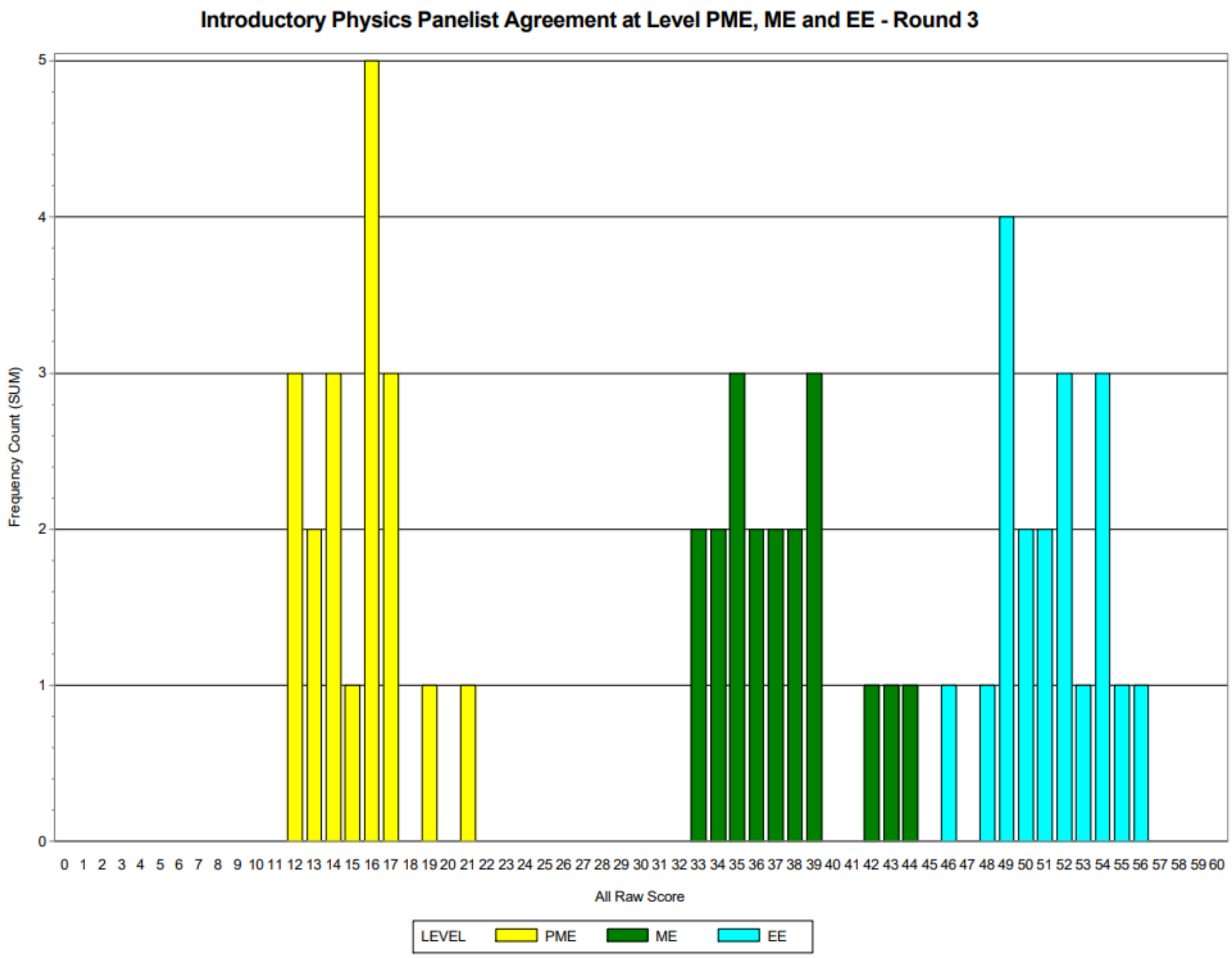
All Three Achievement Levels Concurrently

Round 2:



All Three Achievement Levels Concurrently

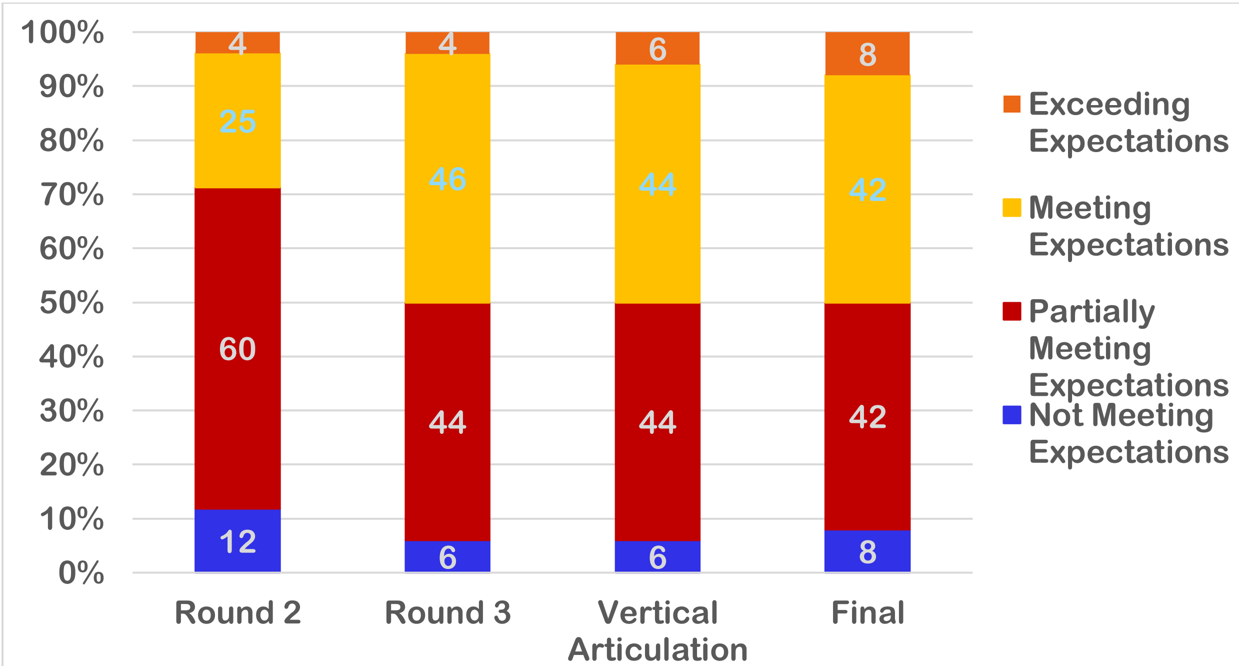
Round 3:



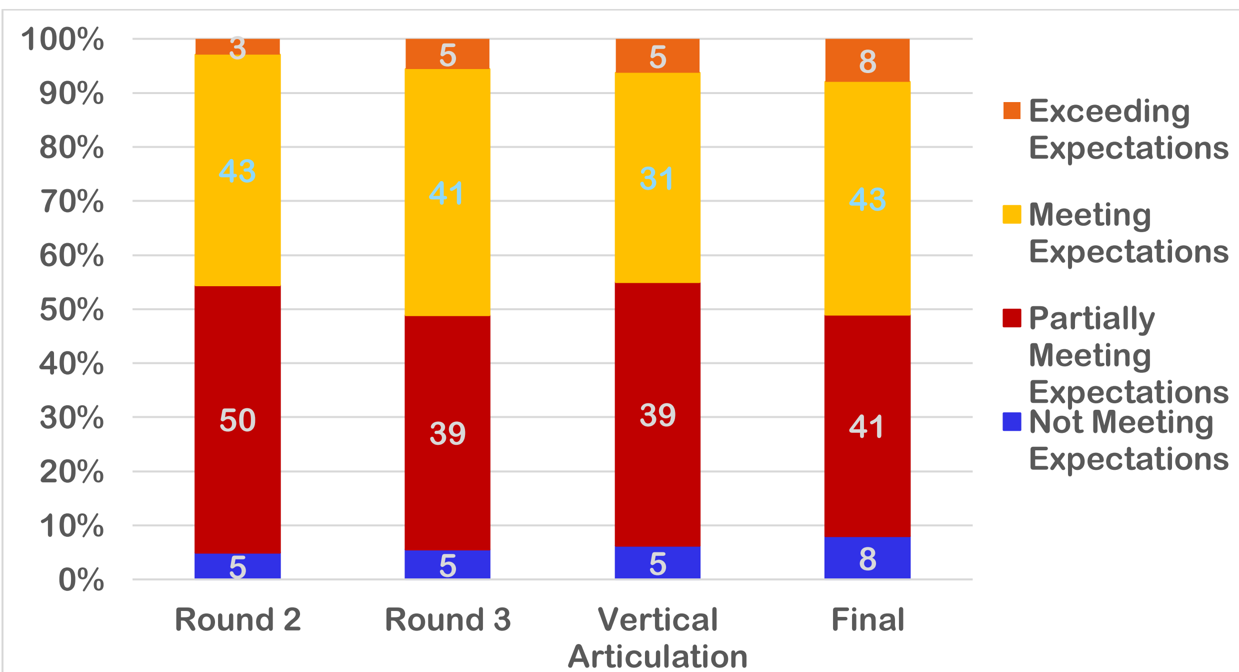
All Three Achievement Levels Concurrently

Appendix JJ – Impact Data

Biology



Introductory Physics

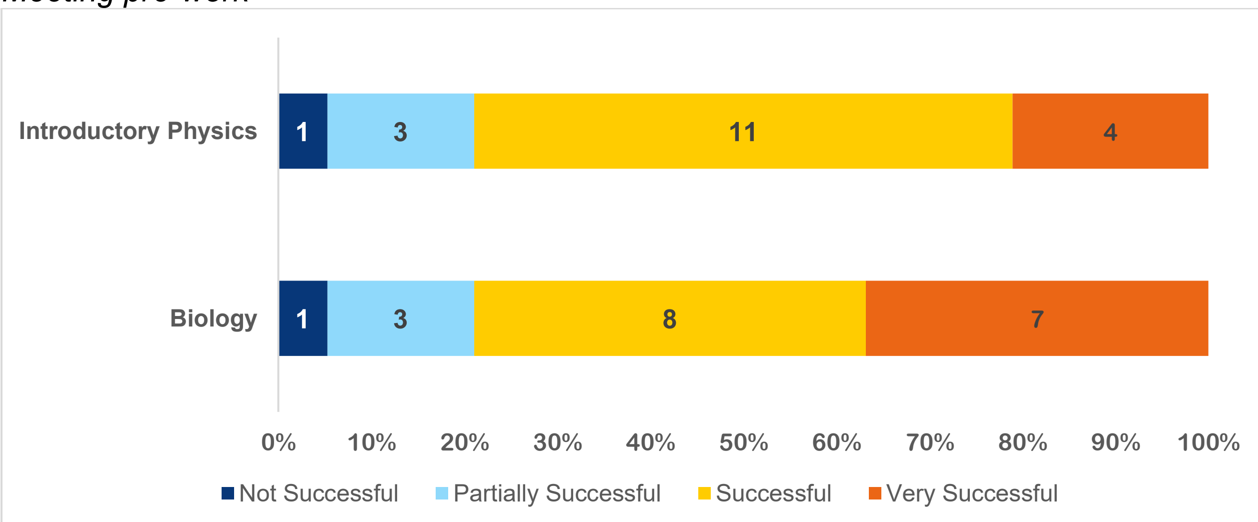


Appendix KK – Participant Evaluation Results

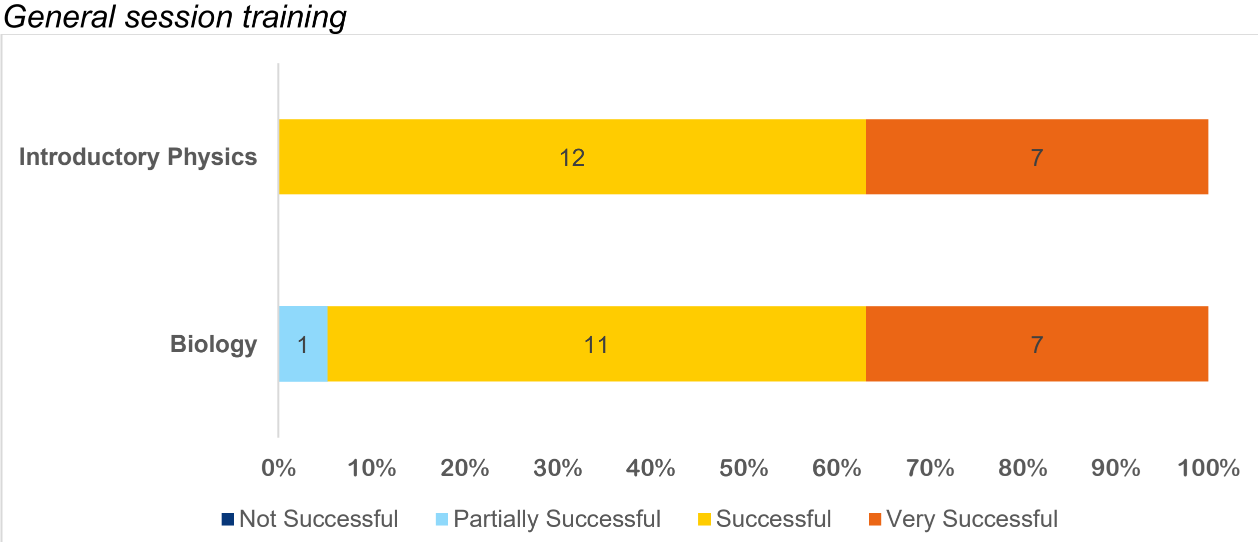
Breakout Session Process Evaluation

Question 1: Select the option that best reflects your opinion about the level of success of the various components of the meeting in which you participated. The activities were designed to help you both understand the process and be supportive of the recommendations made by the committee.

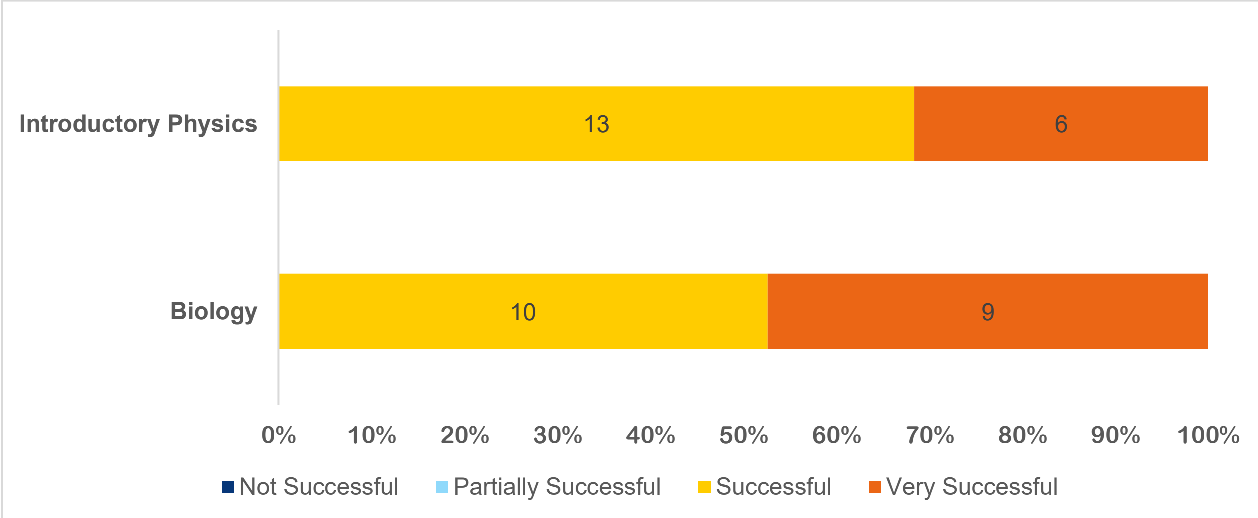
Meeting pre-work



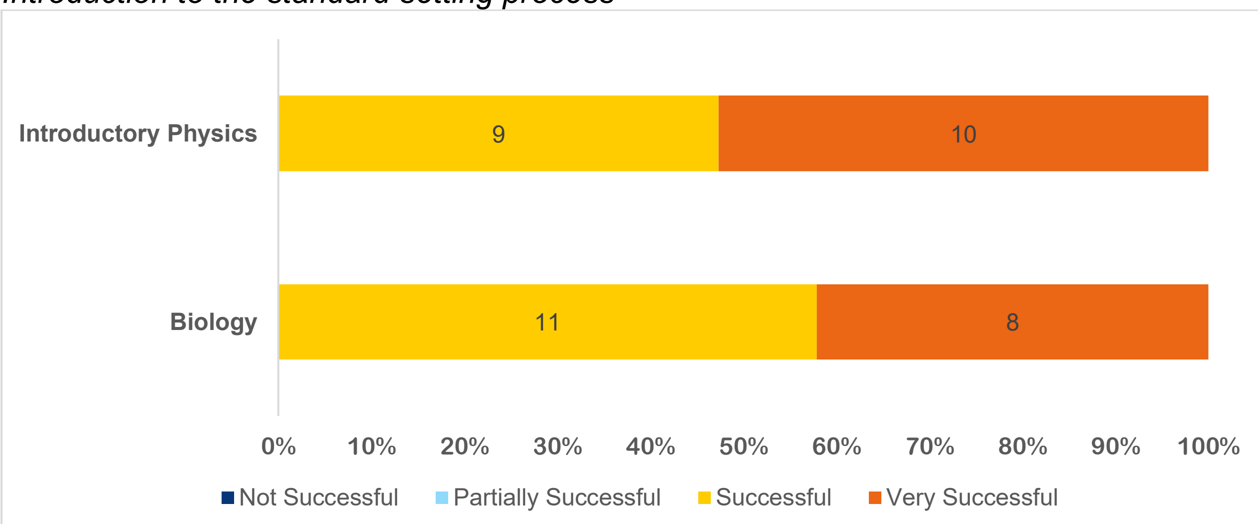
General session training



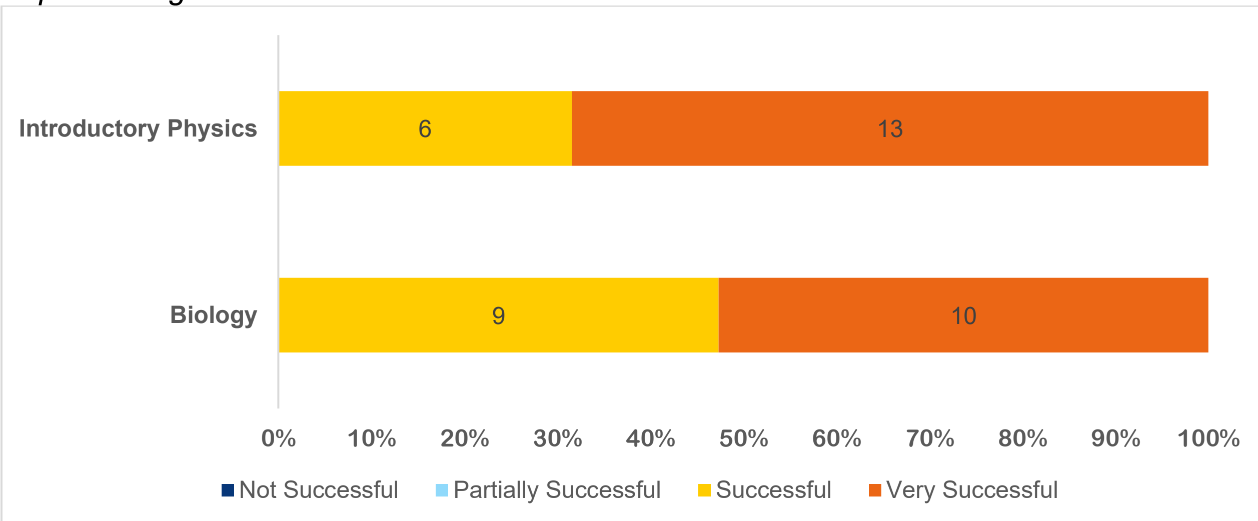
Overview of the MCAS assessments



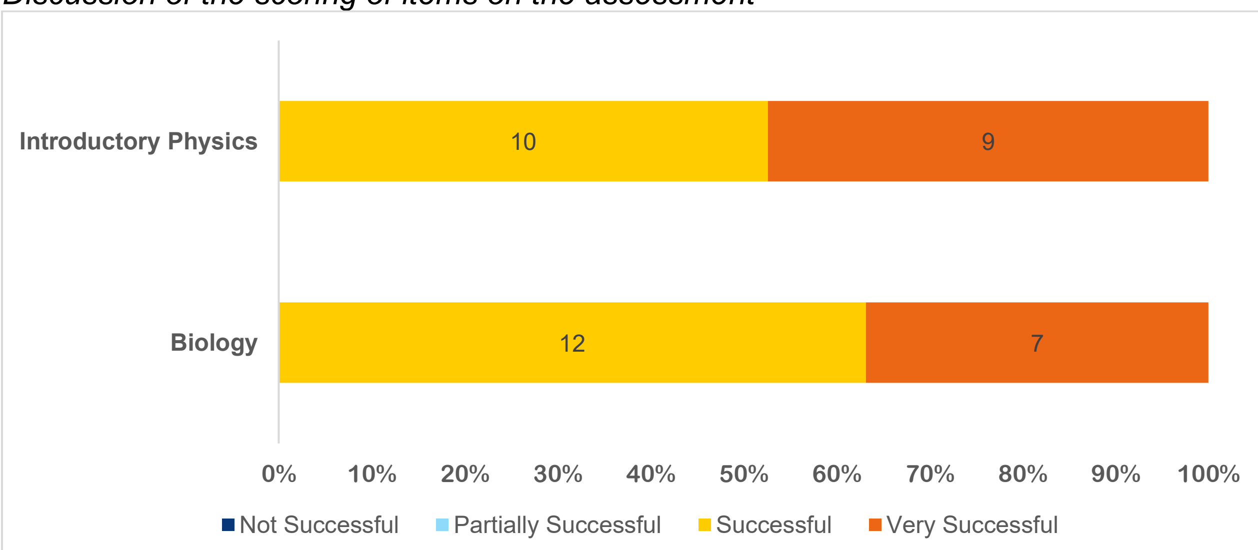
Introduction to the standard setting process



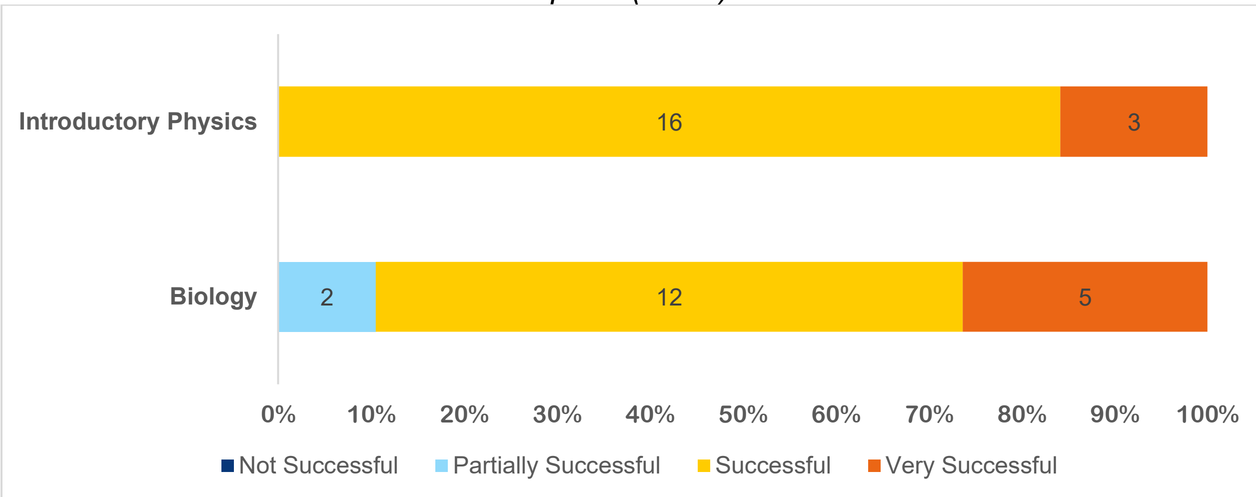
Experiencing the actual assessment



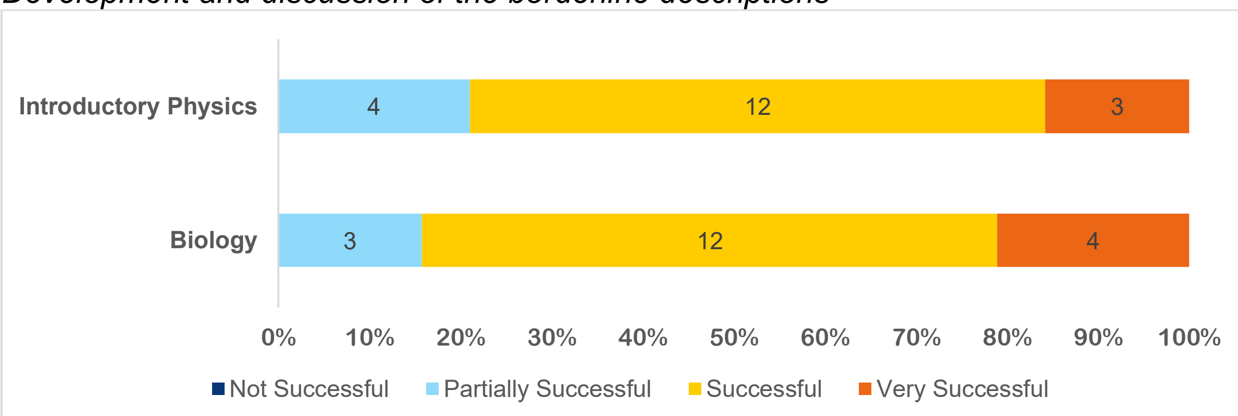
Discussion of the scoring of items on the assessment



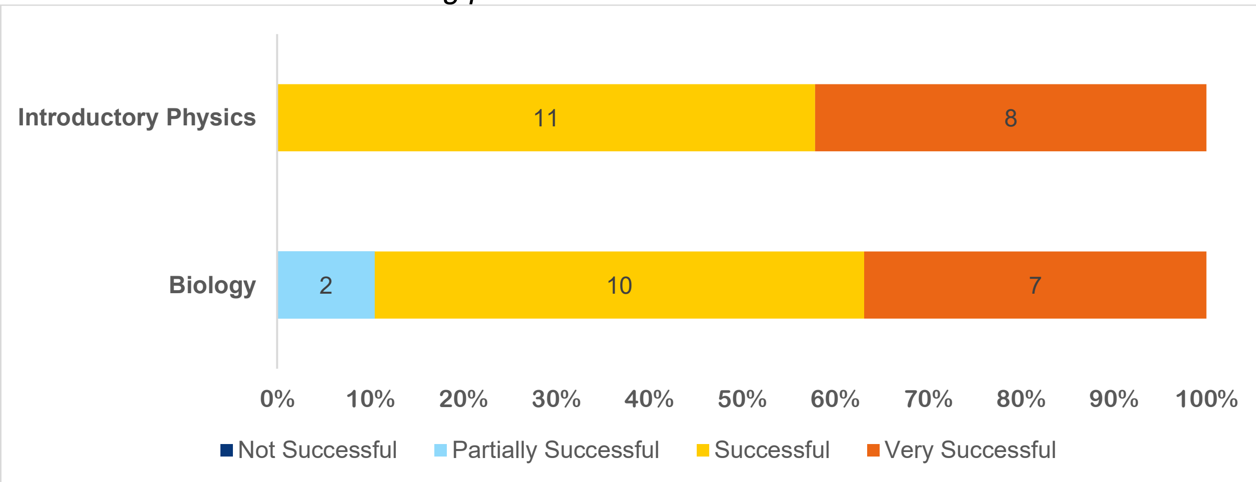
Discussion of achievement level descriptors (ALDs)



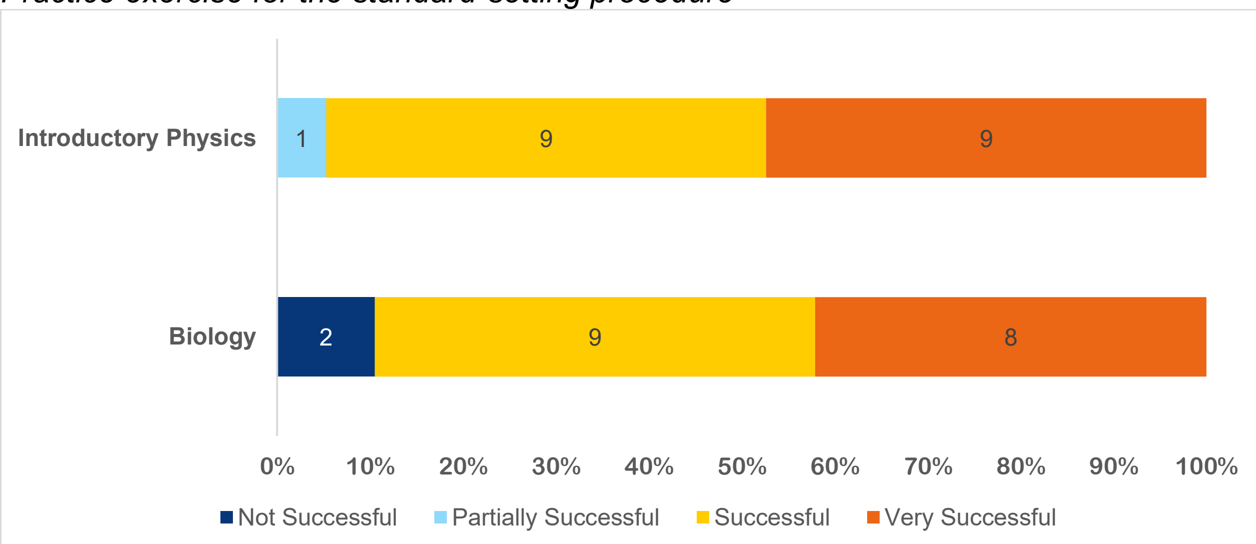
Development and discussion of the borderline descriptions



Overview of the standard-setting procedure

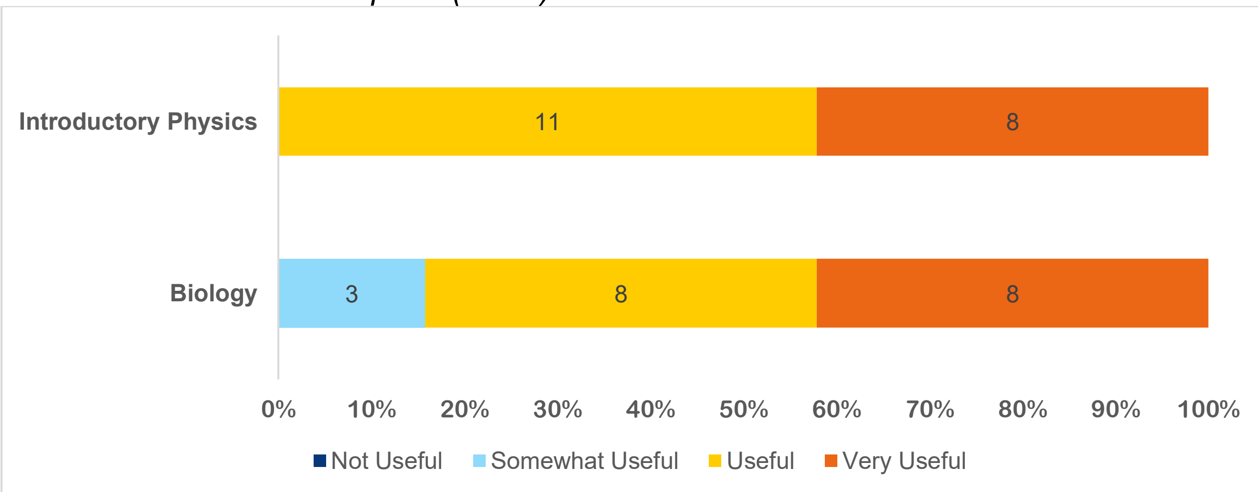


Practice exercise for the standard-setting procedure

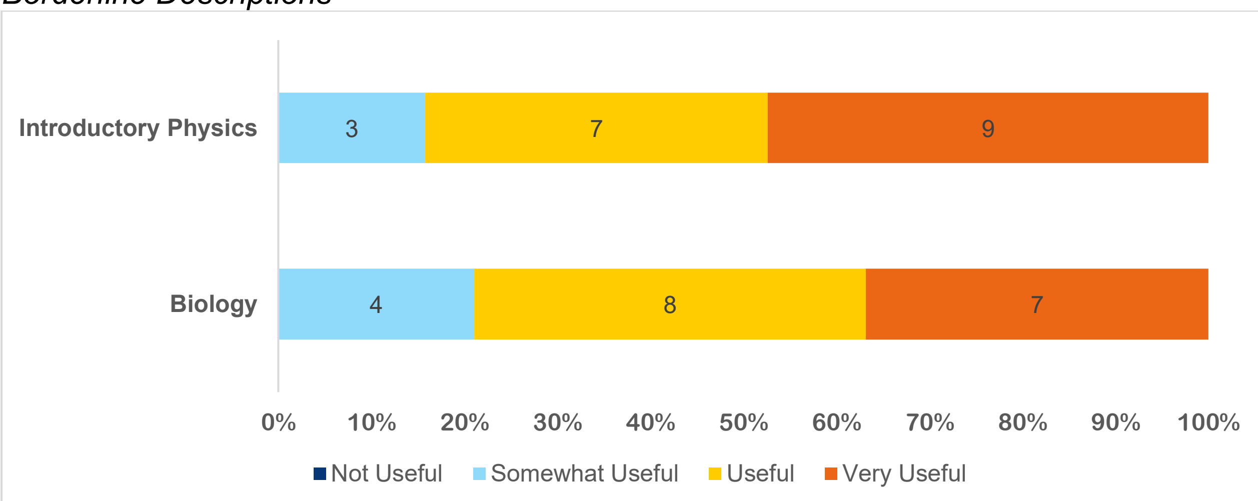


Question 2: How useful do you feel the following activities or information were in assisting you to make your recommendations?

Achievement Level Descriptors (ALDs)

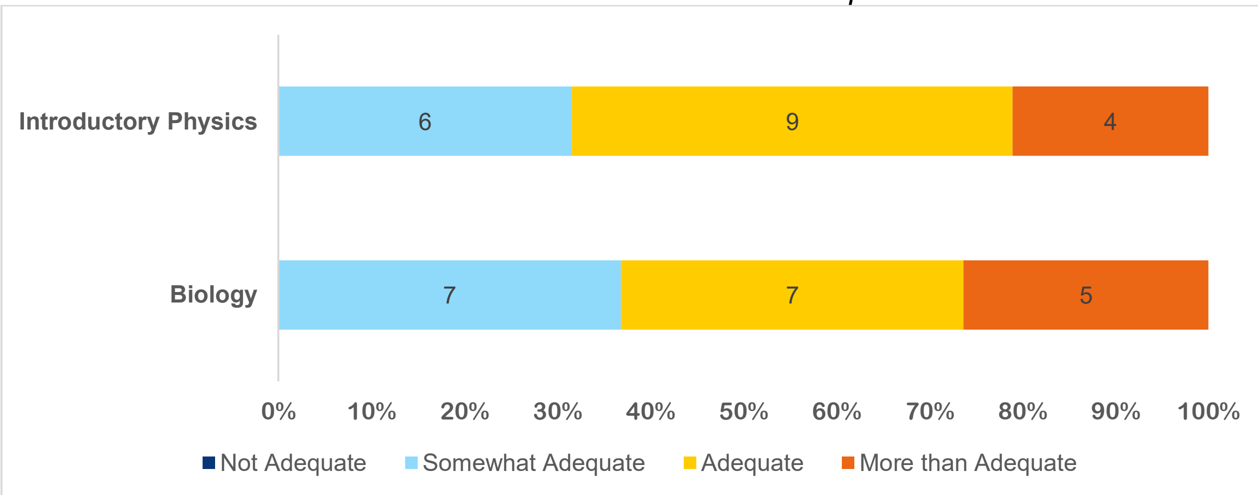


Borderline Descriptions

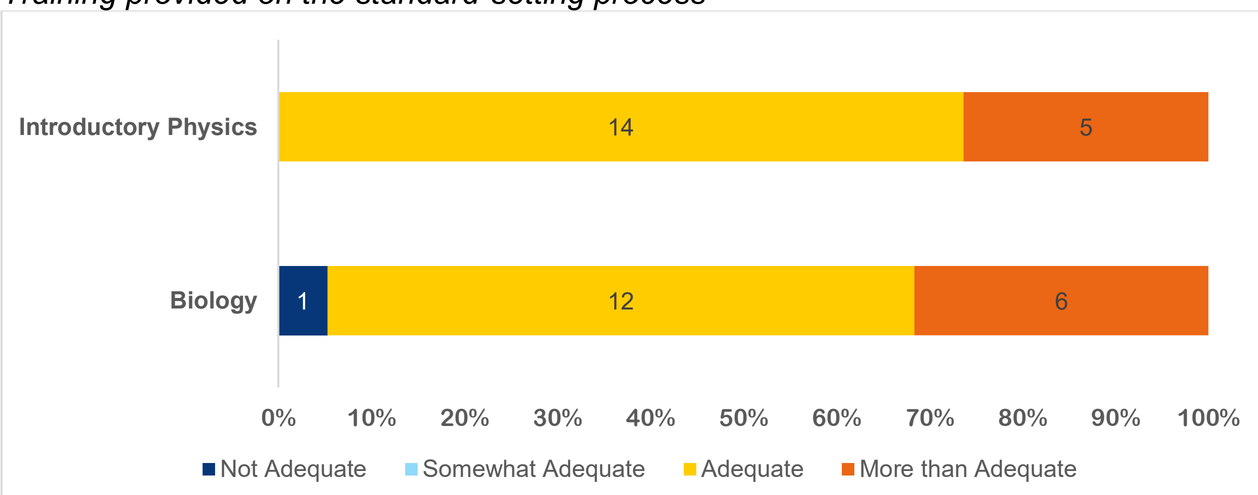


Question 3: How adequate were the following elements of the session?

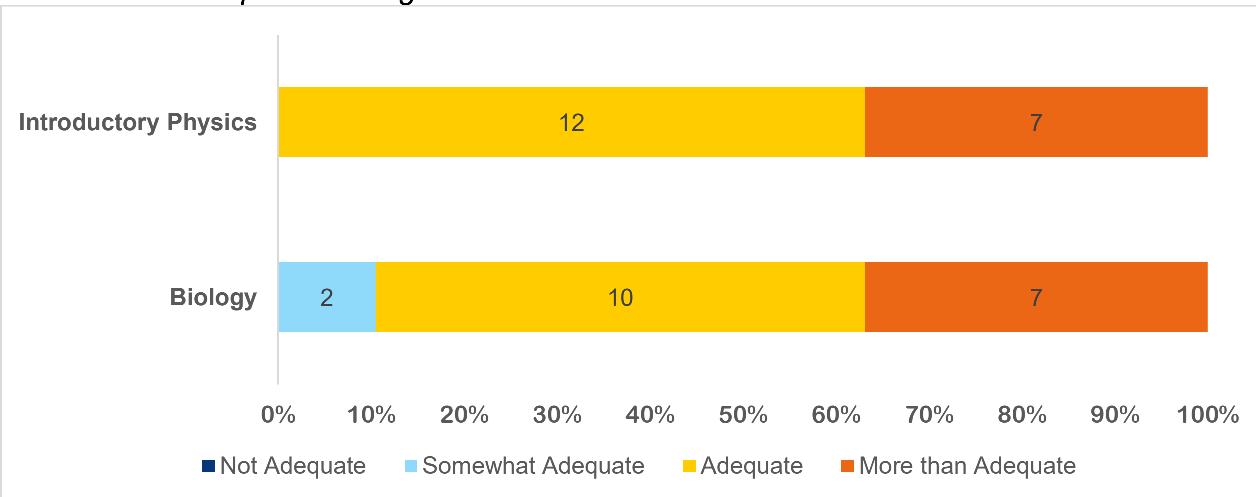
Total amount of time to create and discuss borderline descriptions



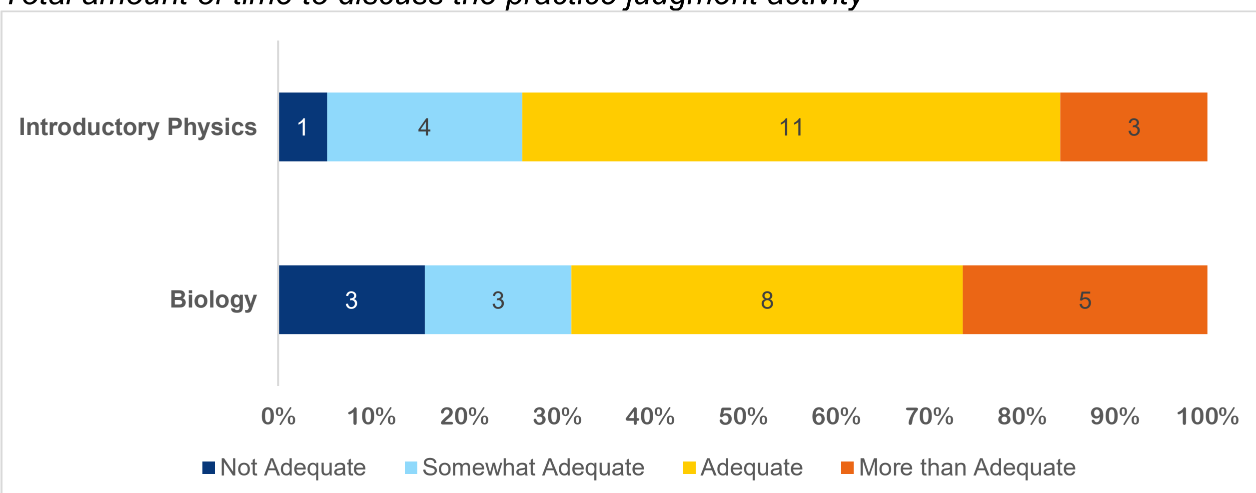
Training provided on the standard-setting process



Amount of time spent training

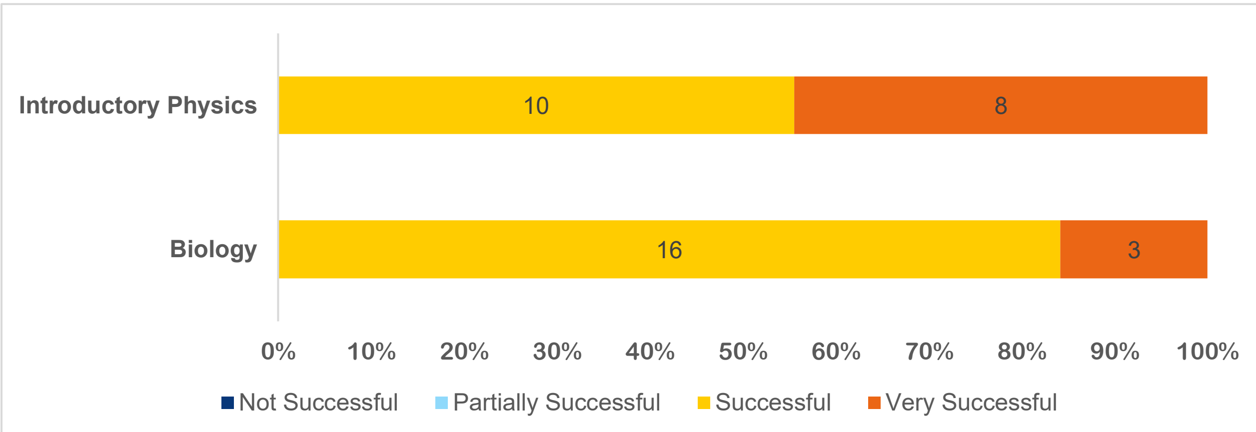


Total amount of time to discuss the practice judgment activity

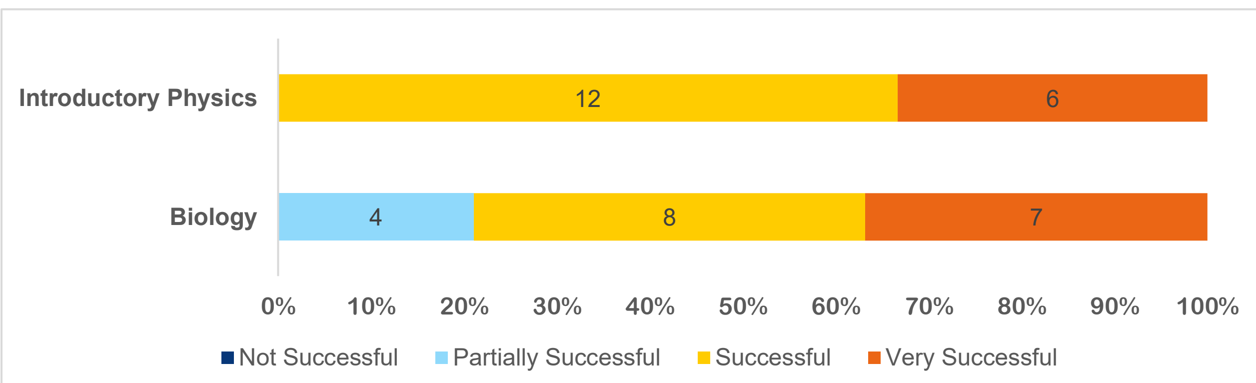


Question 4: Select the option that best reflects your opinion about the level of success of the various components of the meeting in which you participated. The activities were designed to help you both understand the process and be supportive of the recommendations made by the committee.

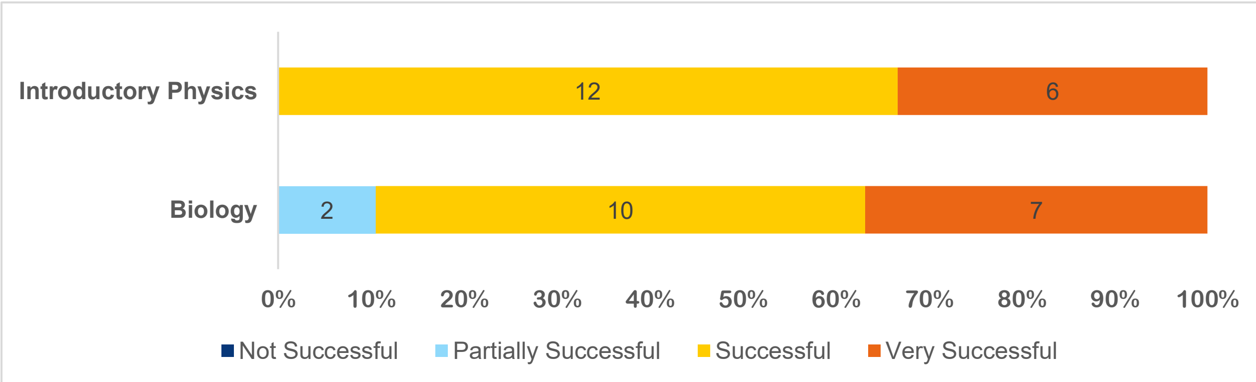
Judgment rounds



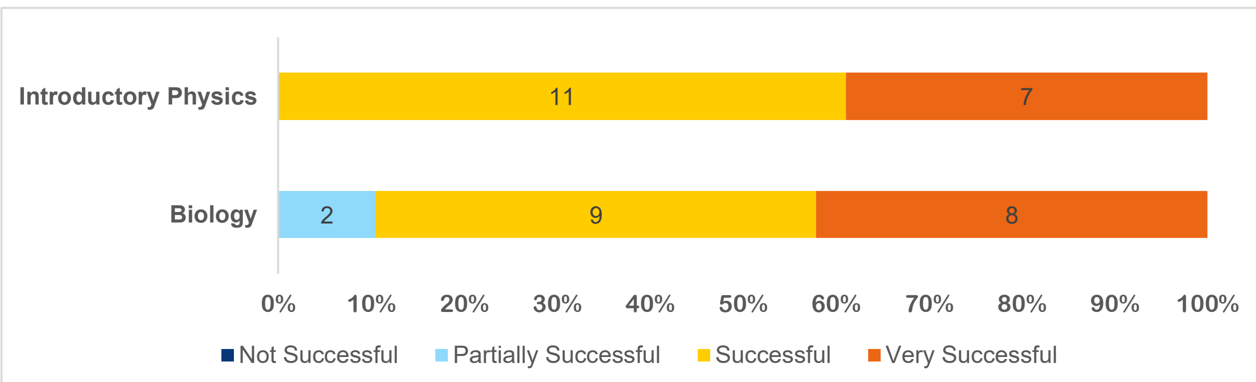
Judgment round feedback – committee-level statistics



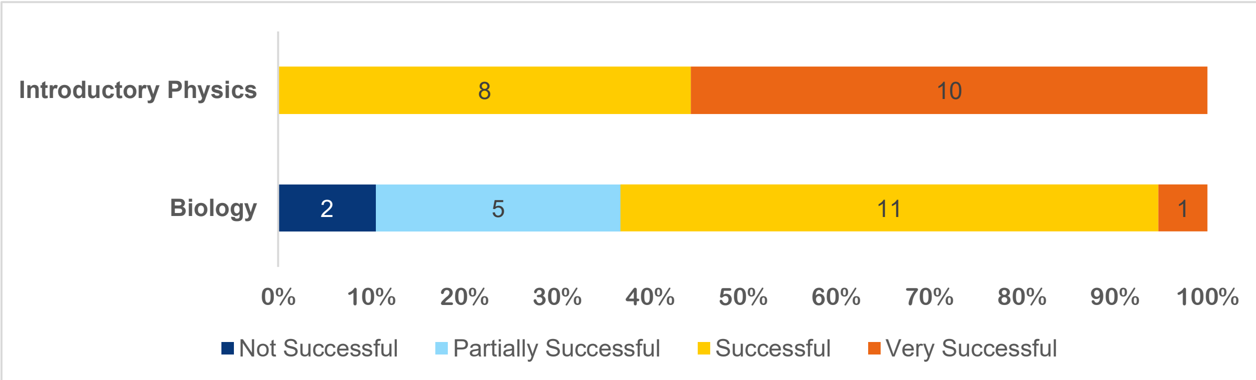
Judgment round feedback – panelist cut score agreement data



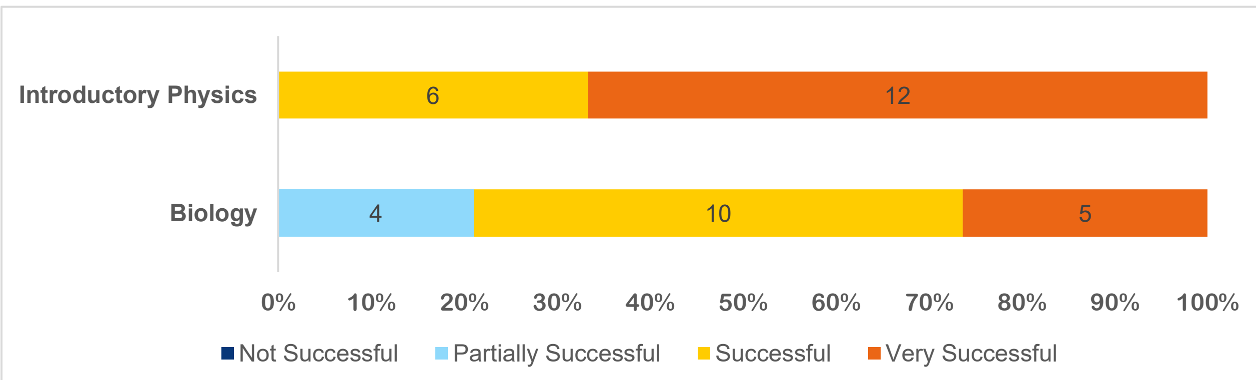
Judgment round feedback – panelist judgment agreement data



Judgment round feedback – impact data

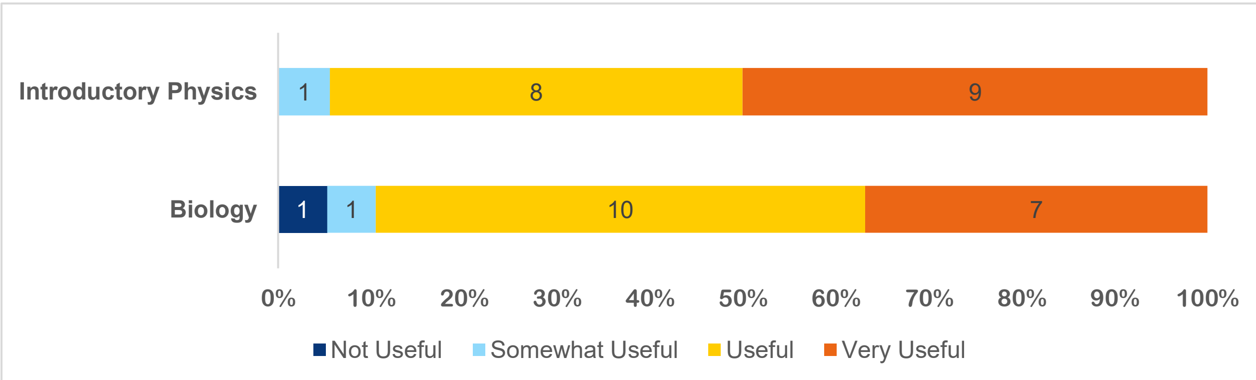


Discussions after each round

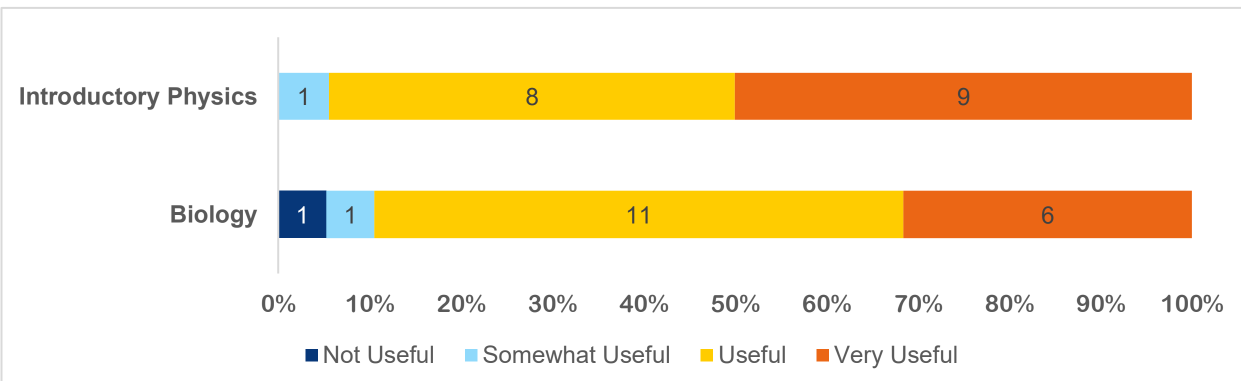


Question 5: How useful do you feel the following activities or information were in assisting you to make your recommendations?

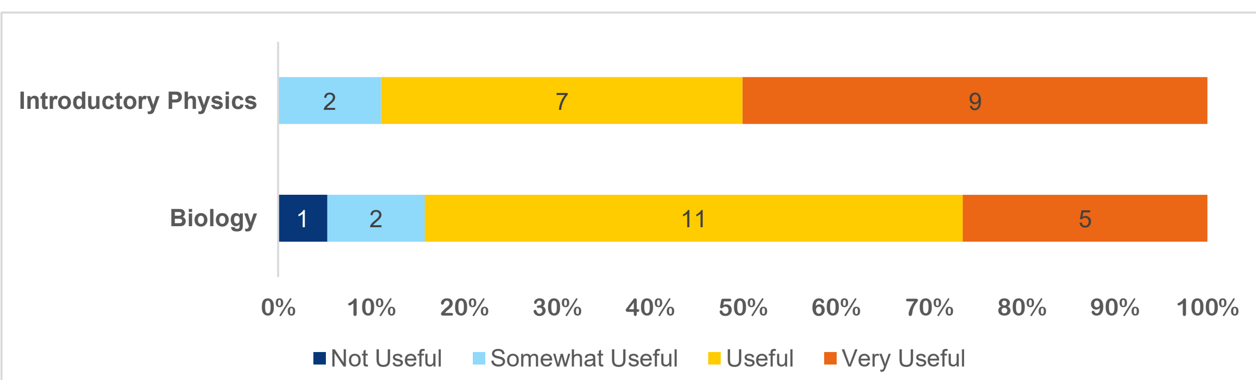
Committee-level statistics after Rounds 1 and 2



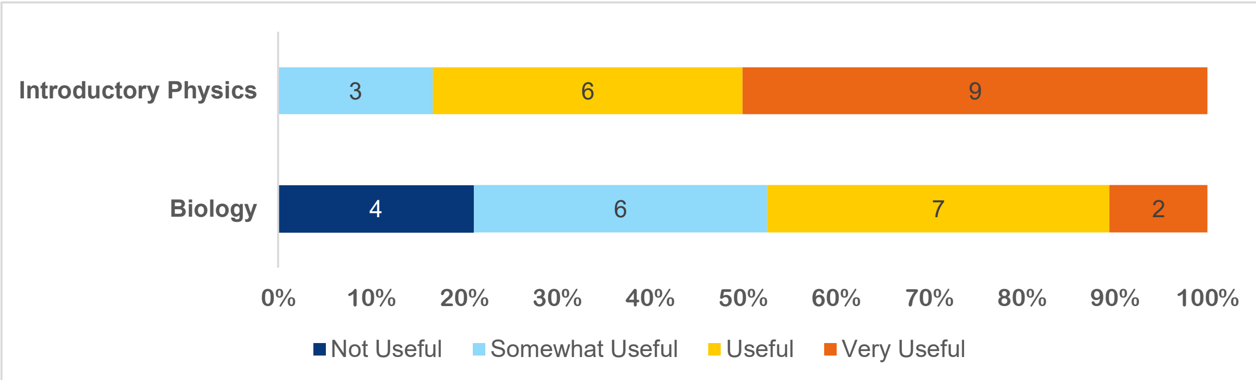
Panelist agreement data provided after Round 1



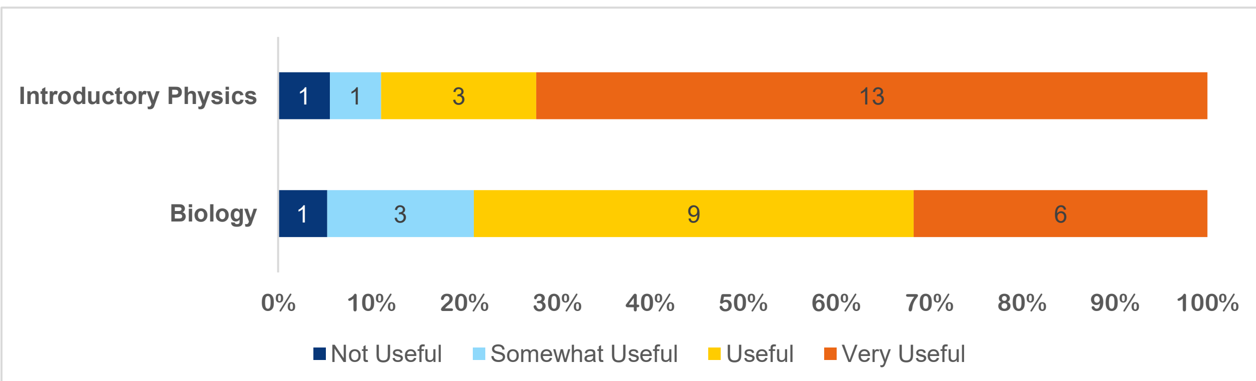
Panelist agreement data provided after Round 2



Impact data after Round 2

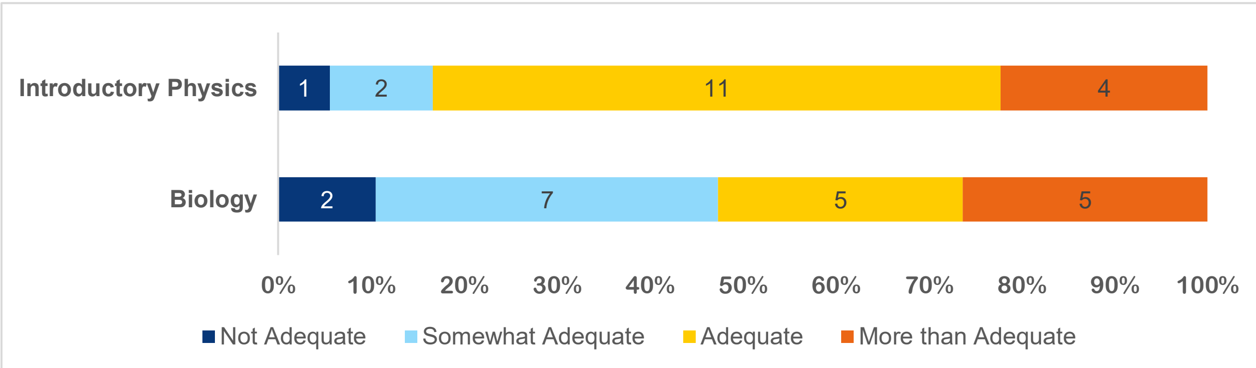


Discussion after each judgment round

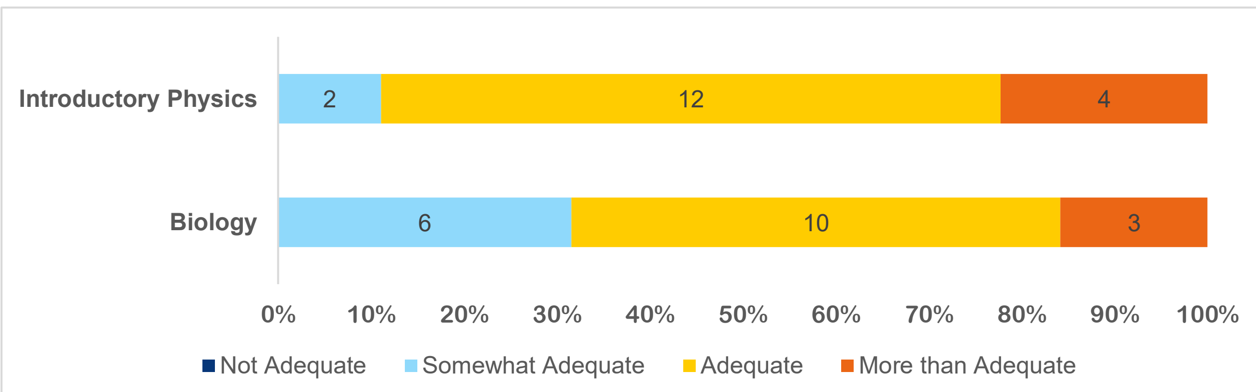


Question 6: How adequate were the following elements of the session?

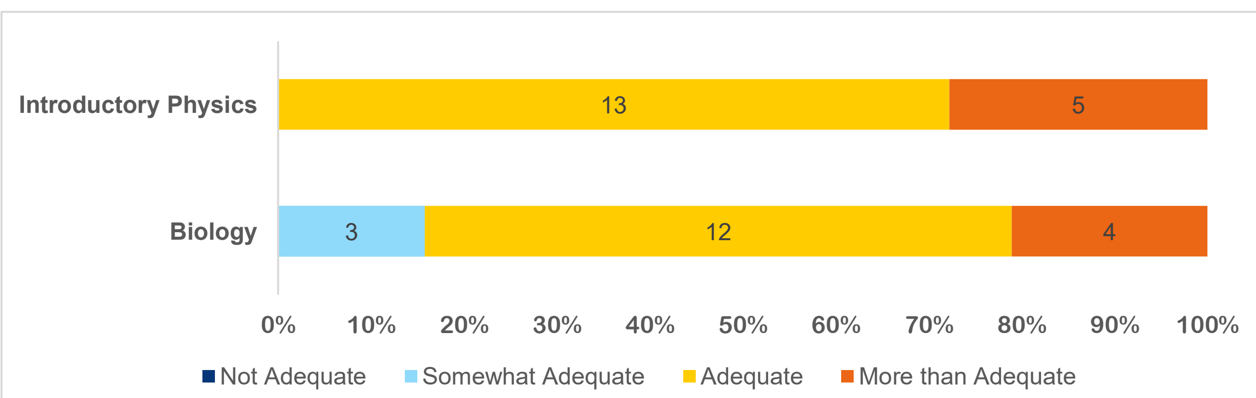
Amount of time to make judgments



Visual presentation of the feedback provided



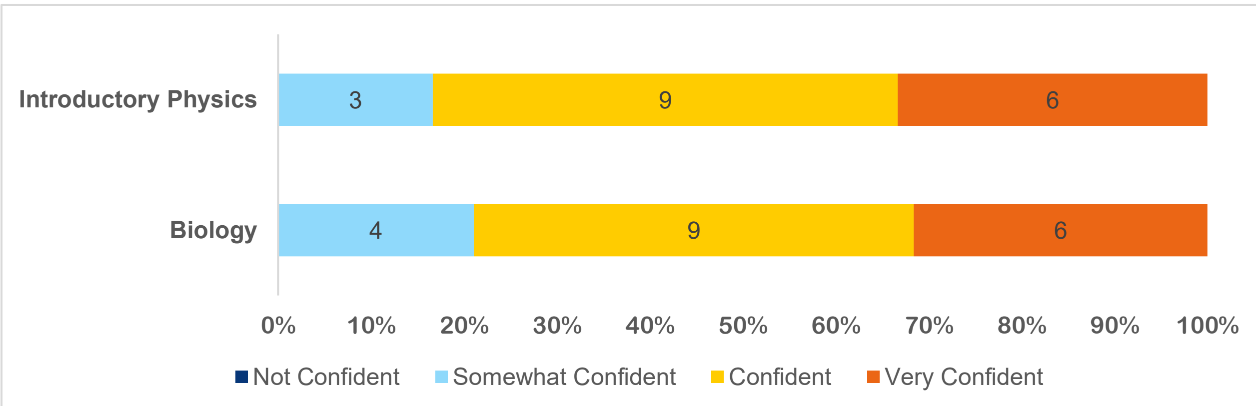
Number of judgment rounds



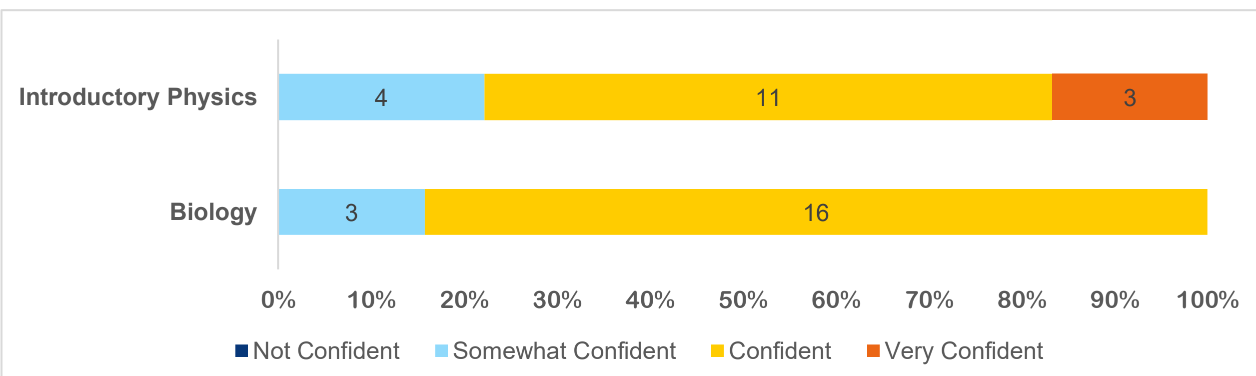
Question 7: In applying the standard-setting method, you were asked to recommend cut scores (separating four achievement levels) for student performance on MCAS assessments.

How confident do you feel that the Achievement Level Descriptors (ALDs) for the specific subject and grade are reasonable for each student achievement level?

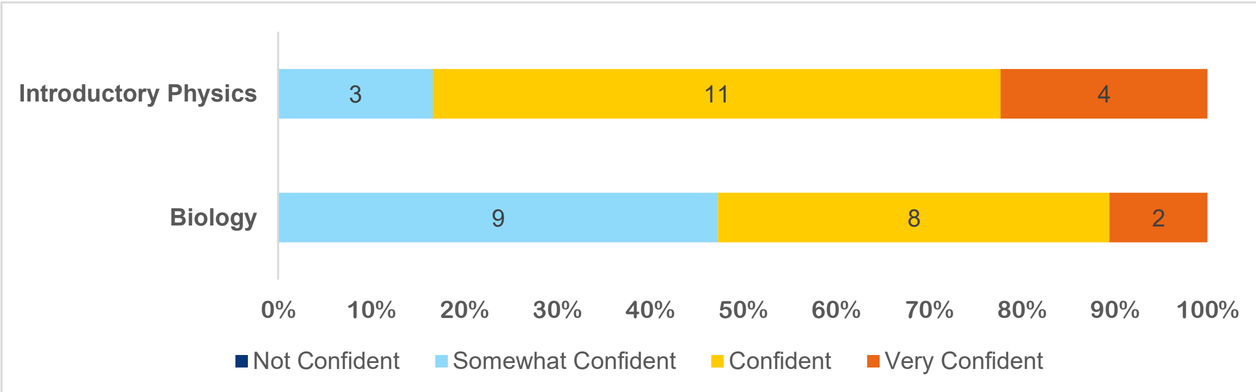
Exceeding Expectations



Meeting Expectations

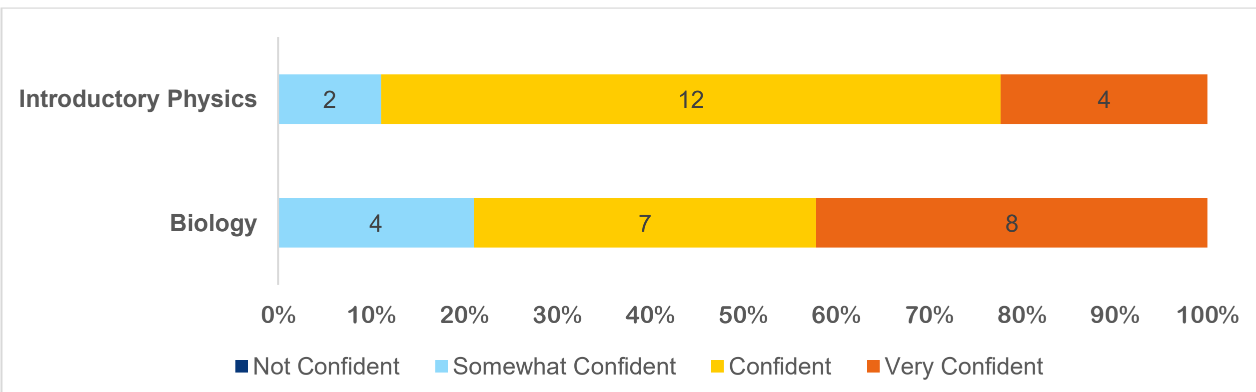


Partially Meeting Expectations

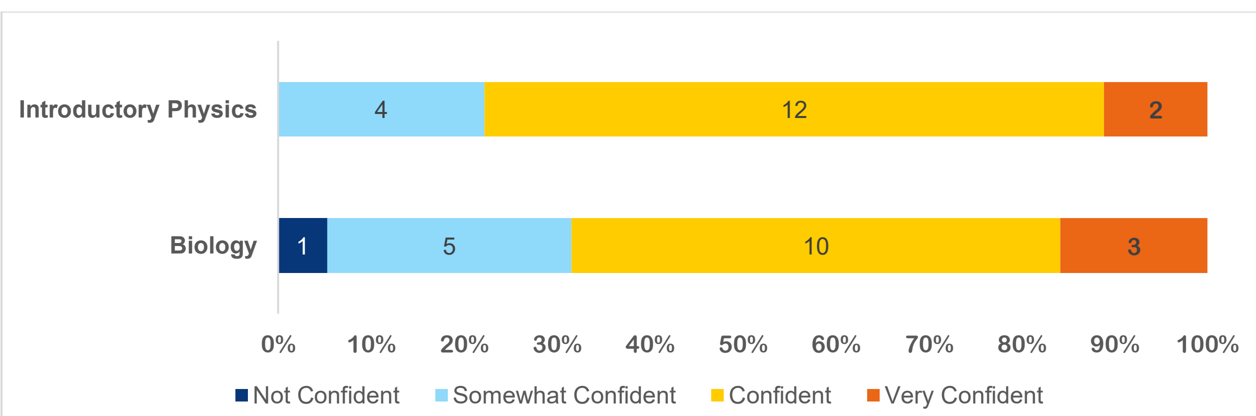


Question 8: How confident do you feel that the final cut score recommendations for the specific subject and grade represent appropriate levels of student performance?

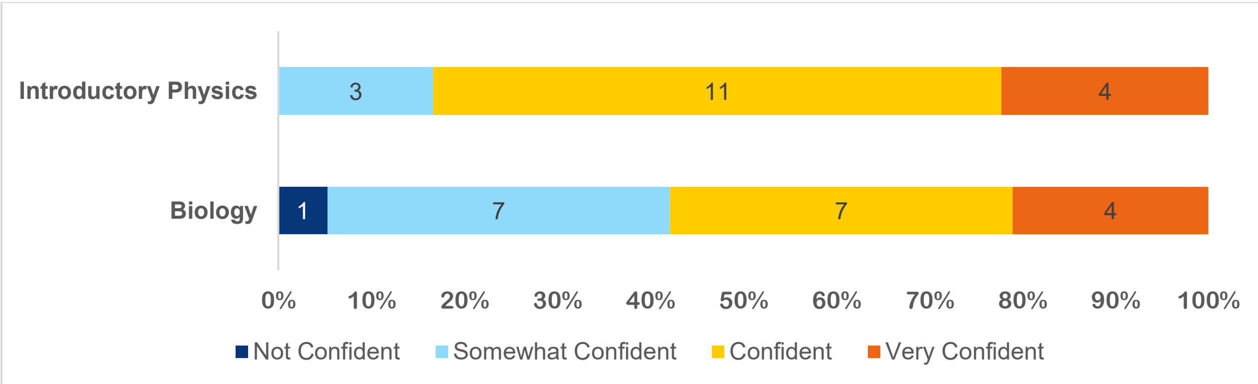
Exceeding Expectations



Meeting Expectations

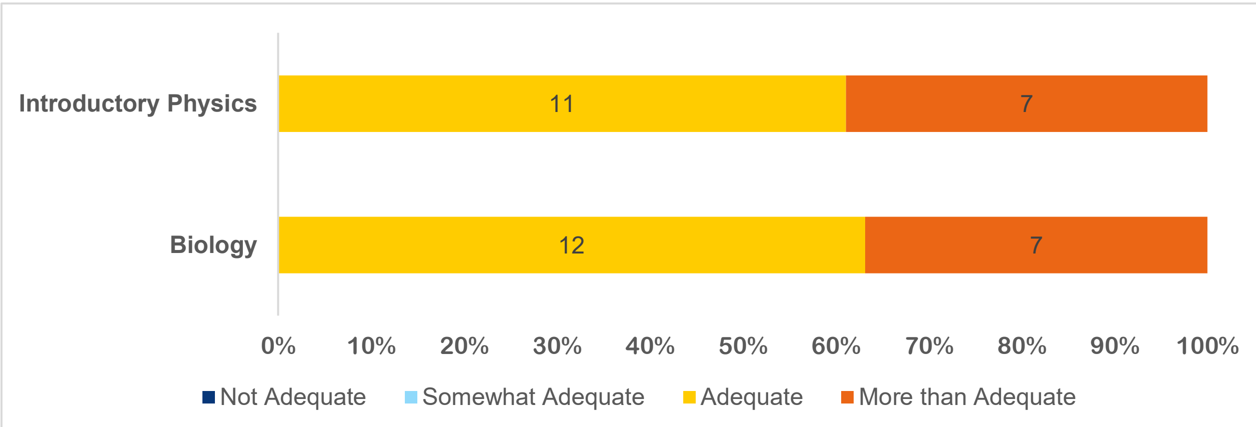


Partially Meeting Expectations

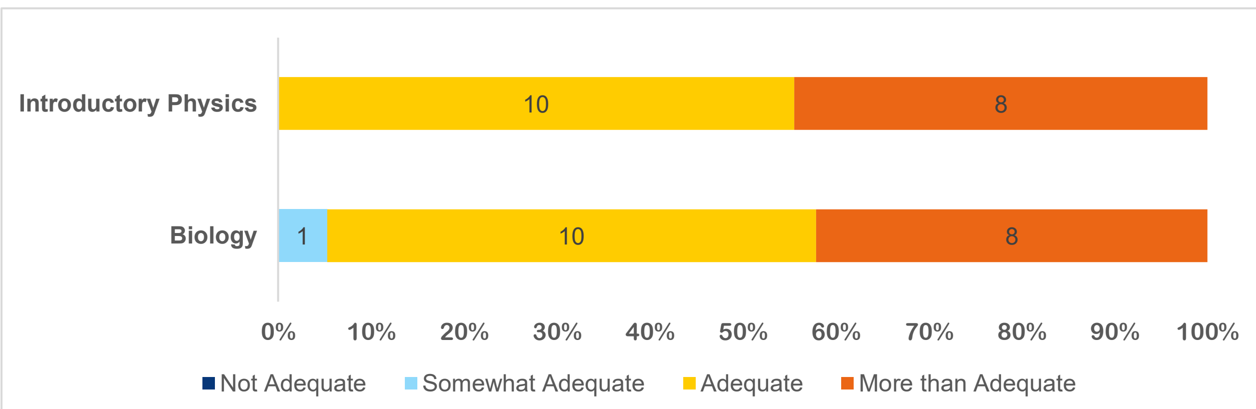


Question 9: How adequate were the following elements of the session?

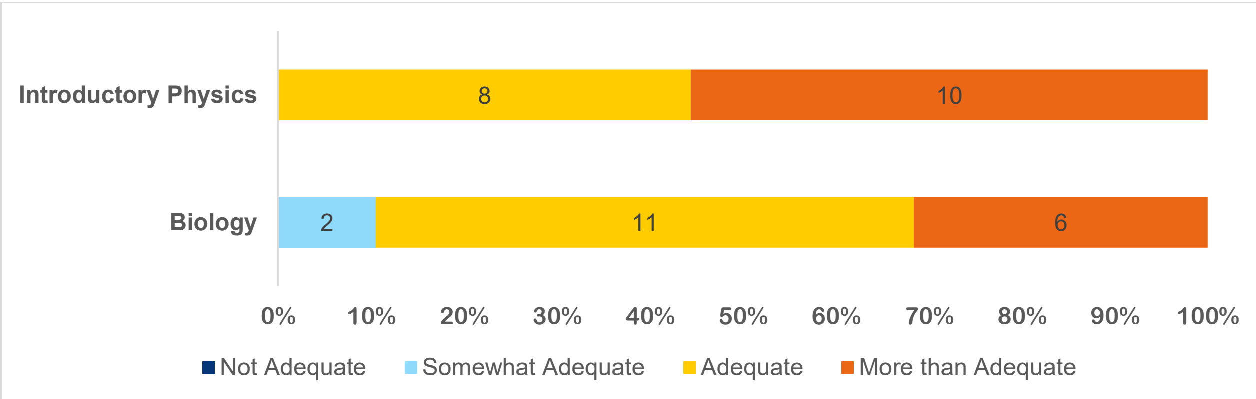
Facilities used for the general session



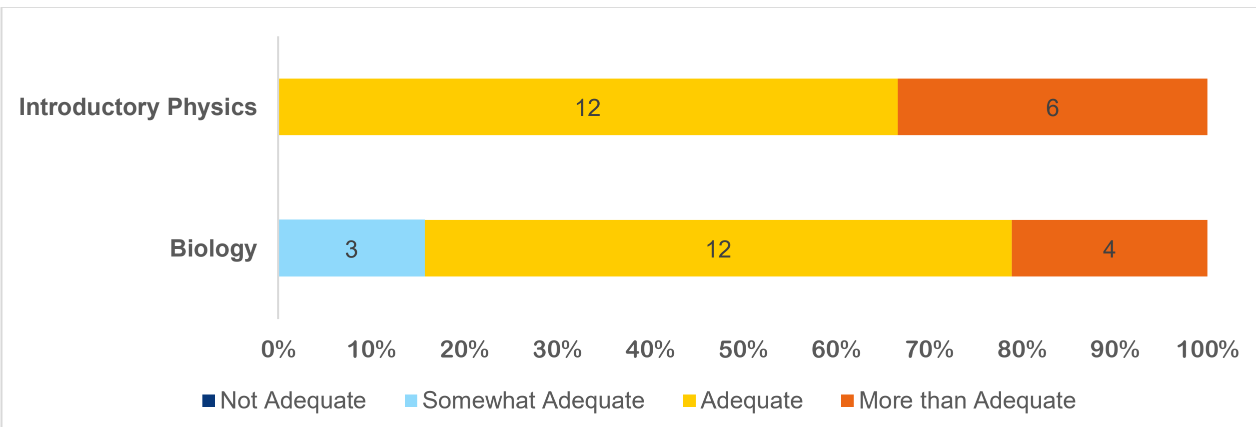
Facilities used for the breakout session



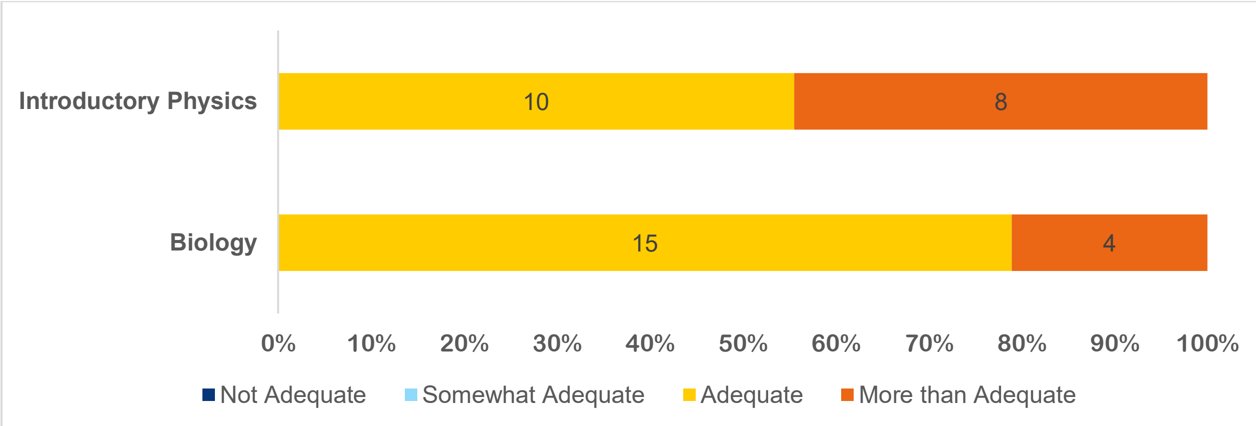
Computers used during the meetings



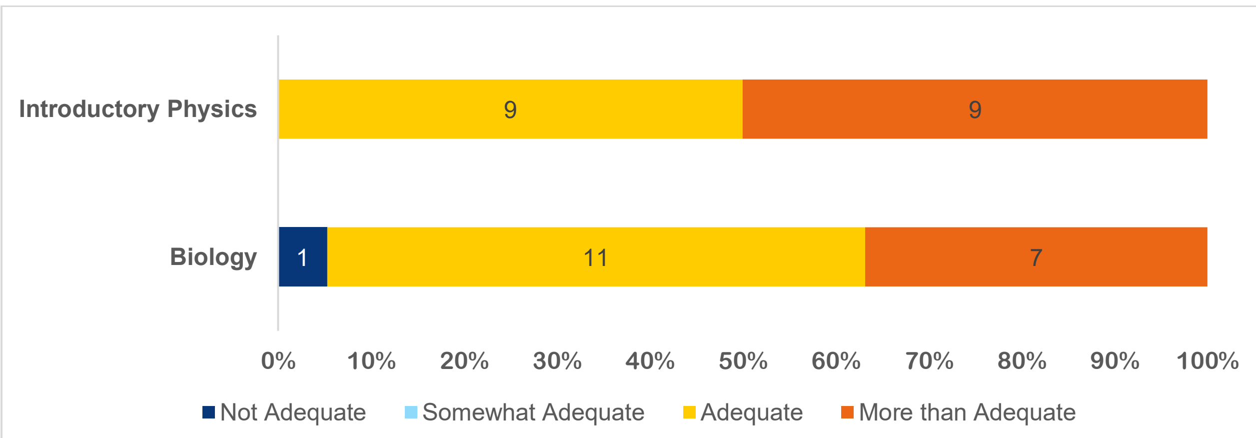
Standard Setting website for accessing materials and making judgments



Materials provided in the folder

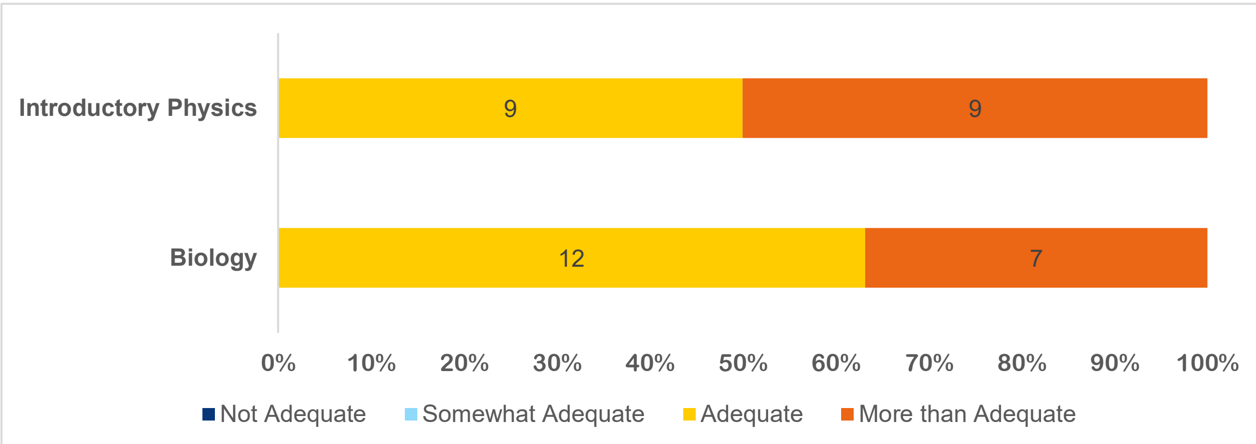


Work space in table groups during the meeting

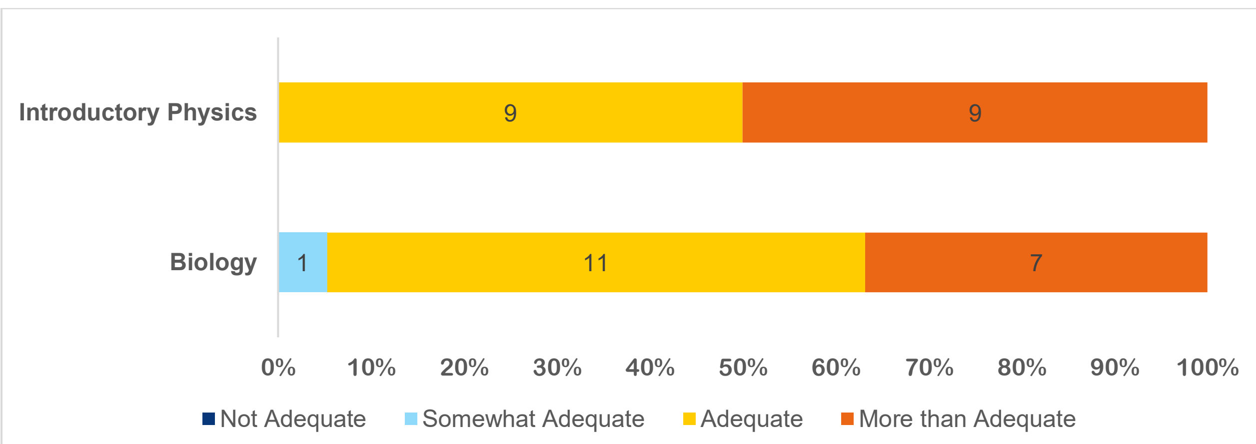


Question 10: Did you have adequate opportunities during the session to:

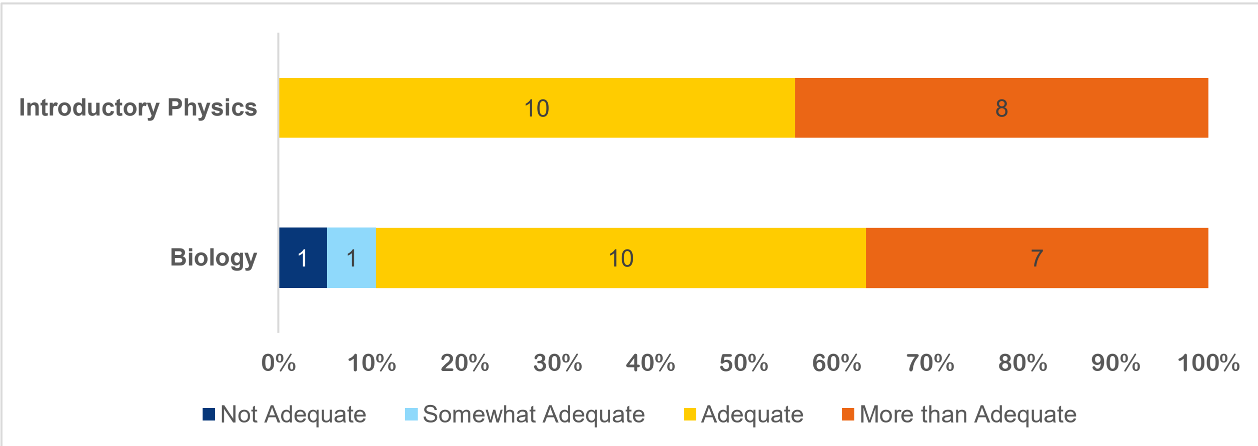
Express your opinions about student achievement levels



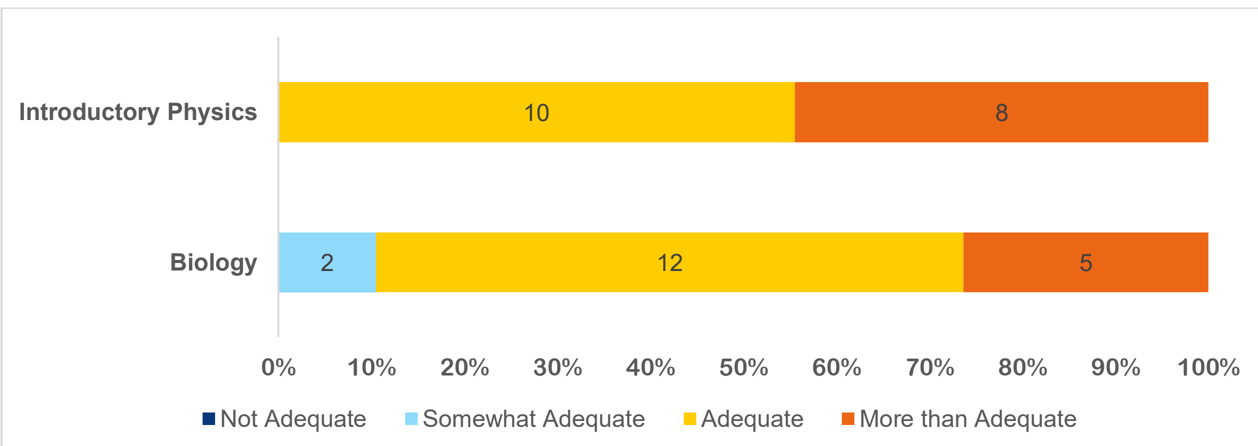
Ask questions about the cut scores and how they will be used



Ask questions about the process of making cut score recommendations

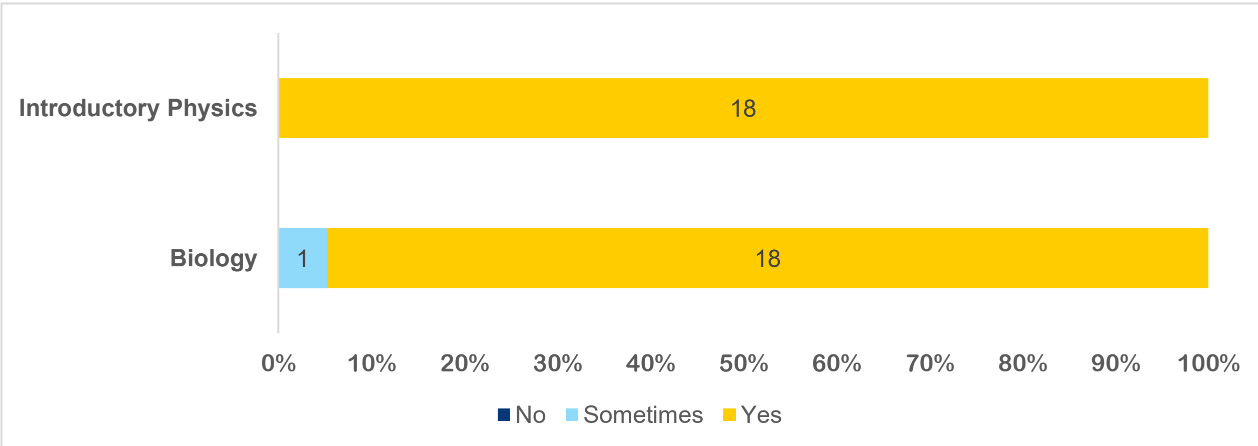


Interact with your fellow panelists

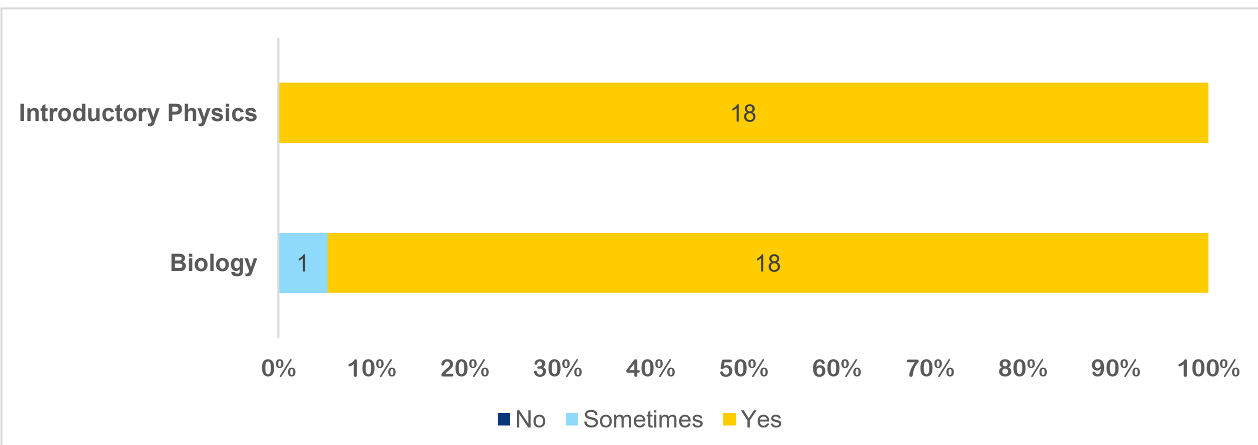


Question 11: Do you believe your opinions and judgments were treated with respect by:

Fellow panelists



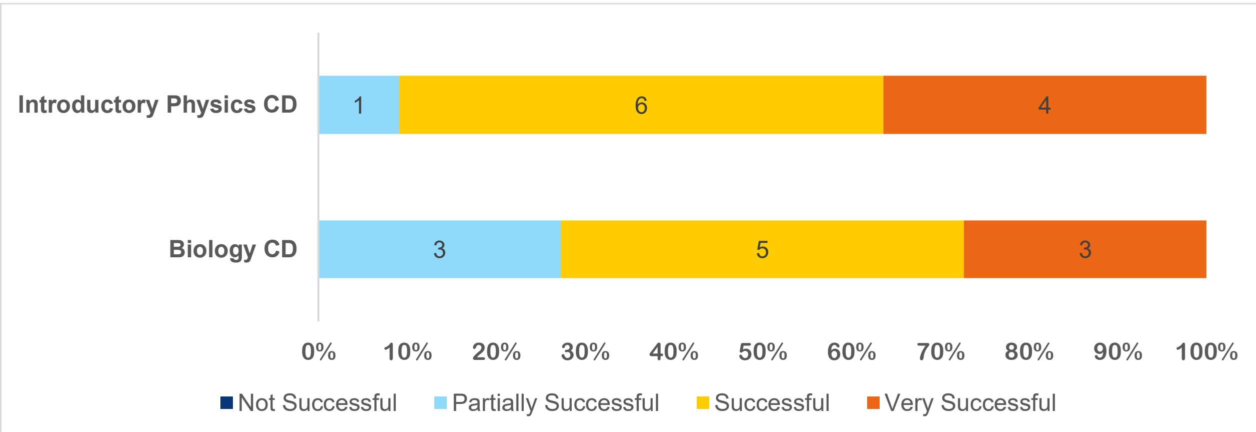
Facilitators



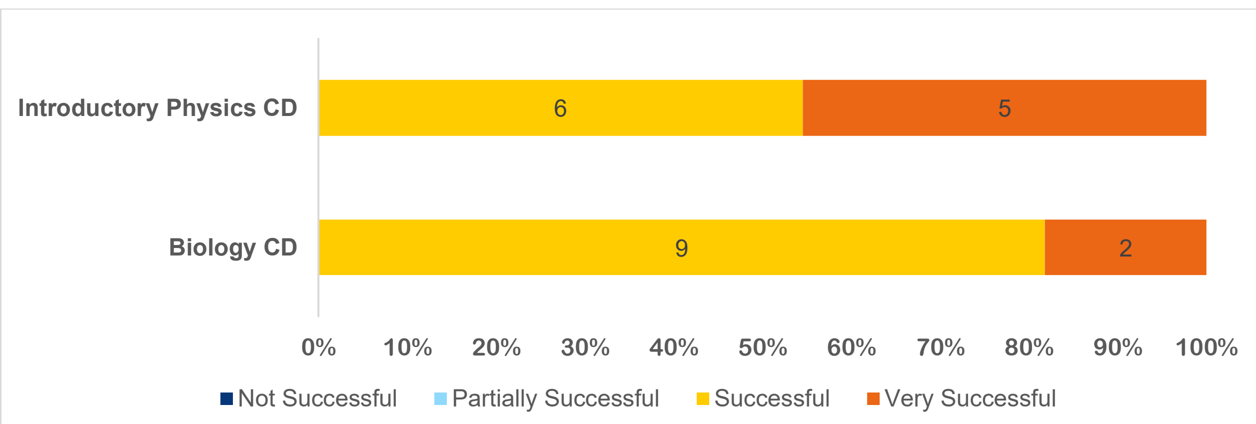
CD Validation Session Process Evaluation

Q.1. Select the option that best reflects your opinion about the level of success of the various components of the meeting in which you participated. The activities were designed to help you both understand the process and be supportive of the recommendations made by the committee.

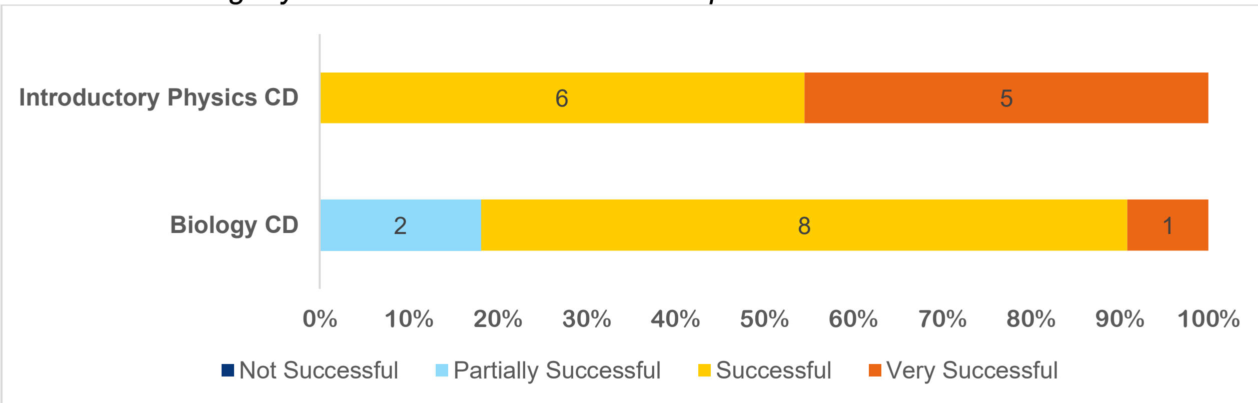
Introduction to CD validation process



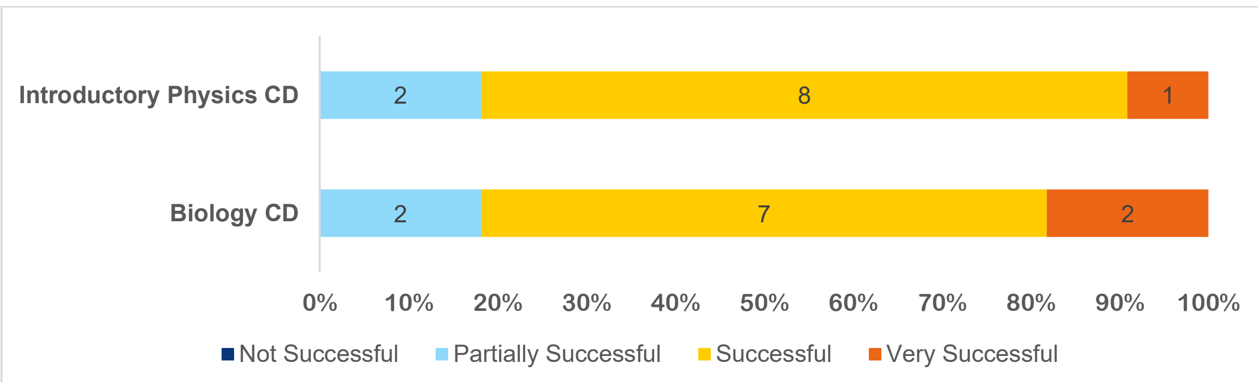
Review of the Legacy assessment and student profiles



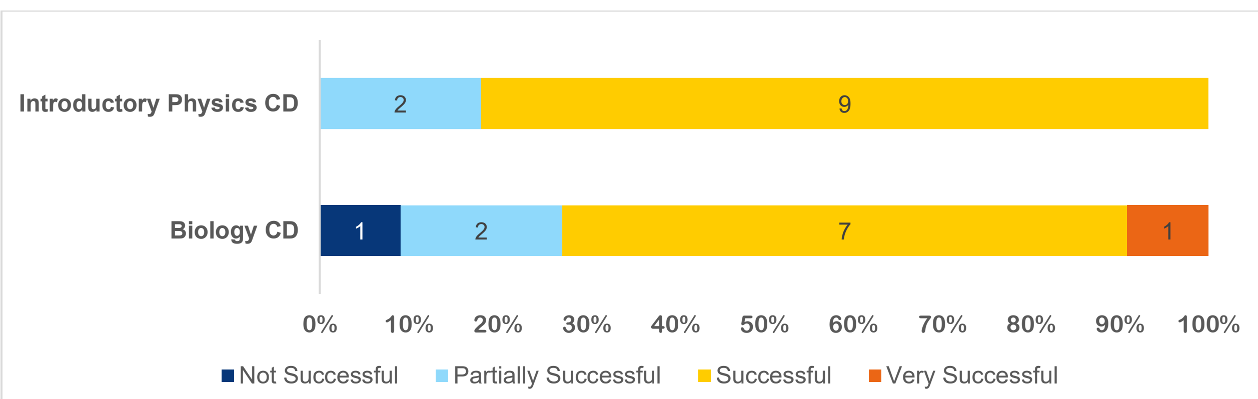
Review of the legacy assessment achievement expectations



Review of the next-generation assessment and student profiles

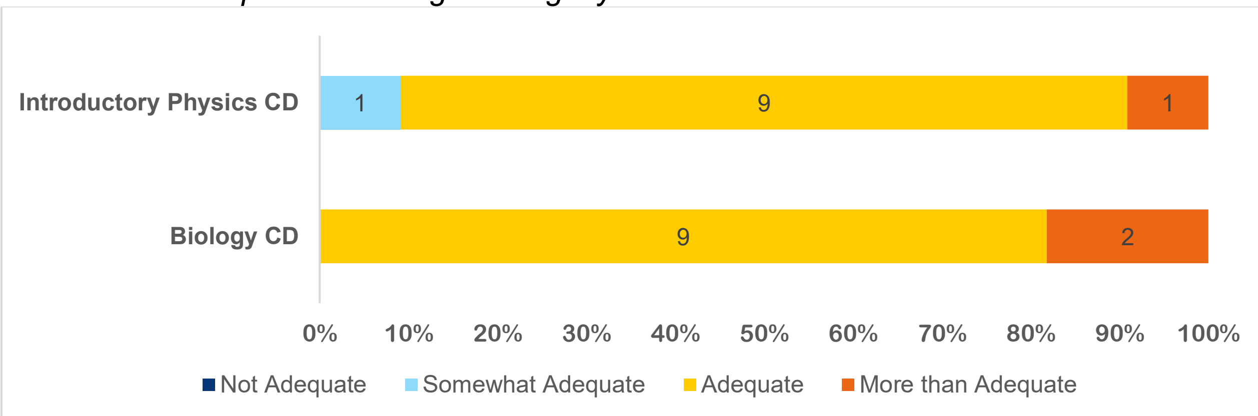


Judgment process of Interim cut score recommendations

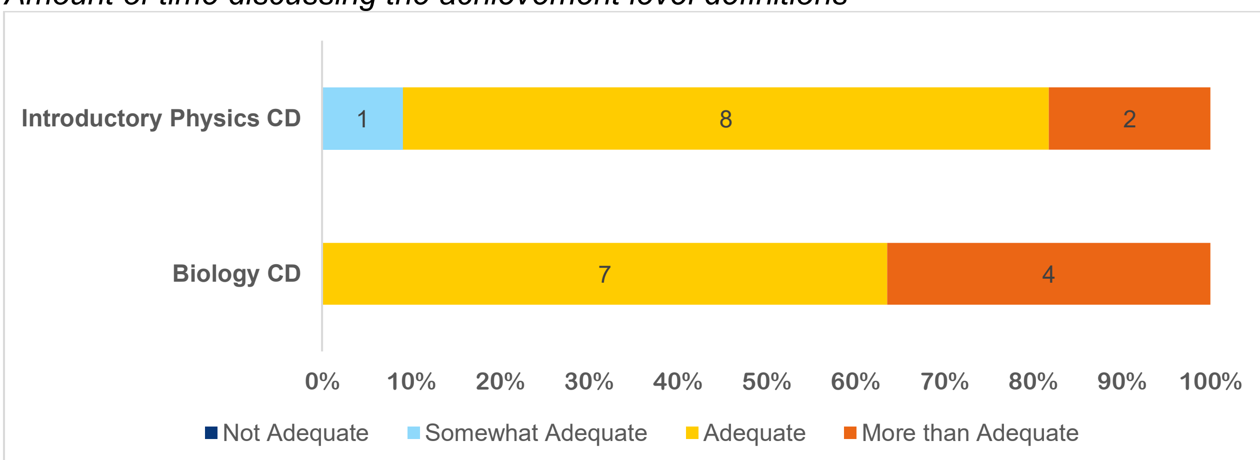


Q.2. How adequate were the following elements of the session?

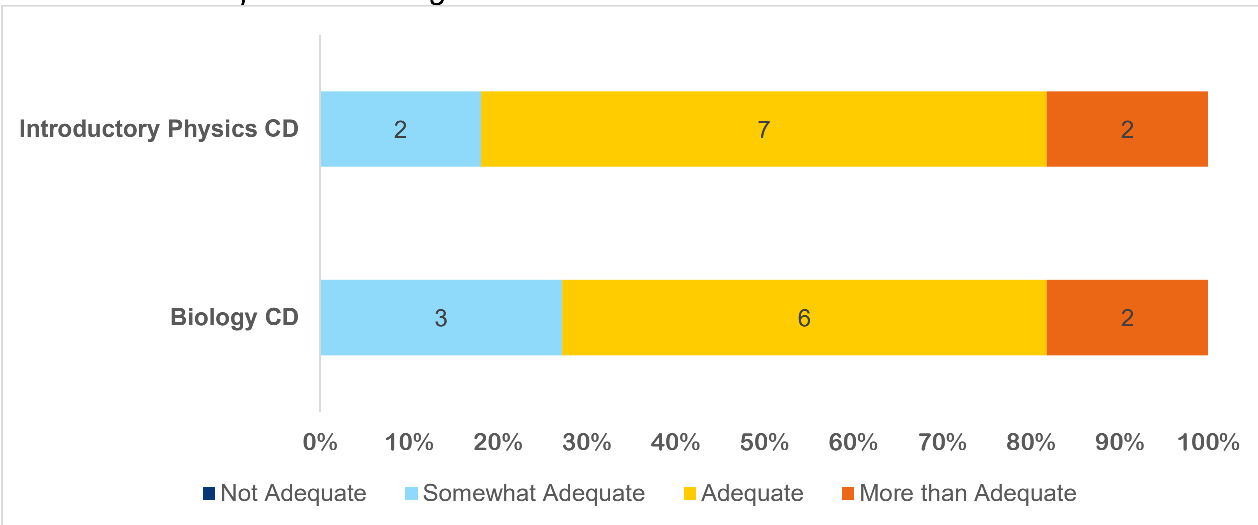
Amount of time spent reviewing the Legacy assessment



Amount of time discussing the achievement level definitions

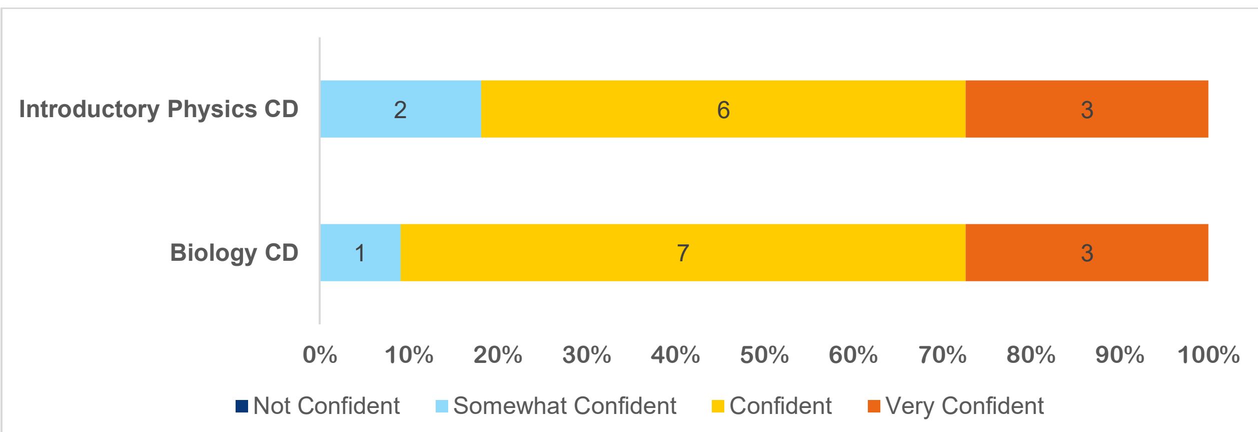


Amount of time spent reviewing the Next-Generation assessment

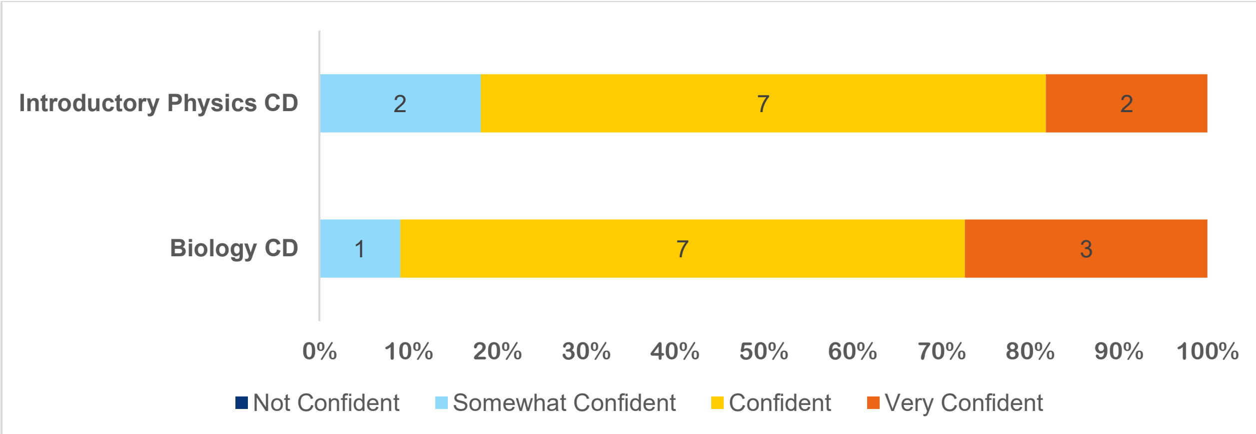


Q.3. How confident do you feel that the final interim cut score recommendations for the subject represent appropriate levels of student achievement?

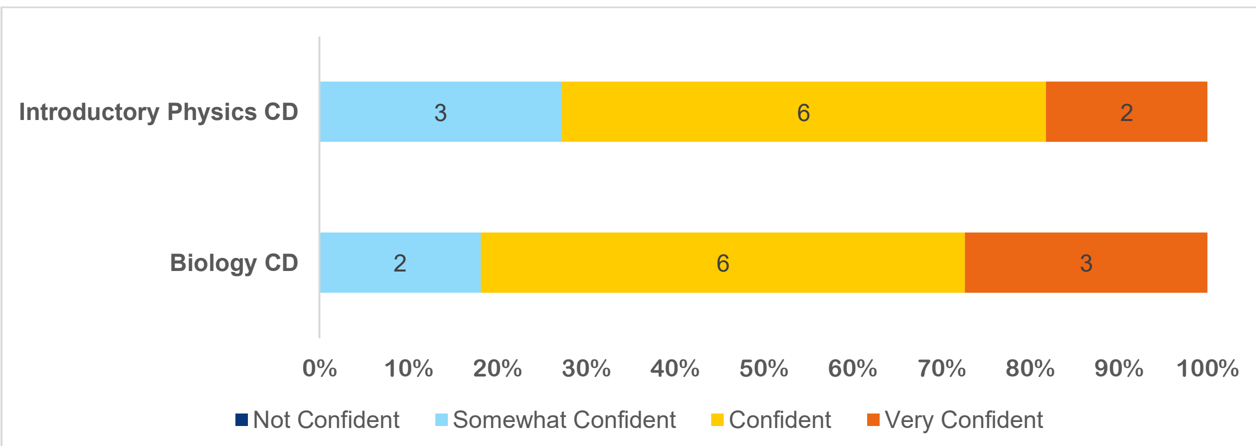
Needs improvement



Proficient



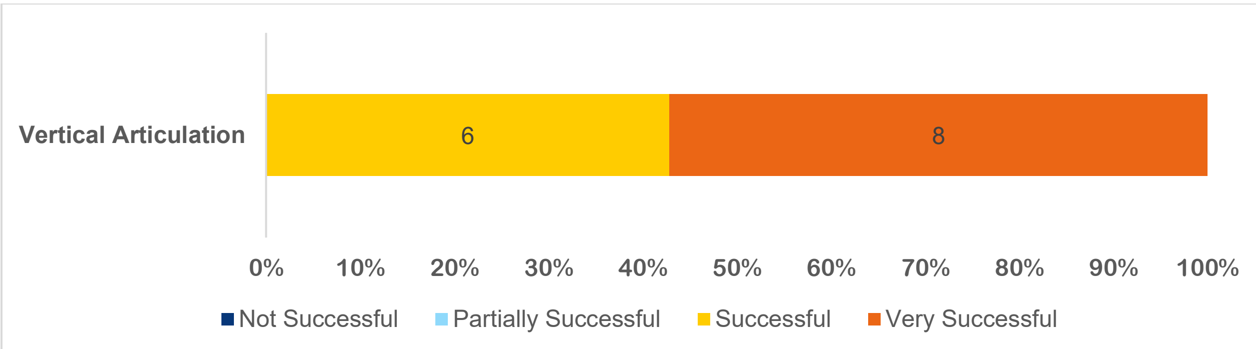
Advanced



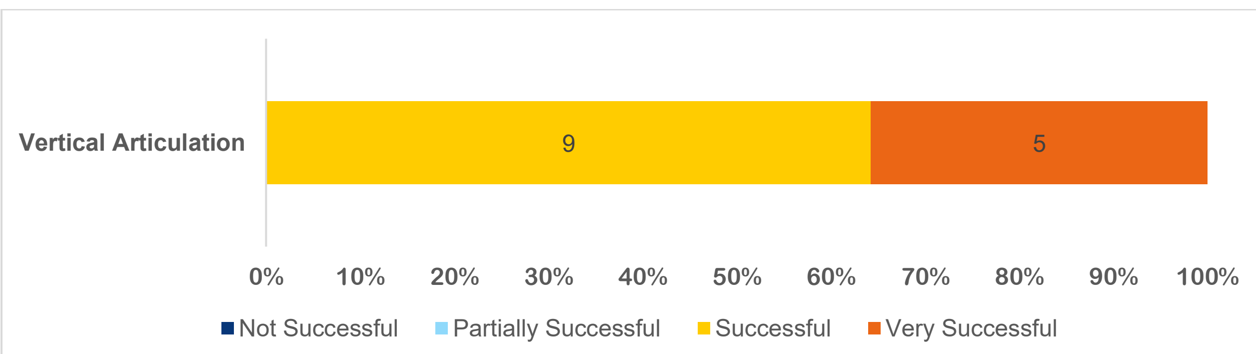
Vertical Articulation Session Process Evaluation

Q.1. Select the option that best reflects your opinion about the level of success of the various components of the meeting in which you participated. The activities were designed to help you both understand the process and be supportive of the recommendations made by the committee.

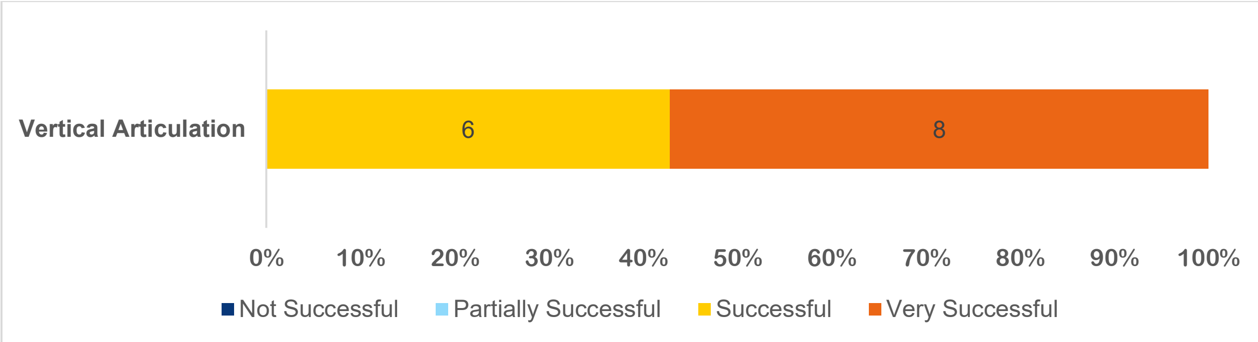
Introduction to vertical articulation process



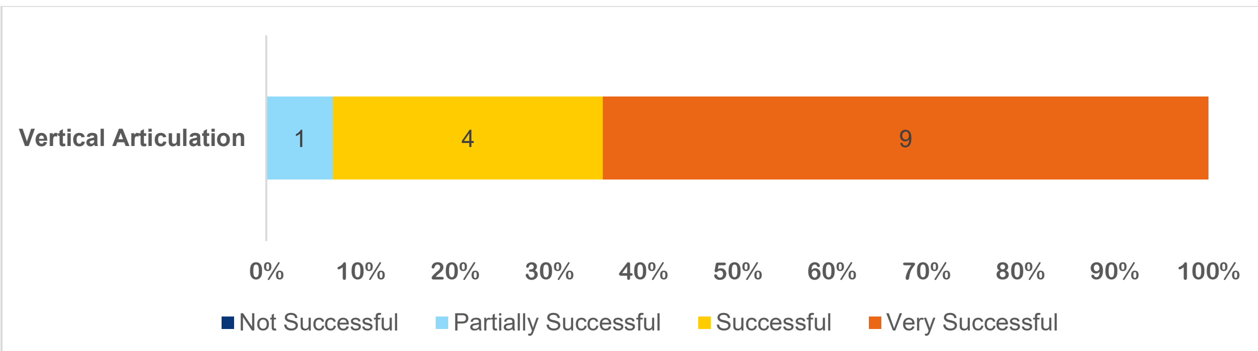
Review of the Achievement Level Descriptors



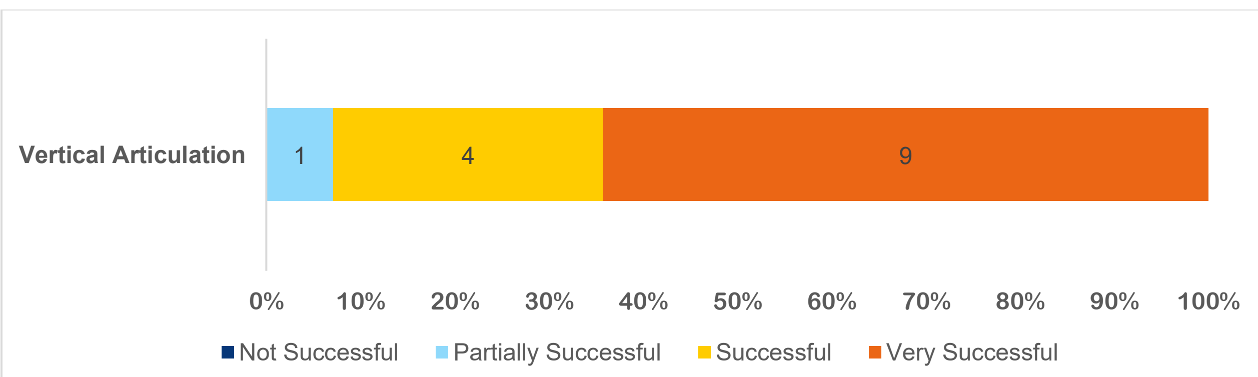
Review of the cross-grade impact data



Use of interactive vertical articulation spreadsheet

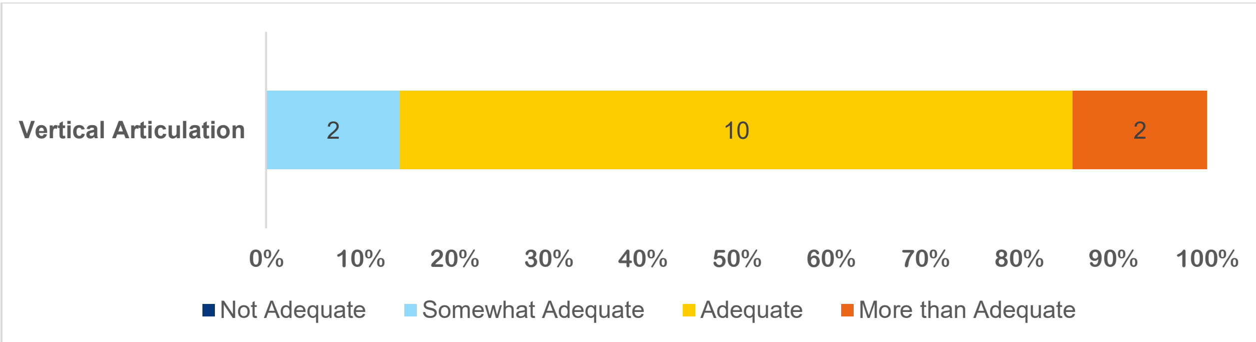


Discussion of recommended changes

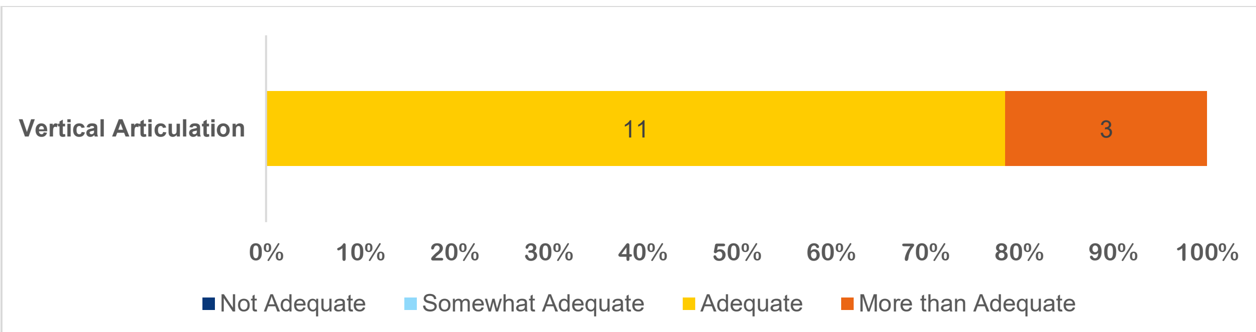


Q.2. How adequate were the following elements of the session?

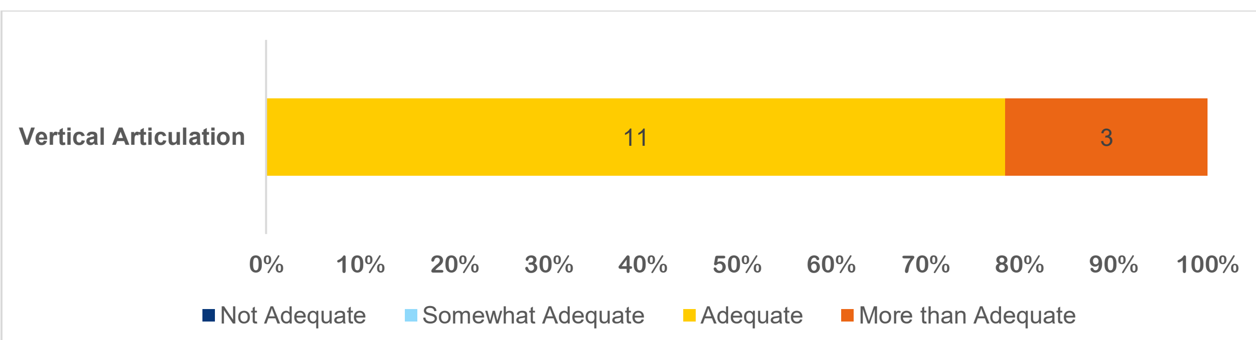
Amount of time spent reviewing the ALDs



Amount of time discussing the impact data

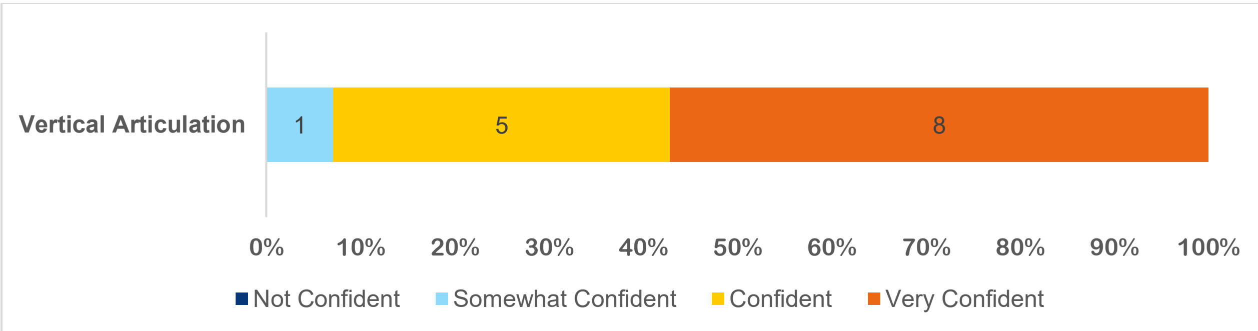


Amount of time working with the interactive spreadsheet

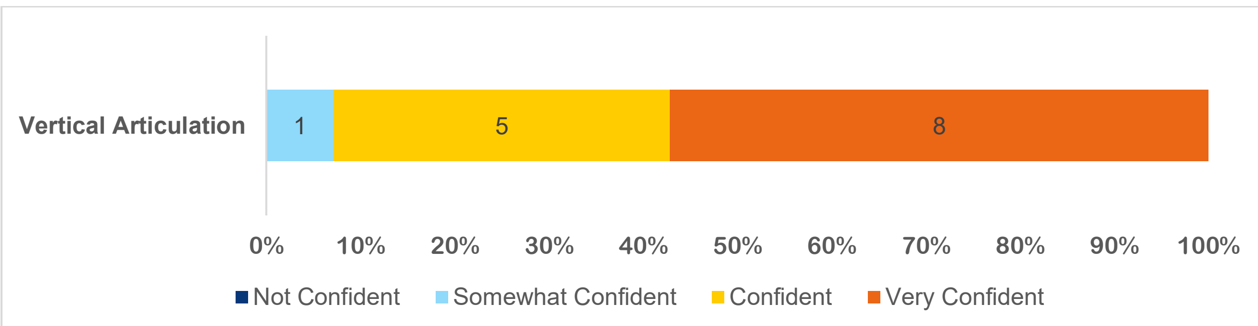


Q.3. How confident do you feel that the final cut score recommendations for Biology and Introductory Physics represent appropriate levels of student achievement?

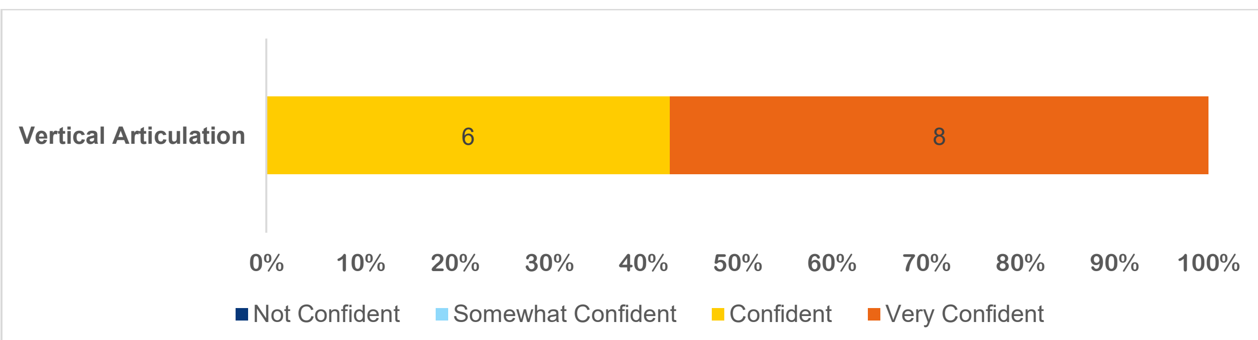
Partially Meeting Expectations



Meeting Expectations



Exceeding Expectations



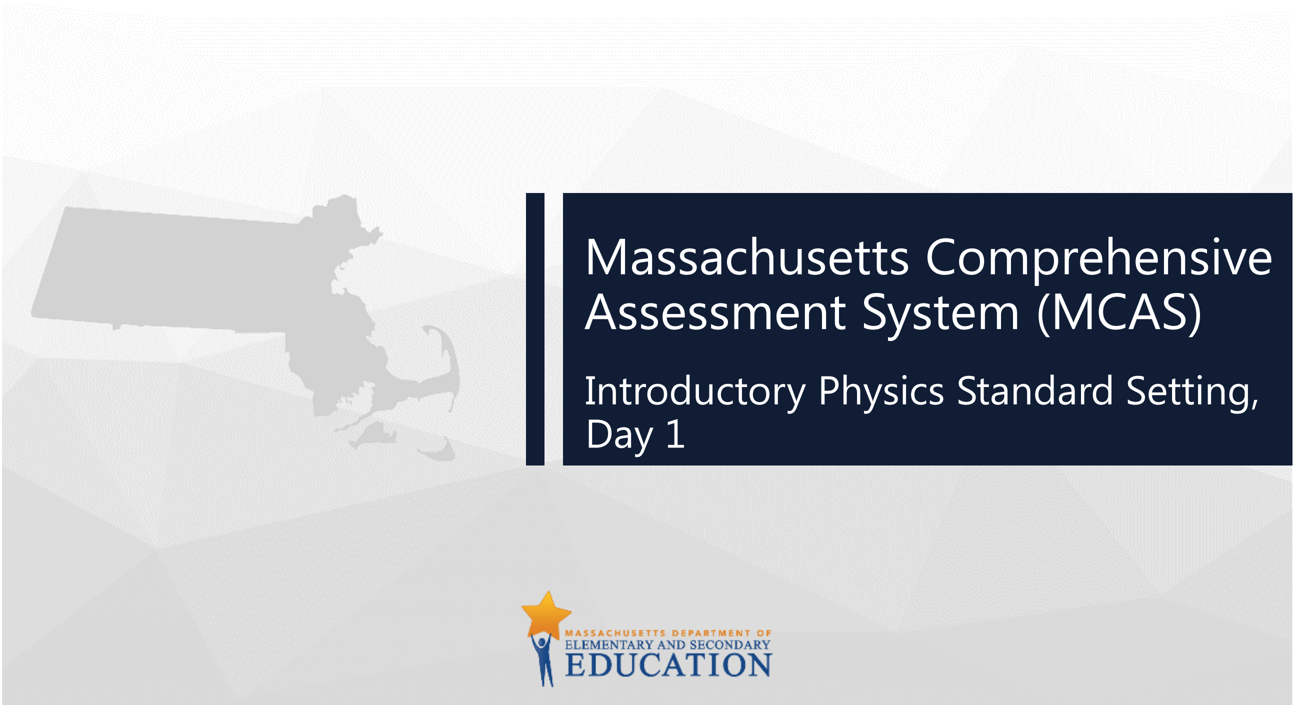
Appendix LL – PowerPoint Presentations

A sampling of presentations from the General Session and Breakout sessions by day are presented below. The full presentations may be accessed via the attachment paperclip on the left side of the pdf reader.

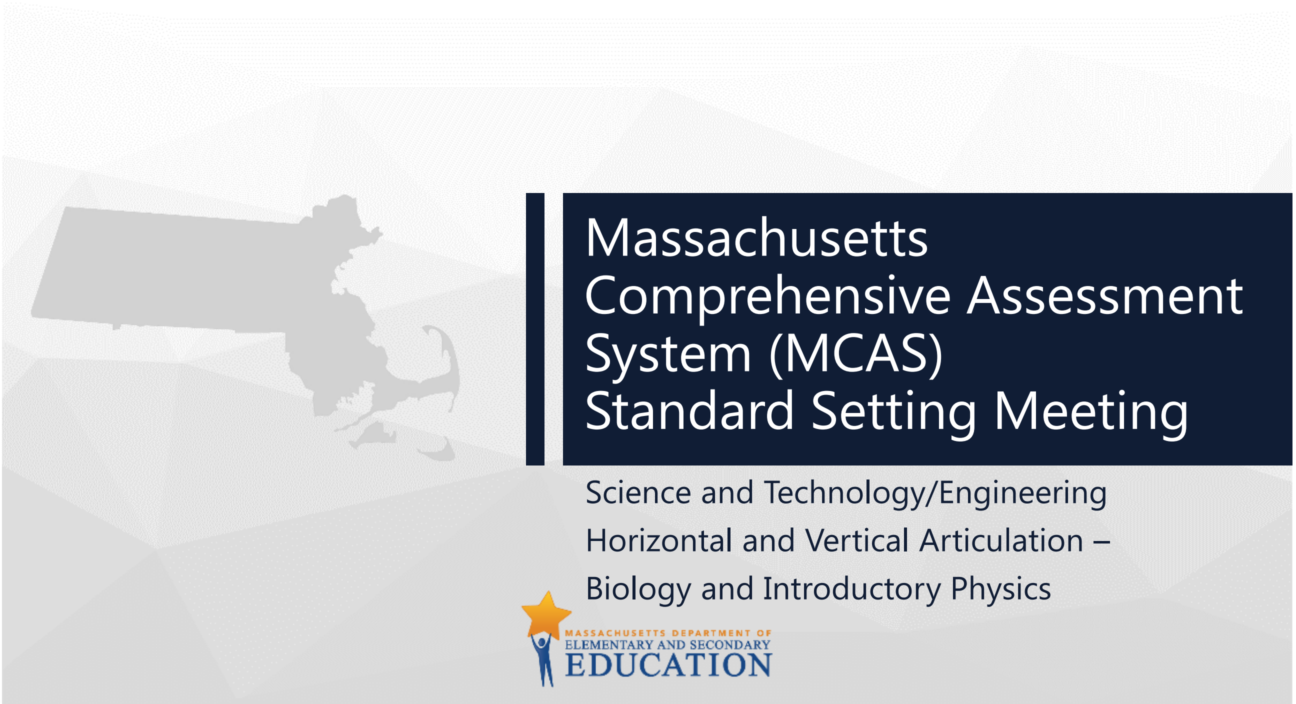
General Session

MCAS Biology Breakout Days 1-3

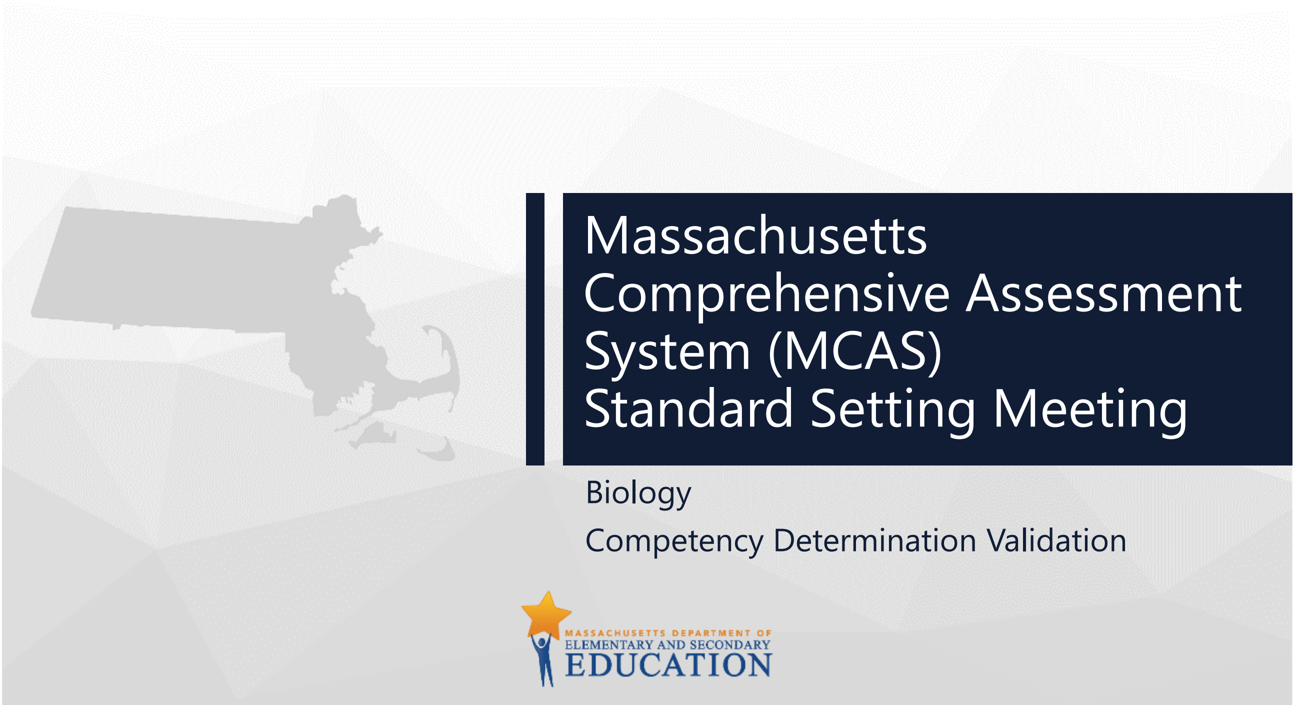
MCAS Introductory Physics Days 1-3



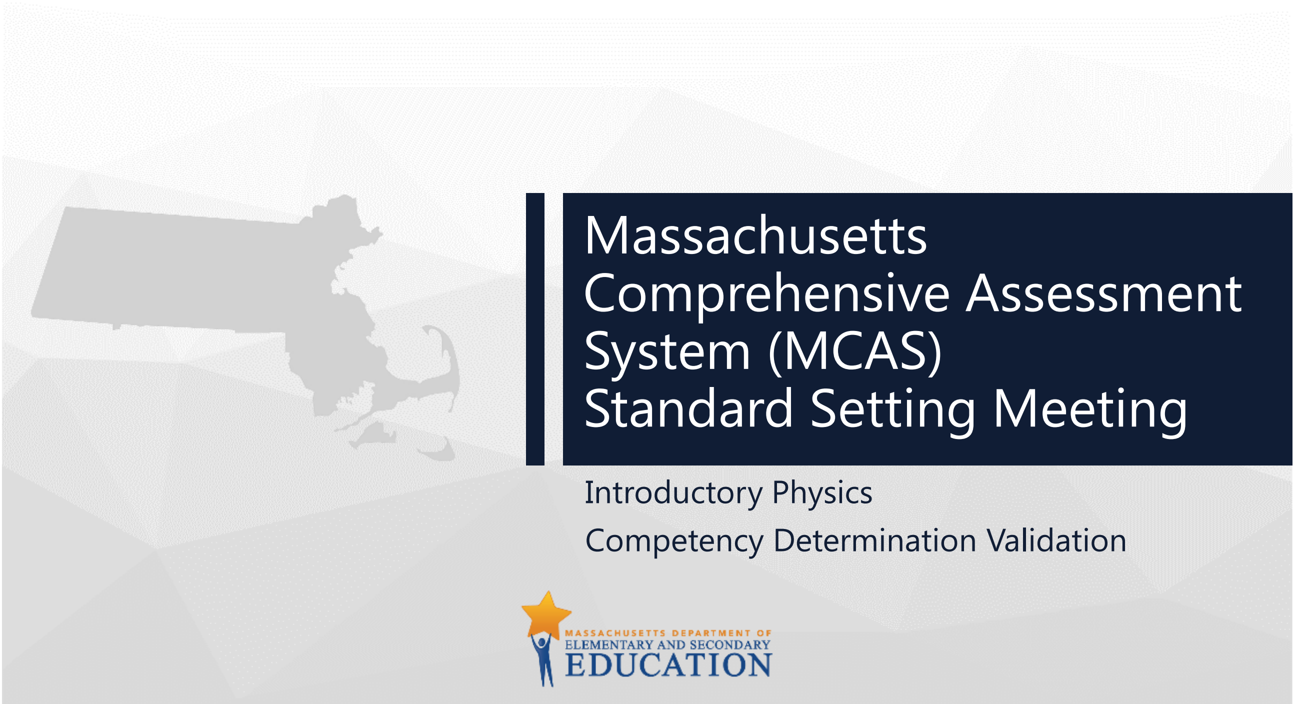
Vertical Articulation



Competency Determination Validation Biology



Competency Determination Validation Introductory Physics



Appendix MM – External Reviewer Report

MCAS BIOLOGY AND INTRODUCTORY PHYSICS STANDARD SETTING: OBSERVATION REPORT

September 2022

Will Lorié, Ph.D.
Senior Associate
Center for Assessment

Center for Assessment

National Center for the Improvement
of Educational Assessment
Dover, New Hampshire

Table of Contents

Pearson and Cognia, under contract with the Massachusetts Department of Elementary and Secondary Education (DESE), held a standard-setting meeting on August 9-12, 2022, in Wakefield, MA. The purpose of the meeting was to establish cut scores for the Massachusetts Comprehensive Assessment System (MCAS) Next Generation tests for High School Biology and Introductory Physics (collectively, “high school science”). The meeting included vertical articulation (from 8th-grade science to high school science) and horizontal articulation (between the high school science subjects) components. In addition, the meeting included a scale anchoring procedure to translate the competency determination (CD) cuts from the MCAS legacy assessments in high school science to the Next Generation assessments.
DESE contracted with the National Center for the Improvement of Educational Assessment (Center for Assessment) to observe the standard-setting meetings. Will Lorié was the Center for Assessment observer and the author of this observation report.

Workshop Description

Pearson designed a workshop in which it would implement the Extended Modified Yes/No Angoff method (Davis & Moyer, 2015; Plake, Ferdous, Impara, & Buckendahl, 2005) to recommend achievement level cut scores for each assessment. These cut scores will classify students into four levels: “does not meet expectations,” “partially meets expectations,” “meets expectations,” and “exceeds expectations.” The workshop ran over four days. Each content area panel consisted of 19 content experts, principally high school teachers, from across the state. As planned, the panelists experienced the test, reviewed content standards and achievement level descriptions (ALDs), defined borderline expectations, made item judgments over three rounds, and participated in either an articulation or competency determination meeting.

Participants

Several people attended the standard-setting meetings, including Pearson and DESE facilitators, educators who served as panelists, DESE representatives and observers, and an outside observer from the Center for Assessment.
Eric Moyer (Senior Research Scientist, Pearson) facilitated the study. He was assisted by process facilitators Soo Ingrisone (Biology) and Scott Strickman (Introductory Physics), Senior Research Scientists at Pearson. Content facilitators led large-group content conversations in each room. Content facilitators were Katie Bowler (Director of Test Development, DESE) and Steve Long (Test Development, DESE) in Biology and Phil Slauzis-Durham (Test Development, Cognia), and Isadel Eddy (Test Development, DESE) in Introductory Physics. DESE representatives, including Michol Stapel (Associate Commissioner, Student Assessment) and Rob Curtin (Chief Officer for Data, Assessment, and Accountability), provided context in the general session or served as process observers. Ha Phan (Research Scientist, Pearson) also served as an observer.

DESE invited 38 participants to attend the standard setting – 19 panelists for Biology and 19 panelists for Introductory Physics. Throughout the standard-setting meeting, participants were engaged with the task, posed questions to the facilitators, and sought clarification from each other.

Observation Notes

Day 0: Monday, August 8, 2022.

Attendees: Eric Moyer, Michol Stapel, Frank Padellaro (Psychometrics Manager, Cognia), Chris Clough (Lead Program Manager, Cognia), Phil Slauzis-Durham, Dawn Cope (Test Development, Cognia), Scott Strickman, Soo Ingrisone, Ha Phan, Steve Long, Isadel Eddy, Katie Bowler, and Will Lorié.

Shortly after 3 PM and per the schedule, Eric Moyer opened this meeting. Eric indicated that he would provide some updates at this meeting. He said that a new section was added to Pearson's online standard-setting system to assist with a part of the standard-setting meeting in which groups would discuss the relative difficulties of pairs of items. Eric highlighted that there should be two aspects to the discussion – the first would be about the items' content, and the second would be about item "features" that can influence the relative difficulties of the items. Eric provided examples of such features: single-part versus two-part, stand-alone versus part of a module, and TEI versus open response. Eric indicated that other than this, there should be no major changes to the Day 1 process.

For Day 2, Eric said that a slide would be added to illustrate the process of making a standard-setting judgment on a multipoint item. He noted that content specialists would be making updates to some item keys. Eric added that handwritten responses had been turned into typed text.

We then had general introductions.

Eric asked process and content facilitators to be in the large-room presentation, scheduled to begin at 8:30 the following day so that panelists could see them and connect names to faces.

Eric provided guidance for how far each group should get by the end of Day 1 – drafting borderline ALDs of students at the meeting expectations achievement level. He said that if participants completed that activity by 3:45, then it was OK to move on to drafting borderline ALDs of students at the "partially meets expectations" achievement level.

Eric said there would be a debrief at the end of each day, from 4:30 to 5:00. He adjourned the meeting.

After the meeting, there was some discussion between Eric and DESE (Michol and Katie) regarding the CD validation activity. Katie raised concerns that the starting point for the CD validation implies, from a policy perspective, cut scores that would be too low. I did not observe the resolution of this discussion, but this issue was raised at least a couple more times before Day 4 (when the CD validation activity would take place). The range of raw score points for CD validation was ultimately expanded prior to Day 4.

Day 1: Tuesday, August 9, 2022.

Attendees: Michol Stapel, Rob Curtain, Eric Moyer, process facilitators, content facilitators, observers, and all panelists.

At 8:30 AM on Day 1, Michol opened the general orientation session of the standard setting with a welcome and an introduction to the lead staff. Katie followed with additional orientation in which she highlighted the diversity and collective experience of the participating educators. Rob then addressed the role of Massachusetts educators in the MCAS test development process, drawing particular attention to the challenges raised by the COVID-19 pandemic. He told the panelists that it is “really important that we do not lower our expectations for our students.” He thanked them and said he hoped they would enjoy the experience. Michol then recounted the history of MCAS standard settings. She said that the shift from the legacy MCAS to the Next Generation MCAS implied a “new definition of how we talk about student achievement.” She then turned the session over to Eric, who provided an overview of the Next Generation MCAS standard-setting meeting.

Eric reviewed the schedule, ground rules, and the role of the panelists. He emphasized that they will set standards for the entire state – not (just) for their students, schools, or districts. He provided test security dos and don’ts. Among the latter: Not using one’s phone in the room, not taking equipment or materials out of the room, and not discussing – outside of the meetings – the specifics of in-room discussions. He encouraged them to share their experience in general terms with their colleagues. He drew attention to the Cognia NDA, which he then asked participants to read and sign if they had not already done so.

Eric then explained the standard setting process at a high level, from panelists to commissioner approval, to incorporating the final cut scores for reporting test results. He explained that standard-setting meetings bring together student expectations (in the form of ALDs), content expertise (provided by panelists), and assessment to answer the question, “How much is enough?” He presented a visual showing how cut scores classify students. He then turned to the task of the panelists, defining basic terms such as content standards, achievement levels, ALDs, cut scores, standard-setting process, and feedback data.

Eric then introduced the Extended Modified (yes/no) Angoff process. He said it was the same process used in other Massachusetts state tests. Eric explained that it is a content-based standard-setting method in which panelists make item-centered judgments. Eric said that panelists would be looking at an item and thinking about the knowledge and skills needed to get the item correct. To illustrate the process for the lowest cut that panelists will be considering and for a simple multiple-choice item, he said that panelists would ask themselves: If a “partially meets expectations” student, as defined by the ALDs, encounters this item, will they get it correct? They will answer that question with either yes or no.

Eric said that the standard-setting process would be iterative, occurring over several rounds. The first round would be about “you and the content,” referring to the panelists working individually. Feedback would be provided, comparing one’s judgments with those

of others, followed by discussion among all panelists. There will then be a second and third round.
Eric then outlined the standard-setting process at a higher level, which included experiencing the test, reviewing standards and ALDs, defining borderline expectations, rendering item judgments, and participating in articulation and competency determinations.
Eric returned the judgment process in more detail, using a hypothetical example of setting standards on a test designed to elicit the degree to which the test taker was a fan of the New England Patriots (U.S. football team).
Eric emphasized that in the actual standard setting, all judgments must be individual. He briefly turned to the agenda for the Friday meetings (vertical and horizontal articulation and competency determinations). He ended with an overview of the agenda before opening it up for questions.
A panelist asked if this standard-setting process is done for every test. Eric replied, “We don’t do this every year for every test. We take your cut score recommendation and place it on the test scale. This applies to every test that is created based on the scale.”
Another panelist asked how tests differ from year to year. Eric said that tests vary yearly in specific content but not in the representation across the reporting categories and approximate difficulty.
After no further questions, Eric adjourned the general session and asked the panelists to join their content area groups.
I observed the Introductory Physics group for a few minutes. Scott, the process facilitator, asked content facilitators, panelists, and observers to introduce themselves. After they did so, Scott returned to address group norms and security. Next, they moved into the “experience the assessment” activity, in which panelists took the test.
I moved to the Biology room, where panelists were also taking the assessment.
Back in the Introductory Physics room, Scott closed the “experience the assessment” portion of the program at around 1:10 PM. He asked for reflections on the experience.
Panelists made several comments, including:

- Many questions, especially module questions, require students to ignore information[1]
- Not many problems were simple one-step problems. Many involved two or three steps
- It was possible to (easily) eliminate distractors on many questions

[1] This refers to information in item stimuli or stems, which is not needed to answer a specific item. Including extraneous information for some items by design can be a legitimate way to ensure students demonstrate their knowledge on the assessed content.

- [Remark by a college-level teacher educator] Students should / need to receive instruction on how to use different tools, especially the equation editor
- No words were bolded or italicized. (Isadel responded that italics are not used due to universal design considerations, but that bolding is still used when necessary and that DESE has guidelines for bolding.)

Scott then moved to the item difficulty comparison activity, showing two items on the room screen. He facilitated discussion about factors that make one or the other item more difficult. Panelists referenced several factors: content, format, cognitive load, computational, and reading load. A second item pair was presented, followed by discussion. Then a third item pair, followed by discussion.

A similar discussion was taking place in the Biology room.

Around 2:30 PM in both rooms, Scott and Soo oriented panelists to the next scheduled activity, discussing and drafting borderline ALDs. Working from existing (range) ALDs (prepared by a separate educator group before the standard-setting meeting), panelists worked in groups for about 45 minutes to create borderline ALDs. These were to consist of 3-5 borderline descriptions per disciplinary core idea (DCI), identifying key characteristics that the “just barely” student in the “meets expectations” category would be able to demonstrate. Facilitators displayed a slide with some guiding questions on the room screens.

Since the groups worked in tables while drafting borderline ALDs, a large-group discussion was necessary for the entire group to share and contribute these draft descriptions. Content facilitators in each room led this discussion, writing the draft borderline descriptions on large sheets of paper. This activity continued until the scheduled close of the panelists’ work, at 4:30 PM, when panelist meetings adjourned.

Eric held a debrief at the end of Day 1. All non-panelist participants attended. Eric addressed several points, beginning with panelist Q&As:

5. Question: Wouldn’t the CD activity affect the borderline descriptions?

   Answer: No.

6. Question: How should we consider the pandemic (in our borderline descriptions and judgments)? Answer: Don’t.

7. Question: If our school made a conscious decision not to teach (a particular standard), the answer to the 2/3rds question (the operational definition of "likely to get an item correct") would always be no for that standard, right?

   Answer: No. You must think about the state, not your school.

8. Question: They are thinking about potential items when they are thinking about the borderline description, and they shouldn't, right?

   Answer: Correct, they should be thinking about content, not items. "We are not going to be able to write borderline descriptions that apply to every single item. What we're trying to get them to do is get them to speak the same language – not a list, but a comprehensive judgment. The working definition will get refined as we move along."

Eric encouraged the process and content facilitators, as they facilitate discussions, to listen for "should versus would," "meets versus borderline," and "2/3rds of the time." These were critical phrases from the training. After a brief discussion of reimbursement logistics, the types of feedback that panelists would receive, and expectations for where panelists should be at the end of Day 2, the debrief was adjourned.

Day 2: Wednesday, August 10, 2022.

Attendees: Michol Stapel, Eric Moyer, process facilitators, content facilitators, observers, and all panelists.

Day 2 began with continued discussion and formulation of the borderline ALDs for Biology and Introductory Physics. In both groups, a facilitator made it clear to panelists that if they felt that a particular range ALD statement adequately conveyed some aspect of the borderline description for that achievement level, they were free to take that statement without modification into the borderline ALD. This clarification helped prevent unproductive discussion about how to revise a range ALD component when it might already be in "minimal" (that is, borderline) form.

Process facilitators began judgment task training in both rooms after participants drafted all three borderline ALDs. (Meanwhile, content facilitators typed and printed the text of the borderline ALDs for distribution to panelists.)

Participants next engaged in a practice round of the judgment activity and had an opportunity to ask questions and to individually register, via survey, their comfort with instructions and the judgment task.

Participants next entered Round 1 of their judgments individually. This phase entailed reviewing every operational item on the Spring 2022 test form. After all panelists in a room had made their judgments, process facilitators provided judgment feedback, which consisted of individual and committee-level feedback. Each panelist received their individual item judgments and their individual cut scores. The latter was expressed in raw score units and computed by Pearson. The committee-level feedback consisted of the mean, median, minimum, maximum, and second and third quartiles of the cut score recommendations across all panelists. A panelist item judgment agreement stacked bar graph showing the number of panelists recommending a particular raw score for a specific level, with the level judgments color-coded in such a way to allow panelists to visually inspect the degree of overlap in the distribution of judgments for the different achievement level cuts; and item statistics (item p-value or distribution of point-score for multipoint items).

Next, process facilitators initiated a whole group discussion for each achievement level cut. The discussion was driven by items flagged statistically as exhibiting the most disagreement[2] across panelists.

In reviewing sample flagged items, panelists had discussions justifying their ratings based on their descriptions of the borderline student at the level being discussed. During this discussion in Introductory Physics, one panelist drew on another's reasoning to change her rating, consistent with guidelines about the conditions under which panelists should change their ratings: As a result of dialogue and information exchange, not unrelated social influence factors (Fitzpatrick, 1989).

Two potentially problematic issues emerged in the Biology room, as evidenced by the discussion following Round 1. The major one was the perception among some panelists that the borderline "exceeds expectations" student would get all items correct, which led to a high recommended cut score for that level for Round 1. The second issue stemmed from a component of the "partially meets expectations" borderline ALD. The panelists had agreed that the borderline student at that level would know about one body system, not all of them. However, the test had items addressing several different body systems. Thus, it was not readily apparent how to implement this borderline ALD in rendering judgments. One panelist chose an item-by-item strategy, which resulted in her providing a judgment of "yes" on each body system item meeting the borderline ALD description, independent of her judgments on other body system items. This led to her providing more "yeses" to body system items for that achievement level that she would have if she considered them collectively. Another panelist adopted a different strategy: He reasoned that the digestive system was the simplest and, therefore, the one most likely to be the one body system familiar to a student at the borderline of partially meeting expectations. Thus, he rendered his judgments according to this criterion – that is, "yeses" to digestive system items wherever appropriate, "noes" to the others.

[2] As Eric explained to me, if a multiple-choice item was such that half the panelists judged a borderline "meeting expectations" student to get it correct (with the other half rendering a "no" judgment), then panelists could not disagree more on that item (for that level), and it would be among the items flagged.

Eric addressed the first issue by reminding the Biology panelists that the concept of “just barely” meeting the requirements of an achievement level also applies to the highest level. So it does not follow that a borderline “exceeds expectations” student would get every point on every item. After his explanation, the panelists appeared to understand and internalize this notion.

Panelists adopted a workaround strategy post-Round 2 that would result in cut score recommendations unaffected by this artifact of item-by-item methods for borderline ALD statements that followed a “one of N” formulation. Each panelist chose a specific system to operationalize the borderline ALD statement and rendered their judgments according to that choice.

Panelists in both groups concluded their Round 1 discussion and moved to Round 2. Biology room panelists post-Round 2 drew heavily on item statistics and the disparity between panelists’ expectations of how students would do on the items and how they had performed. This prompted Eric to remind the panelists that the item statistics they are seeing are somewhat depressed from what they would have been had there not been a pandemic. This was especially the case in Biology, where item data included students who took Biology in 9th grade but, because of schooling disruptions, took the test a full year later, in 10th grade, when they might have forgotten much of the material. Eric told the panelists to consider the item statistics “with a large grain of salt.”

At the close of day debriefing, Eric and others discussed the reasonableness of the initial cuts and the resulting impact data. Eric suggested that process and content facilitators emphasize the COVID effect to contextualize the item statistics and impact data for panelists. At the debrief, one person said that some panelists set their “partially meets expectations” cut below the test’s guessing level in Biology. Eric said the solution to this is to have a conversation with the group about guessing to have them think about whether their recommendation implies a cut below the test’s guessing level.

Day 3: Thursday, August 11, 2022.

Attendees: Michol Stapel, Eric Moyer, process facilitators, content facilitators, observers, and all panelists.

In the Introductory Physics room, Day 3 began with Round 2 feedback. Scott presented items on which there was the most disagreement in judgments and elicited opinions from the panelists on their reasons for their judgments. Most panelists drew on the borderline descriptions or the ALDs. Some brought in considerations about guessing, cognitive processes (such as the number of steps required to arrive at the correct answer), and the Spring statistics. Some panelists articulated how they were explicitly weighing these different considerations to arrive at their judgments.

In the Biology room, as panelists moved into a discussion of Round 2 feedback, Eric addressed the impact data extensively. He used a thermometer analogy, saying that the panelists’ job was to operationalize the equivalent of 98.6 degrees Fahrenheit concerning the standard, as determined by the content. Eric also emphasized that panelists were setting standards not just for 2022 but also for several years into the future. He said competency determination is a different matter, which panelists will consider later in the standard setting. Eric later had a similar discussion with the Introductory Physics panelists when they saw the impact data post-Round 2.

The item-by-item whole group discussion in the Biology room was predominantly content-based. Not all items on the flagged list were discussed, which the process facilitator noted was due to time. However, she said that if anyone wanted a particular item to be addressed, to let her know. (She also focused on items that they had not already discussed.)

After panelists in both groups indicated they were ready, they moved to Round 3. As before, feedback was provided at the end of the round.

The panelists in each group were split approximately equally, with half assigned to articulation and the other half to competency determinations. The panelist meetings were then adjourned for the day.

The Day 3 debrief took place after lunch. At the debrief, Eric outlined what would happen on Day 4. He advised the facilitators in the articulation groups not to begin vertical articulation by showing the data "because the panelists will create a story to explain it." He said that instead, they should start by asking the panelists what they expected the impact data to look like across the grades, based on the content.

For horizontal articulation, Eric said that the discussions and patterns until that point suggest that panelists will think that the impact should be the same across the grades. Eric said that we would bring the matched data in for this discussion.

Eric then turned to the competency determination validation plan. He illustrated how to browse legacy items in the panelists' online portal. He said the "key pieces" of information were the profiles at the three legacy cuts. These profiles showed, for each legacy cut,

3. The distribution of points on multipoint items; and
4. The conditional percent correct on dichotomous items, grouped into four categories:
    a. Category 1: 0-39% ("about guessing"),
    b. Category 2: 40-59% ("a little above guessing"),
    c. Category 3: 60-74% ("this matches the 2/3rds -this gives us an idea of what students at this level know and are able to do"), and
    d. Category 4: 75%+

Eric explained that the goal was to have panelists take the items in this third category and have them build a description of what these students know and can do. They were to do this for the legacy achievement levels: "needs improvement," "proficient," and "advanced."

Eric said to aim for about five statements per level; he clarified that panelists are not to look at or draw on the legacy ALDs for this task.
The next question for the CD group would be to answer, for each legacy borderline ALD that they crafted, what raw score in the NextGen assessment best describes that legacy borderline ALD? At that point, Eric explained, panelists will review a range of profiles (each conditional on a different raw score) to answer that question. Eric instructed facilitators to have panelists start in the middle of the profiles group, then work up or down.
Eric then reviewed the judgment form with the debrief group, and the group then discussed whether to plan to have a second round. The consensus was to look at the spread of panelist judgments and decide.
Concerning the legacy profiles, Eric drew particular attention to the profile for the Biology "needs improvement" level, as there was only one dichotomous item in category 3, and none in category 4. Eric said that in this case, to instruct panelists to look at the category 2 items that assess more or less the same content as the item in category 3 and to craft a statement about "emerging understanding" at the Biology "needs improvement" level.

Day 4: Friday, August 12, 2022.

Attendees: Michol Stapel, Eric Moyer, process facilitators, content facilitators, observers, and all panelists.
On Day 4, three groups worked simultaneously: the Biology competency determinations (CD) group, the Introductory Physics CD group, and the articulations group. There were 11, 12, and 15 panelists in these groups, respectively. In the articulations group, there were seven Introductory Physics and eight Biology panelists.
The process in the CD groups proceeded as planned. Notably, the Biology CD group dealt effectively with the most challenging profile ("needs improvement" for the Biology legacy assessment). The group reviewed the category 3 items with the highest conditional p-values to develop a description of the "emerging" knowledge and skills of the borderline "needs improvement" student. By 11 AM, both CD groups were well into describing the borderline "advanced" student.
Eric facilitated the articulations group process by first asking panelists to consider what they would expect in terms of general patterns from 8th-grade science to high school Biology or Physics, and across the two content areas in high school. Eric provided the interquartile ranges (IQRs) of the standard setting judgments for each of the cuts to panelists, indicating that these ranges represented the leeway that panelists had to adjust cuts. They were not allowed to adjust any cut, however, without the approval of the panelists from that content area. The articulation group ultimately adjusted cuts mostly downward to align with their general expectations about how students would be doing statewide. Two of these expectations, for example, were that approximately 50% of students would be at "meets expectations" or above in high school, and about 10% would be in "exceeds expectations." Panelists adjusted four cut scores to reflect this, three down and one up. These changes were all within the IQRs.
In the Introductory Physics CD room, a panelist voiced a concern, after completing the needs improvement CD judgment, that the task was challenging because no Next

Generation test profile corresponded to the group's borderline ALD for the (legacy test) "needs improvement" level. The panelist said she was very unsure of her recommendation. Another did not feel so strongly but felt the methodology was "a little hand-wavy."

Eric intervened, emphasizing that there would be no one-to-one mapping, and acknowledged how difficult the task was. A third panelist expressed similar frustration and proposed they discuss the matter as a group. (Up to this point, panelists had been working individually.) Eric agreed that they could discuss their process with their table colleagues but to refrain from sharing specific raw score judgments. This change in the process was to help them complete the task. Eric had a similar discussion with the Biology CD group after panelists in this group expressed similar concerns.

Both CD groups were shown the distribution of their raw score judgments. They were asked if they'd like an additional round of judgments. Nobody said they'd move their judgments for reasons other than to reach more agreement with their peers, so there was no extra round.

The final meeting of the day, which began at 2:30 PM, involved half the Introductory Physics CD group and half the Biology CD group. Eric asked them what they expected to see in the impact data if they had Biology and Introductory Physics next to each other. One panelist said he'd expect the distributions to be similar. Another echoed this idea. Eric showed the impact data on the matched data, with cuts based on the CD validation activity. He asked the group if they were OK with forwarding the recommended cuts to DESE. The panelists said yes.

Conclusion

The Massachusetts Department of Elementary and Secondary Education (DESE), with the assistance of Pearson and Cognia, held a standard-setting meeting on August 9-12, 2022, in Wakefield, MA. The purpose of the meeting was to establish cut scores for the Massachusetts Comprehensive Assessment System (MCAS) Next Generation tests for High School Biology and Introductory Physics (collectively, "high school science"). The meeting included vertical articulation (from 8th-grade science to high school science) and horizontal articulation (between the high school science subjects) components. In addition, the meeting included a scale anchoring procedure to translate the competency determination (CD) cuts from the MCAS legacy assessments in high school science to the Next Generation assessments.

Pearson designed a workshop in which it would implement the Extended Modified Yes/No Angoff method (Davis & Moyer, 2015; Plake, Ferdous, Impara, & Buckendahl, 2005) to recommend achievement level cut scores for each assessment to distinguish students into four levels. Consistent with Pearson's plan for the workshop, the standard setting included content experts, principally high school teachers, from across the state. The workshop ran over four days. As planned, the panelists experienced the test, reviewed standards and achievement level descriptions (ALDs), defined borderline expectations, made item judgments over three rounds, and participated in articulation and competency determination meetings.

My observations confirm that Pearson and Cognia followed through on their plan. Consistent with generally accepted guidelines for conducting standard settings, the two organizations implemented a defensible process whereby suitably qualified individuals can bring their expertise to operationalizing expectations expressed in ALDs. Thus, the results of this standard-setting meeting should be accepted as the informed and considered judgment of Massachusetts educators as to the Next Generation MCAS Biology and Introductory Physics assessment cut scores and competency determinations.

Implications for Standard Setting Practice

Two aspects of this standard-setting meeting have, in my opinion, implications for future standard-setting practice. Neither of these implications should be construed as reasons for modifying or second-guessing the results of the process I observed.

5. Item-by-item standard setting methods, including the Extended Modified Yes/No Angoff method (Davis & Moyer, 2015; Plake, Ferdous, Impara, & Buckendahl, 2005), fail to accommodate some legitimate formulations of borderline ALDs. The prime example I observed in this standard-setting implementation was the borderline ALD component referencing body systems for the Biology “partially meets expectations” level. As explained in my observation report, the borderline ALD for this level asserted that the borderline student would know about only one such system. The borderline ALD did not (and need not) specify the system. However, this lack of specification implies that items addressing body systems should be considered as a group. As discussed in my notes, the group found a defensible workaround, the result of which is the same as if the items had been considered as a group. But a more robust standard-setting methodology would allow panelists to render their judgments without such ad hoc considerations.

6. How panelists should take “guessing” into account in making judgments on multiple-choice questions is an unresolved issue in standard-setting practice. The Pearson/Cognia implementation of the MCAS Next Generation high school science assessments assumes that panelists consider guessing when they make their judgments. However, it is not impossible for panelists taking guessing into account, appropriately and consistently, to make judgments that result in cut scores outside of reasonable boundaries – for example, below the guessing level of a test or at or near the ceiling. Both occurred in Biology at Round 1. Pearson did the reasonable thing and communicated the consequences of such “extreme” judgments to panelists. But this begs the question: What if panelists are correct in their “extreme” judgments? What if the test does not span the range it should, at least concerning the ALDs? This potential disconnect between ALDs and the range of the test should be avoided in a more systematic manner, but it is not clear how to do so.

References

Davis, L. L. & Moyer, E. L. (2015). PARCC performance level setting technical report. Available from Partnership for Assessment of Readiness for College and Careers (PARCC), Washington, D.C.

Fitzpatrick, A. R. (1989). Social influences in standard setting: The effects of social interaction on group judgments. *Review of Educational Research*, *59*(3), 315-328.

Plake, B.S., & Cizek, G. J. (2012). Variations on a Theme. In G.J. Cizek (Ed.), Setting performance standards (2nd ed.). New York: Routledge.

Plake, B. S., Ferdous, A. A., Impara, J. C., & Buckendahl, C. W. (2005). *Setting Multiple Performance Standards Using the Yes/No Method: An Alternative Item Mapping Method.* Meeting of the National Council on Measurement in Education. Montreal, Canada.

Center for Assessment

Observation of the MCAS Biology and Introductory Physics Standard Setting

This report was prepared for the Massachusetts Department of Elementary and Secondary Education (DESE) by Will Lorié, Ph.D., Senior Associate at the National Center for the Improvement of Educational Assessment (Center for Assessment). For any questions related to this report, please contact him at wlorie@nciea.org.

APPENDIX N

CLASSICAL RELIABILITY AND SEM

Table N-1. Subgroup Reliabilities—ELA

Grade	Subgroup	Number of Students	Raw Score Maximum	Raw Score Mean	Raw Score Standard Deviation	Alpha	SEM
3	All Students	62,665	44	24.72	9.07	0.91	2.77
	EL/FEL	12,663	44	20.02	8.76	0.89	2.88
	Low Income	28,136	44	21.33	8.44	0.88	2.86
	African American/Black	5,593	44	21.76	8.49	0.89	2.86
	Asian	4,863	44	28.69	7.84	0.88	2.75
	Hispanic/Latino	14,052	44	20.37	8.56	0.89	2.87
	Native American	132	44	21.69	8.95	0.90	2.78
	White	34,072	44	26.98	7.72	0.87	2.73
	Pacific Islander/Hawaiian	55	44	24.09	8.38	0.88	2.87
	Multi-Race; Non-Hispanic/Latino	2,881	44	26.96	8.34	0.89	2.74
	Male	31,002	44	24.52	8.47	0.89	2.76
	Female	30,647	44	25.72	8.67	0.90	2.81
	Title 1	33,566	44	22.46	8.60	0.89	2.84
	English Learner	9,301	44	17.44	7.65	0.86	2.89
	Former EL	3,363	44	27.15	7.62	0.87	2.78
	SWD	10,472	44	18.81	8.21	0.88	2.85
	Plan504	2,601	44	25.54	7.57	0.87	2.75
4	All Students	62,994	44	24.92	9.08	0.89	2.95
	EL/FEL	12,242	44	20.35	8.50	0.87	3.03
	Low Income	28,222	44	21.48	8.23	0.87	3.02
	African American/Black	5,608	44	21.80	8.35	0.87	3.02
	Asian	4,838	44	28.93	7.77	0.86	2.90
	Hispanic/Latino	14,071	44	20.68	8.37	0.87	3.02
	Native American	121	44	22.38	8.72	0.88	3.01
	White	34,462	44	27.08	7.94	0.87	2.91
	Pacific Islander/Hawaiian	38	44	25.95	9.38	0.91	2.88
	Multi-Race; Non-Hispanic/Latino	2,926	44	27.07	8.55	0.88	2.92
	Male	31,405	44	24.52	8.51	0.88	2.93
	Female	30,655	44	26.06	8.68	0.88	2.97
	Title 1	32,793	44	22.70	8.50	0.88	3.00
	English Learner	7,961	44	16.87	7.03	0.82	3.01
	Former EL	4,281	44	26.83	7.11	0.82	2.99
	SWD	11,024	44	18.65	7.82	0.86	2.96
	Plan504	3,254	44	25.56	7.71	0.86	2.93
5	All Students	64,521	48	28.69	10.05	0.92	2.92
	EL/FEL	12,186	48	23.76	10.13	0.91	2.99
	Low Income	28,732	48	24.95	9.55	0.90	2.96
	African American/Black	5,748	48	25.44	9.66	0.91	2.98

continued

Grade	Subgroup	Number of Students	Raw Score Maximum	Raw Score Mean	Raw Score Standard Deviation	Alpha	SEM
5	Asian	4,745	48	33.52	8.62	0.89	2.87
	Hispanic/Latino	14,393	48	24.14	9.81	0.91	2.97
	Native American	151	48	25.82	9.32	0.90	2.92
	White	35,603	48	30.97	8.51	0.89	2.88
	Pacific Islander/Hawaiian	66	48	28.73	9.96	0.91	2.92
	Multi-Race; Non-Hispanic/Latino	2,916	48	30.63	9.41	0.90	2.91
	Male	32,322	48	28.29	9.53	0.91	2.89
	Female	31,292	48	29.89	9.48	0.90	2.96
	Title 1	30,145	48	26.00	9.70	0.91	2.96
	English Learner	6,093	48	17.60	8.25	0.87	2.95
	Former EL	6,093	48	29.92	7.82	0.86	2.96
	SWD	11,583	48	21.37	9.37	0.90	2.93
	Plan504	3,962	48	29.08	8.56	0.89	2.89
6	All Students	64,771	50	27.85	10.61	0.92	3.01
	EL/FEL	11,960	50	22.16	10.19	0.91	3.09
	Low Income	28,707	50	23.79	9.85	0.90	3.07
	African American/Black	5,820	50	24.00	9.81	0.90	3.06
	Asian	4,667	50	33.44	9.37	0.90	2.89
	Hispanic/Latino	14,341	50	22.91	10.02	0.91	3.08
	Native American	127	50	26.25	10.17	0.91	3.04
	White	36,114	50	30.22	9.29	0.90	2.97
	Pacific Islander/Hawaiian	43	50	29.98	10.64	0.92	3.05
	Multi-Race; Non-Hispanic/Latino	2,784	50	29.82	10.10	0.91	2.98
	Male	32,518	50	26.95	10.17	0.91	3.03
	Female	31,344	50	29.54	10.01	0.91	2.99
	Title 1	27,145	50	24.99	10.13	0.91	3.06
	English Learner	4,649	50	14.61	7.36	0.84	2.98
	Former EL	7,311	50	26.96	8.73	0.88	3.08
	SWD	11,456	50	19.83	9.12	0.89	3.03
	Plan504	4,430	50	28.35	9.05	0.89	3.00
7	All Students	66,477	50	28.03	10.71	0.92	3.11
	EL/FEL	11,280	50	21.85	10.10	0.90	3.21
	Low Income	29,774	50	24.21	9.97	0.90	3.17
	African American/Black	6,191	50	24.81	9.90	0.90	3.17
	Asian	4,869	50	34.36	9.54	0.91	2.91
	Hispanic/Latino	14,764	50	23.49	10.18	0.90	3.18
	Native American	163	50	25.94	10.13	0.90	3.20
	White	36,637	50	30.11	9.50	0.90	3.07
	Pacific Islander/Hawaiian	72	50	28.69	9.99	0.91	3.03
	Multi-Race; Non-Hispanic/Latino	2,874	50	29.64	10.20	0.91	3.10

continued

Grade	Subgroup	Number of Students	Raw Score Maximum	Raw Score Mean	Raw Score Standard Deviation	Alpha	SEM
7	Male	33,548	50	26.68	10.19	0.91	3.13
	Female	31,937	50	30.19	10.06	0.91	3.07
	Title 1	27,667	50	25.27	10.22	0.90	3.16
	English Learner	4,474	50	14.65	7.20	0.82	3.03
	Former EL	6,806	50	26.58	8.86	0.87	3.18
	SWD	11,595	50	19.82	8.92	0.88	3.10
	Plan504	4,752	50	28.27	9.26	0.89	3.11
8	All Students	68,852	50	31.57	10.52	0.92	3.04
	EL/FEL	10,541	50	24.42	10.52	0.91	3.19
	Low Income	30,409	50	27.94	10.16	0.91	3.13
	African American/Black	6,360	50	28.78	9.81	0.90	3.10
	Asian	5,054	50	37.48	8.36	0.89	2.77
	Hispanic/Latino	15,198	50	27.21	10.54	0.91	3.15
	Native American	148	50	29.48	10.03	0.91	3.09
	White	38,422	50	33.64	8.98	0.89	2.97
	Pacific Islander/Hawaiian	57	50	32.04	10.09	0.91	2.98
	Multi-Race; Non-Hispanic/Latino	2,671	50	32.94	9.71	0.90	3.03
	Male	34,627	50	30.31	10.13	0.91	3.07
	Female	33,190	50	33.74	9.40	0.90	2.96
	Title 1	27,437	50	28.99	10.20	0.91	3.11
	English Learner	4,709	50	17.31	8.45	0.87	3.10
	Former EL	5,832	50	30.17	8.27	0.86	3.08
	SWD	11,533	50	23.36	9.48	0.89	3.13
	Plan504	5,327	50	31.86	8.88	0.89	3.00
10	All Students	66,627	51	35.74	10.56	0.92	3.03
	EL/FEL	7,223	51	24.78	11.55	0.91	3.43
	Low Income	27,211	51	32.10	10.50	0.90	3.25
	African American/Black	5,917	51	32.90	9.83	0.89	3.20
	Asian	4,649	51	40.64	7.83	0.89	2.62
	Hispanic/Latino	14,123	51	30.83	11.27	0.91	3.30
	Native American	131	51	35.11	9.81	0.90	3.07
	White	38,248	51	38.33	7.90	0.87	2.87
	Pacific Islander/Hawaiian	50	51	34.86	10.67	0.91	3.13
	Multi-Race; Non-Hispanic/Latino	2,386	51	37.60	9.04	0.89	2.95
	Male	33,158	51	34.80	9.82	0.90	3.10
	Female	32,138	51	37.92	9.03	0.90	2.89
	Title 1	22,524	51	33.02	10.33	0.90	3.20
	English Learner	4,408	51	18.83	9.33	0.87	3.30
	Former EL	2,815	51	34.11	7.96	0.84	3.17
	SWD	10,056	51	28.62	9.76	0.89	3.30
	Plan504	5,530	51	37.00	8.10	0.86	2.98

Note that Form 1, predominantly given to students with the text-to-speech special access accommodation, is excluded from these results.

Table N-2. Subgroup Reliabilities—Mathematics

Grade	Subgroup	Number of Students	Raw Score Maximum	Raw Score Mean	Raw Score Standard Deviation	Alpha	SEM
3	All Students	54,427	48	27.12	11.47	0.93	3.06
	EL/FEL	7,345	48	24.49	11.62	0.93	3.09
	Low Income	21,863	48	22.54	10.61	0.91	3.12
	African American/Black	4,652	48	21.89	10.65	0.91	3.11
	Asian	4,486	48	34.32	9.72	0.92	2.81
	Hispanic/Latino	9,914	48	21.92	10.59	0.91	3.11
	Native American	104	48	23.87	11.24	0.92	3.10
	White	31,508	48	29.22	10.11	0.91	3.04
	Pacific Islander/Hawaiian	51	48	25.80	10.79	0.92	3.07
	Multi-Race; Non-Hispanic/Latino	2,698	48	28.84	11.47	0.93	3.03
	Male	26,567	48	28.52	11.02	0.92	3.04
	Female	26,854	48	26.73	10.84	0.92	3.08
	Title 1	27,052	48	24.25	10.86	0.92	3.11
	English Learner	4,081	48	20.55	10.59	0.91	3.10
	Former EL	3,264	48	29.41	10.96	0.92	3.01
	SWD	6,602	48	20.57	11.11	0.92	3.10
	Plan504	2,404	48	26.54	10.39	0.91	3.10
4	All Students	54,467	54	30.72	13.02	0.93	3.35
	EL/FEL	7,280	54	27.92	13.03	0.93	3.39
	Low Income	21,955	54	25.36	12.03	0.92	3.39
	African American/Black	4,637	54	24.14	12.03	0.92	3.37
	Asian	4,428	54	38.85	11.09	0.92	3.06
	Hispanic/Latino	10,070	54	24.88	12.09	0.92	3.40
	Native American	98	54	27.48	12.36	0.92	3.41
	White	31,551	54	33.16	11.51	0.92	3.29
	Pacific Islander/Hawaiian	36	54	30.31	11.99	0.93	3.20
	Multi-Race; Non-Hispanic/Latino	2,714	54	32.46	12.94	0.93	3.31
	Male	26,677	54	32.33	12.64	0.93	3.32
	Female	26,853	54	30.16	12.26	0.93	3.36
	Title 1	26,577	54	27.27	12.31	0.92	3.38
	English Learner	3,263	54	21.53	11.88	0.92	3.34
	Former EL	4,017	54	33.10	11.54	0.92	3.28
	SWD	6,428	54	22.47	12.80	0.93	3.37
	Plan504	3,027	54	30.26	11.95	0.92	3.36
5	All Students	56,517	54	28.99	12.80	0.93	3.39
	EL/FEL	8,047	54	25.10	12.17	0.92	3.42
	Low Income	23,061	54	23.26	11.06	0.91	3.39
	African American/Black	4,852	54	22.66	10.93	0.90	3.39
	Asian	4,415	54	38.18	11.69	0.93	3.16

continued

Grade	Subgroup	Number of Students	Raw Score Maximum	Raw Score Mean	Raw Score Standard Deviation	Alpha	SEM
5	Hispanic/Latino	10,825	54	22.64	10.99	0.91	3.38
	Native American	121	54	24.88	11.29	0.90	3.49
	White	32,631	54	31.46	11.53	0.92	3.36
	Pacific Islander/Hawaiian	60	54	28.25	14.40	0.95	3.31
	Multi-Race; Non-Hispanic/Latino	2,698	54	30.60	12.97	0.93	3.40
	Male	27,905	54	29.96	12.68	0.93	3.39
	Female	27,688	54	28.93	12.03	0.92	3.40
	Title 1	24,715	54	24.70	11.50	0.91	3.40
	English Learner	2,487	54	17.59	9.52	0.88	3.28
	Former EL	5,560	54	28.47	11.72	0.92	3.39
	SWD	6,579	54	20.98	11.45	0.91	3.37
	Plan504	3,705	54	27.92	11.88	0.92	3.40
6	All Students	57,815	54	26.85	12.75	0.93	3.40
	EL/FEL	8,529	54	22.18	12.10	0.92	3.32
	Low Income	23,771	54	21.20	10.91	0.91	3.27
	African American/Black	5,020	54	20.29	10.82	0.91	3.24
	Asian	4,406	54	37.28	12.24	0.93	3.26
	Hispanic/Latino	11,410	54	20.54	10.80	0.91	3.25
	Native American	113	54	24.11	12.07	0.92	3.34
	White	33,354	54	29.19	11.48	0.91	3.41
	Pacific Islander/Hawaiian	36	54	31.67	13.26	0.94	3.29
	Multi-Race; Non-Hispanic/Latino-Race	2,589	54	28.56	13.05	0.93	3.42
	Male	28,568	54	27.65	12.58	0.93	3.41
	Female	28,322	54	26.86	12.22	0.92	3.41
	Title 1	23,068	54	22.58	11.34	0.91	3.31
	English Learner	2,068	54	13.85	9.12	0.90	2.95
	Former EL	6,461	54	24.84	11.72	0.92	3.35
	SWD	6,918	54	18.11	10.86	0.91	3.19
	Plan504	4,191	54	25.69	11.42	0.91	3.38
7	All Students	60,204	54	23.36	13.07	0.93	3.50
	EL/FEL	8,309	54	17.66	11.32	0.91	3.34
	Low Income	25,311	54	17.68	10.34	0.90	3.31
	African American/Black	5,401	54	17.19	10.19	0.89	3.31
	Asian	4,645	54	35.07	13.73	0.94	3.37
	Hispanic/Latino	12,157	54	17.04	10.20	0.90	3.29
	Native American	141	54	20.94	12.53	0.93	3.40
	White	34,238	54	25.49	12.19	0.92	3.51
	Pacific Islander/Hawaiian	64	54	21.80	11.47	0.91	3.43
	Multi-Race; Non-Hispanic/Latino	2,651	54	24.87	13.63	0.93	3.54
	Male	30,030	54	24.24	13.05	0.93	3.49

continued

Grade	Subgroup	Number of Students	Raw Score Maximum	Raw Score Mean	Raw Score Standard Deviation	Alpha	SEM
7	Female	29,193	54	23.15	12.62	0.92	3.53
	Title 1	24,054	54	19.00	11.11	0.91	3.38
	English Learner	2,209	54	11.67	8.44	0.88	2.90
	Former EL	6,099	54	19.83	11.44	0.91	3.41
	SWD	7,459	54	15.10	10.08	0.90	3.14
	Plan504	4,553	54	22.26	11.73	0.91	3.44
8	All Students	63,247	54	27.70	13.60	0.93	3.56
	EL/FEL	7,660	54	20.76	11.99	0.92	3.41
	Low Income	26,340	54	21.99	11.73	0.91	3.45
	African American/Black	5,587	54	21.66	11.55	0.91	3.43
	Asian	4,787	54	39.21	12.53	0.93	3.33
	Hispanic	12,756	54	21.49	11.74	0.91	3.43
	Native American	130	54	26.58	12.33	0.92	3.59
	White	36,459	54	29.93	12.50	0.92	3.57
	Pacific Islander/Hawaiian	54	54	27.85	11.44	0.90	3.56
	Multi-Race; Non-Hispanic/Latino	2,507	54	28.78	13.99	0.93	3.59
	Male	31,342	54	28.15	13.58	0.93	3.59
	Female	30,843	54	28.08	12.95	0.92	3.55
	Title 1	24,126	54	23.55	12.23	0.92	3.49
	English Learner	2,415	54	14.34	9.43	0.89	3.08
	Former EL	5,245	54	23.71	11.88	0.91	3.48
	SWD	8,032	54	17.71	10.86	0.91	3.30
	Plan504	5,136	54	26.40	12.33	0.92	3.56
10	All Students	63,457	60	31.08	15.36	0.94	3.72
	EL/FEL	5,218	60	19.88	12.80	0.92	3.54
	Low Income	24,738	60	24.33	13.22	0.92	3.70
	African American/Black	5,641	60	23.01	12.74	0.92	3.66
	Asian	4,553	60	42.95	14.38	0.94	3.38
	Hispanic/Latino	12,067	60	23.51	12.97	0.92	3.68
	Native American	128	60	27.40	14.59	0.93	3.72
	White	37,526	60	34.12	13.97	0.93	3.69
	Pacific Islander/Hawaiian	47	60	31.19	16.13	0.95	3.74
	Multi-Race; Non-Hispanic/Latino	2,358	60	32.67	15.96	0.95	3.71
	Male	31,378	60	32.01	15.14	0.94	3.72
	Female	30,735	60	31.21	14.69	0.94	3.73
	Title 1	20,516	60	25.87	13.68	0.93	3.71
	English Learner	2,665	60	14.41	9.31	0.88	3.19
	Former EL	2,553	60	25.60	13.44	0.92	3.69
	SWD	8,981	60	19.52	11.78	0.91	3.52
	Plan504	5,382	60	31.14	13.94	0.93	3.73

Note that Form 1, predominantly given to students with the text-to-speech special access accommodation, is excluded from these results.

Table N-3. Subgroup Reliabilities—STE

Grade	Subgroup	Number of Students	Raw Score Maximum	Raw Score Mean	Raw Score Standard Deviation	Alpha	SEM
5	All Students	52,104	54	31.21	10.99	0.92	3.14
	EL/FEL	7,216	54	27.49	10.09	0.90	3.24
	Low Income	20,529	54	27.48	9.61	0.89	3.25
	African American/Black	4,343	54	26.39	9.56	0.88	3.26
	Asian	4,033	54	36.54	8.95	0.88	3.04
	Hispanic/Latino	9,528	54	26.85	9.70	0.89	3.25
	Native American	109	54	27.61	10.02	0.90	3.23
	White	30,071	54	33.97	8.82	0.87	3.13
	Pacific Islander/Hawaiian	54	54	30.93	11.86	0.93	3.18
	Multi-Race; Non-Hispanic/Latino	2,402	54	33.37	9.98	0.90	3.13
	Male	25,301	54	32.55	9.89	0.90	3.14
	Female	25,231	54	31.71	9.60	0.89	3.19
	Title 1	21,626	54	28.55	9.72	0.89	3.23
	English Learner	2,232	54	20.22	8.66	0.86	3.19
	Former EL	4,984	54	30.75	8.92	0.87	3.23
	SWD	6,058	54	25.67	10.36	0.90	3.21
	Plan504	3,413	54	31.92	9.55	0.89	3.17
8	All Students	59,318	54	27.71	11.87	0.92	3.29
	EL/FEL	6,842	54	21.39	9.79	0.88	3.34
	Low Income	23,534	54	23.97	9.89	0.88	3.36
	African American/Black	4,951	54	23.24	9.51	0.87	3.37
	Asian	4,417	54	35.47	9.70	0.89	3.16
	Hispanic/Latino	11,300	54	23.10	9.93	0.89	3.35
	Native American	122	54	26.42	10.55	0.90	3.31
	White	33,523	54	30.90	9.77	0.89	3.30
	Pacific Islander/Hawaiian	48	54	29.21	9.51	0.88	3.31
	Multi-Race; Non-Hispanic/Latino	2,259	54	29.70	11.02	0.91	3.30
	Male	28,505	54	29.19	10.89	0.91	3.29
	Female	28,021	54	28.74	10.25	0.89	3.36
	Title 1	21,309	54	24.96	10.13	0.89	3.36
	English Learner	2,152	54	14.95	7.86	0.84	3.11
	Former EL	4,690	54	24.35	9.15	0.86	3.38
	SWD	7,433	54	21.13	9.99	0.89	3.30
	Plan504	4,705	54	28.71	10.13	0.89	3.33

Note that Form 1, predominantly given to students with the text-to-speech special access accommodation, is excluded from these results.

Table N-4. Subgroup Reliabilities—Biology

Grade	Subgroup	Number of Students	Raw Score Maximum	Raw Score Mean	Raw Score Standard Deviation	Alpha	SEM
HS	All Students	52,389	60	31.99	13.54	0.93	3.55
	EL/FEL	5,503	60	21.97	11.22	0.90	3.52
	Low Income	22,437	60	26.80	11.75	0.91	3.58
	African American/Black	4,619	60	26.48	11.53	0.90	3.59
	Asian	3,801	60	40.28	12.93	0.93	3.34
	Hispanic/Latino	11,126	60	25.76	11.74	0.91	3.57
	Native American	133	60	28.73	11.96	0.91	3.56
	White	29,604	60	35.17	11.93	0.91	3.51
	Pacific Islander/Hawaiian	57	60	31.30	13.32	0.93	3.52
	Multi-Race; Non-Hispanic/Latino	1,950	60	34.05	13.28	0.93	3.55
	Male	25,582	60	32.53	13.07	0.93	3.56
	Female	25,532	60	32.75	12.65	0.92	3.57
	Title 1	18,589	60	28.23	12.05	0.91	3.58
	English Learner	2,905	60	16.66	8.32	0.84	3.31
	Former EL	2,598	60	27.92	11.06	0.90	3.58
	SWD	7,029	60	24.15	11.19	0.90	3.54
	Plan504	4,381	60	32.75	11.96	0.91	3.55

Note that Form 1, predominantly given to students with the text-to-speech special access accommodation, is excluded from these results.

Table N-5. Subgroup Reliabilities—Introductory Physics

Grade	Subgroup	Number of Students	Raw Score Maximum	Raw Score Mean	Raw Score Standard Deviation	Alpha	SEM
HS	All Students	12,903	60	34.83	12.64	0.92	3.48
	EL/FEL	1,282	60	26.09	11.70	0.91	3.51
	Low Income	4,778	60	27.96	11.17	0.90	3.52
	African American/Black	1,305	60	26.97	10.70	0.89	3.53
	Asian	1,068	60	44.35	10.74	0.91	3.15
	Hispanic/Latino	2,414	60	27.72	11.12	0.90	3.50
	Native American	21	60	26.19	8.52	0.85	3.31
	White	7,494	60	37.07	11.64	0.91	3.43
	Pacific Islander/Hawaiian	10	60	27.20	9.01	0.86	3.34
	Multi-Race; Non-Hispanic/Latino	564	60	37.62	13.51	0.94	3.41
	Male	6,591	60	35.43	12.70	0.93	3.46
	Female	6,230	60	34.29	12.40	0.92	3.51
	Title 1	3,502	60	27.59	10.75	0.89	3.49
	English Learner	559	60	21.29	10.06	0.88	3.42
	Former EL	723	60	29.80	11.52	0.91	3.50
	SWD	1,721	60	25.82	11.00	0.90	3.47
	Plan504	1,048	60	34.14	11.56	0.91	3.48

Note that Form 1, predominantly given to students with the text-to-speech special access accommodation, is excluded from these results.

Table N-6. Subgroup Reliabilities—Alt/ELA

Grade	Subgroup	Number of Students	Raw Score			Alpha	SEM
			Maximum	Mean	Standard Deviation		
3	All Students	871	39	27.93	3.78	0.64	2.27
	EL/FEL	198	39	28.66	3.66	0.64	2.19
	Low Income	643	39	28.04	3.74	0.66	2.18
	African American/Black	115	39	27.89	3.90	0.72	2.06
	Asian	79	39	28.38	3.64	0.55	2.44
	Hispanic/Latino	260	39	28.15	3.61	0.60	2.28
	Native American	0	--	--	--	--	--
	White	367	39	27.71	3.83	0.65	2.27
	Pacific Islander/Hawaiian	1	--	----	--	--	--
	Multi-Race; Non-Hispanic/Latino	49	39	27.76	4.24	0.65	2.52
	Male	614	39	27.82	3.78	0.64	2.26
	Female	257	39	28.19	3.78	0.64	2.28
	Title 1	512	39	28.20	3.73	0.64	2.24
	English Learner	174	39	28.56	3.75	0.65	2.23
	Former EL	24	39	29.42	2.83	0.59	1.81
	SWD	870	39	27.93	3.78	0.64	2.26
	Plan504	5	--	--	--	--	--
4	All Students	836	39	28.28	3.72	0.63	2.27
	EL/FEL	174	39	28.82	3.59	0.71	1.94
	Low Income	614	39	28.32	3.70	0.65	2.18
	African American/Black	146	39	28.21	3.81	0.65	2.24
	Asian	49	39	27.29	4.22	0.52	2.92
	Hispanic/Latino	249	39	28.68	3.43	0.64	2.05
	Native American	2	--	--	--	--	--
	White	347	39	28.14	3.80	0.64	2.27
	Pacific Islander/Hawaiian	0	--	--	--	--	--
	Multi-Race; Non-Hispanic/Latino	42	39	28.29	3.83	0.41	2.93
	Male	604	39	28.12	3.81	0.66	2.23
	Female	232	39	28.68	3.47	0.54	2.35
	Title 1	484	39	28.59	3.59	0.59	2.30
	English Learner	151	39	28.90	3.60	0.73	1.86
	Former EL	23	39	28.30	3.53	0.56	2.35
	SWD	834	39	28.28	3.73	0.63	2.27
	Plan504	4	--	--	--	--	--
5	All Students	759	39	28.31	3.74	0.67	2.14
	EL/FEL	144	39	28.22	4.10	0.67	2.37
	Low Income	530	39	28.18	3.83	0.67	2.18
	African American/Black	108	39	28.54	3.35	0.70	1.82
	Asian	62	39	28.08	3.92	0.69	2.19
	Hispanic/Latino	212	39	28.48	3.87	0.66	2.26
	Native American	2	--	--	--	--	--
	White	347	39	28.17	3.75	0.68	2.14
	Pacific Islander/Hawaiian	2	--	--	--	--	--
	Multi-Race; Non-Hispanic/Latino	26	39	28.92	3.38	0.50	2.40
	Male	512	39	28.22	3.69	0.67	2.12
	Female	247	39	28.50	3.84	0.68	2.16
	Title 1	377	39	28.63	3.65	0.66	2.13
	English Learner	130	39	28.28	4.07	0.66	2.37
	Former EL	14	39	27.64	4.48	0.72	2.37
	SWD	758	39	28.31	3.74	0.67	2.13
	Plan504	4	--	--	--	--	--
6	All Students	742	39	28.26	3.69	0.64	2.21
	EL/FEL	151	39	28.94	3.49	0.63	2.11

continued

Grade	Subgroup	Number of Students	Raw Score Maximum	Raw Score Mean	Raw Score Standard Deviation	Alpha	SEM
6	Low Income	534	39	28.29	3.72	0.65	2.20
	African American/Black	115	39	28.31	3.17	0.47	2.30
	Asian	41	39	27.95	3.54	0.48	2.57
	Hispanic/Latino	213	39	28.59	3.77	0.66	2.21
	Native American	2	--	--	--	--	--
	White	334	39	28.03	3.84	0.69	2.12
	Pacific Islander/Hawaiian	1	--	--	--	--	--
	Multi-Race; Non-Hispanic/Latino	35	39	28.89	3.35	0.54	2.27
	Male	524	39	28.15	3.64	0.63	2.20
	Female	218	39	28.53	3.81	0.66	2.21
	Title 1	342	39	28.77	3.44	0.65	2.05
	English Learner	134	39	29.14	3.20	0.64	1.93
	Former EL	17	39	27.41	5.09	0.63	3.10
	SWD	736	39	28.27	3.69	0.64	2.20
	Plan504	5	--	--	--	--	--
7	All Students	733	39	28.20	3.89	0.63	2.38
	EL/FEL	138	39	28.71	3.98	0.64	2.39
	Low Income	527	39	28.28	3.86	0.65	2.28
	African American/Black	124	39	28.87	3.66	0.73	1.90
	Asian	55	39	27.85	3.92	0.51	2.76
	Hispanic/Latino	211	39	28.38	4.06	0.65	2.41
	Native American	0	--	--	--	--	--
	White	310	39	27.94	3.84	0.58	2.49
	Pacific Islander/Hawaiian	0	--	--	--	--	--
	Multi-Race; Non-Hispanic/Latino	33	39	27.45	3.87	0.59	2.48
	Male	508	39	28.05	3.92	0.59	2.50
	Female	224	39	28.52	3.82	0.69	2.13
	Title 1	325	39	28.66	3.85	0.62	2.38
	English Learner	123	39	28.87	3.95	0.65	2.33
	Former EL	15	39	27.47	4.19	0.49	2.99
	SWD	731	39	28.21	3.87	0.63	2.37
	Plan504	5	--	--	--	--	--
8	All Students	757	39	28.43	3.58	0.68	2.01
	EL/FEL	146	39	29.30	3.26	0.65	1.93
	Low Income	544	39	28.48	3.58	0.72	1.90
	African American/Black	104	39	28.99	3.04	0.56	2.03
	Asian	42	39	29.10	3.05	0.56	2.02
	Hispanic/Latino	237	39	28.83	3.57	0.71	1.92
	Native American	4	--	--	--	--	--
	White	344	39	27.83	3.75	0.70	2.05
	Pacific Islander/Hawaiian	0	--	--	--	--	--
	Multi-Race; Non-Hispanic/Latino	26	39	29.00	3.29	0.38	2.58
	Male	518	39	28.43	3.49	0.69	1.95
	Female	239	39	28.42	3.76	0.67	2.16
	Title 1	337	39	28.93	3.45	0.59	2.20
	English Learner	129	39	29.18	3.36	0.66	1.97

continued

Grade	Subgroup	Number of Students	Raw Score			Alpha	SEM
			Maximum	Mean	Standard Deviation		
8	Former EL	17	39	30.18	2.27	0.38	1.79
	SWD	754	39	28.42	3.58	0.68	2.02
	Plan504	6	--	--	--	--	--
10	All Students	739	39	28.25	4.05	0.65	2.41
	EL/FEL	90	39	29.80	3.60	0.69	2.00
	Low Income	479	39	28.28	4.15	0.68	2.35
	African American/Black	108	39	28.37	4.58	0.73	2.39
	Asian	53	39	28.19	3.73	0.59	2.38
	Hispanic/Latino	184	39	29.13	3.65	0.60	2.31
	Native American	3	--	--	--	--	--
	White	369	39	27.73	4.08	0.65	2.43
	Pacific Islander/Hawaiian	4	--	--	--	--	--
	Multi-Race; Non-Hispanic/Latino	18	39	29.28	3.63	0.28	3.08
	Male	493	39	28.37	4.11	0.65	2.42
	Female	246	39	28.02	3.93	0.63	2.38
	Title 1	231	39	28.47	4.53	0.66	2.63
	English Learner	83	39	29.93	3.55	0.73	1.86
	Former EL	7	--	--	--	--	--
	SWD	738	39	28.25	4.05	0.65	2.41
	Plan504	1	--	--	--	--	--

Note: No reliability or SEM values are reported for some subgroups, because there were some items for which only one student in the subgroup received a score.

Table N-7. Subgroup Reliabilities—Alt/Mathematics

Grade	Subgroup	Number of Students	Raw Score Maximum	Raw Score Mean	Raw Score Standard Deviation	Alpha	SEM
3	All Students	779	26	21.05	1.54	0.59	0.99
	EL/FEL	174	26	21.06	1.76	0.64	1.05
	Low Income	580	26	21.01	1.59	0.59	1.02
	African American/Black	102	26	21.17	1.31	0.52	0.91
	Asian	71	26	21.10	1.48	0.56	0.99
	Hispanic/Latino	241	26	21.14	1.55	0.60	0.97
	Native American	1	--	--	--	--	--
	White	321	26	20.93	1.60	0.58	1.03
	Pacific Islander/Hawaiian	2	--	--	--	--	--
	Multi-Race; Non-Hispanic/Latino	41	26	21.15	1.68	0.72	0.89
	Male	540	26	21.10	1.54	0.58	0.99
	Female	239	26	20.94	1.56	0.60	0.99
	Title 1	463	26	21.14	1.53	0.61	0.95
	English Learner	157	26	20.97	1.83	0.64	1.10
	Former EL	17	26	21.88	0.33	-0.08	0.35
	SWD	777	26	21.05	1.55	0.59	0.99
	Plan504	4	--	--	--	--	--
4	All Students	741	26	21.14	1.41	0.61	0.88
	EL/FEL	163	26	21.38	1.20	0.70	0.66
	Low Income	541	26	21.13	1.38	0.60	0.87
	African American/Black	130	26	21.19	1.43	0.59	0.91
	Asian	41	26	20.76	1.53	0.50	1.08
	Hispanic/Latino	226	26	21.13	1.44	0.65	0.85
	Native American	2	--	--	--	--	--
	White	303	26	21.17	1.40	0.62	0.86
	Pacific Islander/Hawaiian	0	--	--	--	--	--
	Multi-Race; Non-Hispanic/Latino	38	26	21.16	1.20	0.41	0.92
	Male	529	26	21.09	1.48	0.63	0.90
	Female	212	26	21.26	1.21	0.53	0.83
	Title 1	429	26	21.31	1.19	0.56	0.79
	English Learner	142	26	21.40	1.14	0.69	0.63
	Former EL	21	26	21.24	1.61	0.75	0.80
	SWD	739	26	21.15	1.41	0.61	0.88
	Plan504	6	--	--	--	--	--
5	All Students	670	26	21.08	1.51	0.65	0.90
	EL/FEL	126	26	21.24	1.40	0.70	0.77
	Low Income	474	26	21.06	1.53	0.67	0.88
	African American/Black	107	26	21.26	1.26	0.56	0.83
	Asian	52	26	21.06	1.54	0.66	0.90
	Hispanic/Latino	191	26	21.24	1.34	0.62	0.82
	Native American	2	--	--	--	--	--
	White	291	26	20.89	1.69	0.67	0.97
	Pacific Islander/Hawaiian	1	--	--	--	--	--
	Multi-Race; Non-Hispanic/Latino	26	26	21.31	1.05	0.53	0.72
	Male	445	26	21.08	1.48	0.63	0.90
	Female	225	26	21.07	1.56	0.68	0.88
	Title 1	330	26	21.32	1.30	0.66	0.76
	English Learner	117	26	21.25	1.40	0.70	0.77
	Former EL	9	--	--	--	--	--
	SWD	669	26	21.08	1.51	0.64	0.90
	Plan504	3	--	--	--	--	--
6	All Students	692	26	21.03	1.64	0.61	1.02
	EL/FEL	142	26	21.44	1.05	0.52	0.73
	Low Income	494	26	21.12	1.58	0.60	1.00
	African American/Black	107	26	21.08	1.46	0.56	0.97
	Asian	37	26	21.51	0.80	0.29	0.68

continued

Grade	Subgroup	Number of Students	Raw Score Maximum	Raw Score Mean	Raw Score Standard Deviation	Alpha	SEM
6	Hispanic/Latino	193	26	21.18	1.68	0.59	1.07
	Native American	2	--	--	--	--	--
	White	320	26	20.87	1.75	0.65	1.04
	Pacific Islander/Hawaiian	1	--	--	--	--	--
	Multi-Race; Non-Hispanic/Latino	31	26	21.29	1.30	0.39	1.01
	Male	484	26	21.02	1.64	0.60	1.04
	Female	208	26	21.04	1.65	0.65	0.98
	Title 1	319	26	21.30	1.30	0.63	0.79
	English Learner	127	26	21.44	1.05	0.50	0.74
	Former EL	15	26	21.40	1.12	0.70	0.61
	SWD	686	26	21.03	1.65	0.61	1.02
	Plan504	5	--	--	--	--	--
7	All Students	662	26	21.13	1.41	0.54	0.95
	EL/FEL	127	26	21.33	1.25	0.59	0.80
	Low Income	475	26	21.14	1.41	0.57	0.92
	African American/Black	112	26	21.20	1.56	0.69	0.87
	Asian	50	26	20.92	1.66	0.54	1.13
	Hispanic/Latino	193	26	21.16	1.36	0.55	0.91
	Native American	0	--	--	--	--	--
	White	279	26	21.13	1.35	0.47	0.98
	Pacific Islander/Hawaiian	0	--	--	--	--	--
	Multi-Race; Non-Hispanic/Latino	28	26	21.14	1.35	0.53	0.93
	Male	457	26	21.19	1.32	0.49	0.95
	Female	204	26	21.00	1.59	0.62	0.97
	Title 1	302	26	21.32	1.25	0.58	0.81
	English Learner	112	26	21.30	1.31	0.61	0.82
	Former EL	15	26	21.53	0.64	-0.08	0.67
	SWD	660	26	21.14	1.41	0.54	0.95
	Plan504	5	--	--	--	--	--
8	All Students	686	26	20.95	1.68	0.64	1.00
	EL/FEL	129	26	21.04	1.73	0.70	0.95
	Low Income	493	26	20.97	1.70	0.69	0.96
	African American/Black	96	26	21.07	1.46	0.54	0.99
	Asian	40	26	21.18	1.38	0.59	0.88
	Hispanic/Latino	211	26	21.09	1.59	0.68	0.90
	Native American	4	--	--	--	--	--
	White	311	26	20.78	1.80	0.65	1.06
	Pacific Islander/Hawaiian	0	--	--	--	--	--
	Multi-Race; Non-Hispanic/Latino	23	26	20.96	1.89	0.54	1.29
	Male	478	26	21.02	1.59	0.61	0.99
	Female	208	26	20.78	1.86	0.69	1.04
	Title 1	308	26	21.25	1.42	0.64	0.85
	English Learner	115	26	21.07	1.71	0.69	0.95
	Former EL	14	26	20.79	1.93	0.76	0.95
	SWD	682	26	20.95	1.67	0.64	1.00
	Plan504	5	--	--	--	--	--
10	All Students	746	39	30.16	3.76	0.79	1.72
	EL/FEL	89	39	30.84	3.50	0.83	1.43
	Low Income	479	39	30.17	3.86	0.78	1.79
	African American/Black	103	39	30.57	3.63	0.83	1.49
	Asian	51	39	30.73	3.50	0.87	1.25
	Hispanic/Latino	191	39	30.36	3.58	0.70	1.95
	Native American	3	--	--	--	--	--
	White	376	39	29.83	3.92	0.79	1.80
	Pacific Islander/Hawaiian	4	--	--	--	--	--
	Multi-Race; Non-Hispanic/Latino	18	39	30.78	3.34	0.81	1.47
	Male	501	39	30.22	3.81	0.77	1.83
	Female	245	39	30.02	3.65	0.82	1.56

continued

Grade	Subgroup	Number of Students	Raw Score Maximum	Raw Score Mean	Raw Score Standard Deviation	Alpha	SEM
10	Title 1	236	39	30.30	3.85	0.79	1.77
	English Learner	83	39	30.71	3.58	0.83	1.48
	Former EL	6	--	--	--	--	--
	SWD	745	39	30.16	3.76	0.79	1.71
	Plan504	1	--	--	--	--	--

Note: *No reliability or SEM values are reported for some subgroups, because in some cases there were some items for which only one student in the subgroup received a score, and in other cases, the sample size of the subgroup or the number of items is too small to produce meaningful calculations.*

Table N-8. Subgroup Reliabilities—Alt/STE

Grade	Subgroup	Number of Students	Raw Score Maximum	Raw Score Mean	Raw Score Standard Deviation	Alpha	SEM
5	All Students	702	39	29.81	3.60	0.76	1.77
	EL/FEL	134	39	30.51	3.17	0.72	1.66
	Low Income	493	39	29.75	3.69	0.75	1.84
	African American/Black	99	39	30.43	3.31	0.63	2.02
	Asian	62	39	29.79	3.12	0.57	2.03
	Hispanic/Latino	199	39	29.95	3.57	0.73	1.86
	Native American	1	--	--	--	--	--
	White	314	39	29.59	3.75	0.77	1.79
	Pacific Islander/Hawaiian	2	--	--	--	--	--
	Multi-Race; Non-Hispanic/Latino	25	39	29.04	3.92	--	--
	Male	475	39	29.78	3.56	0.73	1.86
	Female	227	39	29.86	3.68	0.80	1.64
	Title 1	355	39	30.05	3.45	0.73	1.81
	English Learner	125	39	30.40	3.23	0.73	1.69
	Former EL	9	--	--	--	--	--
	SWD	701	39	29.81	3.60	0.76	1.77
	Plan504	5	--	--	--	--	--
8	All Students	708	39	30.00	3.53	0.74	1.82
	EL/FEL	138	39	30.41	3.48	0.71	1.87
	Low Income	513	39	30.03	3.62	0.75	1.79
	African American/Black	95	39	30.33	3.34	0.75	1.69
	Asian	44	39	30.02	3.04	0.56	2.02
	Hispanic/Latino	220	39	30.38	3.37	0.70	1.84
	Native American	3	--	--	--	--	--
	White	319	39	29.71	3.72	0.74	1.88
	Pacific Islander/Hawaiian	0	--	--	--	--	--
	Multi-Race; Non-Hispanic/Latino	26	39	29.19	3.57	0.70	1.95
	Male	489	39	29.96	3.62	0.74	1.85
	Female	219	39	30.10	3.32	0.73	1.74
	Title 1	321	39	30.31	3.45	0.72	1.83
	English Learner	121	39	30.18	3.62	0.71	1.95
	Former EL	17	39	32.06	1.56		
	SWD	704	39	30.01	3.52	0.73	1.82
	Plan504	4	--	--	--	--	--

Table N-9. Subgroup Reliabilities—Alt/Biology

Grade	Subgroup	Number of Students	Raw Score			Alpha	SEM
			Maximum	Mean	Standard Deviation		
HS	All Students	432	39	29.85	3.65	0.69	2.02
	EL/FEL	44	39	30.02	3.53	0.71	1.89
	Low Income	260	39	29.81	3.77	0.69	2.10
	African American/Black	53	39	30.00	4.29	0.79	1.97
	Asian	26	39	30.04	3.39	0.69	1.90
	Hispanic/Latino	101	39	30.06	3.47	0.65	2.05
	Native American	1	--	--	--	--	--
	White	239	39	29.67	3.64	0.69	2.04
	Pacific Islander/Hawaiian	3	--	--	--	--	--
	Multi-Race; Non-Hispanic/Latino	9	--	--	--	--	--
	Male	289	39	29.88	3.47	0.66	2.01
	Female	143	39	29.79	3.99	0.75	1.99
	Title 1	125	39	29.98	3.95	0.64	2.36
	English Learner	40	39	29.97	3.59	0.72	1.91
	Former EL	4	--	--	--	--	--
	SWD	431	39	29.84	3.65	0.69	2.02
	Plan504	0	--	--	--	--	--

**Due to the small sample size of the subgroup and the small number of items, the calculation of coefficient alpha does not produce meaningful values.*

Table N-10. Subgroup Reliabilities—Alt/Chemistry

Grade	Subgroup	Number of Students	Raw Score			Alpha	SEM
			Maximum	Mean	Standard Deviation		
HS	All Students	122	39	31.75	2.42	0.69	1.34
	EL/FEL	24	39	32.42	1.72	0.53	1.17
	Low Income	99	39	31.66	2.62	0.73	1.37
	African American/Black	22	39	31.91	2.20	0.82	0.93
	Asian	6	--	--	--	--	--
	Hispanic/Latino	57	39	31.60	2.75	0.56	1.83
	Native American	1	--	--	--	--	--
	White	33	39	31.58	2.28	0.70	1.24
	Pacific Islander/Hawaiian	0	--	--	--	--	--
	Multi-Race; Non-Hispanic/Latino	3	--	--	--	--	--
	Male	82	39	31.74	2.41	0.62	1.49
	Female	40	39	31.75	2.46	0.78	1.16
	Title 1	73	39	31.53	2.76	0.69	1.54
	English Learner	22	39	32.41	1.79	0.60	1.14
	Former EL	2	--	--	--	--	--
	SWD	122	39	31.75	2.42	0.69	1.34
	Plan504	0	--	--	--	--	--

**Due to the small sample size of the subgroup and the small number of items, the calculation of coefficient alpha does not produce meaningful values.*

Table N-11. Subgroup Reliabilities—Alt/Introductory Physics

Grade	Subgroup	Number of Students	Raw Score			Alpha	SEM
			Maximum	Mean	Standard Deviation		
HS	All Students	73	39	28.19	4.68	0.69	2.61
	EL/FEL	7	--	--	--	--	--
	Low Income	54	39	28.09	4.69	0.65	2.79
	African American/Black	7	--	--	--	--	--
	Asian	3	--	--	--	--	--
	Hispanic/Latino	20	39	28.80	4.66	0.67	2.67
	Native American	0	--	--	--	--	--
	White	40	39	27.00	4.79	0.66	2.77
	Pacific Islander/Hawaiian	1	--	--	--	--	--
	Multi-Race; Non-Hispanic/Latino	2	--	--	--	--	--
	Male	42	39	28.17	4.87	0.72	2.59
	Female	31	39	28.23	4.48	0.73	2.32
	Title 1	16	39	31.25	2.67	0.67	1.53
	English Learner	6	--	--	--	--	--
	Former EL	1	--	--	--	--	--
	SWD	73	39	28.19	4.68	0.69	2.61
	Plan504	2	--	--	--	--	--

Table N-12. Subgroup Reliabilities—Alt/Technology/Engineering

Grade	Subgroup	Number of Students	Raw Score			Alpha	SEM
			Maximum	Mean	Standard Deviation		
HS	All Students	119	39	31.29	2.84	0.72	1.51
	EL/FEL	15	39	31.07	3.28	0.78	1.54
	Low Income	75	39	31.13	2.96	0.68	1.67
	African American/Black	14	39	30.50	4.16	0.54	2.82
	Asian	10	39	32.60	1.26	0.84	0.50
	Hispanic/Latino	28	39	31.36	2.25	0.77	1.09
	Native American	1	--	--	--	--	--
	White	60	39	31.17	3.02	0.71	1.64
	Pacific Islander/Hawaiian	0	--	--	--	--	--
	Multi-Race; Non-Hispanic/Latino	6	--	--	--	--	--
	Male	84	39	30.92	3.19	0.74	1.64
	Female	35	39	32.20	1.45	0.64	0.87
	Title 1	24	39	30.63	3.19	0.75	1.61
	English Learner	15	39	31.07	3.28	0.78	1.54
	Former EL	0	--	--	--	--	--
	SWD	119	39	31.29	2.84	0.72	1.51
	Plan504	0	--	--	--	--	--

Table N-13. Reliabilities by Reporting Category by Grade—ELA

Grade	Item Reporting Category	Number of Items	Raw Score Maximum	Raw Score Mean	Raw Score Standard Deviation	Alpha	SEM
3	RE	23	27	16.20	5.91	0.87	2.14
	LA	8	13	7.82	3.02	0.75	1.50
	WR	1	4	0.70	1.00	--	--
4	RE	22	28	17.06	5.88	0.84	2.34
	LA	9	12	6.70	2.89	0.73	1.50
	WR	1	4	1.16	1.11	--	--
5	RE	22	26	18.10	5.83	0.87	2.07
	LA	9	14	8.52	3.28	0.78	1.55
	WR	2	8	2.07	1.83	0.61	1.14
6	RE	24	27	17.26	6.40	0.88	2.18
	LA	7	13	7.51	3.24	0.75	1.64
	WR	2	10	3.09	1.89	0.82	0.81
7	RE	25	29	17.97	6.69	0.87	2.41
	LA	7	11	6.61	2.84	0.74	1.45
	WR	2	10	3.45	2.05	0.83	0.84
8	RE	24	28	19.85	6.01	0.88	2.11
	LA	7	12	7.88	3.08	0.73	1.60
	WR	2	10	3.83	2.29	0.86	0.87
10	RE	23	30	21.86	6.24	0.87	2.28
	LA	7	11	8.71	2.71	0.77	1.30
	WR	2	10	5.17	2.37	0.86	0.87

Table N-14. Reliabilities by Reporting Category by Grade—Mathematics

Grade	Item Reporting Category	Number of Items	Raw Score Maximum	Raw Score Mean	Raw Score Standard Deviation	Alpha	SEM
3	OA	12	14	7.31	3.87	0.83	1.59
	NT	5	7	4.01	2.15	0.72	1.15
	NF	8	10	6.64	2.59	0.72	1.37
	MD	10	12	6.93	3.07	0.72	1.62
	GE	5	5	2.24	1.35	0.50	0.95
4	OA	7	11	6.35	2.92	0.68	1.65
	NT	7	10	6.80	2.62	0.70	1.43
	NF	13	16	9.40	4.47	0.85	1.71
	MD	7	11	5.17	3.01	0.73	1.56
	GE	6	6	3.00	1.66	0.64	0.99
5	OA	4	8	4.37	2.00	0.57	1.30
	NT	13	16	9.01	4.25	0.81	1.86
	NF	10	14	7.00	3.74	0.80	1.67
	MD	9	9	4.37	2.40	0.75	1.20
	GE	4	7	4.24	2.10	0.54	1.42
6	RP	10	11	6.63	2.85	0.78	1.34
	NS	8	11	5.04	2.91	0.72	1.54
	EE	12	16	8.22	4.22	0.80	1.88
	GE	5	8	3.28	2.42	0.60	1.53
	SP	5	8	3.68	1.88	0.54	1.28
7	RP	7	11	6.09	2.87	0.69	1.59
	NS	10	10	4.43	2.72	0.76	1.34
	EE	10	14	5.40	3.89	0.79	1.78
	GE	5	8	2.63	2.18	0.55	1.46
	SP	8	11	4.82	2.94	0.68	1.67
8	NE	17	21	11.14	5.38	0.85	2.08
	FN	8	11	5.49	3.21	0.70	1.76
	GE	12	16	8.65	4.35	0.80	1.93
	SP	3	6	2.42	1.81	0.49	1.30
10	NE	5	9	4.31	2.38	0.64	1.42
	FN	16	21	11.61	6.02	0.87	2.20
	GE	16	21	9.81	5.39	0.83	2.20
	SP	5	9	5.35	2.71	0.70	1.49

Table N-15. Reliabilities by Reporting Category by Grade—STE

Grade	Item Reporting Category	Number of Items	Raw Score			Alpha	SEM
			Maximum	Mean	Standard Deviation		
5	ES	11	14	8.06	3.28	0.77	1.58
	LS	11	14	8.99	3.21	0.76	1.56
	PS	10	14	7.40	2.89	0.69	1.59
	TE	9	12	6.76	2.90	0.72	1.54
8	ES	10	14	7.72	3.38	0.76	1.66
	LS	11	14	7.23	3.71	0.79	1.71
	PS	10	13	5.46	2.93	0.70	1.62
	TE	10	13	7.29	3.13	0.74	1.59

Table N-16. Reliabilities by Reporting Category by Grade—Biology

Grade	Item Reporting Category	Number of Items	Raw Score			Alpha	SEM
			Maximum	Mean	Standard Deviation		
HS	MO	16	21	11.07	5.42	0.84	2.15
	HE	10	15	7.40	3.51	0.73	1.83
	EV	9	12	6.77	3.00	0.73	1.55
	EC	7	12	6.74	2.90	0.73	1.50

Table N-17. Reliabilities by Reporting Category by Grade—Introductory Physics

Grade	Item Reporting Category	Number of Items	Raw Score			Alpha	SEM
			Maximum	Mean	Standard Deviation		
HS	MF	23	30	18.52	6.32	0.86	2.37
	EN	11	18	10.27	4.32	0.80	1.94
	WA	8	12	6.05	2.85	0.66	1.65

Table N-18. SEM by Performance Level by Grade—Alt/ELA

Grade	Performance Level	Number of Students	Raw Score Maximum	Raw Score Mean	Raw Score Standard Deviation	SEM
3	Awareness	36	39	20.31	2.83	2.76
	Emerging	454	39	26.09	3.21	2.52
	Progressing	380	39	30.83	1.18	0.94
	Partially Meeting Expectations-Alt	1	--	--	--	--
4	Awareness	26	39	19.68	2.48	3.37
	Emerging	399	39	26.09	3.26	2.34
	Progressing	409	39	30.9	1.16	0.92
	Not Meeting Expectations-Alt	2	--	--	--	--
5	Awareness	18	39	20.11	3.08	2.92
	Emerging	353	39	25.68	3.08	2.28
	Progressing	386	39	31.06	1.04	0.92
	Not Meeting Expectations-Alt	2	--	--	--	--
6	Awareness	18	39	19.56	2.81	2.47
	Emerging	358	39	26.01	3.25	2.52
	Progressing	365	39	30.89	1.16	0.95
	Not Meeting Expectations-Alt	1	--	--	--	--
7	Awareness	21	39	19.29	2.35	2.74
	Emerging	327	39	25.54	3.29	2.74
	Progressing	384	39	30.95	1.2	0.95
	Not Meeting Expectations-Alt	1	--	--	--	--
8	Awareness	23	39	19.22	2.65	2.14
	Emerging	349	39	26.29	2.9	2.21
	Progressing	384	39	30.92	1.26	0.98
	Not Meeting Expectations-Alt	1	--	--	--	--
10	Awareness	17	39	19.53	3.37	4.5
	Emerging	306	39	25.25	3.02	2.43
	Progressing	406	39	30.99	1.17	0.98
	Partially Meeting Expectations-Alt	2	--	--	--	--
	Not Meeting Expectations-Alt	8	--	--	--	--

**Due to the small sample size of the subgroup, the calculation of SEM does not produce meaningful values.*

Table N-19. SEM by Performance Level by Grade—Alt/Mathematics

Grade	Performance Level	Number of Students	Raw Score			SEM
			Maximum	Mean	Standard Deviation	
3	Awareness	23	26	15.65	1.56	1.98
	Emerging	105	26	18.95	0.96	1.85
	Progressing	650	26	21.57	0.78	0.58
	Not Meeting Expectations-Alt	1	--	--	--	--
4	Awareness	12	26	15.92	1.38	2.1
	Emerging	92	26	18.81	1.14	1.68
	Progressing	636	26	21.56	0.78	0.58
	Not Meeting Expectations-Alt	1	--	--	--	--
5	Awareness	16	26	15.69	1.4	2.04
	Emerging	81	26	18.74	1.21	1.74
	Progressing	571	26	21.56	0.76	0.59
	Not Meeting Expectations-Alt	2	--	--	--	--
6	Awareness	19	26	15.42	1.46	1.61
	Emerging	98	26	19.03	1.08	1.82
	Progressing	573	26	21.58	0.77	0.57
	Not Meeting Expectations-Alt	2	--	--	--	--
7	Awareness	13	26	16	1.29	2.29
	Emerging	87	26	19	1.19	1.81
	Progressing	562	26	21.58	0.75	0.58
8	Awareness	26	26	15.62	1.7	2.48
	Emerging	104	26	19.21	1.24	1.66
	Progressing	554	26	21.55	0.79	0.59
	Not Meeting Expectations-Alt	2	--	--	--	--
10	Awareness	15	39	22.13	2.64	--
	Emerging	183	39	25.23	2.36	1.35
	Progressing	541	39	32.16	1.24	0.66
	Not Meeting Expectations-Alt	7	--	--	--	--
	Awareness	23	26	15.65	1.56	1.98

**Due to the small sample size of the subgroup, the calculation of SEM does not produce meaningful values.*

Table N-20. SEM by Performance Level by Grade—Alt/STE

Grade	Performance Level	Number of Students	Raw Score			SEM
			Maximum	Mean	Standard Deviation	
5	Awareness	35	39	22.57	2.87	--
	Emerging	176	39	25.83	2.5	2.14
	Progressing	488	39	31.73	1.48	0.93
	Partially Meeting Expectations-Alt	1	--	--	--	--
	Not Meeting Expectations-Alt	2	--	--	--	--
8	Awareness	36	39	21.53	2.72	--
	Emerging	153	39	26.14	2.59	2.18
	Progressing	519	39	31.73	1.45	0.94

**Due to the small sample size of the subgroup, the calculation of SEM does not produce meaningful values.*

Table N-21. SEM by Performance Level by Grade—Alt/Biology

Grade	Performance Level	Number of Students	Raw Score			SEM
			Maximum	Mean	Standard Deviation	
HS	Awareness	26	39	23.15	1.99	3.03
	Emerging	95	39	26.07	2.34	2.49
	Progressing	308	39	31.7	1.54	1.02
	Not Meeting Expectations-Alt	3	--	--	--	--

**Due to the small sample size of the subgroup, the calculation of SEM does not produce meaningful values.*

Table N-22. SEM by Performance Level by Grade—Alt/Chemistry

Grade	Performance Level	Number of Students	Raw Score			SEM
			Maximum	Mean	Standard Deviation	
HS	Emerging	12	39	25	0.85	0.16
	Progressing	110	39	32.48	0.93	0.68

**Due to the small sample size of the subgroup, the calculation of SEM does not produce meaningful values.*

Table N-23. SEM by Performance Level by Grade— Alt/Introductory Physics

Grade	Performance Level	Number of Students	Raw Score			SEM
			Maximum	Mean	Standard Deviation	
HS	Emerging	20	39	25.45	2.78	3.89
	Progressing	39	39	31.38	1.84	1.13
	Not Meeting Expectations-Alt	6	--	--	--	--

**Due to the small sample size of the subgroup, the calculation of SEM does not produce meaningful values.*

Table N-24. SEM by Performance Level by Grade— Alt/Technology/Engineering

Grade	Performance Level	Number of Students	Raw Score			SEM
			Maximum	Mean	Standard Deviation	
HS	Awareness	1	--	--	--	--
	Emerging	14	39	25	2	1.1
	Progressing	104	39	32.22	1.36	0.83

**Due to the small sample size of the subgroup, the calculation of SEM does not produce meaningful values.*

APPENDIX O
ACHIEVEMENT-LEVEL SCORE DISTRIBUTIONS

Table O-1. Achievement-Level Distributions by Grade—ELA[1]

Grade	Achievement Level	N[3]	Percent in Level			
			2022[4]	2021	2019	2018
3	Not Meeting Expectations	8,615	14	9	7	6
	Partially Meeting Expectations	26,699	42	40	37	42
	Meeting Expectations	24,331	38	42	47	43
	Exceeding Expectations	4,102	6	10	10	9
4	Not Meeting Expectations	9,409	15	12	8	8
	Partially Meeting Expectations	29,798	46	38	40	39
	Meeting Expectations	22,379	35	43	43	44
	Exceeding Expectations	2,628	4	6	9	10
5	Not Meeting Expectations	7,775	12	11	7	6
	Partially Meeting Expectations	30,819	47	42	40	39
	Meeting Expectations	23,628	36	39	46	48
	Exceeding Expectations	3,237	5	8	7	7
6	Not Meeting Expectations	13,821	21	21	12	10
	Partially Meeting Expectations	24,219	37	31	34	38
	Meeting Expectations	22,186	34	35	41	41
	Exceeding Expectations	5,308	8	12	13	11
7	Not Meeting Expectations	12,285	18	19	12	14
	Partially Meeting Expectations	26,941	40	38	39	40
	Meeting Expectations	24,286	36	37	41	39
	Exceeding Expectations	3,647	5	6	9	8
8	Not Meeting Expectations	11,980	17	17	12	14
	Partially Meeting Expectations	28,018	40	42	35	34
	Meeting Expectations	24,820	36	35	41	42
	Exceeding Expectations	4,598	7	7	11	10
10[2]	Not Meeting Expectations	4,675	7	8	7	--
	Partially Meeting Expectations	23,104	35	27	32	--
	Meeting Expectations	33,286	50	46	48	--
	Exceeding Expectations	5,895	9	20	14	--

[1] This table presents distributions from the standard MCAS ELA tests. Distributions from the MCAS-Alt assessment are displayed beginning with Table O-6.
[2] For Grade 10, only results from 2019 on are displayed because 2019 was the first year of the Next-Generation MCAS program in Grade 10.
[3] These results are based on the psychometric data sample used to conduct equating, not on the whole population of students.
[4] Testing was not conducted in 2020 due to Covid 19.

Table O-2. Achievement-Level Distributions by Grade—Mathematics[1]

Grade	Achievement Level	N[3]	Percent in Level 2022[4]	2021	2019	2018
3	Not Meeting Expectations	12,075	19	25	11	11
	Partially Meeting Expectations	25,406	40	41	39	39
	Meeting Expectations	22,589	35	28	41	41
	Exceeding Expectations	4,090	6	6	9	10
4	Not Meeting Expectations	10,327	16	23	11	11
	Partially Meeting Expectations	26,562	41	44	39	40
	Meeting Expectations	23,893	37	30	42	41
	Exceeding Expectations	3,738	6	4	8	7
5	Not Meeting Expectations	9,819	15	19	9	9
	Partially Meeting Expectations	31,960	49	48	42	45
	Meeting Expectations	21,397	33	30	43	42
	Exceeding Expectations	2,657	4	4	6	5
6	Not Meeting Expectations	9,195	14	22	9	10
	Partially Meeting Expectations	28,806	44	45	39	42
	Meeting Expectations	24,356	37	29	42	41
	Exceeding Expectations	3,433	5	5	11	7
7	Not Meeting Expectations	12,069	18	17	12	12
	Partially Meeting Expectations	29,991	45	48	40	41
	Meeting Expectations	20,788	31	29	38	39
	Exceeding Expectations	4,487	7	6	11	8
8	Not Meeting Expectations	11,151	16	21	11	11
	Partially Meeting Expectations	32,957	47	47	42	39
	Meeting Expectations	20,540	30	29	37	42
	Exceeding Expectations	4,923	7	4	10	8
10[2]	Not Meeting Expectations	6,275	9	11	8	--
	Partially Meeting Expectations	27,106	41	35	33	--
	Meeting Expectations	25,830	39	42	45	--
	Exceeding Expectations	7,627	11	13	13	--

[1] This table presents distributions from the standard MCAS Mathematics tests. Distributions from the MCAS-Alt assessment are displayed beginning with Table O-7.
[2] For Grade 10, only results from 2019 on are displayed because 2019 was the first year of the Next-Generation MCAS program in Grade 10.
[3] These results are based on the psychometric data sample used to conduct equating, not on the whole population of students.
[4] Testing was not conducted in 2020 due to Covid 19.

Table O-3. Achievement-Level Distributions by Grade—STE[1]

Grade	Achievement Level	N[2]	Percent in Level 2022[3]	2021	2019	2018
5	Not Meeting Expectations	10,857	17	18	11	--
	Partially Meeting Expectations	26,213	40	40	40	--
	Meeting Expectations	23,494	36	36	41	--
	Exceeding Expectations	4,786	7	7	9	--
8	Not Meeting Expectations	11,403	17	15	11	--
	Partially Meeting Expectations	28,398	41	44	42	--
	Meeting Expectations	25,180	37	34	39	--
	Exceeding Expectations	4,002	6	8	8	--

[1] This table presents distributions from the standard MCAS STE tests. Distributions from the MCAS-Alt assessment are displayed beginning with Table O-8. Only results from 2019 on are displayed because 2019 was the first year of the Next-Generation MCAS program for STE.
[2] These results are based on the psychometric data sample used to conduct equating, not on the whole population of students.
[3] Testing was not conducted in 2020 due to Covid 19.

Table O-4. Achievement-Level Distributions by Grade—Biology

Grade	Achievement Level	N	Percent in Level			
			2022[1]	2021	2019	2018
HS	Not Meeting Expectations	8,336	15	--	--	--
	Partially Meeting Expectations	22,359	40	--	--	--
	Meeting Expectations	18,995	34	--	--	--
	Exceeding Expectations	5,830	11	--	--	--

[1] *2022 was the first year Biology was administered as a Next-Generation MCAS test.*

Table O-5. Achievement-Level Distributions by Grade—Introductory Physics

Grade	Achievement Level	N	Percent in Level			
			2022[1]	2021	2019	2018
HS	Not Meeting Expectations	1,456	10	--	--	--
	Partially Meeting Expectations	5,719	41	--	--	--
	Meeting Expectations	5,118	37	--	--	--
	Exceeding Expectations	1,652	12	--	--	--

[1] *2022 was the first year Introductory Physics was administered as a Next-Generation MCAS test.*

Table O-6. Achievement-Level Distributions by Grade—Alt/ELA

Grade	Achievement Level	Percent in Level			
		2022[1]	2021	2019	2018
3	Partially Meeting Expectations	0	0	0	0
	Progressing	40	41	53	55
	Emerging	48	46	39	39
	Awareness	4	3	2	2
	Incomplete	8	10	5	4
4	Partially Meeting Expectations	0	0	0	0
	Progressing	47	45	58	56
	Emerging	45	44	37	37
	Awareness	3	3	2	2
	Incomplete	5	9	4	5
5	Partially Meeting Expectations	0	0	0	0
	Progressing	46	46	57	63
	Emerging	42	42	36	32
	Awareness	2	2	2	1
	Incomplete	9	11	5	5
6	Partially Meeting Expectations	0	0	0	0
	Progressing	46	44	55	59
	Emerging	45	42	37	34
	Awareness	2	3	2	2
	Incomplete	8	12	6	6
7	Partially Meeting Expectations	0	0	0	0
	Progressing	48	42	56	62
	Emerging	41	41	34	30
	Awareness	3	2	2	2
	Incomplete	8	15	8	6
8	Partially Meeting Expectations	0	0	0	0
	Progressing	47	47	58	60
	Emerging	42	35	35	32
	Awareness	3	2	2	2
	Incomplete	8	16	5	6
10	Advanced	0	0	0	0
	Proficient	0	0	0	0
	Needs Improvement	0	0	0	0
	Progressing	48	45	55	50
	Emerging	38	40	36	36
	Awareness	2	2	1	3
	Incomplete	12	13	8	11

[1] *Testing was not conducted in 2020 due to Covid 19.*

Table O-7. Achievement-Level Distributions by Grade—Alt/Mathematics

Grade	Achievement Level	Percent in Level			
		2022[1]	2021	2019	2018
3	Partially Meeting Expectations	0	0	0	0
	Progressing	68	69	78	79
	Emerging	11	9	9	8
	Awareness	2	1	2	2
	Incomplete	19	20	11	11
4	Partially Meeting Expectations	0	0	0	0
	Progressing	72	71	79	78
	Emerging	10	12	8	10
	Awareness	1	2	2	2
	Incomplete	16	15	11	11
5	Partially Meeting Expectations	0	0	0	0
	Progressing	68	72	77	78
	Emerging	10	10	10	8
	Awareness	2	2	2	1
	Incomplete	20	17	12	14
6	Partially Meeting Expectations	0	0	0	0
	Progressing	71	70	81	77
	Emerging	12	10	7	9
	Awareness	2	3	2	2
	Incomplete	15	17	10	13
7	Partially Meeting Expectations	0	0	0	0
	Progressing	71	67	75	79
	Emerging	11	8	9	7
	Awareness	2	3	1	1
	Incomplete	16	23	15	13
8	Partially Meeting Expectations	0	0	0	0
	Progressing	68	67	76	74
	Emerging	13	7	9	10
	Awareness	3	2	1	1
	Incomplete	17	24	14	15
10	Advanced	0	0	0	0
	Proficient	0	0	0	0
	Needs Improvement	0	0	0	0
	Progressing	66	66	72	61
	Emerging	22	18	17	22
	Awareness	2	2	1	2
	Incomplete	11	15	10	15

[1] *Testing was not conducted in 2020 due to Covid 19.*

Table O-8. Achievement-Level Distributions by Grade—Alt/STE

Grade	Achievement Level	Percent in Level			
		2022[1]	2021	2019	2018
5	Needs Improvement	0	0	0	0
	Progressing	61	57	65	79
	Emerging	22	22	23	12
	Awareness	4	4	3	1
	Incomplete	12	18	10	8
8	Needs Improvement	0	0	0	0
	Progressing	65	57	70	76
	Emerging	19	16	16	16
	Awareness	5	3	2	0
	Incomplete	12	23	11	8

1 Testing was not conducted in 2020 due to Covid 19.

Table O-9 Achievement-Level Distributions—Alt/Biology

Grade	Achievement Level	Percent in Level			
		2022[1]	2021	2019	2018
HS	Advanced	0	0	0	0
	Proficient	0	0	0	0
	Needs Improvement	0	0	0	0
	Progressing	60	45	75	63
	Emerging	19	24	14	18
	Awareness	5	5	1	2
	Incomplete	16	26	11	17

[1] Testing was not conducted in 2020 due to Covid 19.

Table O-10. Achievement-Level Distributions—Alt/Chemistry

Grade	Achievement Level	Percent in Level			
		2022[1]	2021	2019	2018
HS	Advanced	0	0	0	0
	Proficient	0	0	0	0
	Needs Improvement	0	0	2	10
	Progressing	78	78	76	53
	Emerging	8	0	6	18
	Awareness	0	0	0	0
	Incomplete	14	22	16	19

1 Testing was not conducted in 2020 due to Covid 19.

Table O-11. Achievement-Level Distributions—Alt/Introductory Physics

Grade	Achievement Level	Percent in Level			
		2022[1]	2021	2019	2018
HS	Advanced	0	0	0	0
	Proficient	0	0	0	3
	Needs Improvement	0	0	3	9
	Progressing	53	40	73	56
	Emerging	26	0	14	21
	Awareness	11	0	3	3
	Incomplete	10	60	8	10

1 Testing was not conducted in 2020 due to Covid 19.

Table O-12. Achievement-Level Distributions—Alt/Technology/Engineering

Grade	Achievement Level	Percent in Level			
		2022[1]	2021	2019	2018
HS	Advanced	0	0	0	0
	Proficient	0	0	0	0
	Needs Improvement	0	0	0	0
	Progressing	79	64	74	52
	Emerging	11	17	15	22
	Awareness	1	2	0	2
	Incomplete	10	17	11	24

1 Testing was not conducted in 2020 due to Covid 19.

APPENDIX P
SAMPLE REPORTS—MCAS

Name:
SASID:

Grade 5
Spring 2022
Computer-based test

Your Child's Achievement Level: **Not Meeting Expectations**
Your Child's Score: **451**

451

440		470		500		530		560

Not Meeting Expectations

A student who performed at this level did not meet grade-level expectations in this subject.

The school, in consultation with the student's parent/guardian, should determine the coordinated academic assistance and/or additional instruction the student needs to succeed in this subject.

Partially Meeting Expectations

A student who performed at this level partially met grade-level expectations in this subject.

The school, in consultation with the student's parent/guardian, should consider whether the student needs additional academic assistance to succeed in this subject.

Meeting Expectations

A student who performed at this level met grade-level expectations and is academically on track to succeed in the current grade in this subject.

Exceeding Expectations

A student who performed at this level exceeded grade-level expectations by demonstrating mastery of the subject matter.

Achievement

How your child performed compared to students in their school, district, and state.

Your Child's		Year	Average Score		
Grade	Score		School	District	State
5	451	2022	505	495	495

The horizontal gray bar in the graphic above shows the range of likely scores your child would receive if they took the test multiple times.

How your child performed in each reporting category, on the science and engineering practices, and on each test question

Reporting Category	Points Earned by Your Child	Average Points in School	Average Points in District	Average Points in State	Total Possible Points	Average Points at Meeting Expectations*
Earth and Space Science (ES)	3	9.0	7.8	7.8	14	8.8
Life Science (LS)	4	9.9	8.7	8.8	14	9.6
Physical Science (PS)	1	8.4	7.3	7.3	14	7.6
Technology/Engineering (TE)	4	7.2	6.4	6.6	12	7.0
Science and Engineering Practices	7	25.3	21.9	22.0	41	23.9

* Average number of points earned statewide by students at or near a score of 500, at the low end of the Meeting Expectations level.

Individual Test Questions

Go online to access released test questions at www.doe.mass.edu/mcas/testitems.html.

Question Number	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
Reporting Category	LS	TE	LS	ES	TE	LS	TE	PS	TE	ES	ES	PS	ES	PS	PS	LS	ES	PS	LS	TE
Practice Category	/	/	C	C	/	B	C	C	C	B	C	C	C	C	C	C	/	B	B	/
Points Earned	0/1	1/1	0/1	0/1	0/2	1/1	1/1	0/1	0/1	0/1	0/1	0/1	0/3	0/1	1/3	1/2	0/2	0/1	0/1	1/1

Question Number	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41
Reporting Category	LS	PS	ES	TE	TE	PS	TE	LS	PS	PS	ES	LS	LS	ES	LS	PS	ES	TE	ES	ES	LS
Practice Category	C	B	B	C	A	C	C	A	C	B	B	/	/	/	A	/	B	/	/	A	C
Points Earned	1/1	0/1	0/1	0/1	0/1	0/1	0/3	0/3	0/2	0/2	1/1	0/1	1/1	1/1	0/1	0/1	0/1	1/1	0/1	1/1	0/1

Key Points Earned: x/y = x points earned out of y possible points; Blank space = no answer
Practice Categories: A = Investigations and Questioning; B = Mathematics and Data; C = Evidence, Reasoning, and Modeling; "/" = Practice Category Not Assessed

Spring 2022 MCAS Tests Parent/Guardian Report

MASSACHUSETTS DEPARTMENT OF ELEMENTARY AND SECONDARY EDUCATION

Name:
SASID:
Date of Birth:
District:
School:
Grade: 5

This report provides your child's results on the spring 2022 Massachusetts Comprehensive Assessment System (MCAS) tests in English Language Arts, Mathematics, and Science and Technology/Engineering.

For each test your child took in spring 2022, the report shows your child's score (between 440 and 560) and an associated achievement level. See pages 2-4 of this report for your child's scores on each test and for a description of each achievement level.

Information about your child's achievement in this report should be used alongside other assessments, such as school tests and classroom work, when possible.

In addition to your child's results, the report also shows how students in your child's school, district, and state did on the tests, how achievement changed over time, and how your child's academic progress, or growth, compares to other students.

This year, the report includes MCAS Science and Engineering Practices as a Reporting Category, in addition to the content reporting categories. Page 4 of this report presents the reporting category and practice category for each item. The practice categories include (A) Investigations and Questioning; (B) Mathematics and Data; and (C) Evidence, Reasoning, and Modeling. More information is available at www.doe.mass.edu/mcas/tdd/practice-categories.html.

The information below, from the **Family Guides** to the Massachusetts Curriculum Frameworks, is designed to help you support your child's learning in their **current grade**. The questions and topics can help you talk with your child and your child's teacher about what they are learning in their **sixth-grade** classes. More information about the Family Guides is available at www.doe.mass.edu/highstandards.

	QUESTIONS YOU CAN ASK YOUR CHILD:	TOPICS YOU CAN DISCUSS WITH YOUR CHILD'S TEACHER:
English Language Arts	▶ Can you tell me about the last research project you did? ▶ When you are working in a group, how do you and your classmates decide how you will get your work done?	▶ What new types of writing your child is exploring ▶ What topics your child is curious about and what types of things they read at home
Mathematics	▶ How long will it take to drive home if we go 30 miles per hour? ▶ How many goals does your soccer team typically score?	▶ Ways to practice using ratios and rates at home ▶ Your child's fluency with basic operations (addition, subtraction, multiplication, and division)
Science and Technology/Engineering	▶ What kinds of materials and tools would you use to build a birdhouse? ▶ What are some ways to separate salt from salt water?	▶ Ways of applying what your child learns in science to everyday situations ▶ Places in the community that can help your child learn science

Name:
SASID:

Grade 5
Spring 2022
Computer-based test

Your Child's Achievement Level: **Not Meeting Expectations**
Your Child's Score: **461**

Not Meeting Expectations	Partially Meeting Expectations	Meeting Expectations	Exceeding Expectations
A student who performed at this level did not meet grade-level expectations in this subject. The school, in consultation with the student's parent/guardian, should determine the coordinated academic assistance and/or additional instruction the student needs to succeed in this subject.	A student who performed at this level partially met grade-level expectations in this subject. The school, in consultation with the student's parent/guardian, should consider whether the student needs additional academic assistance to succeed in this subject.	A student who performed at this level met grade-level expectations and is academically on track to succeed in the current grade in this subject.	A student who performed at this level exceeded grade-level expectations by demonstrating mastery of the subject matter.

The horizontal gray bars in the graphics above and below show the range of likely scores your child would receive if they took the test multiple times.

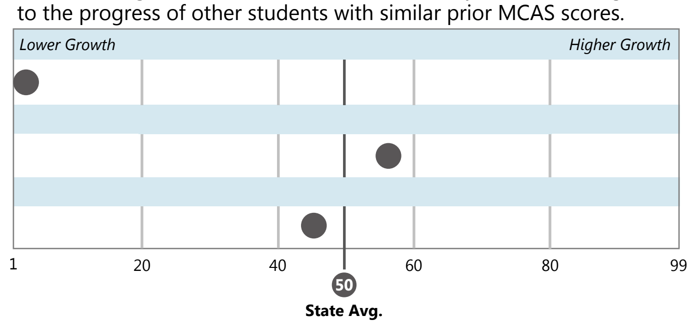
Achievement

How your child performed compared to students in their school, district, and state

Your Child's Grade	Your Child's Score	Year	Average Score: School	Average Score: District	Average Score: State
5	461	2022	497	493	495
4	487	2021			

2022 Student Growth Percentiles

The student growth percentile (1-99) compares your child's progress to the progress of other students with similar prior MCAS scores.



How your child performed in each reporting category and on each individual test question

Reporting Category	Points Earned by Your Child	Average Points in School	Average Points in District	Average Points in State	Total Possible Points	Average Points at Meeting Expectations*
Reading (RE)	8	19.3	18.0	18.2	26	21.3
Language (LA)†	3	8.7	8.2	8.5	14	9.7
Writing (WR)‡	0	2.0	1.8	2.1	8	1.9

† The Language reporting category includes the standard English convention scores.
‡ The Writing reporting category is based on the idea development scores.

* Average number of points earned statewide by students at or near a score of 500, at the low end of the Meeting Expectations level.

Individual Test Questions

Go online to access released test questions at www.doe.mass.edu/mcas/testitems.html.

Question Number	1	2	3	4	5	6	7	8	9	10	11	12 CV	12 ID	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31 CV	31 ID
Reporting Category	RE	LA	LA	RE	RE	RE	RE	RE	RE	RE	RE	LA	WR	RE	RE	LA	LA	RE	RE	RE	LA	RE	LA	RE	RE	LA	RE	RE	RE	RE	RE	LA	WR
Points Earned	1/1	0/1	0/1	0/1	1/1	0/1	0/1	0/1	0/1	0/2	2/2	0/3	0/4	0/1	0/1	0/2	0/1	1/1	0/1	0/1	1/1	0/1	0/1	0/1	1/1	1/1	0/1	0/2	0/1	1/1	1/2	1/3	0/4

Key Points Earned: x/y = x points earned out of y possible points; Blank space = no answer; ID = Essay idea development score; CV = Essay conventions score

Name:
SASID:

Mathematics

Grade 5
Spring 2022
Computer-based test

Your Child's Achievement Level: **Not Meeting Expectations**
Your Child's Score: **448**

Not Meeting Expectations	Partially Meeting Expectations	Meeting Expectations	Exceeding Expectations
A student who performed at this level did not meet grade-level expectations in this subject. The school, in consultation with the student's parent/guardian, should determine the coordinated academic assistance and/or additional instruction the student needs to succeed in this subject.	A student who performed at this level partially met grade-level expectations in this subject. The school, in consultation with the student's parent/guardian, should consider whether the student needs additional academic assistance to succeed in this subject.	A student who performed at this level met grade-level expectations and is academically on track to succeed in the current grade in this subject.	A student who performed at this level exceeded grade-level expectations by demonstrating mastery of the subject matter.

The horizontal gray bars in the graphics above and below show the range of likely scores your child would receive if they took the test multiple times.

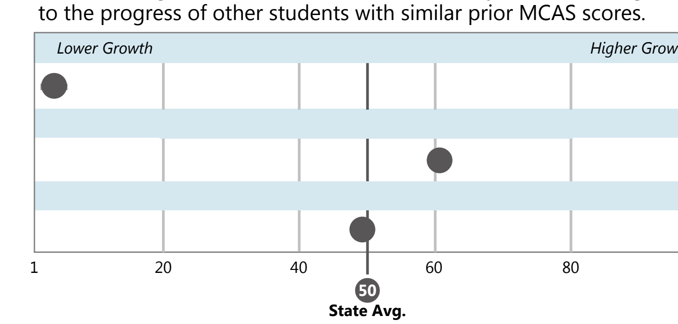
Achievement

How your child performed compared to students in their school, district, and state.

Your Child's Grade	Your Child's Score	Year	Average Score: School	Average Score: District	Average Score: State
5	448	2022	500	494	493
4	461	2021			

2022 Student Growth Percentiles

The student growth percentile (1-99) compares your child's progress to the progress of other students with similar prior MCAS scores.



How your child performed in each reporting category and on each individual test question

Reporting Category	Points Earned by Your Child	Average Points in School	Average Points in District	Average Points in State	Total Possible Points	Average Points at Meeting Expectations*
Operations and Algebraic Thinking (OA)	0	4.3	4.0	4.1	8	4.9
Number and Operations in Base Ten (NT)	1	9.7	8.5	8.5	16	10.4
Number and Operations-Fractions (NF)	0	8.2	6.8	6.6	14	7.8
Measurement and Data (MD)	1	4.8	4.2	4.1	9	4.9
Geometry (GE)	4	4.8	4.4	4.0	7	4.9

Individual Test Questions

* Average number of points earned statewide by students at or near a score of 500, at the low end of the Meeting Expectations level.

Question Number	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40
Reporting Category	MD	NT	NF	OA	MD	NT	NF	NT	NT	OA	NT	MD	GE	NF	OA	MD	NF	NF	MD	NF	NT	MD	NT	OA	NT	NF	MD	NT	NT	NF	GE	NF	MD	GE	NT	GE	MD	NT	NF	NT
Points Earned	0/1	0/1	0/1	0/1	0/1	0/1	0/1	0/1	0/4	0/1	0/1	0/1	3/4	0/1	0/2	0/1	0/1	0/1	0/1	0/1	0/1	0/1	1/1	0/4	0/1	0/4	0/1	0/1	0/1	0/2	0/1	0/1	1/1	1/1	0/1	0/1	0/1	0/1	0/1	0/1

Key Points Earned: x/y = x points earned out of y possible points; Blank space = no answer

Go online to access released test questions at www.doe.mass.edu/mcas/testitems.html.

APPENDIX Q
SPRING 2022 MCAS & MCAS-ALT
ANALYSIS AND REPORTING BUSINESS REQUIREMENTS

Table of Contents

MCAS NextGen Overview

The Massachusetts Department of Elementary and Secondary Education (DESE) administers the MCAS tests in grades 3–8 and in high school. ELA and math tests are administered in grades 3–8 and 10. Science and Technology/Engineering (STE) tests are administered in grades 5 and 8, and high school science tests are administered starting in grade 9.

In Spring 2022, next-generation introductory physics and biology tests were administered for the first time. Legacy chemistry and technology/engineering tests were also administered. Standard setting will occur in the summer for next-generation introductory physics and biology. The following tests were also administered:

1. An online-only pilot administration of Grade 8 civics, broken into the Performance Task test and the End of Course Test.
2. Grades 5 & 8 STE short form (mini) tests were administered to students participating in the Innovative Science Pilot; both the short form and the pilot were administered in Pearson TestNav. The mini form was created by using only a subset of the operational items in the grade/subject.
3. Operational Grades and subjects are:

NextGen			**Legacy**		
Grade	Subject	Mode of test	Grade	Subject	Mode of Test
3–8	ELA	Online Paper	**9/10**	Legacy Technology/Engineering Legacy Chemistry	Legacy is paper only
3–8	Math	Online Paper			
5 & 8	Science and Technology/Engineering (STE)	Online Paper			
10	ELA	Online Paper			
10	Math	Online Paper			
9/10	Introductory Physics Biology	Online Paper			

Contract Code

163652

Reporting Deliverables

Preliminary Reporting		**Final Reporting**	
External	Internal	External	Internal
• Megafiles-All grades and subjects • Questionnaire Data files • Accommodations-by subject • Accommodations-by subject and item • Students with both Alt and General results	• Letter counts • Language counts • Discrepancy table	• Megafiles-All grades and subjects • 1 student report-print copy • Web student report • Student label-print copy • State File	• Printer data • iCore data

Delivery of Reports

- 1 copy of the Student Report is printed and shipped to districts.
- 1 Student Results Label is printed and shipped to districts, for each student.
- Online reports are available to the student's official school.
- Online reports are available in Pearson Access Next (PAN).
- Student Reports are sent to their tested school.

Test Design

Item metadata data is stored in the ABBI item banking system. Pearson provides a test map, which is an extract from ABBI that provides the item metadata for each operational and field test being administered.

Grade	Subject	Form(s)	Items included in Raw Score	Item Types
HS	Chemistry Technology/Engineering	Paper Accommodated Paper	Common	MC, OR
3–8	ELA	Online, Paper, Online Accommodated, Paper Accommodated	Common (OP)	SR= 1 pt. or 2 pt. CR=3 pt. ES=7 pt. or 8 pt.
3–8	Math	Online, Paper, Online Accommodated, Paper Accommodated	Common (OP)	SA and SR= 1 pt. or 2 pt. CR= 3 pt. or 4 pt.
5 & 8	Science	Online, Paper, Online Accommodated, Paper Accommodated	Common (OP)	SR=1 pt. or 2 pt. CR=2 pt. or 3 pt.
HS	Bio and Physics	Online, Paper, Online Accommodated, Paper Accommodated, Online Spanish, Paper Spanish	Common (OP)	SR=1 pt. or 2 pt. CR=3 pt. or 4 pt.
10	ELA	Online, Paper, Online Accommodated, Paper Accommodated	Common (OP)	SR=1 pt. or 2 pt. ES=8 pt.
10	Math	Online, Paper, Online Accommodated, Paper Accommodated, Online Spanish, Paper Spanish	Common (OP)	SA and SR=1 pt. or 2 pt. CR=4 pt.

Forms

Form 01 is used for the accommodated forms.

Form conventions:
Form_Code=Year||subject||grade||Admin||Accommodation/Mode||Language||Form Number||Unit Number||Special
Where year=22;
Subject=EL, MA, SC, CV=Civics;
Grade=03, 04, 05, 06, 07, 08, 10, BI-Biology, PH-Introductory Physics, EC=Civics EOC, PT=Civics Performance Task
Spanish testers have Language=ES
Paper testers have accommodation/mode=PA

See *MCAS Scoring Form ID Key_1-11-22.xlsx* for more information
Mini STE:

1. We will receive a separate lookup table for these students from Psychometrics.
2. The full scale should be used for reporting.

3. The short form consists of a subset of the OP items on the long form. It contains no FT, or matrix equating items.
4. There is 1 form per grade

Scoring

Machine scored items are scored according to the scoring rules and QTI in ABBI. The following table is applicable to hand scored items.

Raw Data Value	Reported Value	Description	Point Value	Response Attempted
0-max pts	Final score	Open Response / Short Answer	0-max	ü
N	0	Not Scorable	0	ü
BL		Blank response	0	
DC	0	Direct Copy	0	ü
UN	0	Unreadable\Unintelligible	0	ü
OT	0	Off Topic	0	ü
NE	0	Non-English	0	ü

Test Attemptedness

Grades 3-8 and HS, ELA, Mathematics and STE: On the operational tests, a test meets attemptedness if there is at least one **operational** item that is attempted **per session**.

Grade 8 Civics Pilot: The test meets attemptedness if there is at least one item attempted per session.

If the student meets attemptedness then Attempt[sub]='F' (Fully Attempted). If the student has attempted operational items but not in each session, then Attempt[sub]='P' (Partially Attempted). If the student does not meet attemptedness Attempt[sub]='N' (Not Attempted).

Not Tested Reasons

The following not tested reasons apply to the Spring tests:

1. Medically Excused (MED)
2. Transfer (TRN)
3. First-year EL (LEP)
4. Void (VAB)
5. Previously Passed (High School STE only) (PAS)
6. Previously Failed (High School STE only) (PRF)
7. Multiple Answer Booklet (DUP)
8. Invalidated (INV)
9. Absent (ABS)
10. Student took the Alternate Assessment (ALT)

If a student has more than one Not Tested Reason, the following hierarchy is applied:

Participation Status Assignment Hierarchy (by subject)

a. Breach List (Amend Flag > ‘1’)
b. Void
c. Multiple Answer Booklets (Amend=‘1’)
d. Summarize = ‘1’ or TestGrade = ‘09’:
    i. If the student is in the Alternate Assessment data, the student’s participation status is taken from the Alternate Assessment data
    ii. If ELFirstyear=’1’ then: Not Tested LEP (PartStatus=‘F’).

    iii. **(Applicable for 3-8 and 10; HS STE without prior results)**:
        1. If the student meets attemptedness then: Tested (PartStatus = ‘Z’).
        2. If the student partially attempted or did not attempt:
            a. if Active_Test ≠ ‘1’ then: Not Tested Transfer (PartStatus=‘D’).
            b. Otherwise if MED then: Not Tested Medically Excused (PartStatus=‘G’).
            c. Otherwise: Did Not Test (Partstatus=’J’) (**Not assigned in grades 3-8 unless specified in Breach list)**
            d. Otherwise: Not Tested Absent (PartStatus=‘E’).
    iv. (Applicable for HS with prior results): Previously Failed (High_sPerf from SIMS in (‘F’,’PRG’,’EMG’,’AWR’,’INP’)):
        1. If the student meets attemptedness then: Tested Accountable Retest (PartStatus=‘Y’).
        2. If the student partially attempted or did not attempt then: Not Tested Accountable Retest (PartStatus=‘L’).
    v. (Applicable for HS with prior results Previously Passed (High_sPerf from SIMS in (‘A’,’P’,’NI’,’A_A’,’P_A’,’NIA’):
        1. (**Pre-Discrepancy only; only grade 9 and Grade 10 students with summarize=’1’**) If the student meets attemptedness or partially attempted then: Ineligible Accountable Retest, Previously Passed (PartStatus=‘P’).
        2. If the student did not attempt (or during final processing: if the student did not attempt, partially attempted, or meets attemptedness) then: Previously Passed (PartStatus = ‘K’)
e. Summarize = ‘0’ (regardless of any prior test results):
    i. Student is found in the Alternate Assessment data the student’s participation status is taken from the Alternate Assessment data
    ii. Otherwise, if the student meets attemptedness then: Tested Not Accountable (Retest) (PartStatus = ‘R’).
    iii. Otherwise, if the student partially attempted then: Partially Tested Not Accountable (Retest) (PartStatus = ‘B’).
    iv. Otherwise if the student did not attempt then: Not Tested Not Accountable (Retest) (PartStatus = ‘J’).

Note:
1. Students with a blank High_*s*Perf and sciNTL ≠ ‘1’ from SIMS are considered to not have prior results.
2. Students with SciNTL = ‘1’ from SIMS are considered to have previously participated in science as a First Year EL student.
3. If High_sPerf is <u>not</u> a Previously Passed value and SciNTL = ‘1’, the student is considered Previously Failed.
4. Tests with participation status Void in preliminary reporting may be unvoided during the discrepancy period. Post-Discrepancy any remaining void tests will be suppressed. Students with no test may be built out according to Data Processing rules.

The table below describes the calculation of the applicable participation statuses.

Summarize	Prior Results	Description	Part Status	Test Stat*	Discrepancy Site	
					Code	Text
n/a	*n/a*	Breach	*Breach Instructions are applied at the student level regardless of participation status and are identified by Amend > '1'*			
		Void *(Preliminary Only)*	H	NTO	VAB	Void Answer Booklet
		Multiple Answer Documents *(Security Breach)*				
		Preliminary	I	NTO	DUP	Multiple Answer Booklets
		Final	N	NTO	*n/a*	*n/a*
		Invalidated *(Only assigned via Breach List)*	N	NTO	INV	Invalidated
1 (or Grade=09)	*n/a*	Tested Accountable Alternate Assessment	A	T	ALT	Tested Alternate Assessment
		Tested	Z	T	STD	Tested Standard
		Not Tested (/Partially Tested) – LEP *(ELA Only)*	F	NTL	LEP	Not Tested First Year EL
		Not Tested (/Partially Tested) - Transfer	D	NTO	TRN	Transferred
		Not Tested (/Partially Tested) – Medically Excused Absent	G	NTM	MED	Medically Excused
		Not Tested (/Partially Tested) - Absent	E	NTA	ABS	Absent
		Incomplete	S	NTO	INC	Incomplete
	Prev. Failed	Tested Alternate Assessment Accountable Retest	C	TR	ALR	Retested Alternate Assessment
	Prev. Failed	Tested Accountable Retest	Y	TR	RET	Retested
	Prev. Failed	Previously Failed (Not Tested /Partially Tested Accountable Retest)	L	NTO	PRF	Previously Failed
	Prev. Passed	Ineligible Accountable Retest – Previously Passed & Retested *(Preliminary Only- final see K)*	P	NTO	PPR	Previously Passed & Retested
	Prev. Passed	Previously Passed	K	NTO	PAS	Previously Passed
0	*Any*	Tested Not Accountable Alternate Assessment (Retest)	W	TR	ALN	Retested Alternate Assessment Not Aggregated
		Tested Not Accountable (Retest)	R	TR	REN	Retested Not Aggregated
		Partially Tested Not Accountable (Retest)	B	NTO	INC	Incomplete
		Not Tested Not Accountable (Retest)	J	NTO	DNT	Did Not Test

* Student results achieved while First-year EL, or students currently First-year EL (see rptLEPFirst calculation) are reported with TestStat = "NTL" in place of listed TestStat (all subjects). See Calculations by Participation Status Summary Table for more details.

Inclusion/Exclusion Rules

The following applies to Item Analysis Student Inclusion/Exclusion (Ex[sub]) & Matrix Files:

1. Only first-time accountable test takers that are not first-year LEP (Partstatus = 'Z' and rptLEP[sub] are included for item analysis and psychometric equating files (Ex[sub] = '0'). All other students are excluded (Ex[sub] = '1').
2. All analysis will be based on CBT tests only for Next Gen

3. For Next Gen tests due to the way some accommodations cannot be spiraled. The accommodations listed below will have the following special handling
    a. Students with unique accommodations to be excluded include: paper-based testing, text-to-speech (TTS), Braille, Spanish, screen reader, ASL, and assistive technology;
    b. At DESE's discretion data will be provided to psychometrics to study mode effects.
    c. Students with these accommodations will be excluded from all matrix files
    d. Students with these accommodations will be excluded from CTT and dif calculations for matrix items but will be included for scaling items.
4. The following applies to High School Science (STE's):
    a. First time test taker in HS STE is a student with stugrade='09' and no prior results (high_sperf2 is null in SIMS) **or** summarize='1' and no prior results (high_sper2 is null in SIMS)
    b. Only first-time test takers are included in analyses.

Rounding Rules

Calculation	Rounded (to the nearest)
Average scale score	Whole Number
Average reporting category points	Tenth
Mean Growth Percentile	Whole Number

Files from DESE

1) Breach List
    a. Students who are considered a security breach are provided by DESE in the Breach List. Instructions for processing and reporting each security breach case are provided
    b. Data Analysis reviews the breach list and adds necessary Amend flag values (> '1') and instructions to the Amend Code Definition Lookup for each distinct scenario on the Breach List.
    c. Data Processing applies any necessary changes to the raw student record based on DESE instructions and applies the corresponding Amend Flag value from the lookup to the student for Data Analysis processing.
2) Technology Failure List
    a. DESE will provide a list of students who could not complete the assessment based on a persistent technology issue with the testing platform. This file will be provided at the same time as the Breach List.
    b. These students are processed with an Amend code (AmendCode=13).
        i. If a student has a PerfLevel = 2, 3, or 4, the following information is reported:
            1. a. Student's earned raw score, earned item scores, and earned mfScaledScore. These students will be reported as NTO
    c. iii. If a student does not have a PerfLevel equal to 2, 3, 4, then the student is reported as "INC" with their raw score and item scores reported. The student's perf2, numin, and assess values will all be blank
3) SIMS
    a. Student data are provided by DESE for reporting use following the SIMS file layout (also provided by DESE.)
    b. SIMS contains various demographic, historical scores, and accountability data fields. The data populated depends on the time of year of the handoff
    c. Multiple handoffs occur during the year
4) Current Year Student Growth Data

a. Current year student growth percentiles (and corresponding standard errors) are provided for ELA and Math at the student level from DESE based on preliminary results.
b. If a score changes after Preliminary reporting, the growth score from DESE is suppressed and no growth is reported for the test.
c. In 2022, the state growth mean will be calculated and not fixed at 50.

5) Grade Span Lookup
a. DESE provides a grade span lookup for all public official schools. It is used to assign “SchType” in the various megafile handoffs.
b. Cognia will provide DESE with a list of any public schools that have students assigned to them that are not included in the lookup, resulting in blank grade span data based on the Preliminary data release.
c. All public schools must have a grade span for final post-discrepancy reporting. For earlier releases grade spans may be blank for schools missing from the lookup.

6) Discrepancy Resolution
a. Data from preliminary reporting is posted to the discrepancy site for clean up by the field and the department.
b. See the Discrepancy Site Requirements for more details on which fields are available for editing at each user level.
c. Data Processing re-processes data post-discrepancy to incorporate the updated information and discrepancy resolutions from DESE for DA for final reporting.
d. During final processing all information from the discrepancy site is considered final and is maintained, however, changes to certain fields require additional data audits and/or recalculation of student participation status to ensure consistency. See the Data Reconciliation section for these details.
e. DESE provides a spreadsheet with additional discrepancies reported by schools that were not able to be resolved in the tool or came later than the school window. Any late discrepancies reported well after the close of the window will be reported in the rerun.
f. In 2022, the discrepancy site will not include scaled scores and performance levels for Introductory Physics and Biology. Scaled sores and performance levels are available after Standard Setting.

7) Sprp_sch and Sprp_dis: Exceptions List
a. DESE will provide this list to Cognia
b. The lookup is used in the assignment of official student school and district (See Data Reconciliation Audits for details)

8) One School District List (daSingleSchDisLookup)
a. DESE will provide this list to Cognia
b. The lookup is used in the aggregate calculations (see Aggregate Calculations for details)

9) Official School and Official District Code
a. Official District (sprp_dis)
i. If the student’s testing discode+schcode is on the Exceptions List (System+School) then the official district is the sprp_dis from the Exceptions List.
ii. If the student’s testing orgtype is 6, 13 or 22 then the official district is set to the discode concatenated with four zeroes.
iii. Otherwise, the official district is the sending district from SIMS (senddiscode) if it exists, concatenated with four zeroes at the end. If senddiscode is blank the official district is set to ‘99999999’.
b. Official School (sprp_sch)

1. If the student’s testing school (discode+schcode) is on the Exceptions List (System+School) then the official school is the sprp_sch from the Exceptions List.
2. If a student is from a collaborative school (testing OrgType = 3 or 4) then the official school is = 05XX0000 where XX is the 3rd and 4th digit of the testing district code.
3. If the student’s testing orgtype is 25,31, or 50 then the official school is the official school code from SIMS (simsDiscode + SimsSchcode). If the simsDiscode and simsSchcode are blank the official school is set to the testing school code (discode+schcode). If the official school from SIMS turns out to be orgtype 22, then use the Exceptions list for official school.
4. Otherwise, the official school is the testing school (discode+schcode).

a. Setting of Orgtype
   1. Orgtype is based on the official school code
   2. Using the official school code link to the MCAS org data file (DA use: icore) and pull the org type (DA use: Reportcode2).
   3. In the event that an orgtype is not assigned, default orgtype to ‘X’. This is expected due to some SPRP schools not being in the Org data file
b. The table below displays possible values for a school’s Orgtype

Orgtype Code	Description
1	Special Education Agency
2	Special Education School
3	Collaborative
4	Collaborative Program
5	Public School District
6	Public School
9	MA State Agency
10	MA State Agency Unit
11	Private School
12	Charter District
13	Charter School
22	Charter School Program
25	Public Alternative Ed Program
29	Out-of-State School
30	Adult Diploma Site
31	MCAS Test Site
34	SEIS Program
37	Adult Basic Education
50	Public School Program
95	Special Education Program

Scaling, Equating and Item Statistics

For the purposes of scaling and equating all high school students taking the High School Sciences are treated the same. They have taken the same sets of tests regardless of their student grade. Exclusions from analysis are described in the calculation section.

1) Legacy Scaling
   a. Scaling is done using a lookup table provided by psychometrics and the student’s overall raw score (by subject).

b. The scaled scores are even numbers from 200 to 280.

2) Next-Gen Scaling
   a. Scaling is completed using a lookup table provided by Psychometrics. Scales are based on student's scaleform, and raw scores
   b. The scaled scores are integers from 440 to 560.

3) Achievement Level Coding
   a. The MCAS Standard Assessment has four possible achievement levels, assigned to students using the raw to scaled score lookup provided by psychometrics.
   b. Alternate Assessment achievement levels are translated to their corresponding standard assessment achievement level prior to computing any aggregate calculations that include alternate assessment achievement level results as shown below.

MCAS Achievement Level	MCAS Description	MCAS Alt Achievement Level	MCAS Alt Description
1	N/A N/A Legacy: Failing (F) NextGen: Not Meeting Expectations (NM)	7 8 9 10 17	Incomplete Portfolio (INP) Awareness (AWR) Emerging (EMG) Progressing (PRG) Not Meeting Expectations-Alt (NM_A)
2	Legacy: Needs Improvement (NI)	11	Needs Improvement-Alt (NIA)
	NextGen: Partially Meeting Expectations (PM)	14	Partially Meeting Expectations-Alt (PM_A)
3	Legacy: Proficient (P)	12	Proficient-Alt (P_A)
	NextGen: Meeting Expectations (M)	15	Meeting Expectations-Alt (M_A)
4	Legacy: Advanced (A)	13	Advanced-Alt (A_A)
	NextGen: Exceeding Expectations (E)	16	Exceeding Expectations-Alt (E_A)

Student Level Calculations

Calculations by Participation Status Summary

Summarize	Prior Results	Description	Part Stat	rptLEP[sub] [1]	Test Stat	Current Year Reporting Results (‘---‘indicates data are blank): Raw Scores	Item Scores	rScaled Score *(Cognia Reports)*	Achievement Level *(rPerfLevel, mfPerfLev)*	mfScaledScore	Aggregation and Accountability Results: Achievement Level *(Perf2/mfPerf2)*	CPI / Numin	Assess [2]
		Breach	*Breach Instructions are applied at the student level regardless of participation status and are identified by Amend > '1'*										

		Void *(Preliminary Only)*	H	*any*	NTO	earned	earned	---	VAB	---	---	---	0[3]
		Multiple Answer Documents (Security Breach):											
		Preliminary	I	*any*	NTO	earned	earned	---	DUP	---	---	---	---
		Final	N	*any*	NTO	---	---	---	INV	---	---	---	---
1 (or Grade=09*)		Tested Alternate Assessment	A	0	T	---	---	---	earned (Alt)	---	earned (Alt)	ü	1
				1	NTL					---	---	---	1
		Tested	Z	0	T	earned	earned	earned	earned	earned	earned	ü	1
				1	NTL			*Pass:* earned *Else:* ---	*Pass:* earned *Else:* LEP	*Pass:* earned *Else:* ---	---	---	1
		Not Tested /Partially Tested – LEP (ELA Only)	F	1	NTL	Earned		*HS Pass:* earned *Else:* ---	*HS Pass:* earned *Else*: LEP	*HS Pass:* earned *Else:* ---	---	---	1
		Not Tested /Partially Tested - Transfer	D	0 (M/S 1)	NTO				*HS Pass:* earned *Else*: TRN		---	---	---
		Not Tested /Partially Tested – Medically Excused Absent	G	0 (M/S 1)	NTM				*HS Pass:* earned *Else*: MED		---	---	0
		Not Tested /Partially Tested - Absent	E	0 (M/S 1)	NTA				*HS Pass:* earned *Else*: ABS		---	---	0
	F	Tested Alternate Assessment Accountable Retest	C	0	TR	---	---	---	earned (Alt)	---	highest (Alt)	ü	1
				1	NTL					---	---	---	1
	F	Tested Accountable Retest	Y	0	TR	earned	earned	earned	earned	earned	highest	ü	1
				1	NTL			*Pass:* earned *Else:* ---	*Pass:* earned *Else*: LEP	*Pass:* earned *Else:* ---	---	---	1
	F	Previously Failed (Not Tested /Partially Tested Accountable Retest)	L	0	NTO	*Pass:* earned *Else:* ---	*Pass:* earned *Else:* ---	*Pass:* earned *Else:* ---	*Pass:* earned *Else:* PRF	earned	highest	ü	1
				1	NTL				*Pass:* earned *Else:* LEP	*Pass:* earned *Else:* ---	---	---	1
	P	Ineligible Accountable	P	0	NTO	earned	earned	---	PPR**	prior	prior	ü	1

		Retest – Previously Passed & Retested *(Preliminary Only)*		1	NTL					prior	---	---	1
	P	Previously Passed	K	0	NTO	---	---	---	PAS**	prior	prior	ü	1
				1	NTL					prior	---	---	1
0		Tested Not Accountable Alternate Assessment (Retest)	W	0	TR	---	---	---	earned (Alt)	---	---	---	---
				1	NTL								
		Tested Not Accountable (Retest)	R	0	TR	earned	earned	earned	earned	earned	---	---	---
				1	NTL			*Pass:* earned *Else:* ---	*Pass*: earned *Else:* LEP	*Pass:* earned *Else:* ---			
		Partially Tested Not Accountable (Retest)	B	*any*	NTO	earned	earned	*Pass:* earned *Else:* ---	*Pass:* earned *Else:* INC	*Pass:* earned *Else:* ---	---	---	---
		Not Tested Not Accountable (Retest)	J	*any*	NTO	---	---	---	DNT	---	---	---	---

[1] rptLEP is LEPFirst for all grades/subjects/participation statuses that do not have prior results. It is a calculated combination of LEPFirst and prior LEP First status for Accountable partstatuses with prior results. See calculations section for details.
[2] Assess exceptions for ELA: there is an additional condition of participation on the Access test. See calculation specifics for details.
[3]If Summarize = 1 then Assess = 0. If Summarize = 0 then Assess is blank.
*Grade = 09 students are assigned participation statuses as if Summarize = '1'. Perf2, CPI, Numin, and Assess are populated for calculations but set to blank in the Megafile deliverable.
**if (PPR or PAS) and (grade='09' or (grade='10' and summarize='1')) then invalidate current test and report prior results. (2022)
Note: "(M/S 1)" indicates that rptLEP[sub] may also be '1' in Math and Science for the listed participation statuses.

Other Calculations

1) StudentID
    a. StudentID = rptStudentID from DPRaw (verified SASID)
    b. For non-demonstration students, if StudentID does not begin with '10' it was generated by DP for linking purposes, and will be set to blank for reporting
2) Accommodations and Accommodation Footnotes
    a. If a student did not attempt any items in a subject, the corresponding raw accommodation indicators (from DPRaw) are ignored during the determination of accommodations and footnotes for reporting. Otherwise, if a student attempts at least one item in a subject, the corresponding raw accommodation indicators are evaluated:
        i. For ELA and Math accommodation all items (common, matrix, and field-test) are considered.
        ii. All of the underlying accommodation fields in DPRaw are maintained as provided, regardless of student attempt status.
    b. Standard Accommodations
        i. Accom_e = '1' if the student received any accommodations (except color contrast, answer masking and Alternative Mouse Cursor Pointer, non-IEP/non-504) in ELA, otherwise set it to blank.
        ii. Accom_m = '1' if the student received any accommodations in Math (except color contrast, answer masking and Alternative Mouse Cursor Pointer, non-IEP/non-504), otherwise set it to blank.

iii. Accom_s = '1' if the student received any accommodations in Science (except color contrast, answer masking and Alternative Mouse Cursor Pointer, non-IEP/non-504), otherwise set it to blank.

c. Special Access ELA Accommodations
   i. If Human Read-Aloud as a special access Accommodation is indicated, then Accom_ReadAloud='H'
   ii. If Text to Speech accommodation is indicated, then Accom_ReadAloud='T'
   iii. If Kurzweii special access Accommodation is indicated, then set Accom_Readaloud='K'
   iv. If Human Scribe special access Accommodation is indicated, then Accom_Scribe='H'
   v. If Speech to Text Non-Standard Accommodation is indicated, then Accom_Scribe='S'
d. Special Access Math Accommodation
   i. If calculation Device Accommodation is indicated, then Accom_Calculator='1'
e. For special access Accommodation Student Report text based on elaNSAFootnote and matNSAFootnote see table Special Access Accommodation Footnote Text (Student Report)

4) Reporting First Year EL Status
   a. RptLEP is determined for each subject based on current year partstatus, test attemptedness, EL First-year status, and Prior EL First year status (where applicable) to determine if a student's results should be considered achieved while under EL First year status or as currently EL First year. This takes into consideration the prior status of the student when prior results are eligible for accountability (currently only allowed in science)
   b. For all participation statuses that are considered Not Accountable rptLEP[sub] = ELfirstyear.
   c. Otherwise, if the student is considered Accountable then:
      i. If the student has prior results:
         1. If the student meets attemptedness this year, then: rptLEP[sub] = ELFirstyear.
         2. If the student partially attempts or does not attempt this year, then:
            a. rptLEP[sub] = '1' if either ELFirstyear = '1' or [sub]NTL = '1
            b. Otherwise rptLEP[sub] = '0
      ii. If the student does not have prior results, then rptLEP[sub] = ELFirstyear

5) Alt
   a. [e/m/s]Alt is set to '1' if a student is considered Tested or Retested Alternate Assessment (accountable or not accountable; PartStatus in 'A','C','W'). Otherwise, it is set to '0'.

6) SpecialEd
   a. If a student is considered Tested or Retested Alternate Assessment (accountable or not accountable) in any subject (eAlt, mAlt, or sAlt = '1') then SpecialEd = '1'. Otherwise, it is taken from IEP in SIMS. If it is blank it is defaulted to '0'.

7) SIMS CD
   a. The latest CD value from SIMS for Math, ELA, and Science is stored for each student as-is, without any additional formatting as SIMS_[sub]CD

8) SSubject
   a. SSubject is set to the science subject that is used for reporting
   b. Data Processing will provide the science subject for the current test as well as science subject for prior results
   c. If a student took alt, then the alt science subject is reported

d. Report the current science subject, if the test meets attemptedness rules and is not invalidated due to student being in grade 9 or (10 and summarize='1') and previously passed. First time grade 10 is defined as gradesims='10' and summarize='1'.
e. If the student has prior results being reported, use prior subject.
f. Otherwise, report the student as NextGen Biology (ssubject=5)

9) Raw Scores
   a. Overall Raw Score
      i. The student's overall raw score is the sum of scores for all scaling items
      ii. If a student has a partstatus that does not receive reported raw scores or if the student did not attempt any items (Attempt[sub]='N') then the raw score is set to blank after all subsequent calculations are complete.

10) Points Earned
   a. MCpts are based on common, scaling multiple choice or selected response items with point values stored in item metadata tables.
   b. ORpts are based on non-MC or involving open response, constructed response and short answers (including essay scores). Item point totals are calculated based on item metadata tables.
   c. If a student does not receive reported raw scores these calculations are set to blank.

11) Reporting Category Points Earned
   a. The total points earned, and the percentage of possible points earned by the student are calculated by reporting category.
   b. Calculations include all scaling items.
   c. If a student does not receive reported raw scores the number of points earned, and the percent of possible points earned are set to blank

12) Legacy Item Responses
   a. If a student has a participation status that does not receive reported item scores, or does not receive item scores because of attempt status, pass requirements or rptLEP conditions, all item responses will be blanked out (NULL) after raw score calculations are complete.
   b. Otherwise, re-formatted and re-ordered responses to all common items are reported to support the student report and megafile deliverables (excluding the State File, which includes all items):
      i. OR items: the item score or not scorable code is reported. Responses of 'B' (blank) are set to NULL.
      ii. MC items: "+" indicates a correct response, and "- "indicates a masked incorrect response choice (multiple responses ("*") remain unmasked).
      iii. Legacy HS STE have no released items.

13) Next Gen Item Responses—Students with a participation status that does not receive reported item scores and those who do not receive item scores due to test attempt status, passing status, or rptLEP conditions will have scores blanked out (NULL) after raw scores have been calculated, if applicable.
   a. All scaling items are reported and stored to support the student report and megafile deliverables (excluding the State File, which includes all items):
      i. OR and MS items: the item score or not scorable code is reported. Responses of 'B' (blank) are set to NULL.
      ii. Scores are formatted as x/y where x=earned score on the item; y=maximum score possible on the item.
   b. The order of the items is the reporting sequence in the test map.
   c. Items' release status is stored in the Objective 3 field in the test map. If an item has Objective 3=Release Pending the item is released.
   d. RepCatCode is the 2-character reporting category code for each item:

        i. Assigned by Item Number for Math and ELA using daReportingCategoriesCrosswalk.
        ii. Assigned by daIref.Cat2 for Science using daSciRepCatCodes
        iii. Reporting Categories are stored in Objective 1 in the test maps.

14) Current-Year Reporting Results
    a. Information stored in ScaledScore, Perflevel, rScaledScore, and rPerflevel are based on current year test results only. See the Calculations by Participation Status Summary table for details.
    b. ScaledScore
        i. Current year scaled score are used for aggregations. Conditions based on pass/fail, rptLEP or breach codes are not applied. This is an internal MP field that is not directly reported.
        ii. Blank for alternate assessment students and students not eligible to receive a scaled score based solely on participation status.
    c. PerfLevel
        i. Earned current-year achievement level based on scaledscore (1-4). Conditions based on pass/fail, rptLEP, or breach codes are not applied.
        ii. For Alternate Assessment students the un-translated PerfLevel from the Alternate Assessment data table StuPL is stored (7-17).
        iii. If the student does not receive an achievement level based solely on partstatus PerfLevel is blank.
        iv. Valid Values: numeric achievement levels (1-4, 7-17) or blank. Internal Cognia field that is not directly reported.
    d. rScaledScore
        i. rScaledScore is the current year earned scaled score for Cognia reporting purposes.
        ii. rScaledScore = ScaledScore, with suppression based on pass/fail status, rptLEP, or breach codes applied from the participation status summary table.
    e. rPerfLevel
        i. rPerfLevel is the current year achievement level or partstatus.
        ii. rPerfLevel = Perflevel, modified based on pass/fail status, rptLEP, or breach codes for reporting as follows:
            1. If perflevel = ‘1’ and rptLEP[sub] = ‘1’ and the student has a partstatus that receives the text “LEP” in place of a non-passing achievement level, then rPerfLevel = ‘F’. This is applied by subject for all subjects.
            2. Otherwise, if perflevel is blank then rPerflevel = partstatus.
            3. If a student has a breach code, then rPerfLevel is assigned per the breach instructions to override any other standard rules.
        iii. Valid values: numeric achievement levels (1-4, 7-17) and partstatus codes.
    f. mfPerfLev (megafile: [e/m/s]PerfLev)
        i. Formatted rPerfLevel (current year reporting results) to contain either the student’s achievement level abbreviated text (Standard or Alt), or 3-character participation status code for all students (e.g., ‘P’ or ‘P_A’ or ‘LEP’ or ‘TRN’).
15) Aggregation/Accountability Results
    a. Aggregation and Accountability Results combine prior and current results, where applicable. See the Calculations by Participation Status Summary table for details.
    b. mfScaledScore (megafile: [e/m/s]scaleds)
        i. For Accountable or Grade 09 students mfScaledScore is populated with either the current year scaled score, or prior scaled score as applicable for

accountability. For Not-Accountable students mfScaledScore is populated with current year results as applicable.

ii. mfScaledScore is populated as follows for Accountable students (or Grade 09):
    1. mfScaledScore = rScaledScore for First Time Testers and First Time Testers that did not meet attemptedness (ABS, MED, TRN, LEP).
    2. mfScaledScore = Prior highest scaled score for Previously Passed (whose test has been invalidated) students ([sub]ScaledScore] from DPraw).
        a. Note: if [sub]ScaledScore is blank for the above scenario, the student passed via appeals and an accurate scaled score may not be available. mfScaledScore is left blank.
    3. Otherwise mfScaledScore is blank

iii. If rptLEP = ‘1’ and the student’s mfScaledScore (as determined above) is considered Failing, then mfScaledScore is set to blank.

iv. mfScaledScore = rScaledScore for Not-Accountable students.

c. Perf2 (used in aggregate calculations;In 2022, not used for science aggregation for P/G reports)
    i. Populated with the achievement level for aggregate calculations and to support the megafile Perf2 using current year and prior results as applicable.
    ii. Perf2 is blank for all students with rptLep[sub] = ‘1’.
    iii. Otherwise Perf2 is populated as follows for Accountable or Grade 09 students:
        1. Perf2 = rPerfLevel for First Time Testers (1-4, ‘6’ is translated to ‘1’).
        2. Perf2 is blank for First Time Testers that did not meet attemptedness (ABS, MED, TRN, LEP).
        3. Perf2 = Highest achievement level between rPerfLevel and High_xPerf for Accountable Retesters (science only).
        4. Perf2 = Highest prior achievement level (High_sPerf) for Previously Passed students.
        5. Perf2 = Translated Alternate Assessment Perf2 for students Tested Alternate Assessment or Accountable Retested Alternate Assessment. Translation is done from Alternate Assessment Achievement Levels of 7-16 to Standard Achievement Levels 1-4
    iv. Otherwise perf2 is blank. Perf2 is blank for all Not-Accountable students except for grade 09 (available for grade 09 specific Cognia aggregations).

d. mfPerf2 (megafile: [e/m/s]Perf2)
    i. Perf2 formatted to contain the student’s achievement level abbreviated text (using Standard Assessment text only, e.g., ‘P’ or ‘A’). Blank if Perf2 is blank.
    ii. mfPerf2 is set to blank for grade 09 students in the megafile export.

16) Competency: Updating ELA_CD, Mat_CD, and Sci_CD
    a. These variables represent whether a student has met the testing graduation requirement for the subject, combining prior CD information from SIMS with the current test results.
    b. The updated mfCD fields begin with the prior CD value from SIMS (studemo SIMS_[sub]CD) for all students, regardless of participation status on this year’s test. The prior value may be blank for students that have not previously tested in a subject.
    c. The mfCD fields are then updated using current year scaled score results (rscaledscore) if and only if the CD value increases, otherwise the prior value is retained:
    d. For NextGen ELA:

i. If scaled score is ≥ 455 and scaled score is <472 then CD = ‘1’.
ii. Otherwise, if scaled score ≥ 472 then CD = ‘2’.
iii. Otherwise, CD is ‘0’.a

e. For NextGen Math:
   i. If scaled score is ≥ 469 and scaled score is <486 then CD = ‘1’.
   ii. Otherwise, if scaled score ≥ 486 then CD = ‘2’.
   iii. Otherwise, CD is ‘0’.

f. For Legacy HS Science:
   i. If scaled score ≥ 220 then CD = ‘1’.
   ii. Otherwise, CD is ‘0’.

g. For Next Gen Biology:
   i. If scaled score ≥467 then CD=’1’.
   ii. Otherwise, CD is ‘0’.

h. For Next Gen Introductory Physics:
   i. If scaled score ≥ 470 then CD=’1’.
   ii. Otherwise, CD is ‘0’.

j. For students tested via the Alternate Assessment (Partstatus in ‘A’, ‘C’, or ‘W’) the CD field is taken from the current-year updated CD field in the alternate assessment data (tblStuPL.mfCD) and is not re-calculated.

17) Graduation Requirement Footnote (CDFootnote) (tblScoredItem)
   a. The graduation requirement footnote is for High School students and indicates if a student has met, previously met, or still needs to meet the testing requirements for graduation.
   b. Using the previous CD value, student grade and summarize from SIMS (tblstudemo.SIMS_[sub]CD) and the updated CD value incorporating current test results (tblScoredItem.mfCD) for each subject determine the appropriate text for the student report. See table in *Student Report section* more details.

18) Composite Performance Index (CPI) Points (HS Science and Technology/Engineering only)
   a. CPI Points are assigned based on results used for Aggregations and Accountability. Assigned to students with sper2.
   b. For students whose accountability results are from the Standard MCAS Assessment:
      i. CPI points are assigned based on their Accountability Scaled Score (mfScaledScore) per table in Appendix B.
      ii. If Partstatus in (‘K’,’P’) and mfscaledscore is missing:
         1. If mfperf2 is “NI” (Standard Assessment) set CPI = 50 to indicate the student passed via appeals.
         2. Otherwise, mfPerf2 is from a prior year Alternate Assessment. CPI points are set per table in Appendix B.
   c. For Accountable Alternate Assessment students (Tested Alt or Accountable Retested Alt) CPI points are taken from the Alternate Assessment data

19) Next Gen Composite Performance Index (CPI) Points – HS STE only
   a. Calculated using legacy-equivalent scores
   b. Calculated for any student with sperf2
   c. See Appendix B for point assignments

20) NumIn
   a. See the calculations by participation status summary for a list of statuses that receive CPI points and numin = ‘1’. Otherwise, it is ‘0’

21) Assess

a. The subject specific Assess field is populated to indicate whether Accountable students have met the participation requirement this year based on the Calculations by Participation Status Summary table.
b. Exception for ELA only, when Assess = ‘1’: If LEP_off = ‘1’ and ACCESS_Part = ‘0’ then Assess = ‘0’.
c. Fields are prefixed with e/m/s in the megafile.
d. Student was assessed: 1=student tested on MCAS or student is first year EL, 0=ABS or MED or EL student who did not take ACCESS for ELs test, blank=not included in participation reports. See the table on page 12 for more detailed information.

22) Student Growth Percentile (SGP)

a. Student growth percentiles (and standard error range) are reported for accountable first-time test takers that are not considered First Year LEP (PartStatus = ‘Z’ and LEPFirst[sub] = ‘0’) in year 2 (students must receive test scores in consecutive grades two years in a row or have test scores in grade 8 and grade 10 over three years).
b. For all other students, SGP is blank.
c. Growth is provided by DESE for students in Math and ELA, in grades 4-8 & 10.
d. After the discrepancy period, any student with changes to their preliminary raw score, perf2, partstatus, or StudentID will have growth data suppressed.

23) Complexity is populated with the student’s alternate assessment composite complexity score for all students Tested or Retested (accountable or not-accountable) Alternate Assessment.

Aggregate Calculations

1) Aggregation Summary

a. These rules are applied to all aggregate calculations. Any additional rules specific to a particular calculation will be listed under the rules for the calculation.
    i. All reporting levels (sch/dis/sta): Only students eligible for accountability (Summarize = ‘1’) and test status =’T’ are included in aggregate calculations, except for Grade 09 specific calculations.
    ii. For grade 9 and 10 HS Biology and Introductory Physics: aggregations include students with Teststatussci=’T’ (first time testers) for both grades together
    iii. Students are aggregated to their official school (sprp_sch) and official district (sprp_dis), unless their sprp_dis is in daSingleSchDisLookup , in which case they are aggregated to the school associated with their sprp_dis and inclusion rules are dictated by the district (school and district calculations must match).
    iv. Students with an SPRP Orgtype of 6 or 13 are used for school-level aggregations.
    v. For district aggregations, if sprp_dis = ‘99999999’ then delete.
    vi. Exclusions based on OctEnrol are not applied to one-school district school or district level calculations.
    vii. See Appendix B for CPI points assignments
    viii. Reporting category aggregations on the mini-MCAS student reports will only include tested students who took mini-MCAS.
    ix. Aggregations are suppressed for affected reporting categories where items were removed from their form of the test the student took. In 2022, students taking screen reader form in some grade/contents had items removed. See Addenda 1 for specifics in 2022.

b. **Growth Aggregations**
    i. All students with tblScoredItem.GP populated are eligible to be included in the calculations.
    ii. The following exclusions are applied to the pool of eligible students:
        1. Students with OctEnrol ≠ '1' are excluded at the school and district level unless they are at a one-school district.
    iii. The state mean growth will be calculated as the average growth across the state.
    iv. Minimum N-Requirement: if N < 20 for a school or district results are calculated but suppressed from reports.

c. **Next Gen Reporting Category Calculations**
    i. Paper and Online tests are aggregated together.
    ii. Students near Meeting Expectations
        1. The average number of points earned (nPoints) and the percent of total possible points earned (pPoints) by students at the "low end of the Meeting Expectations level" is calculated for each reporting category at the state level, stacked by subject and reporder. The student group used must be greater or equal to 200; if not, the student pool will be expanded to include students with scale scores as follows 501, 499, 502, 498, etc.
        2. If any test/mode at a grade/content level does not reach the 200-student threshold within the scaled score range of 500-505, the student's report will not include the percent possible points for students scoring near Meeting Expectations for the reporting categories.
        3. Only students with partstatus='Z' are included in this calculation.

d. **Next Gen Average Points Earned and Average Scale Score**
    1. Calculate average for School, District and State
    2. Only students with partstatus='Z' are included in this calculation.
    3. Students with OctEnrol ≠ '1' are excluded at the school level unless they are at a one-school district.
    4. For HS Sciences, each science is aggregated by itself. Biology students are not combined with Introductory Physics students.

Data Deliverables Specifications

MegaFile(s)

1) Generic Details
    a. Megafile deliverables are posted by grade to the FTP site for the state and contain data for all processed students.
    b. All MegaFile deliverables follow the most recent layout: MCAS 2021-22 File Layout_Cognia.xlsx
    c. Test-result based fields that are not applicable to particular deliveries are left blank. SIMS based fields are populated for all releases, where available.
    d. Amend
        i. If a student receives an amend code for the General or Alternate Assessment, then the amend field will contain the first letter of that test (e.g., A value of "EM" indicates the student received an amend code in ELA and Math).

e. DataChanged
    i. DataChanged indicates if a student's record has changed since a prior release of the file. It is defaulted to '0' for all students.
    ii. Students whose record changes during the discrepancy period are flagged as datachanged = '1' (first full revision) in the post-discrepancy reporting file (release 4).
    iii. Only use the following fields when calculating datachanged:
        1. sprp_dis
        2. sprp_sch
        3. e/m/steststat
        4. e/m/srawsc
        5. e/m/sscaleds
        6. e/m/sperflev
        7. e/m/sperf2
        8. e/m/scpi
        9. e/m/snumin
        10. e/m/sassess

f. Commas are suppressed from school and district names, and student names.

g. If [e/m/s]Alt. = '0' then set to blank.

h. If LEPFirst = '0' then set to blank.

i. For the following Accommodation variables, if the accommodation equals '0', then set to blank: Accom_readaloud, accom_scribe, accom_calculator.

j. [e/m/s]ScaledS is the combined current year and prior year official scaled score results for students included in aggregations and accountability.

k. [e/m/s]Perflev is the formatted current year achievement level or code.

l. [e/m/s]Perf2 is the formatted combined current and prior year achievement level results for accountability and aggregations. Set to blank for Grade = '09'.

m. [e/m/s]_CD is updated with current-year results.

n. [e/m/s]SGP is the reported current-year student growth percentile.

o. If Grade = '09' then the following accountability fields are set to blank:
    i. sPerf2
    ii. sCPI
    iii. sNumin
    iv. sAssess
    v. (Grade 09 test results are not included in DESE aggregate calculations until their accountability year)

p. The following fields in the megafile will be blank in 2022:
    i. days_remote
    ii. days_in_person
    iii. member
    iv. instruction_mode
    v. eremote
    vi. mremote
    vii. sremote
    viii. esession
    ix. msession

q. For students affected by the screen reader issue or students who take mini-MCAS form, items not available to the student will have "/" in the item column.

2) Preliminary Release Specifics

a. File Name:MCASYYYY_XX.dat
Where YYYY = 4-digit test year (e.g., 2022), XX = 2-digit test grade.

b. Files are produced for grades 03-08 and HS (includes test grade 09 and 10 data).
c. DataChanged is originally set to '0'. If a student record is new or was modified during the discrepancy period, datachanged is set to '1'. For any subsequent updates the datachanged flag will be maintained and incremented as necessary.
d. MCASRowID
The mcasrowid is a 15-digit alpha-numeric field created in the following manner:
    i. 2 digits = administration year (ie: 22 for the 2022 test)
    ii. 2 digits = file grade (03-08 or HS)
    iii. 1 digit = test (1 = Standard)
    iv. 10 digits = bookletnumber (derived by DP from the student's SASID or submitted answer document)

Assigned Accommodations Data File(s)

1) File Name: [sub]Accom.csv
2) One file is produced by subject including all students in all grades and posted to the FTP.
3) The fields are described in the Accommodation File layout.

Accessed Accommodations Data File(s)

1) File Name: [sub]AccomByItem.csv
2) One file is produced by subject including all students in all grades and posted to the FTP.
3) For each test the file is stacked by item UIN and indicates which accommodations were accessed for that item.
4) Items with no accommodations accessed are not included in the file. If a student has not accessed any accommodations on the test this will result in that student not being included in the file.

Questionnaire (VOCAL) Data File(s)

1) File Name: Questionnaire Data GrXX.csv where XX = 2-digit grade
2) Layout: MCAS[4-digit year]Questionnairelayout.xlsx
3) Files are produced for Grades 04, 05, 08, and 10 and posted via FTP.
4) All students are included regardless of responses to questionnaire items, listed by SASID (StudentID)
5) Preliminary Questionnaire files will be delivered in June with final versions delivered in August. The Preliminary files will not have clean SASIDs. The MCASRowID in the final file will match the pre-discrepancy megafile.

Alt & Standard Participation File

A file is produced including students in all grades that took both the Alternate Assessment and Standard Assessment in the same subject. This file provides score and achievement level information for DESE to determine if any students should have their Standard Assessment results override their Alternate Assessment results. This file is posted to the FTP. The filenaming convention is MCASyyyyTestedMCASandAlt.xlsx where yyyy=the academic year ex. 2122

State File

A state file is produced after all reruns have been done. The file contains information per the state file layout. An item list file accompanies the state file to indicate the item metadata for each item.

Report Deliverables Specifications

General Rules for Report Generation

1. If a student does not receive a student report, then no label is printed for the student

2. If all tested subjects for the student are under the Alternate Assessment, then students will not receive a label or student report for the general assessment.
3. If all subjects are DNT the student does not receive a label or student report.
4. "Orphan" schools, defined by the district code field in iCore beginning with a letter, have generic district names such as Test Site or Out-of-State School. These generic names will be printed on the slip sheet of the printed reports but will be blanked out on the reports themselves. This applies to both labels and student reports.

Student Labels

1) Templates
    a. There are three different label templates that differ depending on the number of subjects reported for the tested grade:
        i. One subject – grade 09 (9th grader with no ELA and no Math submitted)
        ii. Two subjects – grades 03, 04, 06, 07
        iii. Three subjects – grades 05, 08, 10 (also any 9th graders with ELA and/or Math submitted)
2) Label Displays
    a. Student Name
        i. Presented as: FName MI. LName (with a period after the middle initial when the middle initial is not blank). Examples: JOHN T. SMITH or JENNY JONES
        ii. This section requires special formatting when one or more of the names are missing:
            1. If Lname is blank and Fname is blank, then section = "BLANK NAME"
            2. If Lname is blank and Fname is not blank, then section = "Fname BLANK"
            3. If Lname is not blank and Fname is blank, then section = "BLANK Lname"
    b. Grade
        i. If grade='10' and summarize = 0 and StuGrade <> 'SP' then use StuGrade from SIMS.
        ii. Otherwise use the Test Grade and remove any leading zeroes.
    c. SASID – Student ID from SIMS, no special formatting applied.
    d. School Name, School Code, and District Name – School and District names and School Code from iCore based on testing school (discode,schcode). No special formatting applied.
    e. Birth Date – DOB from SIMS, no special formatting applied. Stored in tblStudemo.DOB. Must be equal to 10 characters in length (MM/DD/YYYY).
    f. Test Date: "Spring 20YY" where 20YY = test year, e.g., 2013.
    g. Subject Title – Formatted with the following values:
        i. If subject = 'ela' then 'English Language Arts'
        ii. If subject = 'mat' then 'Mathematics'
        iii. If subject = 'sci' then and grade is 05 or 08 then 'Science and Technology/Engineering'
        iv. Otherwise, if subject = 'sci' and grade is 09 or 10 (HS STE's) then:
            1. If rptSciTry = '1' then 'Biology'
            2. If rptSciTry = '2' then 'Chemistry'
            3. If rptSciTry = '3' then 'Introductory Physics'
            4. If rptSciTry = '4' then 'Technology/Engineering'
            5. If rptSciTry= '5' then 'Biology'
            6. If rptSciTry= '6' then 'Introductory Physics'

h. Scaled Score – student earned scaled score stored as rScaledScore. If a student did not earn a scaled score for a tested subject (rScaledScore is NULL) the display is formatted as "---".
i. Achievement level contains either the achievement level text or the not-tested statement stored in tblPerfLevelLookup. This is set using the student's rPerfLevel. This is always populated if the subject existed at the tested grade.

Student Reports

1. Templates
    a. One subject – tested grade 09 legacy (9th grader with no ELA and no Math submitted)
    b. One subject-tested grade 09 NextGen (9th grader with no ELA and no Math submitted)
    c. Two subjects – tested grades 03, 04, 06, 07
    d. Three subjects – tested grades 05, 08, 10 (also any 9th graders with ELA and/or Math submitted)
    e. The grade 10 3-subject report has 2 different templates depending on the HS STE the student took. If the student took a legacy Science (Technology/Engineering or Chemistry) the back page will be in the legacy format. If the student took a Next Gen Science (Physics or Biology) the back page will be in the Next Gen format.
    f. If a student is Previously Passed (invalidated or does not attempt) or Previously Failed (and does not attempted) in HS STE, the results will be on the Grade 10 template with the legacy science page.
        1. The student's Prior score is reported
        2. The prior subject is reported
        3. The achievement level is "Previously Passed" or "Previously Failed"
    g. If a student is Previously Passed (not invalidated and attempted) or Previously Failed (and attempted) in HS STE, the results will be on the Grade 10 template with the NextGen science page.
        1. The student's current earned score is reported
        2. The current subject is reported
        3. The achievement level is earned achievement level
    h. If the student has any other not tested participation status for HS STE, then the grade 10 template with the NextGen HS STE design will be used and the subject will be "Science and Technology/Engineering".
2. Legacy HS (1 subject) Student Report Template (Chemistry or Technology/Engineering and tested grade=9 only)

    The following sections discuss the formatting of the various displays presented on the legacy high school student report. All calculations and aggregation rules can be found in earlier sections of this document. Please note that all details mentioned below cover reporting of tested students as outlined in Test Administration Table.
    a. Cover Page
        i. Title – "Spring 20YY MCAS Tests" where 20YY = test year, e.g., 2022.
        ii. Student Name – Presented as: LName, FName MI. (with a period after the middle initial when the middle initial is not blank). Examples: SMITH, JOHN T. or JONES, JENNY
        iii. This section requires special formatting when one or more of the names is missing:

            If Lname is blank and Fname is blank, then section = "BLANK NAME"
            If Lname is blank and Fname is not blank, then section = "BLANK, Fname"
            If Lname is not blank and Fname is blank then section = "Lname, BLANK"

iv. SASID – Student ID from SIMS, no special formatting applied.
v. School Name and District Name – School and District names from iCore based on testing school. No special formatting applied.
vi. Grade-Test Grade and remove any leading zeroes.
vii. DOB – DOB from SIMS, no special formatting. Must be equal to 10 characters in length (MM/DD/YYYY).

b. Inner Pages

Reporting Category Display

i. Subject – Formatted with the following values:
ii. If rptSciTry = '2' then 'Chemistry'
iii. If rptSciTry = '4' then 'Technology/Engineering'
iv. Reporting category text and two-character codes for the approved text and codes.
v. Reporting category results are displayed only for students who are Tested.
vi. Points earned by your child is the points earned by the student in that reporting category.
vii. Possible Points – points possible for that reporting category.
viii. Percent of possible points earned by your child is points earned by child/points possible times 100. Rounded to the nearest whole number.
ix. Join to tblRepCatSummary based on the subject associated with the student's rptSciTry.

Item Display

i. Subject Title – Formatted with the following values:
   If rptSciTry = '2' then 'Chemistry'
   If rptSciTry = '4' then 'Technology/Engineering'
ii. Order of rows within each grid
   1st = "Question Number" – this is the released item order number.
   2nd = "Reporting Category" – this is the two-character reporting category code.
   3rd = "Your Child's Score" - this is the response provided by the student.
iii. Formatting of Student Responses
   If the student correctly responded for all MC items, this is translated to a 'P' in the reporting data so that a check mark is displayed. Incorrect responses are replaced with a '-' on the report as all items are unreleased.
iv. Otherwise for all other items the points earned by the student is presented along with the possible points for the item separated by a "/". Examples: 2/4 or 7/12.
v. Item responses are blanked out in tblstuitem for students that should not receive reported item responses in the display

Student Achievement Level and Scaled Score

i. Achievement level – contains either the achievement level text or the not-tested statement stored in tblPerfLevelLookup. This is set using the rPerfLevel
ii. Score is the earned scaled score or blank for not tested students
iii. For HS students where Test status not equal to 'T', scaledscores are displayed if earning a passing raw score ("Needs Improvement" or higher)
iv. For current year scaled scores use rScaledScore

v. For standard error bar use lowScaledScore and highScaledScore
vi. Graduation requirement notes:

SIMS grade	g9 or lower taking HS STE only or one subject in g10 ELA/math	g9 or lower taking both g10 ELA & math (summarize set to 1 in megafile) & first-time g10 (class of 2024)	repeating g10 & g11 (class of 2023)	G12, SP (class of 2022)	blank (adults or not linked to SIMS)
summarize	**0/blank**	**1**	**0/blank**	**0/blank**	**0/blank**
ELA/math: CD=2	PASSED and met the MCAS graduation requirement in this subject	PASSED and met the MCAS graduation requirement in this subject	PASSED and met the MCAS graduation requirement in this subject	PASSED and met the MCAS graduation requirement in this subject	PASSED and met the MCAS graduation requirement in this subject
ELA/math: CD=1	PASSED but requires an Educational Proficiency Plan in this subject	PASSED but requires an Educational Proficiency Plan in this subject	PASSED but requires an Educational Proficiency Plan in this subject	PASSED but an Educational Proficiency Plan may be required in this subject. See above for details about MCAS graduation requirements	PASSED but an Educational Proficiency Plan may be required in this subject. See above for details about MCAS graduation requirements
ELA/math: CD=0	HAS NOT MET the MCAS graduation requirement in this subject	HAS NOT MET the MCAS graduation requirement in this subject	HAS NOT MET the MCAS graduation requirement in this subject	HAS NOT MET the MCAS graduation requirement in this subject but may be eligible for the modified CD. See above for details about MCAS graduation requirements	HAS NOT MET the MCAS graduation requirement in this subject
STE: CD=1	PASSED and met the MCAS graduation requirement in this subject	PASSED and met the MCAS graduation requirement in this subject	PASSED and met the MCAS graduation requirement in this subject	PASSED and met the MCAS graduation requirement in this subject	PASSED and met the MCAS graduation requirement in this subject
STE: CD=0	HAS NOT MET the MCAS graduation requirement in this subject	HAS NOT MET the MCAS graduation requirement in this subject	HAS NOT MET the MCAS graduation requirement in this subject but may be eligible for the modified CD. See above for details about MCAS graduation requirements.	HAS NOT MET the MCAS graduation requirement in this subject but may be eligible for the modified CD. See above for details about MCAS graduation requirements.	HAS NOT MET the MCAS graduation requirement in this subject

3. Next Gen Student Report Template (note that this also includes legacy HS science for students taking Chemistry or Technology/Engineering)

   The following sections discuss the formatting and displays presented on the Next Gen P/G Student Report. All calculations and aggregation rules can be found in earlier sections of this document.

   1) General Rules for Report Generation
      a. If all tested subjects for the student are under the Alternate Assessment, then students will not receive a student report or label for the general assessment.
      b. Test mode – Displayed is which mode of test the student used
         i. "Paper-based test" or "Computer-based test"
         ii. If a student has not attempted items ([x]attempt='N') then test mode will be blank on the student's report.
      c. Order of the Subject results
         i. The inner pages of the report display ELA on the left side of the page and Math on the right side of the page.
         ii. If grade is 05, 08 or HS, then Science results are displayed on the back page

2) Cover Page

a. If tested grade=10: – “Your Child’s Overall Results in Grade [GG]” (where grade = student’s tested grade)
b. Title – “Spring 20YY MCAS Tests” where 20YY = test year, e.g., 2022.
c. Student Name – Presented as proper case based on LName, FName MI. (with a period after the middle initial when the middle initial is not blank). Examples: Smith, John T. or Jones, Jenny
    i. This section requires special formatting when one or more of the names is missing:
        1. If Lname is blank and Fname is blank, then section = “Blank Name”
        2. If Lname is blank and Fname is not blank, then section = “Blank, Fname”
        3. If Lname is not blank and Fname is blank then section = “Lname, Blank”
d. SASID – Student ID from SIMS, no special formatting applied.
e. School Name and District Name – School and District names are truncated names from iCore based on testing school. No special formatting applied.
f. Grade – Student’s tested grade will be used for reports
g. DOB – DOB from SIMS, no special formatting. Must be equal to 10 characters in length (MM/DD/YYYY).
h. High School: Use the following table and the earned CD to determine the appropriate note:

SIMS grade	g9 or lower taking HS STE only or one subject in g10 ELA/math	g9 or lower taking both g10 ELA & math (summarize set to 1 in megafile) & first-time g10 (class of 2024)	repeating g10 & g11 (class of 2023)	G12, SP (class of 2022)	blank (adults or not linked to SIMS)
summarize	**0/blank**	**1**	**0/blank**	**0/blank**	**0/blank**
ELA/math: CD=2	PASSED and met the MCAS graduation requirement in this subject	PASSED and met the MCAS graduation requirement in this subject	PASSED and met the MCAS graduation requirement in this subject	PASSED and met the MCAS graduation requirement in this subject	PASSED and met the MCAS graduation requirement in this subject
ELA/math: CD=1	PASSED but requires an Educational Proficiency Plan in this subject	PASSED but requires an Educational Proficiency Plan in this subject	PASSED but requires an Educational Proficiency Plan in this subject	PASSED but an Educational Proficiency Plan may be required in this subject. See above for details about MCAS graduation requirements	PASSED but an Educational Proficiency Plan may be required in this subject. See above for details about MCAS graduation requirements.
ELA/math: CD=0	HAS NOT MET the MCAS graduation requirement in this subject	HAS NOT MET the MCAS graduation requirement in this subject	HAS NOT MET the MCAS graduation requirement in this subject	HAS NOT MET the MCAS graduation requirement in this subject but may be eligible for the modified CD. See above for details about MCAS graduation requirements	HAS NOT MET the MCAS graduation requirement in this subject
STE: CD=1	PASSED and met the MCAS graduation	PASSED and met the MCAS graduation	PASSED and met the MCAS graduation requirement in this subject	PASSED and met the MCAS graduation requirement in this subject	PASSED and met the MCAS graduation

SIMS grade	g9 or lower taking HS STE only or one subject in g10 ELA/math	g9 or lower taking both g10 ELA & math (summarize set to 1 in megafile) & first-time g10 (class of 2024)	repeating g10 & g11 (class of 2023)	G12, SP (class of 2022)	blank (adults or not linked to SIMS)
summarize	**0/blank**	**1**	**0/blank**	**0/blank**	**0/blank**
	requirement in this subject	requirement in this subject			requirement in this subject
STE: CD=0	HAS NOT MET the MCAS graduation requirement in this subject	HAS NOT MET the MCAS graduation requirement in this subject	HAS NOT MET the MCAS graduation requirement in this subject but may be eligible for the modified CD. See above for details about MCAS graduation requirements.	HAS NOT MET the MCAS graduation requirement in this subject but may be eligible for the modified CD. See above for details about MCAS graduation requirements.	HAS NOT MET the MCAS graduation requirement in this subject

i. If tested grade=10: print Not Tested reason below the text from the above table. If the student is tested this section is blank. The not-tested reason wording is stored in tblPerfLevelLookup. This is set using the rPerfLevel variable from tblStuTest

j. If tested grade=10: Print Student Growth Percentile under scaled score information

k. If the student is being reported on the legacy science Grade 10 template, then apply the following:

   Graduation requirement footnotes

   i. If student has cd='0' then print "Your child has not met the MCAS graduation requirement in this subject.

   ii. If student has PartStatus='K' then print "Your child has already met the MCAS graduation requirement in this subject."

   iii. If student has cd='1' then print "Your child has met the MCAS graduation requirement in this subject."

l. If tested grade is in 3-8: Print Family Guide text for each subject based on the next higher grade than the student's tested grade. Grade 8 will have text from High School.

m. Grade 9 reports will have text from High School. The same science text displayed on the Grade 8 reports.

3) Inner pages

a. Reporting Category Display

   i. Subject– Formatted with the following values:

      If subject = 'ela' then 'English Language Arts'
      If subject = 'mat' then 'Mathematics'
      If subject = 'sci' and grade is 05 or 08 then 'Science and Technology/Engineering'
      Otherwise, if subject = 'sci' and grade is 09 or 10 (HS STEs) then:
         If rptSciTry = '1' or '5' then 'Biology'
         If rptSciTry = '3' or '6' then 'Introductory Physics'
         If rptSciTry = '2' then 'Chemistry'
         If rptSciTry = '4' then 'Technology/Engineering'

b. Next Gen: Reporting category text, two-character codes, and report display ordering – refer to daRepCatTextLookup for the approved text and codes.

c. Reporting categories are sorted in the order listed in appendix A.
d. Reporting category results and state comparisons are displayed only for students who are Tested. State results include only students who are Tested.
e. Legacy Science only: Percent of points earned by your child– pRawScore variables from tblStuRepCatPoints, no special formatting with RepCatID indicating the Reporting category RepOrder in daPointsPossible.
f. For ELA, Math, 5 and 8 Science, and NextGen HS STE (Biology and Introductory Physics) the comparison is "Average points earned" includes Meeting Expectation students who scored close to 500"
    i. Prior to calculation, the pool of students used must be no less than 200. If there are less than 200 students at the 500 level, then expand the student pool to include students with scale scores equal to 501, 499, 502, 498, etc. until a minimum n of 200 students is reached, only considering students within the same test mode and scaleform.
    ii. For any mode at a grade/content level that does not reach the 200-student threshold within the scaled score range of 500-505, the student's report will not include the average points for the reporting categories.
    iii. Data displaying averages in the scaled score table should include data from the full population, and not separated out by test mode.
    iv. For students who are scored using a non-standard scaleform, the reporting category for which the reduced number of points is associated, display "N/A".
g. Item Display
    i. Subject Title and Subject Ordering follow the same rules as above.
    ii. Order of rows within each grid
    1 = "Question Number" – this is the released item order number.
    2 = "Reporting Category" – this is the two-character reporting category code. This is displayed for HS Science students only
    If subject is ELA or Math then: 3 = "Points Earned" - this is the score the student received for the item/total points possible for the item.
    If subject is STE then: 3=Practice Category-The single character abbreviation for the Practice Category assigned to the item. If there is no Practice Category assigned to the item then "/"
    If subject is STE then: 4=" Points Earned"- this is the score the student received for the item/total points possible for the item.
    iii. Order of items
        a. Items are ordered in the order specified in the reporting sequence column in the test maps.
        b. Item responses are ordered by the reportingsequence column in the test maps.
        c. For essays points for each trait will be printed separately on the report in released item and trait order.
    iv. Formatting of Student Responses
        a. Legacy HS Science data will include the following:
        Check marks for correct answers
        An asterisk for more than one answer provided
        A dash if a student incorrectly answered the item
        Open response items are displayed with the number of points earned out of the total possible points (Ex. 3/4 or 0/1).
        b. ELA and Math and 5&8 Science data are displayed as the number of points earned out the total points possible (Ex. 1/1 or 0/3).

c. If a student did not answer an item, that cell will be blank.

h. Student Achievement Level and Scaled Score Statements
   i. Next Gen: “Your Child’s Achievement Level:” Achievement level earned by the student or the not tested reason for not tested students
   ii. Next Gen: “Your Child’s Score:” earned scaled score, the rScaledScore variable from tblStuTest.
   iii. EL First-year students:
      a. Students who are not Tested do not receive scaled scores
      b. if TestStat = NTL:
         Scaled scores printed for ELA and Math and 5&8 Science if earned Achievement Level is PM or above.
         Scaled scores printed for HS Science students earning an achievement level of NI or above.
   iv. State results will only include students who fully attempted.
i. Special Access Accommodation Student Report text based on table Non-Standard Accommodation Footnote Text (Student Report). See below for wording.
j. Next Gen: Average Scaled Scores and Prior Scaled Scores
   i. Display current year average scaled score based on official school and official district
   ii. Prior grades and scaled scores will be pulled from the SIMS data
   iii. Prior scores in grades 3-8 to be reported are for years 2019 and 2021 where available. Grade 10 will have results for 2019 and 2018 where available.
k. Student Growth Percentile Display
   i. Growth is provided by DESE
   ii. If a student’s test status changes to Not Tested, then growth will be blanked out
   iii. Mean growth is based on official school and official district
   iv. Your Child – presents the student’s growth percentile
   v. GP is used to mark the location of the circle with score.
   vi. lowGP and highGP are used to draw a standard error bar behind the student score circle.
   vii. School/District – Mean value from tblSummary for school/district based on official school and district (sprp_sch and sprp_dis).
   viii. School/District Means are displayed regardless of whether the student has a growth percentile displayed
   ix. In 2022, State mean is not fixed at 50. The display will reflect the calculated value.
l. Special access accommodation footnote

Special Access Accommodation	Student Report Text
Read aloud	Information provided by the school indicates student received a special access accommodation (the ELA test was read aloud to student) as required by their IEP or 504 plan.
Scribe	Information provided by the school indicates student received a special access accommodation (student used a scribe for the ELA test) as required by their IEP or 504 plan.
Calculator	Information provided by the school indicates student received a special access accommodation (student used a calculator for the non-calculator session of the mathematics test) as required by their IEP or 504 plan.
Read aloud and Scribe	Information provided by the school indicates student received special access accommodations (the ELA test was read aloud to student and student used a scribe for the ELA test) as required by their IEP or 504 plan.

Portfolio Feedback Form (PFF)

The Portfolio Feedback Form is produced in June for the students who participate in the Alternate Assessment.

Reporting Category Table

The red text in the below table indicates legacy Biology and Physics reporting categories. The last 3 rows in the table below are the science practice categories.

Grade	Subject	RepCatID	RepCatLabel	RepCatAbb	rptRepCatOrder
3	ela	1	Reading	RE	1
3	ela	2	Language	LA	2
3	ela	3	Writing	WR	3
3	mat	1	Operations and Algebraic Thinking	OA	2
3	mat	2	Number and Operations in Base Ten	NT	2
3	mat	3	Number and Operations-Fractions	NF	3
3	mat	4	Measurement and Data	MD	4
3	mat	5	Geometry	GE	5
4	ela	1	Reading	RE	1
4	ela	2	Language	LA	2
4	ela	3	Writing	WR	3
4	mat	1	Operations and Algebraic Thinking	OA	1
4	mat	2	Number and Operations in Base Ten	NT	3
4	mat	3	Number and Operations-Fractions	NF	3
4	mat	4	Measurement and Data	MD	4
4	mat	5	Geometry	GE	5
5	ela	1	Reading	RE	1
5	ela	2	Language	LA	2
5	ela	3	Writing	WR	3
5	mat	1	Operations and Algebraic Thinking	OA	1
5	mat	2	Number and Operations in Base Ten	NT	3
5	mat	3	Number and Operations-Fractions	NF	3
5	mat	4	Measurement and Data	MD	4
5	mat	5	Geometry	GE	5
5	sci	1	Earth and Space Science	ES	1
5	sci	2	Life Science	LS	2
5	sci	3	Physical Science	PS	3
5	sci	4	Technology/Engineering	TE	4
6	ela	1	Reading	RE	1
6	ela	2	Language	LA	2
6	ela	3	Writing	WR	3
6	mat	1	Ratios and Proportional Relationships	RP	1
6	mat	2	The Number System	NS	2
6	mat	3	Expressions and Equations	EE	3
6	mat	4	Geometry	GE	4
6	mat	5	Statistics and Probability	SP	5
7	ela	1	Reading	RE	1
7	ela	2	Language	LA	2
7	ela	3	Writing	WR	3
7	mat	1	Ratios and Proportional Relationships	RP	1
7	mat	2	The Number System	NS	2
7	mat	3	Expressions and Equations	EE	3
7	mat	4	Geometry	GE	4
7	mat	5	Statistics and Probability	SP	5
8	ela	1	Reading	RE	1
8	ela	2	Language	LA	2
8	ela	3	Writing	WR	3
8	mat	1	Number System & Expressions/Equations	NE	1
8	mat	2	Functions	FN	2
8	mat	3	Geometry	GE	3
8	mat	4	Statistics and Probability	SP	4
8	sci	1	Earth and Space Science	ES	1
8	sci	2	Life Science	LS	2
8	sci	3	Physical Science	PS	3
8	sci	4	Technology/Engineering	TE	4
10	bio	1	Biochemistry and Cell Biology	BC	1
10	bio	2	Genetics	GE	2

continued

Grade	Subject	RepCatID	RepCatLabel	RepCatAbb	rptRepCatOrder
10	bio	3	Anatomy and Physiology	AP	3
10	bio	4	Evolution and Biodiversity	EV	4
10	bio	5	Ecology	EC	5
10	che	1	Properties of Matter and Thermochemistry	TH	1
10	che	2	Atomic Structure and Periodicity	AS	2
10	che	3	Bonding and Reactions	BR	3
10	che	4	Solutions, Equilibrium, and Acid-Base Theory	SO	4
10	ela	1	Reading	RE	1
10	ela	2	Language	LA	2
10	ela	3	Writing	WR	3
10	mat	1	Number and Quantity	NQ	1
10	mat	2	Algebra and Functions	AF	2
10	mat	3	Geometry	GE	3
10	mat	4	Statistics and Probability	SP	4
10	phy	1	Motion and Forces	MF	1
10	phy	2	Heat and Heat Transfer	HT	2
10	phy	3	Waves and Radiation	WV	3
10	phy	4	Electromagnetism	EM	4
10	tec	1	Engineering Design	ED	1
10	tec	2	Construction and Manufacturing	CM	2
10	tec	3	Fluid and Thermal Systems	FL	3
10	tec	4	Electrical and Communication Systems	EL	4
10	bio	1	Molecules to Organisms	MO	1
10	bio	2	Heredity	HE	2
10	bio	3	Evolution	EV	3
10	bio	4	Ecology	EC	4
10	phy	1	Motion, Forces, and Interactions	MF	1
10	phy	2	Energy	EN	2
10	phy	3	Waves	WA	3
	sci	N/A	Investigations and Questioning	A	N/A
	sci	N/A	Mathematics and Data	B	N/A
	sci	N/A	Evidence, Reasoning, and Modeling	C	N/A

CPI Charts for Grade 10

By ALT standard (nextGen or legacy)	CPI 2022 (G10 all 4 STE subjects)
INP	25
AWR	50
EMG	75
PRG	100
By Grade-Level complexity (nextGen)	**CPI 2022 (G10 Bio & Phy)**
NM_A	25
PM_A	75
M_A	100
E_A	100
By Grade-Level complexity (legacy)	**CPI 2022 (G10 Chem & Tech/Eng) & banked results**
F_A	25
NI_A	75
P_A	100
A_A	100
Standard Test (legacy or legacy-equivalent)	**CPI**
240-280	100
230-238	75
220-228	50
210-218	25
200-208	0

Addenda

1. The following items have been removed from the specified forms:

FormName	FormID	UIN	Item Type	PvMax	Comment
MCASma08sp22OPform00SR	22MA08SPSREN0102 22MA08SPATEN0102	MA715920050_PA	CR	4.0	Removed from SR/NSR forms only
MCASsc05sp22OPform01SR	22SC05SPSREN0102 22SC05SPATEN0102	SC313154_PA	CR	3.0	Removed from SR/NSR forms only
MCASsc08sp22OPform01SR	22SC08SPSREN0102 22SC08SPATEN0102	SC631744146_PA	CR	3.0	Removed from SR/NSR forms only

2. The following describes effects on the student report for affected students
    a. A · is populated in the cell in the item grid for the affected subject for the item in sequence
    b. A corresponding footnote appears below the item grid for the affected subject only
    c. The note reads: "·=This question was not administered on the version of the test your child took and did not count toward their results."
    d. ** appear in the affected reporting category row for columns: Average Points in School, Average Points in District, Average Points in State, and Average Points at Meeting Expectations
    e. A corresponding ** footnote appears below the reporting category table
    f. The ** footnote reads" Average number of points for the school, district, state and at Meeting Expectations are not available for the version of the test your child took."
3. In the megafile the items that are not scored are presented with a "/".
4. The following items will have 1 pt. credited (i.e., added to their earned score on the other parts of the item) for affected items for the affected students who took the screen reader form MCASscBIsp22OPform01SR:

UIN	Form ID	Issue	Points added
SC816235890_PA	22SCBISPATEN0101 22SCBISPSREN0101	SR/NSR students will not be able to use subscripts and won't be able to populate directly into the equation in Part A like paper students will be able to.	1
SC312659_PA	22SCBISPATEN0101 22SCBISPSREN0101	SR/NSR students will not be able to draw in Parts B & D as the item instructs them to.	2

5. Students who took the mini-MCAS test will be treated as follows:
    a. They are aggregated only with other students who took the mini-MCAS who are classified as tested.
    b. On their student report, the item grid will have · where the item was not presented on the mini-MCAS test.

c. A footnote will appear below the item grid that reads=This question was not administered on the version of the test your child took and did not count toward their results.”
d. In the megafile the items that are not scored are presented with a “/”.
e. In the megafile, ssession=1 to indicate regular test, and 3 to indicate mini form.

6. The following table clarifies changes to reporting students who previously passed or previously failed in 2022.

Partstatus	Invalidated*?	score on ISR	Sscaleds/sperflev in megafile	ssubject	Sperf2 in megafile (summarize=1 only)
PAS	Y	prior only (legacy template)	prior SS/PAS	prior	Prior
PRF (no attempt spr22)	NA	prior only (legacy template)	prior SS/PRF	prior	prior
PRF (attempted spr22)	NA	Current	Current SS/current sperflev + prior (new fields)	current	highest
PAS	N	Current	Current SS/current sperflev + prior (new fields)	current	highest

7. Students with no prior scaledscore but prior perflevel and no prior science are reported on the NextGen template with subject=Biology. The aggregations will be reported where available.
8. Students from DESE who are under investigation are reported as INC with no item level data. Perflev=’INC’ and other performance fields are blank in the megafile. In 2022, the students and subjects are listed in **To Suppress 8.19.22.xlsx**

MCAS-ALT Contract Overview

Reporting Business Requirements
Massachusetts Comprehensive Assessment System Alternate Assessment (MCAS-Alt)
Spring 2022

This section of Appendix Q details requirements for analysis and reporting for MCAS-Alt. The final student level data used for analysis and reporting is described in the "Data Processing Specifications." This document is considered a draft until the Massachusetts Department of Elementary and Secondary Education (DESE) signs off. If there are rules that need to be added or modified after said sign-off, DESE sign-off will be obtained for each such rule.

New For This Year

a. Legacy HS STE CPIs will be calculated in 2022
b. Will not apply in 2022: For Grade 10 STE, if a student does not have results instead of "Required, but not submitted" being printed on student report, the achievement level column on the report will be blank. These will be treated as students in grades 11, 12, or 12+.
c. On the Student Report, students with participation status Previously Failed will have Achievement Level="Previously Tested" printed
d. Achievement Level "Incomplete Portfolio" is changed to "Incomplete"

Test Administration(s) Adminid=5

Subject	Required Grades	Permissible Grades	Test Type
ELA	03-08, 10	03-08, 10+	Portfolio
Mathematics	03-08, 10	03-08, 10+	Portfolio
Science & Technology/Engineering	05, 08	05, 08	Portfolio
One of either High School Biology, Chemistry, Introductory Physics, or Technology/Engineering	10	09,10+	Portfolio

General Information

- Client and internal deliverables for this contract are listed. Specifications for each deliverable are detailed in the Deliverable Specifications section provided.

Deliverable	Type	Delivery	Administration		
			June	Prelim	Post-Discrepancy
Student data Files	.xls	To PM	ü		ü
Alt Mega File	.dat	To PM	ü		
Comments Summary	.xls	To PM			ü
General Portfolio Comments Summary	.xls	To PM			ü
State Performance Level Summary	.xls	To PM		ü	ü

Deliverable	Type	Delivery	Administration		
			June	Prelim	Post-Discrepancy
State Participation Summary	.xls	To PM			ü
Teacher Survey	.xls	To PM		ü	
Participation by Disability	.xls	To PM			ü
Portfolio Feedback Form (school level pdf)	.pdf	FTP for State	ü		
Portfolio Feedback Form (by student pdf)	.pdf	Shipped with Portfolio	ü		
Parent/Guardian Report (school and district copy)	.pdf	Shipped to District			ü

Internal Data Sources

Scoring

- If score 1 does not match score 2 for any dimension, there must be a 3rd score for that dimension.
- If there is a 3rd score for a dimension, that score is the score of record. Otherwise, the 1st score is the score of record.
- If scorer 3 bubbles Strand not Submitted, the strand will be considered not submitted and no scores will be reported.
- If Demonstration of Skills or Independence has a score of 'M' then both Demonstration of Skills and Independence must have a score of 'M'.
- A score of 'M' for scorer 1 and/or 2 will always have a 3rd score.
- A score of '1' for Level of Complexity from scorer 1 and/or 2 will always have a 3rd score.
- If Level of Complexity has a score of 1 then all other scores for that strand must be blank.
- If 'At or Close to Grade Level Bubble' is 1 for a content area then at least one of the required strands for that content area must have a Complexity score of 3 or higher.
- A score of 'M' for Demonstration of Skill and Independence counts as a 1 for analysis.
- The performance level for each strand is determined by a lookup table (see section VI.B) using scores from Complexity, Demonstration of Skills, and Independence.
- Bubbled comments that do not have text associated with them will be suppressed.
- Strands with a Level of Complexity score of 1 will be treated as not submitted for analysis. If a required strand has a Level of Complexity score of 1, then the resulting performance level will be incomplete.
- For High School sciences DP sets the SciTry variable to indicate which science test was submitted for the current year, SciTry is calculated by reconciling the subject indicated by scorer 1 with scorer 3.
  e. '1' = Biology
  f. '2' = Chemistry
  g. '3' = Physics
  h. '4' = Technology/Engineering
  i. '5' = next-gen Biology
  j. '6' = next-gen Physics

k. For grades 10+ where science was not submitted, default sciTry to 1.
l. SciTry is blank for grades 03-08.
m. DA calculates the final reporting SciTry value as rptScitry.

Data Processing (DP)

- Amend Flag

n. The Amend flag for each content area is set by DP based on test booklet reconciliation and the DESE Breach List on an individual student basis. The default Amend flag value for all students is ‘0’.

o. See the Amend Flag Lookup (a Cognia internal Document) for valid Amend Flag values and their impact on reporting.

External Data Sources

Breach List

- Students who are considered a security breach are provided by the DESE in the Breach List. These students are identified as Security Breach: Cheating and instructions for processing and reporting the tests on an individual case basis are provided.
- Data Analysis adds necessary Amend flag values (> ‘1’) and instructions to the Amend Flag Lookup for each distinct scenario on the Breach List.
- Data Processing applies any necessary changes to the student record based on the DESE instructions and applies the corresponding Amend Flag value from the lookup to the student for Data Analysis processing.

SIMS

- Student demographic data is provided by the DESE for reporting use. Please see the Data Processing specifications for internal validations and requirements of the data.
- Summarize

p. Summarize is populated in SIMS as either ‘1’ or ‘0’ or blank:

i. Summarize = ‘1’ indicates that the student is expected to test in the subjects specified for their grade and should be included in aggregations (where applicable). Their results are included in accountability determinations.

Students in Grades 03-08 are all expected to test.

Students in Grade 10 (or students skipping grade 10 who have not yet been tested) are expected to test in Math and ELA and are expected to test or to have prior scores for science. They will have Summarize = ‘1’.

ii. Summarize = blank in SIMS is only applicable to students from the student directory that do not link to SIMS.

iii. Summarize = ‘0’ indicates that the student is not expected or required to test at this time for accountability. These students are excluded from aggregations (except for grade 09 specific aggregations). Their results are not counted towards accountability determinations. This includes but is not limited to: student grade 09 students, students that are retesting to meet graduation requirements in a subject they previously failed or missed, students that are retesting to increase their scores for scholarship purposes, or students that are new to Massachusetts.

q. See the Data Reconciliation section IV.A for Data Processing rules for determining the final Summarize source or default value in the views for DA based on Test Grade and SIMS data.

- Banked Prior Achievement Level

r. Only applicable for science. All references are specific to science; in the event that these determinations are needed for Math or ELA, the corresponding Math and ELA specific fields would be used.

s. High_sPerf in SIMS contains the prior high achievement level to be considered during participation status assignment. ELA and Math fields are High_ePerf and High_mPerf respectively and are expected to be blank for HS students with Summarize = ‘1’.

t. All other fields with historical score or performance information, including the CD fields, are ignored during the participation status determination for students.

u. Data are stored in DPRaw for DA in [sub]PerfLevelHigh (for all subjects) and [sub]NTL fields (for Science).

- SciNTL

v. If SciNTL = ‘1’ a student is considered to have previously tested in science as a first-year LEP student and was reported with a sTestStat = ‘NTL’.

Grade Span Lookup

w. The DESE provides a grade span lookup for all public official schools. These are joined to student data based on sprp_sch in tblStudemo.

x. Cognia will provide DESE with a list of any public schools that have students assigned to them that are not included in the lookup, resulting in blank grade span data based on the Preliminary data release.

y. All public schools must have a grade span for final post-discrepancy reporting. For earlier releases grade spans may be blank for schools missing from the lookup.

Discrepancy Site

- Data from preliminary reporting is posted to the discrepancy site for clean up by the field and the department.
- See the Discrepancy Site Requirements for more details on which fields are available for editing at each user level.
- Data Processing re-processes data post-discrepancy to incorporate the updated information and discrepancy resolutions from the DESE for DA for final reporting.
- During final processing all information from the discrepancy site is considered final and is maintained, however, changes to certain fields require additional data audits and/or recalculation of student participation status to ensure consistency. See the Data Reconciliation section for these details.

Alternate Assessment Override

- Based on preliminary results from the Alt and Standard Results data file, the DESE may identify any students whose Standard Assessment results should be reported instead of their Alternate Assessment results during final reporting (subject specific).
- The DESE will provide this list to Data Processing with the discrepancy resolutions.
- DP will set the amend flag to appropriately identify these students for DA.

Data Reconciliation

The following cleanup will be performed on student level data prior to analysis once demographic data and reconciled test information are compiled to ensure consistency. Calculations are performed in the order listed below, and audited values are used in each subsequent check and for all analysis and reporting, as applicable:

Summarize (performed by DP)

- If test grade is in 03-08, summarize is defaulted to ‘1’ for all students, regardless of SIMS value.
- If test grade is ‘09’ summarize is defaulted to ‘0’ for all students, regardless of SIMS value.
- If test grade is ‘10’:
  - z. If student grade is ≤ ‘09’:
    - iv. If the student submitted both Math and ELA (Alt or Standard), then summarize = ‘1’.
    - v. Otherwise, summarize = ‘0’.
  - aa. If student grade = ‘10’,’11’,’12’, or ’SP’ then summarize is taken from SIMS. If summarize is missing, or if student grade is missing, it is defaulted to ‘0’.
- The same rules are applied post-discrepancy, except summarize is taken from the updated Discrepancy data in place of SIMS. If summarize is updated during discrepancy reporting the participation status is set to blank to be reassigned.

LEPFirst/ YrsInmass/ YrsInmass_num

- Lepfirst is provided in SIMS and is not audited by Cognia
- YrsInmass and YrsinMass_num are not audited by Cognia

LEP

- If LEPFirst = ‘1’ then update existing LEP to ‘1’.

LEPFLEP

- If LEPFirst = ‘1’ or LEP = ‘1’ or LEPFormer (DA Use: “flep_off” in dpraw) = ‘1’ then update existing LEPFLEP to ‘1’.

Official School and Official District Code

Terminology:

- Discode = Cognia Testing Discode from DPRaw (See DP Specifications)
- SchCode = Cognia Testing SchCode from DPRaw (See DP Specifications)
- SendDiscode = Sending District from SIMS
- SimsDisCode = Official Discode from SIMS
- SimsSchCode = Official SchCode from SIMS
- Testing Orgtype = Testing school (discode+schcode) Org type

- OrgType = SPRP school org type
- Exceptions List is provided to Cognia by the DESE.
- *(DA Use)*: The exceptions list is stored in daTestSitelookup

Official District (sprp_dis)

- If the student's testing discode+schcode is on the *Exceptions List* (System+School) then the official district is the sprp_dis from the *Exceptions List*.
- If the student's testing orgtype is 6, 13 or 22 then the official district is set to the discode concatenated with four zeroes.
- Otherwise the official district is the sending district from SIMS (senddiscode) if it exists, concatenated with four zeroes at the end. If senddiscode is blank the official district is set to '99999999'.

Official School (sprp_sch)

- If the student's testing school (discode+schcode) is on the *Exceptions List* (System+School) then the official school is the sprp_sch from the *Exceptions List*.
- If a student is from a collaborative school (testing OrgType = 4) then the official school is = 05*XX*0000 where *XX* is the 3rd and 4th digit of the testing district code.
- If the student's testing orgtype is 25 or 31 then the official school is the official school code from SIMS (simsDiscode + SimsSchcode). If the simsDiscode and simsSchcode are blank the official school is set to the testing school code (discode+schcode). If the official school from SIMS turns out to be orgtype 22, then use the Exceptions list for official school.
- Otherwise the official school is the testing school (discode+schcode).

Setting of Orgtype

- Orgtype is based on the official school code
- Using the official school code link to the MCAS org data file (DA use: icore) and pull the org type (DA use: Reportcode2).

  bb. In the event that an orgtype is not assigned, default orgtype to 'X'. This is expected due to some SPRP schools not being in the Org data file.

YrsInSch and YrsInDis

- If sprp_sch or testing school (discode+schcode) = the official SIMS school code from June SIMS (simsDiscode + simsSchcode) then use YrsInSch value from SIMS. Otherwise set YrsInSch = '1'.
- If sprp_dis = SendDiscode+0000 from June SIMS then use the YrsInDis value from SIMS. Otherwise set YrsInDis = '1'.

Oct_Enrol (enrolled in same location since Oct)

- If sprp_sch or testing school (discode+schcode) = SIMS school code from June SIMS (simsDiscode+simsSchcode) then OctEnr = Oct_off from SIMS. Otherwise set Oct_Enr = '0'.

Con_Enrol (continuously enrolled for 2 years)

- Only populated for students in the grade 10 view, otherwise blank.
- If sprp_sch or testing school (discode+schcode) = the official SIMS school code from June SIMS (simsDiscode + simsSchcode) then use con_enr_sch value from SIMS. Otherwise set con_enr_sch = blank.
- If sprp_dis = SendDiscode+0000 from June SIMS then use the con_enr_dis value from SIMS. Otherwise set con_enr_dis = blank.
- ConEnr_sta is taken from SIMS.

Student Participation and Reporting Status

Basic Definitions

- ***Test Attemptedness*** *(by subject)*

  cc. A strand was submitted if there is at least one scoring dimension with a valid score

  dd. Attempt: A student participated if at least one required strand was submitted

  ee. Did not attempt: Students did not submit any required strands.

- ***Not Tested Indicators*** *(by subject)*

  The following Not Tested reasons may be bubbled on the student's answer booklet.

  ff. Tested Standard MCAS

  gg. Absent-Medically Documented (MED)

- ***Transfer***

  hh. If Active_Test ≠ '1' and at least one required strand is missing the student is considered a transfer student.

- ***Void***

  ii. Students whose only Student Information booklet (SIB) has been voided (Void = '1') are considered "Void".

- ***Prior Results*** *(by subject)*

  Prior results currently only apply to HS Science. All references to High_sPerf and SciNTL should be considered subject specific in the event that ELA and Math are updated to allow for prior result determinations.

  jj. **No Prior Results**

  Students with a blank High_*x*Perf and sciNTL ≠ '1' from SIMS are considered to not have prior results.

  kk. **Previously Passed**

  Students with a High_*x*Perf from SIMS in ('A', 'P', 'NI', 'A_A','P_A', 'NIA','M','E', or 'PM') are considered to have previously passed the subject.

  ll. **Previously Failed**

  Students with a High_*x*Perf from SIMS in ('F', 'PRG', 'EMG', 'AWR', and 'INP','NM') are considered to have previously failed the subject.

  mm. **Previously First Year LEP**

  vi. Students with SciNTL = '1' from SIMS are considered to have previously tested in science as a First Year LEP student and were reported as TestStat = 'NTL'.

Applies to Science only, corresponding variables for ELA and Math do not currently exist in SIMS.

If High_sPerf is not a Previously Passed status and SciNTL = ‘1’, the student is considered Previously Failed.

Participation Status Assignment Hierarchy (by subject):

- Breach List (Amend Flag > ‘1:’ continue through assignment, breach instructions will trump all reporting instructions)
- Summarize = ‘1’ or Grade=’09’ without prior results:
  - nn. If the student **meets attemptedness** Tested *(PartStatus=‘A).*
  - oo. If the student did not attempt:
    - *vii.* If subject = ‘ELA’ and First Year LEP then: **Not Tested, LEP** *(PartStatus=‘F’)*
    - viii. Otherwise if MED then: **Not Tested Medically Documented** *(PartStatus=‘G’)*
    - ix. Otherwise if Tested Standard MCAS is indicated then: **Tested MCAS Standard Assessment** (PartStatus=’Z’)
    - x. Otherwise: **Not Tested Absent** *(PartStatus=‘E’)*
- If (Summarize=’1’ or Grade=’09’) and Previously Failed:
  - pp. If the student *meets attemptedness* then: **Tested Accountable Retest** (PartStatus=‘C’).
  - qq. If the student *partially attempted* or *did not attempt* then: **Not Tested Accountable Retest** (PartStatus=‘L’).
- If (Summarize=’1’ or Grade=’09’) and Previously Passed: **Previously Passed** (PartStatus=’K’)
- Summarize = ‘0’ and grade≠’09’ (regardless of any prior test results):
  - rr. If the student meets attemptedness: **Not Accountable Retester** *(PartStatus=‘W’).*
  - ss. If the student did not attempt: **Not Tested Not Accountable** (P*artStatus=‘J’).*

Participation Status Summary

- **Note there are some participation statuses in the chart that are not in the hierarchy above. These are not achievable in the alt and will only come out of the discrepancy site.**

Summarize	Prior Results	Description	Part Status	Test Stat*	Discrepancy Site Code	Discrepancy Site Text
n/a	*n/a*	Breach	*Breach Instructions are applied at the student level regardless of participation status and are identified by Amend > '1'*			
		Void *(Preliminary Only)*	H	NTO	VAB	Void Answer Booklet
		Multiple Answer Documents (Security Breach) Preliminary	I	NTO	DUP	Multiple Answer Booklets
		Final	N	NTO	*n/a*	*n/a*
		Invalidated (Only assigned via Breach List)	N	NTO	INV	Invalidated
1 (or Grade=09)	*n/a*	Tested Accountable Alternate Assessment	A	T*	ALT	Tested Alternate Assessment
		Tested	Z	T*	STD	Tested Standard
		Not Tested (/Partially Tested) – LEP *(ELA Only)*	F	NTL	LEP	Not Tested First Year LEP
		Not Tested (/Partially Tested) - Transfer	D	NTO	TRN	Transferred
		Not Tested (/Partially Tested) – Medically Documented	G	NTM	MED	Absent-Medically Documented

continued

Summarize	Prior Results	Description	Part Status	Test Stat*	Discrepancy Site Code	Text
1 (or Grade=09)	n/a	Not Tested (/Partially Tested) - Absent	E	NTA	ABS	Absent
	Prev. Failed	Tested Alternate Assessment Accountable Retest	C	TR*	ALR	Retested Alternate Assessment
	Prev. Failed	Tested Accountable Retest	Y	TR*	RET	Retested
	Prev. Failed	Previously Failed (Not Tested /Partially Tested Accountable Retest)	L	NTO*	PRF	Previously Failed
	Prev. Passed	Ineligible Accountable Retest – Previously Passed & Retested *(Preliminary Only- final see K)*	P	NTO*	PPR	Previously Passed & Retested
	Prev. Passed	Previously Passed	K	NTO*	PAS	Previously Passed
0	*Any*	Tested Not Accountable Alternate Assessment (Retest)	W	TR*	ALN	Retested Alternate Assessment Not Aggregated
		Tested Not Accountable (Retest)	R	TR*	REN	Retested Not Aggregated
		Partially Tested Not Accountable (Retest)	B	NTO*	INC	Incomplete
		Not Tested Not Accountable (Retest)	J	NTO*	DNT	Did Not Test

* Student results achieved while First-year LEP, or students currently First-year LEP (see rptLEPFirst calculation) are reported with TestStat = "NTL" in place of listed TestStat (all subjects). See Calculations by Participation Status Summary Table for more details.

Post-Discrepancy Assignment

- DA only "recalculates" participation statuses for students with a blank participation status during post-discrepancy processing. All other participation statuses are maintained as they are provided from the discrepancy data.
- DP will reset participation statuses to blank prior to final processing for the following discrepancy events so DA will recalculate a new status:

tt. Student test grade is changed.

uu. Summarize is changed (not applicable in unchanged grades 03-08, 09).

vv. First year LEP status is changed.

ww. Answer document is still void (entire book is suppressed).

xx. Answer document(s) are added or removed for a student.

yy. Prior results (high_xPerf, sciNTL) are changed for a student.

Summarize	Prior Results	Description	Part Stat	rptLEP*[sub]* [1]	Test Stat	Current Year Reporting Results ('---' indicates data are blank): Raw Scores (n/A for Alt)	Item Scores (N/A for Alt)	rScaled Score (N/A for Alt)	Achievement Level (*rPerfLevel, mfPerfLev*)	Aggregation/Accountability Results: mfScaledScore (N/A for Alt)	Achievement Level (mfperf2)	CPI (applicable to Legacy HS Sci / Numin	Assess [2]
		Breach	*Breach Instructions are applied at the student level regardless of participation status and are identified by Amend > '1*										
		Void *(Preliminary Only)*	**H**	*any*	NTO	earned	earned	---	VAB	---	---	---	0 [3]
		Multiple Answer Documents (Security Breach) :											
		Preliminary	**I**	*any*	NTO	earned	earned	---	DUP	---	---	---	---
		Final	**N**	*any*	NTO	---	---	---	INV	---	---	---	---
1 (or Grade=09*)		Tested Alternate Assessment	**A**	0	T	---	---	---	earned (Alt)	---	earned (Alt)	ü	1

						Current Year Reporting Results *('---' indicates data are blank)*				Aggregation/Accountability Results			
Summarize	**Prior Results**	**Description**	**Part Stat**	**rptLEP*[sub]* [1]**	**Test Stat**	**Raw Scores (n/A for Alt)**	**Item Scores (N/A for Alt)**	**rScaled Score (N/A for Alt)**	**Achievement Level** *(rPerfLevel, mfPerfLev)*	**mfScaledScore (N/A for Alt)**	**Achievement Level (mfperf2)**	**CPI (applicable to Legacy HS Sci / Numin**	**Assess [2]**
				1	NTL					---	---	---	1
		Tested	**Z**	0	T	earned	earned	earned	earned	earned	earned	ü	1
				1	NTL			*Pass:* earned *Else:* ---	*Pass:* earned *Else:* LEP	*Pass:* earned *Else:* ---	---	---	1
		Not Tested /Partially Tested – LEP (ELA Only)	**F**	1	NTL	earned		*HS Pass:* earned *Else:* ---	*HS Pass:* earned *Else*: LEP	*HS Pass:* earned *Else:* ---	---	---	1
		Not Tested /Partially Tested - Transfer	**D**	0 (M/S 1)	NTO				*HS Pass:* earned *Else*: TRN		---	---	---
		Not Tested /Partially Tested – Medically Documented Absent	**G**	0 (M/S 1)	NTM				*HS Pass:* earned *Else*: MED		---	---	0
		Not Tested /Partially Tested - Absent	**E**	0 (M/S 1)	NTA				*HS Pass:* earned *Else*: ABS		---	---	0
	F	Tested Alternate Assessment Accountable Retest	**C**	0	TR	---	---	---	earned (Alt)	---	highest (Alt)	ü	1
				1	NTL					---	---	---	1
	F	Tested Accountable Retest	**Y**	0	TR	earned	earned	earned	earned	highest	highest	ü	1
				1	NTL			*Pass:* earned *Else:* ---	*Pass:* earned *Else:* LEP	*Pass:* highest *Else:* ---	---	---	1
	F	Previously Failed (Not Tested /Partially Tested Accountable Retest)	**L**	0	NTO	*Pass:* earned *Else:* ---	*Pass:* earned *Else:* ---	*Pass:* earned *Else:* ---	*Pass:* earned *Else:* PRF	highest	highest	ü	1
				1	NTL				*Pass:* earned *Else:* LEP	*Pass:* highest *Else:* ---	---	---	1
	P	Ineligible Accountable Retest – Previously Passed & Retested *(Preliminary Only)*	**P**	0	NTO	earned	earned	---	INE	prior	prior	ü	1
				1	NTL					prior	---	---	1
	P	Previously Passed	**K**	0	NTO	---	---	---	PAS	prior	prior	ü	1
				1	NTL					prior	---	---	1

Summarize	Prior Results	Description	Part Stat	rptLEP*[sub]* [1]	Test Stat	Raw Scores (n/A for Alt)	Item Scores (N/A for Alt)	rScaled Score (N/A for Alt)	Achievement Level (*rPerfLevel, mfPerfLev*)	mfScaledScore (N/A for Alt)	Achievement Level (mfperf2)	CPI (applicable to Legacy HS Sci / Numin	Assess [2]
						Current Year Reporting Results *('---' indicates data are blank)*				**Aggregation/Accountability Results**			
0		Tested Not Accountable Alternate Assessment (Retest)	**W**	0	TR	---	---	---	earned (Alt)	---	---	---	---
				1	NTL								
		Tested Not Accountable (Retest)	**R**	0	TR	earned	earned	earned	earned	earned	---	---	---
				1	NTL			*Pass:* earned *Else:* ---	*Pass*: earned *Else:* LEP	*Pass:* earned *Else:* ---			
		Partially Tested Not Accountable (Retest)	**B**	*any*	NTO	earned	earned	*Pass:* earned *Else:* ---	*Pass:* earned *Else:* INC	*Pass:* earned *Else:* ---	---	---	---
		Not Tested Not Accountable (Retest)	**J**	*any*	NTO	---	---	---	DNT	---	---	---	---

[1] rptLEP is LEPFirst for all grades/subjects/participation statuses that do not have prior results. It is a calculated combination of LEPFirst and prior LEP First status for Accountable partstatuses with prior results. See calculations section for details.
[2] Assess exceptions for ELA: there is an additional condition of participation on the Access test. See calculation specifics for details.
[3]If Summarize = 1 then Assess = 0. If Summarize = 0 then Assess is blank.
*Grade = 09 students are assigned participation statuses as if Summarize = '1'. Perf2, CPI, Numin, and Assess are populated for calculations but set to blank in the Megafile deliverable.
Note: "(M/S 1)" indicates that rptLEP[sub] may also be '1' in Math and Science for the listed participation statuses.

Calculations

Calculation Summary by Participation Status (by subject)

Student Level Calculations

- ***StudentID (tblStudemo)***

  zz. StudentID = rptStudentID from DPRaw.

  aaa. If StudentID begins with '8' it will be set to blank.

- ***Grade Span (tblStudemo)***

  bbb. Calculated using a lookup file provided by the DESE.

- ***Reporting First Year LEP Status (rptLEP[sub])*** *(tblStudemo)*

  ccc. RptLEP is determined for each subject based on current year partstatus, test attemptedness, First Year LEP status, and Prior First Year LEP Status (where applicable) in order to determine if a student's results should be considered achieved while under First-Year LEP status or as currently First-year LEP. This takes into consideration the prior status of the student when prior results are eligible for accountability.

ddd. For all participation statuses that are considered Not Accountable rptLEP*[sub]* = LEPFirst.

eee. Otherwise if the student is considered Accountable then:

xi. If the student has prior results:

If the student meets attemptedness this year then: rptLEP*[sub]* = LEPFirst.

If the student does not attempt this year then:

rptLEP*[sub]* = ‘1’ if either LEPFirst = ‘1’ or SciNTL = ‘1’.

Otherwise rptLEP*[sub]* = ‘0’.

xii. If the student does not have prior results then rptLEP*[sub]* = LEPFirst..

- ***SpecialEd*** (tblStudemo)

fff. If a student is considered Tested or Retested Alternate Assessment (accountable or not accountable) in any subject, then Sped_off = ‘1’. Otherwise, it is ‘0’.

- ***ParentLetter (tblStudemo)***

ggg. The Parent Letter flag is set to ‘0’ to indicate that the student should not receive a Parent/Guardian Report in the following cases:

xiii. If a student is classified as not tested or breach in all required subject then ParentLetter = ‘0’.

hhh. Class Pack Identifiers (Cognia) for printing the Parent version of the Parent/Guardian Report are produced for all students with ParentLetter = ‘1’.

- ***General Portfolio Comments (tblStuDemo)***

iii. Scorers have the option of leaving comments for individual strands as well as for the portfolio as a whole.

jjj. Comments will be sorted numerically.

kkk. Only the first 4 general portfolio comments will be kept and reported on the portfolio feedback form.

lll. If a student did not receive a performance level of incomplete and the student has less than 4 general portfolio comment codes, then

xiv. Data Analysis will add comment code associated with Gen Comment 1 from the lookup provided by client services as a general portfolio comment. If the student still has less than 4 general portfolio comment codes, Data Analysis will add comment code associated with Gen Comment 2 from the lookup provided by client services as a general portfolio comment.

- ***Strand Specific Comments (tblStuScore)***

mmm. Scorers have the option of leaving comments for individual strands as well as for the portfolio as a whole.

nnn. Comments will be sorted numerically and then alphabetically

ooo. Data Analysis will set comment code associated with LOC=1 from the lookup provided by client services automatically when the Level of Complexity score is ‘1’.

ppp. Only first 2 strand specific comments will be kept and reported on the portfolio feedback form.

qqq. For Strand Specific comments, if the student’s final score for a particular strand does not have an ‘M’ for Independence and Demonstration of Skill, then comments that refer to an ‘M’ in either of these dimensions will be suppressed.

rrr. For strand specific comments, if a student’s final score for a particular strand has an ‘M’ for Independence or Demonstration of Skills then the student will receive at least one comment that refers to an ‘M.’ (This is handled at scoring not programmatically)

sss. If the performance level for a particular subject is Student took the Standard MCAS then suppress all strand specific comments for that subject.

ttt. For grades 11, 12, and 12+ suppress the comment “Strand required but not submitted” for all strands.

- ***Performance Level (tblStuPL)***

uuu. A content area has a performance level of Incomplete when one of the following occurs:

xv. When not all the required strands are submitted for a content area, the content performance level is Incomplete.

xvi. If Demonstration of Skills and Independence = M:

For contents requiring 3 strands, if there are 2 strands or more M’s in either Independence or Demonstration of Skills, the content performance level is Incomplete.

For contents requiring 2 strands, if there is 1 strand or more M’s in either Independence or Demonstration of Skills, the content performance level is Incomplete.

vvv. For content areas that are not incomplete, the performance level is found using the overall strand performance level and the lookup table.

xvii. The overall strand performance level for a content requiring 3 strands is found by averaging the performance levels of the 3 final strands of record. If the average is between 3 and 3.9 round down, otherwise, round to the nearest whole number.

xviii. When more than 3 strands are submitted for a content area that requires the choice of 3, use the 3 strands that yield the highest overall strand performance level. If more than 3 strands have the same performance level, sort the strands by self-evaluation, complexity, and generalized performance, and select the top 3 based on those criteria.

xix. The overall strand performance level for a content requiring 2 strands is determined by averaging the performance levels of the 2 strands and rounding down.

xx. If the calculations for strand score average yield a performance level of 11 (Needs Improvement) or 14 (Partially Meeting Expectations), then check that the student meets other requirements to earn Needs Improvement or Partially Meeting Expectations before assigning the final performance level.

www. Needs Improvement (Legacy STE only) or Partially Meeting Expectations (NextGen only):

xxi. Grades 03-08 only

For grades 03-08, in order to earn an overall performance level of *Partially Meeting Expectations the student must meet the following criteria:*

For ELA, a student must complete the 3 required strands and earn a performance level of 4 for each of the strands.

For Mathematics, complete all 5 strands and earn a performance level of 4 for each of the strands.

For Science, a student must complete strands in three different STE disciplines and earn a performance level of 4 for each of the strands.

If the student is marked "at or close to grade level" and submits fewer than 3 strands with a performance level of 4, the student will be reported as Not Meeting Expectations.

If a student submits 3 or more strands when 2 are required, the 2 required strands and the highest scoring additional strand will be used to determine Partially Meeting Expectations.

xxii. Competency: Grades 09-12+ only

The Competency List is provided by DESE and lists students in grades 09-12+ who were judged by a panel of competency experts to be at a performance level of *Needs Improvement* or *Partially Meeting Expectations* or above. Only students on the Competency list are eligible for a performance level of *Needs Improvement*/*Partially Meeting Expectations* or above. The students must also meet the following criteria:

For ELA, a student must complete the 3 required strands and earn a performance level of 4 for each of the strands.

For Mathematics, complete all 5 strands and earn a performance level of 4 for each of the strands.

For Science, a student must complete all 4 strands in one discipline and earn a performance level of 4 for each of the strands.

If a student is on the Competency List and the requirements are met, the earned scores are reported but the performance level is taken from the list.

If a student is on the Competency List and the requirements are not met a list is sent to Program Management for resolution.

If any HS student attempting competency (at or close to grade level is marked) and does not meet the requirements above for any reason, the test is reported as Failing/Not Meeting Expectations.

If resubmitted appeal / competency determination portfolio, Math students will be tested against the 13-14 Math strands. Otherwise, students will be aligned with the 18-19 Math strands.

- ***Aggregation/Accountability Results*** *(tblStuPL)*

Aggregation and Accountability Results combine prior and current results, where applicable.

xxx. **Perf2** *(*Cognia *aggregate calculations)*

xxiii. Populated with the achievement level for aggregate calculations and the megafile.

xxiv. Perf2 is blank for all students with rptLep[sub] = '1'.

xxv. Perf2 = rPerfLevel for Tested Alternate Assessment that are not first-year LEP (PartStatus = 'A' and rptLEP = '0'). It is translated to standard assessment achievement levels (1-4).

xxvi. Perf2 = the highest achievement level between PerfLevel and [sub]PerfLevelHigh for Accountable Retest Alternate Assessment students that are not first-year LEP (PartStatus = 'C' and rptLEP = '0'). It is translated to standard assessment achievement levels (1-4).

xxvii. Otherwise, Perf2 is calculated in general MCAS.

- ***NumIn*** (***tblStuPL*** for Megafile)

yyy. For HS students and 5 and 8 Science, the subject specific numin field is set to '1' if the student is assigned CPI Points for the subject. Otherwise it is '0'. Fields are prefixed with *e/m/s* in the megafile.

zzzz. For 03-08 ela and math, See the calculations by participation status summary for a list of statuses that result in numin = ‘1’. Because this calculation is only be done at grade 03-08, if Teststat is ‘T’ then numin=’1’. Otherwise it is ‘0’.

- ***Assess*** (***tblStuPL*** for Megafile):

aaaa. Blank since alt mega file is only produced in June

- ***Composite Level of Complexity (tblStuPL)***

bbbb. All students who receive an alt performance level will have a Composite Level of Complexity (CLC) computed.

cccc. Composite Level of Complexity is calculated using the Complexity scores from the final strands used to calculate the content performance level, the ‘At or Close to Grade Level’ bubble (if it exists), and a lookup table, which is based on the number of strands.

dddd. Students attempting Partially Meeting Expectations Grade 03-08

xxviii. When a two-strand portfolio contains the required strands plus at least one additional strand, apply the rules for a three-strand portfolio.

xxix. If there is more than one additional strand submitted use the strand with the higher complexity score to compute the CLC.

eeee. Incomplete Portfolios

xxx. For portfolios with not all required strands submitted, only the required strands that were submitted will be used to compute the CLC.

xxxi. When a three-strand portfolio has a strand missing, apply the rules for a two-strand portfolio.

xxxii. When a two or three strand portfolio has only one of the required strands, apply the rules for a one strand portfolio.

- ***Competency: Updating ELA_CD, Mat_CD, and Sci_CD (tblStuPL)***

ffff. *Applicable to High School only*

gggg. These variables represent whether or not a student has met the testing graduation requirement for the subject, combining prior CD information from SIMS with the current test results.

hhhh. The updated CD fields begin with the prior CD value from SIMS (studemo SIMS_*[sub]*CD) for all students, regardless of participation status on this year’s test. The prior value may be blank for students that have not previously tested in a subject.

iiii. The CD Status from SIMS is then updated using the current test results if and only if it <u>increases</u>, otherwise the prior value is retained:

jjjj. For Math and ELA:

xxxiii. If rPerflevel =’11’ or ‘14’ then CD = ‘1’.

xxxiv. Otherwise, if rPerflevel in (‘12’,’13’,’15’,’16’) then CD = ‘2’.

xxxv. Otherwise, CD is ‘0’.

kkkk. For Science:

xxxvi. If rPerflevel in (‘11’,‘12’,’13’,’14’,’15’,’16’) then CD = ‘1’.

xxxvii. Otherwise, CD is ‘0’.

- ***Composite Performance Index Points (daStuCPI)***

For HS science, DESE provides Cognia with the number for students tested in MCAS and MCAS-Alt. These counts are provided at the subject level. DA use: These counts are stored in tblstuCPILookup.

llll. CPI will be calculated for only legacy high school science and technology/engineering (STE)

mmmm. CPI Points are assigned based on results used for Aggregations and Accountability.

nnnn. Students with Test Status='T' or (PartStatus="C" and rptLEP=0) will receive CPI points.

oooo. Otherwise, CPI points will not be assigned.

pppp. Breach cases will not receive CPI points.

qqqq. Assign cpi points for students with Test Status=" T" as follows

xxxviii. Assign cpi points based on performance level as follows for performance levels other than PRG

CPI=100 for PerfLevel=A_A or P_A.

CPI=75 for PerfLevel=EMG or NIA.

CPI=50 for PerfLevel=AWR

CPI=25 for PerfLevel=INP.

xxxix. Assign cpi points based on performance level as follows for PRG

Step 1

CPI=100 for PerfLevel=PRG and NatureofDis=01, 09, 10, 11, or 13 and LevelOfNeed=04.

CPI=75 for PerfLevel= PRG and NatureofDis not equal to 01, 09, 10, 11, or 13 or LevelOfNeed not equal to 04

If Step 1 results in the number of students with 100 CPI points being less than 1.0499 percent of the total tested students in both the alt and standard MCAS then proceed to Step 2:

Step 2

CPI=100 for PerfLevel=PRG and NatureofDis=01, 09, 10, 11, or 13 and LevelOfNeed=03 or 04.

CPI=75 for PerfLevel= PRG and NatureofDis not equal to 01, 09, 10, 11, or 13 or LevelOfNeed not equal to 03 or 04

If Step 2 results in the number of students with 100 CPI points being less than 1.0499 percent of the total tested students in both the alt and standard MCAS then proceed to Step 3:

Step 3

CPI=100 for PerfLevel=PRG and NatureofDis=01, 09, 10, 11, or 13 and LevelOfNeed=01, 02, 03, or 04.

CPI=75 for PerfLevel= PRG and NatureofDis not equal to 01, 09, 10, 11, or 13 or LevelOfNeed not equal to 01, 02, 03, or 04.

If Step 3 results in the number of students with 100 CPI points being greater than 1.0499 percent of the total tested students in both the alt and standard MCAS then proceed to Step 4:

Step 4

CPI=100 for PerfLevel=PRG and NatureofDis=01, 09, 10, 11, or 13 and LevelOfNeed=03 or 04.

Also CPI=100 for PerfLevel=PRG and NatureofDis=01 and LevelOfNeed=01 or 02.

CPI=75 for PerfLevel= PRG and NatureOfDis and LevelOfNeed do not satisfy I or II.

If Step 4 results in the number of students with 100 CPI points being greater than 1.0499 percent of the total tested students in both the alt and standard MCAS then proceed to Step 5:

Step 5

CPI=100 for PerfLevel=PRG and NatureofDis=01, 09, 10, 11, or 13 and LevelOfNeed=04.

Also CPI=100 for PerfLevel=PRG and NatureofDis=01 and LevelOfNeed=03.

CPI=75 for PerfLevel= PRG and NatureOfDis and LevelOfNeed do not satisfy I or II.

xl. If Step 4 or 5 results in the number of students with 100 CPI points being less than 1.0499 percent of the total tested students in both the alt and standard MCAS then stop.

xli. If Step 5 results in the number of students with 100 CPI points being greater than 1.0499 percent of the total tested students in both the alt and standard MCAS then proceed to Step 1 and then stop.

rrrr. Assign student's with (PartStatus="C" and rptLEP=0) CPI points as follows

CPI points will be based on either current year Alternate assessment Achievement level or Prior year test results which may be from the Alternate Assessment or MCAS. The results from the assessment that produces the highest CPI points will be used.

Calculate the current year CPI points using the Alternate Assessment translation below on the tblstuPL.rPerfLevel

If ScaledScoreHigh is populated, calculate the prior year CPI points using the MCAS lookup table below. Otherwise, use the Alternate Assessment lookup table on PerfLevelHigh.

Composite Performance Index (CPI) – Legacy MCAS Tests *(High School Science and Technology/Engineering only)*		
Test	**ScaledScore Range**	**CPI Points**
Standard MCAS	240-280	100
	230-238	75
	220-228	50
	210-218	25
	200-208	0

CPI – MCAS-Alt *(High School Science and Technology/Engineering only)*		
Test	**Alt Performance Level:**	**CPI Points**
Alternate Assessment (Only when re-assigning based on prior-year Alt Results for Accountability)	A_A P_A PRG	100
	EMG NIA	75
	AWR	50
	INP	25

- ***Achievement Level Coding***

ssss. The MCAS Standard Assessment has four possible achievement levels, assigned to students using the raw to scale score lookup provided by psychometrics.

tttt. Alternate Assessment achievement levels are translated to their corresponding standard assessment achievement level prior to computing any aggregate calculations that include alternate assessment achievement level results as shown below:

MCAS and MCAS-Alt Achievement Levels			
MCAS Achievement Level	**MCAS Description**	**MCAS Alt Achievement Level**	**MCAS Alt Description**
1	*03-08, 10 (Next Gen):* Not Meeting Expectations (NM) *Legacy HS Science:* Failing (F)	7 8 9 10 17	Incomplete (INC) Awareness (AWR) Emerging (EMG) Progressing (PRG) Not Meeting Expectations-Alt (NM_A)
2	Legacy HS Science: Needs Improvement (NI) NextGen: Partially Meeting Expectations (PM)	11	Needs Improvement (NIA)
		14*	Partially Meeting Expectations-Alt (PM_A)
3	Legacy HS Science: Proficient (P) NextGen: Meeting Expectations (M)	12	Proficient (P_A)
		15*	Meeting Expectations-Alt (M_A)
4	Legacy HS Science:Advanced (A) NextGen: Exceeding Expectations (E)	13	Advanced (A_A)
		16*	Exceeding Expectations-Alt (E_A)

**Used for grades 03-08, 10 ELA and math and 05 and 08 Science and NextGen HS Science.*

Aggregate Level Calculations

- ***Aggregation Rules***

uuuu. These rules are applied to all aggregate calculations. Any additional rules specific to a particular calculation will be listed under the rules for the calculation.

vvvv. Tested Students (PartStatus = 'A) are included in aggregations.

Lookup Tables

- ***Required Strands by Content Area and Grade***

Grade	Content Area	Number of Strands Required	Strands Required
3	ELA	3	Language, Reading & Writing*
3	Math	2	Operations and Algebraic Thinking, Measurement and Data
4	ELA	3	Language, Reading & Writing*
4	Math	2	Operations and Algebraic Thinking, Numbers and Operations – Fractions
5	ELA	3	Language, Reading & Writing*
5	Math	2	Number and Operations in Base Ten, Numbers and Operations – Fractions
5	Sci	3	Choice of 3***
6	ELA	3	Language, Reading & Writing*

Grade	Content Area	Number of Strands Required	Strands Required
6	Math	2	Statistics and Probability, The Number System
7	ELA	3	Language, Reading & Writing*
7	Math	2	Ratios and Proportional Relationships, Geometry
8	ELA	3	Language, Reading & Writing*
8	Math	2	Expressions and Equations, Geometry
8	Sci	3	Choice of 3***
10+	ELA	3	Language, Reading, Writing
10+	Math	3	Choice of 3**
09, 10+	Sci	3	Any three learning standards from one discipline: Biology, Chemistry, Physics, or Technology/Engineering

**ELA 03-08: Students that test at or near grade level will take strands:* Reading, Reading II & Writing.

*** Math 10+: The strands titles are: 'Functions', 'Geometry', 'Statistics and Probability', 'Number and Quantity', and 'Algebra'.*

**** Science 05 and 08: Choice of 3 of the following: 'Earth and Space Science', 'Life Science', 'Physical Sciences', and 'Technology/Engineering'*

- ***Strand Performance Level***

Level of complexity	Demonstration of skills	Independence	Performance Level
2	1	1	1
2	1	2	1
2	1	3	1
2	1	4	1
2	2	1	1
2	2	2	1
2	2	3	1
2	2	4	1
2	3	1	1
2	3	2	1
2	3	3	2
2	3	4	2
2	4	1	1
2	4	2	1
2	4	3	2
2	4	4	2
3	1	1	1
3	1	2	1
3	1	3	1
3	1	4	1
3	2	1	1
3	2	2	1
3	2	3	2
3	2	4	2
3	3	1	1
3	3	2	2
3	3	3	3
3	3	4	3
			continued

Level of complexity	Demonstration of skills	Independence	Performance Level
3	4	1	1
3	4	2	2
3	4	3	3
3	4	4	3
4	1	1	1
4	1	2	1
4	1	3	1
4	1	4	1
4	2	1	1
4	2	2	1
4	2	3	2
4	2	4	2
4	3	1	1
4	3	2	2
4	3	3	3
4	3	4	3
4	4	1	1
4	4	2	2
4	4	3	3
4	4	4	3
5	1	1	1
5	1	2	1
5	1	3	2
5	1	4	2
5	2	1	1
5	2	2	2
5	2	3	3
5	2	4	3
5	3	1	1
5	3	2	2
5	3	3	3
5	3	4	4
5	4	1	1
5	4	2	2
5	4	3	3
5	4	4	4

- ***Content Area Performance Lookup***

Strand Performance Levels	Content Achievement Level	Description
1	8	Awareness
2	9	Emerging
3	10	Progressing
4	11 14	Needs Improvement Partially Meeting Expectations
5	12 15	Proficient Meeting Expectations
6	13 16	Advanced Exceeding Expectations
NA	7 17	Incomplete Not Meeting Expectation

- ***Composite Level of Complexity***

Composite Level of Complexity Look up for a 3 strand Portfolio

At or Near Grade Level Bubble	Strand 1: Level of Complexity Score	Strand 2: Level of Complexity Score	Strand 3: Level of Complexity Score	Composite Level of Complexity
0	2, or 1	2, or 1	2, or 1	ACC
0	3, 2, or 1	3, 2, or 1	3	EP
1	3, 2, or 1	3, 2, or 1	3, 2, or 1	GL
0,1	3, 2, or 1	3, 2, or 1	4, or 5	GL
0,1	3, 2, or 1	4	4	GL
0,1	3, 2, or 1	4	5	GL
0,1	3, 2, or 1	5	5	GL
0,1	4	4	4	GL
0,1	4	4	5	GL
0,1	4	5	5	GL
0,1	5	5	5	GL

Composite Level of Complexity Look up for a 2 strand Portfolio

At or Near Grade Level Bubble	Strand 1: Level of Complexity Score	Strand 2: Level of Complexity Score	Composite Level of Complexity
0	2, or 1	2, or 1	ACC
0	3, 2, or 1	3	EP
1	3, 2, or 1	3	GL
0,1	3, 2, or 1	4	GL
0,1	3, 2, or 1	5	GL
0,1	4	4	GL
0,1	4	5	GL
0,1	5	5	GL

Composite Level of Complexity Look up for a 1 strand Portfolio

At or Near Grade Level Bubble	Strand 1: Level of Complexity Score	Composite Level of Complexity
0	2, or 1	ACC
0	3	EP
1	3	GL
0,1	4, or 5	GL

Key:
ACC = Access Skill
EP=Entry Point
GL = Grade Level Achievement Standards

Data Deliverables Specifications

Student Data Files

Student Demographics

Student Scores

Student Performance Levels

- Use Roster code for the Performance Levels

MegaFile

Generic Details

- Megafile deliverables are posted to the FTP site for the state and contain data for all processed students.
- All MegaFile deliverables follow the layout: 2122MCASAlt2122AllStudentFileLayout.xls.
- Fields that are not applicable to particular deliveries are left blank.
- Students with Amend > ‘1’ are reported as Amend = ‘1’.
- Subject specific fields are prefixed by ‘*x*’ such that: m=math, e=ela, s=science.
- *x*Alt = ‘1’ if the student Tested or Retested Alternate Assessment, otherwise blank.
- Sped_Off = tblStudemo.SpecialEd.
- *x*Perflev = tblStuPL.rPerfLevel reformatted to DESE code or achievement level code based on rPerfLevelLookup. DESE Code (See Appendix D).
- *x*Perf2 = tblStuPL.Perf2.
- The mcasrowid is a 15-digit number created in the following manner

  wwww. 2 digits=year (22)

  xxxx. 2 digits=grade

  yyyy. 1 digit=x

  xlii. x=1 if at least one strand was submitted for all required content area.

  xliii. x=2 if at least one strand was submitted for ELA and no strands were submitted for other required content areas.

  xliv. x=3 if at least one strand was submitted for Math and no strands were submitted for other required content areas.

  xlv. x=4 if at least one strand was submitted for science and no strands were submitted for other required content areas.

  xlvi. x=5 if at least one strand was submitted for any 2 required content areas, but nothing was submitted for the third required content area.

  xlvii. X=6 if a student did not submit any content areas.

  zzzz. 10 digits=bookletnumber

Summary Files

Comments Summary

- Contains Counts of each strand specific comment by grade, subject, and strand
- One tab includes all students
- One tab includes student with Performance Level Incomplete

General Portfolio Comments Summary

- Contains counts of each General Portfolio Comment by grade
- Includes all students

State Performance Level Summary

- Layout is MCASAlt2122PerfSummaryLayout.xls
- Include counts and percents
- Only include students who earned an achievement level
- One tab will contain achievement levels aggregated by grade and subject
- One tab will contain achievement levels aggregated across grades and subjects
- One tab will contain achievement level aggregations for grades 09 and 10 by subject.

  aaaaa. Will include the alt students who earned a competency in either May or July Competency determination.
- One tab will contain achievement levels aggregations for grades 11, 12, and 12+ by subject.

  bbbbb. This data will include the alt students who earned competency in either the May or July Competency determination.

State Participation Summary Files

- Layout is MCASAlt2122PartSummaryLayout.xls
- “Assessed Student" = partstatus in ('A','Z') and TestStatus = 'T' based on data in MCAS tblStudemo (therefore NTL or first-year lep students are excluded).
- Retest Students (TestStatust = 'TR' or Alt students in grades, 11, 12, or 13) were excluded from all counts.
- Sort first tab by subject, then grade and the PartByCLC tab by grade then subject.
- One tab will contain counts and percents by grade and subject.
- Percent is based on number of students assessed in standard MCAS or MCAS-Alt
- One tab will contain count and percent of students taking alt across all grade and subjects.
- Percent is based on number of students assessed in standard MCAS or alt.
- One tab will contain counts and percents by grade and subject for the tested in Standard MCAS, Tested in MCAS Alt with a composite level of complexity of Grade Level, and Tested in MCAS Alt with a composite level of complexity of Access Skills or Entry Point.

Teacher Survey Summary

- This file is created every other year and will be produced for the 2122 reporting year.
- Only include records with a first and last name and at least one response.
- Calculate total number of surveys.
- Compute counts and percentages of responses for each question. Also compute number of non-responses for each question.

Participation by Disability

- Counts of tested students by disability type

Report Deliverables Specifications

Portfolio Feedback Form

- The files will be named PortfolioFeedbackForms2122_[DisCode][SchCode].pdf
- A grade 09 or higher report lists the science discipline strands instead of the science strands that appear for grades 03-08.
- For grades 03-08 math and ela the titles of the strands that were not submitted and not required will not print.
    - Indicated in tblStuScore where RepAction='0'
    - For these cases the strands below will move up to display with all blank rows at the bottom.
    - In grade five where there are six possible strands if a student turns in all six only the first five will print based on the strand sort order. The strand "Measurement and Data" will not print in this case.
- An asterisk (*) is displayed in place of missing strand scores for required strands that were not submitted
- For grades 11, 12, and 12+ do not display asterisks in any strands.
- If the performance level for a particular subject is Student took the Standard MCAS then do not display asterisks in any strands.
- Missing scores are left blank for non-required strands.
- All strands submitted will be reported.
- At most 4 general portfolio comments (see section III for description of choosing general portfolio comments).
- At most 2 strand specific comments (see section III for description of choosing strand specific comments).

Parent Report

- Cover Page Header

  For student name print Last Name, First Name, MI. in all caps.

  Print the two-digit grade print for grades 03-12 and 12+ will print for grade 13.

  Print the school name associated with the student's testing school.

Print the district name associated with the student's sending district if it exists. Otherwise print the district name associated with the student's testing district.

- Achievement Display

  For tested students, place a check and shade the achievement level box corresponding to the student's achievement level.

  For not tested students, print the not tested reason in the achievement display for that content area. Based on tblPerfLevelLookup

  If a content area is not tested at a given grade then do not shade or check any achievement level boxes or that content area. Print 'NOT ASSESSED FOR STUDENTS IN THIS GRADE'.

- Score Display

  If the student did not submit the required number of strands print an asterisk (*) after the subject text.

  > Print 'REQUIRED BUT NOT SUBMITTED' in the grid for required strands that were not submitted.
  >
  > If the achievement level for a particular subject is Student took a Standard MCAS then do not display the asterisk or print 'REQUIRED BUT NOT SUBMITTED' in the grid for any strand.

  A grade 09 or higher report lists the High School STE discipline strands instead of the STE strands that appear for grades 03-08.

  Score Grid

  > All strands submitted will be reported.
  >
  > For strands that were submitted, gray shade the box associated with the dimension score for level of complexity, demonstration of skills, independence, self-evaluation, and generalized performance.

- Data Page Header

  For student name print Last Name, First Name, MI in proper case.

  Print SASID.

Appendix—Exceptions List

I. Assigning Sprp_sch and Sprp_dis: Exceptions List (daTestSiteLookup)

This information is collected and stored with the Operational General Assessment program. Please refer to the Operational General Assessment rules for the list of exceptions.

a. One-School District List

This information is collected and stored with the Operational General Assessment program. Please refer to the Operational General Assessment rules for the list of one-school districts.

b. rPerfLevel Lookup for MegaFile Codes

Achievement Level or Part Flag	MegaFile Code	Description
1	F	Failing
2	NI	Needs Improvement
3	P	Proficient
4	A	Advanced
6	W	Warning
7	INP	Incomplete
8	AWR	Awareness
9	EMG	Emerging
10	PRG	Progressing
11	NIA	Needs Improvement-Alt
12	P_A	Proficient-Alt
13	A_A	Advanced-Alt
14	PM_A	Partially Meeting Expectations-Alt
15	M_A	Meeting Expectations-Alt
16	E_A	Exceeding Expectations-Alt
17	NM_A	Not Meeting Expectation
B	INC	Incomplete
D	TRN	Transferred
E	ABS	Absent
F	LEP	First-year LEP
G	MED	Absent - Medically Documented
H	VAB	Void
I	DUP	Invalidated
J	DNT	Did Not Test
K	PAS	Previously Passed
P	PPR	Previously Passed & Retested
L	PRF	Previously Failed
N	INV	Invalidated

APPENDIX R
MCAS-ALT SKILLS SURVEY

MCAS-Alt SKILLS SURVEY

Introduction

The MCAS-Alt Skills Survey is a standardized component of the statewide alternate assessment (MCAS-Alt) that must be administered by the teacher to each student **BEFORE** selecting an entry point or access skill in the subject required for assessment. The survey will help determine a student's current level of knowledge, skills, and abilities so that challenging entry points can be selected in each strand. The survey will also familiarize teachers with the range of entry points in a strand/domain that may be selected for the assessment.

The results of the Skills Survey should be used as the basis for selecting an entry point or access skill listed in the *Resource Guide to the Massachusetts Curriculum Framework for Students with Disabilities*. A follow-up skills survey will not be required after teaching the skill, although it may be helpful to conduct the survey after the skill has been taught, especially if the student will attend a different classroom the following year.

Instructions for Completing the Skills Survey:

Conduct a brief assessment of each skill in the required strand/domain for a student in that grade. Check one box (A–E) for each skill in the required strand/domain(s). Teachers may use any combination of the following methods to conduct a brief assessment of each skill:

a) observations, informal assessments, progress reports, or classroom work; OR
b) 2–4 tasks, based on the **examples** provided in the survey form; or **tasks designed by the teacher** that are accommodated for each student's instructional level and needs.

If using specific tasks or activities to assess the student, please use the following protocol for each skill:

1) Present the first task to the student.
2) If the student does not respond on the first attempt, repeat the task with a verbal reminder or other prompt (if needed), but do not give the answer. (Note: If a prompt is given, the response may be accurate, but is **not** independent.)
3) If the student responds to the first task, give a second, more complex task. Repeat with a prompt if needed. Make notes on the survey form to remind you of the student's performance of each task.
4) If the student does not respond to the second task, even with a prompt, do not introduce a third task. Simply mark an "X" in the column (A, B, C, D, or E) that most closely describes his or her performance of the skill.
5) Introduce the next task in the survey. Repeat steps 2 through 4 until all skills in the required strand/domain are assessed.

Once the survey has been completed for each required strand/domain, review the results, and proceed as follows:

- **Select a related or higher-level-of-complexity entry point from the Resource Guide based on any skill that has been checked in columns A, B, or C**.
- **Do not select an entry point for any skills checked in columns D or E**.
- **If column A ("unable to perform the skill") is checked for all skills in the strand/domain**, consider assessing an access skill (i.e., a motor or communication skill).
- **If columns D and/or E are checked for most of the skills in the strand/domain**, then the IEP team should consider whether the standard MCAS test (paper or online) or grade-level/competency portfolio would be more appropriate for the student in that subject.

Submit a completed MCAS-Alt Skills Survey for each assessed strand in the student's portfolio, just after the Strand Cover Sheet. A strand without a Skills Survey will be considered incomplete.

Descriptors for each column listed on the following pages:

A	B	C	D	E
Student is **unable** to perform this skill. ---------OR-------- Teacher is unable to assess student on this skill.	Student is just starting to learn this skill and demonstrates the skill only **rarely** without support. --- Student performs this skill accurately with **0-25% independence**. ---------OR-------- Student performs this skill independently with **0-25% accuracy**.	Student demonstrates this skill **intermittently** and only **occasionally** without support. --- Student performs this skill accurately with **26-50% independence**. ---------OR-------- Student performs this skill independently with **26-50% accuracy**.	Student demonstrates this skill **more often than not** without support. --- Student performs this skill accurately with **51-75% independence**. ---------OR-------- Student performs this skill independently with **51-75% accuracy**.	Student demonstrates this skill **almost all the time** without support. --- Student performs this skill accurately with **76-100% independence**. --------OR--------- Student performs this skill independently with **76-100% accuracy**.

* % Independence refers to the average percent of unprompted responses by the student.

Student's Name______________________________ Grade_____ Date of Survey_____________

ELA—All Grades

Language (Vocabulary Acquisition and Use)

Based on exposure to vocabulary during academic activities, student can:		A 0% (unable)	B Up to 25% (rarely)	C Up to 50% (occasionally)	D Up to 75% (more often than not)	E Up to 100% (almost always)
1.	Communicate answers to simple questions about familiar objects.					
2.	Identify familiar objects/actions by name.					
3.	Match given words or symbols to pictures that mean the same or similar thing.					
4.	Answer questions about the meaning of words found in stories, poems, or during other academic activities.					
5.	Identify words/symbols/pictures that are opposite in meaning.					
6.	Identify words/symbols/pictures that are similar in meaning.					
7.	Use phrases to express a need, request, idea, or response during an academic activity.					
8.	Describe key attributes of different objects (e.g., the flower is colorful).					
9.	Communicate using common temporal words (e.g., before, after, now, later, first, next).					
10.	Identify examples of figurative language (e.g., idiom, metaphor, simile, hyperbole, or personification) used in a text.					

Student's Name______________________________ Grade_____ Date of Survey_____________

ELA—All Grades

Reading (Informational or Literary Text)

	Based on a literary or informational text read by or to the student, student can:	A 0% (unable)	B Up to 25% (rarely)	C Up to 50% (occasionally)	D Up to 75% (more often than not)	E Up to 100% (almost always)
1.	Identify the main character(s) in the text.					
2.	Identify the setting of the text.					
3.	State key details from the text.					
4.	Identify events (or ideas) presented in the text.					
5.	Identify the central (main) idea of the text.					
6.	Explain *why* or *how* something occurred in the text.					
7.	Identify and define unknown words in the text; or match words or phrases from the text to their meaning.					
8.	Differentiate between a fact and the author's opinion.					
9.	Describe the author's point of view.					

Student's Name______________________________ Grade_____ Date of Survey_____________

ELA—All Grades

Writing (Text Type and Purposes)

	Does the student use a communication system* to express ideas, requests, and responses? ☐ YES ☐ NO If YES, student can use their communication system to:	A 0% (unable)	B Up to 25% (rarely)	C Up to 50% (occasionally)	D Up to 75% (more often than not)	E Up to 100% (almost always)
1.	Initiate expressive communication using a single word or symbol.					
2.	Respond to questions or writing prompts with single words.					
3.	Respond to questions or writing prompts with sentence fragments (i.e., phrases).					
4.	Respond to questions or writing prompts with one complete sentence.					
5.	Respond to questions or writing prompts with at least one paragraph (three or more sentences).					
6.	Retell at least three events in chronological order.					
7.	Express an opinion on a topic and gives at least one reason.					
8.	Express at least two relevant facts or details based on a given topic or text.					
9.	Respond to questions or writing prompts using descriptive language and connecting words or phrases.					

* Communication systems may include verbal/gestural/symbolic/or iconic expression using a keyboard, handwriting, dictation, symbol-based system, assistive technology, ASL or other sign system, Braille, etc.

Student's Name______________________________ Grade_____ Date of Survey______________

Grade 3 Mathematics

Operations and Algebraic Thinking (OA)

Using objects, manipulatives, technology, or paper-pencil, student can:		A 0% (unable)	B Up to 25% (rarely)	C Up to 50% (occasionally)	D Up to 75% (more often than not)	E Up to 100% (almost always)
1.	Count up to 5 objects to answer questions about "how many altogether."					
2.	Match numerals (up to 10) with the number of objects/pictures displayed.					
3.	Add two or more objects, or take away two or more objects, from a set of up to 5 objects and express "how many are left?"					
4.	Create two sets with an equal number of objects in each set.					
5.	Compare two groups of objects and indicate which has "more" and which has "less."					
Using standard numerals, symbols, and notation, student can:						
6.	Plot three single-digit numbers on a number line relative to each other.					
7.	Solve addition problems involving one-digit numbers up to a total of 10 (e.g., 1+3; 2+5; 4+6)					
8.	Solve one-step word problems using addition within 100.					
9.	Solve one-step word problems using subtraction within 100.					
10.	Identify the missing number in a problem involving addition and subtraction (up to 15), with an unknown quantity (e.g., 12 - ? = 5).					
11.	Show equalities in number sentences (e.g., 2 + 4 = 4 + 2; 3 + 1 = 2 + 2).					
12.	Count by 2's to 20.					
13.	Count by 5's to 25.					
14.	Identify the missing number in a problem involving multiplication and division (within 25), with an unknown quantity (e.g., 2 X? = 20; 20 ÷? = 5).					
15.	Use estimation to approximate the solution to a one-step word problem (e.g., if I have 12 marbles and I add 9 more, about how many marbles will I have in all?).					

Student's Name______________________________ Grade_____ Date of Survey______________

Grade 3 Mathematics

Measurement and Data

Using objects, manipulatives, technology, or paper-pencil, student can:		A 0% (unable)	B Up to 25% (rarely)	C Up to 50% (occasionally)	D Up to 75% (more often than not)	E Up to 100% (almost always)
1.	Given two objects, identify the object that is bigger.					
2.	Count the number of objects with a similar characteristic (e.g., count the number of red objects; count the objects with straight edges).					
3.	Compare up to three objects based on length, width, or height (longer, shorter, tallest, shortest).					
4.	Tell time to the nearest hour using analog clocks.					
5.	Identify up to three U.S. coins either by name or value.					
6.	Express the value of a combination of at least two coins up to 99 cents.					
7.	Measure the length of objects using a pre-selected standard tool (e.g., ruler).					
8.	Express time on an analog clock to the nearest minute.					
9.	Find the area of a rectangle by multiplying side lengths.					
10.	Calculate the perimeter of straight-edged polygons.					
11.	Solve word problems involving the addition or subtraction of distances (e.g., miles, yards) and/or money (e.g., dollars, cents).					
12.	Represent a set of data graphically (e.g., on a list, table, bar graph, or circle graph, etc.).					

Student's Name______________________________ Grade_____ Date of Survey_____________

Grade 4 Mathematics

Operations and Algebraic Thinking (OA)

Using objects, manipulatives, technology, or paper-pencil, student can:		A 0% (unable)	B Up to 25% (rarely)	C Up to 50% (occasionally)	D Up to 75% (more often than not)	E Up to 100% (almost always)
1.	Add ("put together") or subtract ("take away") one object from a set of objects and express the resulting quantity.					
2.	Add two or more objects, or take away two or more objects, from a set of 5 objects and express the resulting quantity.					
3.	Create sets with an equal number of objects in each set.					
4.	Compare two groups of objects and indicate which has "more" and which has "less."					
5.	Answer questions about "how many altogether" (up to 10 objects).					
6.	Sort or group objects by multiples of two.					
7.	Match numerals (up to 10) with the number of objects/pictures displayed.					
Using standard numerals, symbols, or notations, student can:						
8.	Plot at least three single-digit numbers on a number line.					
9.	Solve addition problems involving one-digit numbers up to a total of 10.					
10.	Identify the missing number in a problem involving subtraction (up to 15) (e.g., 12 -? = 5)					
11.	Show equalities in number sentences (e.g., 2 + 4 = 4 + 2; 3 + 1 = 2 + 2).					
12.	Count by 2's to 20.					
13.	Count by 5's to 25.					
14.	Determine the unknown quantity in a multiplication problem (within 20) (e.g., how many groups of 5 objects is equal to 15?).					
15.	Solve multiplication problems with multipliers of 1–10.					
16.	Solve division problems within 100 with divisors of 1–10.					
17.	Identify the missing number in a word problem involving multiplication and division (within 25), with unknowns in all positions (e.g., 20 ÷? = 5).					
18.	Create or extend a numerical pattern based on a given rule (e.g., "begin with 7, then the rule is to add 4").					

Student's Name______________________________ Grade_____ Date of Survey_____________

Grade 4 Mathematics

Number and Operations—Fractions

Identify/recognize fractions:		A 0% (unable)	B Up to 25% (rarely)	C Up to 50% (occasionally)	D Up to 75% (more often than not)	E Up to 100% (almost always)
1.	Identify ½ and whole using manipulatives and/or familiar objects.					
2.	Partition a whole into 1/2, 1/3, and 1/4 equal parts.					
3.	Compare parts of the same whole (quarter, third, half) to determine the relative size of each.					
4.	Compare fractions of the same whole with like denominators to determine which is greater (e.g., ¼ or ¾).					
5.	Label points on a number line with simple fractions with like denominators (e.g., label 1/6, 3/6, 5/6 on the same number line).					
6.	Demonstrate one or more fractions that are equivalent to ½ using models or manipulatives (e.g., 2/4, 3/6, 4/8).					
7.	Compare two fractions with unlike denominators and indicate which is greater or less (1/3 or 3/5).					
Operations with fractions:						
8.	Add and subtract "unit fractions" with like denominators (e.g., ¼ + ¼ = ?).					
9.	Add and subtract fractions with like denominators (e.g., 1/8 + 3/8 =? and 5/8 – 3/8 = ?).					
10.	Multiply simple fractions by a whole number (e.g., 3/5 X 5 = 15/5 = 3).					
11.	Multiply fractions by fractions (e.g., 2/4 X 4/5 = 8/20).					
12.	Convert simple decimals to simple fractions and vice versa (e.g., .25 = ¼; ½ = .50).					

Student's Name______________________________ Grade_____ Date of Survey_____________

Grade 5 Mathematics

Number and Operations in Base Ten (NBT)

Using objects, manipulatives, technology, or paper-pencil, student can:		A 0% (unable)	B Up to 25% (rarely)	C Up to 50% (occasionally)	D Up to 75% (more often than not)	E Up to 100% (almost always)
1.	Count by ones to 10.					
2.	Represent up to 5 objects with numerals, including 0.					
3.	Compose numbers from 1 to 9 to create 10, using objects.					
4.	Count by tens to 100.					
5.	Count forward beginning from a given number up to 100 (e.g., count on from 23).					
6.	Identify "ten more" (or "ten less") than a given two-digit number.					
7.	Add and subtract single-digit numbers.					
8.	Add and subtract two-digit numbers.					
9	Round a given amount of money to the nearest dollar (e.g., $2.57 rounds to $3.00).					
10.	Round whole three-digit numbers to the nearest 100.					
11.	Multiply a one-digit number by a two-digit number.					
12.	Divide a three-digit number by a one-digit number (without remainders).					

Student's Name______________________________ Grade_____ Date of Survey_____________

Grade 5 Mathematics

Number and Operations—Fractions

Identify/recognize fractions:		**A** **0%** **(unable)**	**B** **Up to** **25%** **(rarely)**	**C** **Up to** **50%** **(occasionally)**	**D** **Up to** **75%** **(more often than not)**	**E** **Up to** **100%** **(almost always)**
1.	Identify ½ and whole using manipulatives and/or familiar objects.					
2.	Partition a whole into ½, ⅓, and ¼ equal parts.					
3	Compare parts of the same whole (½, ⅓, and ¼) to determine the relative size of each.					
4.	Compare fractions of the same whole with like denominators to determine which is greater (e.g., ¼ or ¾).					
5.	Label points on a number line with simple fractions with like denominators (e.g., label 1/6, 3/6, 5/6 on the same number line).					
6.	Demonstrate one or more fractions that are equivalent to ½ using models or manipulatives (e.g., 2/4, 3/6, 4/8).					
7.	Compare two fractions with unlike denominators and indicate which is greater or less (1/3 or 3/5).					
Operations with fractions:						
8.	Add and subtract "unit fractions" with like denominators (e.g., ¼ + ¼ = ?).					
9.	Add and subtract fractions with like denominators (e.g., 1/8 + 3/8 =? and 5/8 – 3/8 = ?).					
10.	Multiply simple fractions by a whole number (e.g., 3/5 x 5 = 15/5 = 3).					
11.	Multiply fractions by fractions (e.g., 2/4 x 4/5 = 8/20).					
12.	Convert simple decimals to simple fractions and vice versa (e.g., .25 = ¼; ½ = .50).					

Student's Name_______________________________ Grade_____ Date of Survey______________

Grade 6 Mathematics

Statistics and Probability

Using objects, manipulatives, technology, or paper-pencil, student can:		A 0% (unable)	B Up to 25% (rarely)	C Up to 50% (occasionally)	D Up to 75% (more often than not)	E Up to 100% (almost always)
1.	Record responses to a survey.					
2.	Represent a simple set of data graphically, either from a survey or based on observations (e.g., on a table, chart, tally, bar graph, or circle graph).					
3.	Describe what is being shown in a simple data display (e.g., in a table or on a bar, line, or circle graph).					
4.	Answer questions related to the data shown in a data display (e.g., do more students have brown eyes or blue eyes?).					
5.	Order a set of numerical data.					
6.	Find the median in an ordered set of numerical data.					
7.	Calculate the range (spread) of a given set of data (e.g., by finding the difference of the greatest and least values).					
8.	Given two sets of numerical data, decide which has the greatest mean.					
9.	Calculate the mean of a given set of data.					

Student's Name_______________________________ Grade_____ Date of Survey______________

Grade 6 Mathematics

The Number System

Using objects, manipulatives, technology, or paper-pencil, student can:		A 0% (unable)	B Up to 25% (rarely)	C Up to 50% (occasionally)	D Up to 75% (more often than not)	E Up to 100% (almost always)
1.	Match visual representation of a simple fraction to the fraction itself (e.g., match one-third of a pie to "$\frac{1}{3}$").					
2	Distinguish ¼ from ½ of the same object.					
3.	Locate positive whole numbers on a number line.					
4.	Add and subtract one-digit whole numbers.					
5.	Multiply and divide one-digit whole numbers					
6.	Add and subtract two-digit whole numbers.					
7.	Add and subtract fractions with like denominators.					
8.	Multiply two-digit whole numbers by one-digit whole numbers.					
9.	Multiply two- and three-digit whole numbers by two-digit whole numbers.					
10.	Divide two-digit numbers by one-digit whole numbers.					
11.	Multiply fractions by whole numbers (e.g., $4 \times \frac{2}{3}$).					
12.	Multiply fractions by fractions (e.g., ¼ x ⅜).					
13.	Solve word problems involving fractions (e.g., I have 2/3 cup of water. Paul has half as much as me. How much water does Paul have?).					
14.	Identify numbers that are multiples of 2 or 3 from a list of numbers.					
15.	Add and subtract numbers including decimals to tenths (e.g., 3.6 + 4.7).					
16.	Multiply and divide decimals by whole numbers to tenths (e.g., 7.4 X 4; 4.8 ÷ 6).					
17.	Locate and plot points in the first quadrant of a coordinate plane (e.g., plot and/or locate the points (4, 5), (8, 12), (6,3) on a graph).					

Student's Name________________________________ Grade_____ Date of Survey______________

Grade 7 Mathematics

Ratios and Proportional Relationships

Using objects, manipulatives, technology, or paper-pencil, student can:		A 0% (unable)	B Up to 25% (rarely)	C Up to 50% (occasionally)	D Up to 75% (more often than not)	E Up to 100% (almost always)
1.	Create a part-to-part ratio among objects already pre-sorted into sets or categories (e.g., the ratio of red to blue objects is 5:3).					
2.	Express a part-to-whole ratio (e.g., If 5 of 9 students are boys, then the part-to-whole ratio is 5:9).					
3.	Identify two or more equivalent fractions ($\frac{1}{2} = \frac{3}{6}$).					
4	Convert quantities from one measurement unit to another (e.g., 6 feet = 2 yards; 18 inches = 1½ feet).					
5.	Calculate a percentage of a given quantity (e.g., What is 25 percent of 48?).					
6.	Calculate a unit rate using real-world examples (e.g., If 5 apples cost $2.00, the unit rate is $0.40 per apple).					
7.	Determine the percentage given the quantities (e.g., 10 is what percent of 50; 9 is what percent of 45?).					
8.	Solve one-step equations using multiplication (e.g., $3x = 45$ or $4x = 36$).					
9.	Create a table given a ratio (e.g., given the ratio 1:3, make a table with 2? 3:?; and 4:?).					
10.	Express a percent as a fraction equivalent (e.g., 75% = $\frac{75}{100}$ or $\frac{3}{4}$).					
11.	Solve proportions where one quantity is represented by a variable (e.g., $\frac{3}{5} = \frac{x}{15}$).					

Student's Name________________________________ Grade_____ Date of Survey______________

Grade 7 Mathematics

Geometry

Using objects, manipulatives, technology, or paper-pencil, student can:		A 0% (unable)	B Up to 25% (rarely)	C Up to 50% (occasionally)	D Up to 75% (more often than not)	E Up to 100% (almost always)
1.	Find a shape that is round.					
2.	Partition a shape into two equal parts.					
3.	Match identical two-dimensional shapes (e.g., drawings of squares, triangles).					
4.	Match identical three-dimensional shapes (e.g., ball/sphere; box/cube).					
5.	Demonstrate the relative positions of objects (e.g., beside, inside, next to, above, below).					
6.	Sort two-dimensional shapes (e.g., squares, circles, and triangles).					
7.	Identify simple shapes by name (circle, square, triangle, box/cube, ball/sphere).					
8.	Sort two- and three-dimensional shapes by attribute, such as color, shape, and size.					
9	Identify and label a line and an angle.					
10.	Identify angles as either acute, obtuse, or right.					
11.	Plot a given number on a horizontal number line.					
12.	Plot a given ordered pair in the first quadrant of a coordinate plane (e.g., (4, 5); (8, 12); (8, 3)).					
13.	Calculate the area of a square or rectangle.					

Student's Name______________________________ Grade_____ Date of Survey_____________

Grade 8 Mathematics

Expressions and Equations

Using objects, manipulatives, technology, or paper-pencil, student can:		A 0% (unable)	B Up to 25% (rarely)	C Up to 50% (occasionally)	D Up to 75% (more often than not)	E Up to 100% (almost always)
1.	Express the meaning of "equal to, "greater than," or "less than" by comparing groups of objects.					
2.	Compare number quantities using the symbols <, =, or >.					
3.	Represent repeated addition using groups of objects with equal amounts (e.g., given 12 objects, create 2 groups of 6; 3 groups of 4; etc.).					
4.	Create equivalent expressions using commutative property (e.g., 4 + 2 = 2 + 4; 5 X 3 = 3 X 5).					
5.	Solve addition and subtraction equations where the sum or difference is represented by a variable (e.g., $5 + 7 = r$).					
6.	Identify the missing number in an equation involving addition or subtraction (e.g., $8 + ? = 13$).					
7.	Solve multiplication and division equations where the product or quotient is represented by a variable (e.g., $6 \times 7 = t;\ 32 \div 8 = n$).					
8.	Identify the missing factor in an equation involving multiplication (e.g., $4\ \times ? = 28$).					
9.	Identify equivalent numerical expressions (e.g., $8 + 8 + 8$ can be written as 3×8 or 8×3).					
10.	Evaluate expressions with numbers and letters involving addition and subtraction, given the value of an unknown number (e.g., What is 7-*p*, if *p*=2; *p*=3; *p*=5?).					
11.	Generate a number pattern given an initial value and an addition rule (e.g., initial value is 6, rule is "add 4," determine the next 5 numbers in the pattern).					
12.	Solve a one-step equation involving multiplication and/or division, with no remainder (e.g., $14 \div n = 7$).					

Student's Name______________________________ Grade_____ Date of Survey_____________

Grade 8 Mathematics

Geometry

Using objects, manipulatives, technology, or paper-pencil, student can:		A 0% (unable)	B Up to 25% (rarely)	C Up to 50% (occasionally)	D Up to 75% (more often than not)	E Up to 100% (almost always)
1.	Find a shape that is round.					
2.	Match identical two-dimensional shapes (e.g., drawings of squares, triangles).					
3.	Match identical three-dimensional shapes (e.g., ball/sphere; box/cube).					
4.	Match similar shapes of different sizes.					
5.	Distinguish squares, circles, and triangles.					
6.	Communicate the names of simple shapes.					
7.	Describe the relative positions of objects (e.g., beside, inside, next to, above, below).					
8.	Sort two- and three-dimensional shapes by attribute, such as color, shape, and size.					
9.	Partition a shape into two equal parts.					
10.	Identify and label a line and an angle.					
11.	Identify angles as either acute, obtuse, or right.					
12.	Plot numbers on a horizontal number line.					
13.	Plot ordered pairs in the first quadrant of a coordinate plane (e.g., (4, 5); (8, 12); (8, 3)).					
14.	Calculate the area of a square or rectangle.					

Student's Name______________________________ Grade_____ Date of Survey______________

Grade 10 Mathematics
(Conduct the skills survey only in the three Conceptual Categories selected for the grade 10 MCAS-Alt.)

Number and Quantity

Using objects, manipulatives, technology, or paper-pencil, student can:		A 0% (unable)	B Up to 25% (rarely)	C Up to 50% (occasionally)	D Up to 75% (more often than not)	E Up to 100% (almost always)
1.	Locate positive whole numbers on a number line.					
2.	Match visual representation of a simple fraction to the fraction itself (e.g., match one-third of a pie to "$\frac{1}{3}$").					
3.	Compare two fractions and communicate whether one is "less than," equal to," or "greater than" the other.					
4.	Add and subtract one-digit whole numbers.					
5.	Multiply and divide one-digit whole numbers.					
6.	Add and subtract two-digit whole numbers.					
7.	Add and subtract fractions with like or unlike denominators.					
8.	Multiply two-digit whole numbers by one- and two-digit whole numbers.					
9.	Identify perfect squares and their square roots up to 10 (e.g., $6^2 = 36;\ \sqrt{36} = 6$).					
10.	Divide two-digit numbers by one-digit whole numbers.					
11.	Multiply fractions by whole numbers (e.g., $4 \times \frac{2}{3}$).					
12.	Multiply fractions by fractions (e.g., ¼ x ⅜)					
13.	Divide fractions by fractions (e.g., $\frac{1}{3} \cdot \frac{3}{5} = \frac{3}{15}; \frac{1}{3} \div \frac{3}{5} = \frac{5}{9}$)					
14.	Solve word problems involving fractions (e.g., I have 2/3 cup of water. Paul has half as much as me. How much water does Paul have?)					
15.	Identify numbers that are multiples of 2 or 3 from a list of numbers.					
16.	Add and subtract numbers including decimals to tenths (e.g., 3.6 + 4.7).					
17.	Multiply and divide decimals by whole numbers to tenths (e.g., 7.4 X 4; 4.8 ÷ 6).					
18.	Plot and locate points on a coordinate grid (e.g., plot and/or locate the points (3, -2), (-4, 6), (-7, -3) on a graph).					
19.	Round a five-digit number (e.g., 25, 331) to the nearest hundred (e.g., 25, 300) and nearest thousand (e.g., 25,000).					

Student's Name______________________________ Grade_____ Date of Survey______________

Grade 10 Mathematics
(Conduct the skills survey only in the three Conceptual Categories selected for the grade 10 MCAS-Alt.)

Algebra

Using objects, manipulatives, technology, or paper-pencil, student can:		A 0% (unable)	B Up to 25% (rarely)	C Up to 50% (occasionally)	D Up to 75% (more often than not)	E Up to 100% (almost always)
1.	Compare number quantities using the symbols <, =, or >.					
2.	Create groups of objects with equal amounts in multiple ways (e.g., given 12 objects, create 2 groups of 6; 3 groups of 4 etc.).					
3.	Create equivalent expressions using the commutative property (e.g., 4 + 2 = 2 + 4; 5 X 3 = 3 X 5).					
4.	Solve addition and subtraction equations where the sum or difference is represented by a variable (e.g., $5 + 7 = r$).					
5.	Solve multiplication and division equations where the product or quotient is represented by a variable (e.g., $6 \times 7 = t$; $54 \div 7 = n$).					
6.	Identify the missing number in an equation involving addition or subtraction (e.g., $? + 8 = 13$).					
7.	Identify equivalent numerical expressions (e.g., $8 + 8 + 8$ can be written as 3×8).					
8.	Solve one- and two-step equations with one variable (e.g., solve for *x*, if $3x$=15; $5x$ + 7 = 42).					
9.	Multiply a two-digit number by a one-digit number.					
10.	Evaluate expressions with numbers and letters involving addition and subtraction, given the value of an unknown number (e.g., 7-*p*, if *p*=2; *p*=3; *p*=5).					
11.	Extend a simple arithmetic sequence (e.g., 7, 10, 13,?).					
12.	Determine the point of intersection of two lines graphed on a coordinate plane by observation (e.g., the point of intersection of two lines is $(5, -1)$).					

Student's Name______________________________ Grade_____ Date of Survey_____________

Grade 10 Mathematics
(Conduct the skills survey only in the three Conceptual Categories selected for the grade 10 MCAS-Alt.)

Functions

Using objects, manipulatives, technology, or paper-pencil, student can:		A 0% (unable)	B Up to 25% (rarely)	C Up to 50% (occasionally)	D Up to 75% (more often than not)	E Up to 100% (almost always)
1.	Create a part-to-part ratio among objects already pre-sorted into sets or categories (e.g., the ratio of red to blue objects is 5:3).					
2.	Express a part-to-whole ratio (e.g., If 5 of 9 students are boys, then 5/9 of the students are boys; or part-to-whole ratio is 5:9).					
3.	Identify two or more equivalent fractions ($\frac{1}{2} = \frac{3}{6}$).					
4.	Calculate a percentage of a given quantity (e.g., What is 25 percent of 48?).					
5.	Calculate a unit rate using real-world examples (e.g., If 5 apples cost $2.00, the unit rate is $0.40 per apple).					
6.	Determine the percentage given the quantity (e.g., 9 is what percent of 45? what is 40 percent of 300?).					
7.	Express a percent as a fraction equivalent (e.g., 75% = $\frac{75}{100}$).					
8.	Solve proportions where one quantity is represented by a variable (e.g., $\frac{3}{5} = \frac{x}{15}$).					
9.	Complete missing values on an input-output table (or use manipulatives) when given the function rule and input values (e.g., Rule: ribbon costs $1.25 per yard; what is cost for 3 yards? 12 yards; etc.).					
10.	Create a table of ordered pairs (or generate a number pattern) representing a real-life relationship (e.g., based on $.95 cost of one donut, create a table of ordered pairs when multiple donuts are bought; or miles traveled over different periods of time at 60 mph).					
11.	Complete a table (or extend a number pattern) based on an initial value and an addition or subtraction rule.					
12.	Determine the addition or subtraction rule of an input/output table, given the ordered pairs.					

Student's Name______________________________ Grade_____ Date of Survey_____________

Grade 10 Mathematics
(Conduct the skills survey only in the three Conceptual Categories selected for the grade 10 MCAS-Alt.)

Geometry

	Using objects, manipulatives, technology, or paper-pencil, student can:	A 0% (unable)	B Up to 25% (rarely)	C Up to 50% (occasionally)	D Up to 75% (more often than not)	E Up to 100% (almost always)
1.	Find a shape that is round.					
2.	Match identical two-dimensional shapes (e.g., drawings of squares, triangles).					
3.	Match identical three-dimensional shapes (e.g., ball/sphere; box/cube).					
4.	Match similar shapes of different sizes.					
5.	Distinguish squares, circles, and triangles.					
6.	Communicate the names of simple shapes.					
7.	Describe the relative positions of objects (e.g., beside, inside, next to, above, below).					
8.	Sort two- and three-dimensional shapes by attribute, such as color, shape, and size.					
9.	Partition a shape into two equal parts.					
10.	Identify and label a line and an angle.					
11.	Identify angles as either acute, obtuse, or right.					
12.	Plot numbers on a horizontal number line.					
13.	Graph ordered pairs in the first quadrant of a coordinate plane (e.g., (4, 5); (8, 12); (8, 3)).					
14.	Calculate the area of a square or rectangle.					
15.	Identify lines of symmetry within a two-dimensional figure.					
16.	Use the Pythagorean Theorem to find the length of the hypotenuse of a right triangle, given the length of the two other sides.					
17.	Calculate the area of a circle (πr^2), given its diameter or radius (e.g., find the area of a circle with a radius of 3; find the area of a circle with a diameter of 8).					

Student's Name_______________________________ Grade_____ Date of Survey______________

Grade 10 Mathematics
(Conduct the skills survey only in the three Conceptual Categories selected for the grade 10 MCAS-Alt.)

Statistics and Probability

	Using objects, manipulatives, technology, or paper-pencil, student can:	A 0% (unable)	B Up to 25% (rarely)	C Up to 50% (occasionally)	D Up to 75% (more often than not)	E Up to 100% (almost always)
1.	Order a set of numerical data from least to greatest.					
2.	Identify the minimum and maximum values in a set of numbers.					
3.	Identify the range of numerical data in a set of numbers arranged from least to greatest.					
4.	Identify the median (i.e., the middle value) for a set of numerical data.					
5.	Answer simple questions related to data represented on a data display (e.g., numbers on a pie chart showing the number of sunny days to rainy days in a given month).					
6.	Calculate the mean of a set of numerical data.					

Student's Name_______________________________ Grade_____ Date of Survey______________

Next-Generation (Next-Gen) Science and Technology/Engineering (STE):
Grade 5 and 8 – All Strands
High School – Biology and Introductory Physics ONLY

Complete the skills survey **once** for each student in <u>all eight science practices</u> listed below.
Note: The Science Practices are the same across all next-gen STE strands and grade spans.

Before selecting entry points for the student, teachers should assess each student's skills and abilities in each Science Practice, checking the box if the student can perform the skill <u>independently, at least some of the time.</u>

The STE Skills Survey is based on the student's ability to independently perform a science skill (for example ask a question, follow directions, describe something), rather than on specific science content.

Teachers should select entry points at the highest-grade span in which the checked boxes appear. Teachers may select entry points from <u>different grade spans</u>, depending on the results of the skills survey. For example, a student in grade 8 may be able to perform one science practice listed in grade span 6-8, while performing another science practice in grade span 3-5.

NOTE: High School Chemistry and Technology/Engineering are legacy, rather than next-gen, assessments that will be conducted as they have been in previous years (i.e., by submitting a data chart with at least eight dates; plus at least two pieces of evidence in each strand).

SCIENCE and TECHNOLOGY/ENGINEERING (STE) SKILLS SURVEY

Instructions: For grades 5 and 8 STE and high school Biology and Introductory Physics, check the boxes below in each of the eight numbered Science Practices that the student can perform independently, at least some of the time. Select an entry point from each science practice in the highest-grade span in which the checked boxes appear.

		1. Asking Questions and Defining Problems
Less Complex	PreK–Grade 2	☐Ask clarifying questions about a topic or idea. ☐Use observations to ask relevant questions. ☐Define a simple problem related to a topic.
	Grades 3–5	☐Use observations and/or data (for example, multiple-word descriptors, descriptions or drawings of observations, counted observations, measurements) to ask a question about a topic or idea. ☐Identify questions on a topic that can be answered by an investigation. ☐Define a simple problem that can be solved related to a topic.
	Grades 6–8	☐Identify scientific (testable) and non-scientific (non-testable) questions. ☐Generate scientific questions about a topic based on research and/or observations.
	Grades 9–12	☐Evaluate a scientific question to determine if it is testable and/or relevant to a topic. ☐Generate a scientific question about a topic that is testable using available resources.
More Complex		☐My student cannot perform any of the skills in this science practice

		2. Planning and Carrying Out Investigations
Less Complex	PreK–Grade 2	☐Choose how to collect data and/or observations (for example, using one-word descriptors, yes/no observations) on a topic. ☐Follow the steps of an investigation to collect data and/or observations (for example, using one-word descriptors, yes/no observations) on a topic. ☐Record observations (for example, based on first-hand experiences or through the media) on a topic. ☐Use pictures and/or drawings to collect observations related to a topic.
	Grades 3–5	☐Choose how to collect data and/or observations (for example, using multiple-word descriptors, descriptions or drawings of observations, counted observations, measurements) on a topic. ☐Follow the steps of an investigation to collect data and/or observations (for example, multiple-word descriptors, descriptions or drawings of observations, counted observations, measurements) on a topic. ☐From multiple options, select the best method to collect data and/or observations on a topic. ☐Record observations (for example, based on first-hand experiences, or through the media) to collect data on a topic.
	Grades 6–8	☐Choose how to collect data to serve as evidence (for example, descriptions or drawings of observations over time, measurements that may show a pattern). ☐Follow the steps of an investigation on a topic to produce data to serve as evidence (for example, descriptions or drawings of observations over time, measurements that may show a pattern). ☐Select and use appropriate methods and/or tools (for example, ruler, graduated cylinder, thermometer, carbon dioxide sensor) for collecting data in an investigation. ☐Record observations and/or measurements to produce data to serve as evidence for an investigation. ☐Test two different models of the same proposed design solution to determine which better meets the criteria for success.
	Grades 9–12	☐Choose how to collect data to serve as evidence (for example, measurements, or descriptions of observations comparing an experimental and control group over time). ☐Follow the steps of an investigation to produce data to serve as evidence (for example, measurements, or descriptions of observations comparing an experimental and control group over time). ☐Select appropriate tools (for example, ruler, graduated cylinder, thermometer, carbon dioxide sensor) to conduct an investigation on a topic. ☐Select and/or create the appropriate organizer (for example, table, chart, graphic organizer) to collect data from an investigation.
More Complex		☐My student cannot perform any of the skills in this science practice.

3. Analyzing and Interpreting Data		
Less Complex	PreK–Grade2	☐Display data (for example, one-word descriptors, number/tally of yes/no observations) visually using a simple graph, table, or picture to show information on a topic. ☐Identify patterns by grouping information/data by similar observable properties. ☐Make predictions on a topic prior to collecting data/observations.
↕	Grades 3–5	☐Represent data (for example, counted observations, measurements) on a data display. ☐Answer questions based on a representation (for example, data display) of a data set. ☐Make predictions about an outcome in order to compare predictions to actual data and/or observations. ☐Compare predictions to actual data and/or observations from an investigation. ☐Use data and/or observations (for example, multiple-word descriptors, descriptions or drawings of observations, counted observations, measurements) to identify patterns about a topic. ☐Use data and/or observations to identify relationships between topics, ideas, or concepts. ☐From tests of an object or tool, evaluate data and/or observations (for example, multiple-word descriptors, descriptions or drawings of observations, counted observations, measurements) to determine if it works as intended. ☐Construct a conclusion based on evidence or observations (for example, from an investigation).
	Grades 6–8	☐Use data and/or observations (for example, descriptions or drawings of observations over time, measurements that may show a pattern) from an investigation to interpret features of the data or develop conclusions. ☐Describe one or more patterns (for example, using multiple-word descriptors) in a data set. ☐Analyze/interpret data (for example, descriptions or drawings of observations over time, measurements that may show a pattern) to make sense of a topic. ☐Compare and contrast two data sets. ☐Use observations and/or data (for example, descriptions or drawings of observations over time, measurements that may show a pattern) to evaluate and/or refine a design solution.
More Complex	Grades 9–12	☐Analyze/interpret data from a table or graph, citing details and/or evidence from the data display. ☐Create two or more appropriate visual representations of the same data set (for example, line graph, bar graph, circle graph, table, etc.).
		☐My student cannot perform any of the skills in this science practice.

4. Using Mathematics and Computational Thinking		
Less Complex	PreK–Grade2	☐Use counting and numbers to show data on a topic (for example, count/tally the number of yes/no observations or responses from the class). ☐Identify qualitative (i.e., using words) information about objects or data. ☐Identify quantitative (i.e., using numbers) information about objects or data.
↕	Grades 3–5	☐Use counting and numbers to show data on a topic (for example, measurements). ☐Describe, measure, and/or compare quantitative (i.e., numerical) attributes of objects or data. ☐Identify patterns in quantitative (i.e., numerical) data about a topic.
	Grades 6–8	☐Organize simple data sets (for example, data table, chart, graph) to reveal patterns. ☐Evaluate whether qualitative (i.e., descriptive) or quantitative (i.e. numerical) data is best to collect as evidence in an investigation about a topic. ☐Use computations (for example, addition, subtraction, division, multiplication) to analyze data (for example, averages, totals, differences).
	Grades 9–12	☐Use given formulas to solve for relevant quantities (for example, speed, density). ☐Apply mathematical concepts and/or processes (for example, ratios, rates, percentages, proportions, and/or basic operations) to answer questions or solve problems.
More Complex		☐My student cannot perform any of the skills in this science practice.

5. Developing and Using Models		
Less Complex	PreK–Grade2	☐Label a model that shows or explains a topic. ☐Illustrate a model to show or explain a topic. ☐Compare a model of an object with the actual object and identify similarities and differences.
↕	Grades 3–5	☐Given directions, construct a model to show or explain a topic. ☐Develop or create a model to show/explain a topic. ☐Distinguish between a model and the actual object, process, or event. ☐Compare two (or more) models of the same topic (for example, compare models of human body systems to identify common features and differences).
	Grades 6–8	☐Revise a model to more clearly show or explain a topic. ☐Show or explain a topic using a model.
	Grades 9–12	☐Refine an existing model by suggesting revisions. ☐Evaluate a model citing details about clarity and accuracy of the model.
More Complex		☐My student cannot perform any of the skills in this science practice.

6. Constructing Explanations and Designing Solutions		
Less Complex	PreK–Grade2	☐Show/express one or more observations or characteristics of a familiar topic or object. ☐Show/express the relationship between two objects or topics.
↕	Grades 3–5	☐Describe one or more characteristics of a topic or object based on observations. ☐Identify a design problem and a potential solution using words, pictures, or drawings. ☐Draw and/or explain a design solution for a content-related problem.
	Grades 6–8	☐Explain how a familiar object, device, or machine works. ☐Construct conclusions based on evidence from an investigation of a topic. ☐Generate a solution to a design problem using pictures or drawings. ☐Use tools (for example, ruler/tape measure, scissors, hammer) and/or materials to build a prototype that solves a specific problem. ☐Use observations and data from investigations (for example, descriptions or drawings of observations over time, measurements that may show a pattern) to design a solution to a problem.
	Grades 9–12	☐Construct an explanation of how an object, prototype, or machine works based on information from a variety of sources (for example, model, research, investigation, simulation) ☐Generate multiple solutions to a design problem. ☐Compare multiple solutions to a design problem.
More Complex		☐My student cannot perform any of the skills in this science practice.

7. Engaging in Argument from Evidence		
Less Complex	PreK–Grade2	☐Use scientific evidence (for example, data, observations from an investigation) to support an argument about a topic from the grades PreK-2 STE standards (see core ideas at each grade).
↕	Grades 3–5	☐Use scientific evidence to support a claim about a topic from the grades 3-5 STE standards (see core ideas at each grade). ☐Use scientific evidence to support a claim for or against a design solution.
	Grades 6–8	☐Use scientific evidence to support an argument about a topic from the grades 6-8 STE standards (see core ideas at each grade). ☐Compare and critique two arguments about a scientific topic or idea. ☐Defend a claim about the merits of a particular design solution, citing relevant evidence.
	Grades 9–12	☐Use scientific evidence and observations to construct an argument about a topic from the high school STE standards (see core ideas at each grade). ☐Make and defend a claim based on scientific evidence about a topic or idea. ☐Evaluate competing design solutions for a problem using evidence related to the criteria for success and the constraints of the resources.
More Complex		☐My student cannot perform any of the skills in this science practice.

8. Obtaining, Evaluating, and Communicating Information		
Less Complex	PreK–Grade2	☐Research (for example, using media or informational text) and present information (for example, show or express) on a topic from the grades preK-2 STE standards (see core ideas at each grade). ☐Communicate information or ideas (orally, graphically, textually, and/or mathematically) on a topic from grades preK-2 STE standards (see core ideas at each grade). ☐Compare fictional and non-fictional resources on a topic. ☐Recall (retell) important information from a text or from observations.
	Grades 3–5	☐Research (for example, using media or informational text) and present information on a topic from the grades 3-5 STE standards (see core ideas at each grade). ☐Communicate information or ideas (for example, orally, graphically, textually, and/or mathematically) on a topic from grades 3-5 STE standards (see core ideas at each grade). ☐Compare two informational sources (for example, using media, informational text, data display) to determine similarities and differences in how information was presented.
	Grades 6–8	☐Research and present information on a topic from grades 6-8 STE standards (see core ideas at each grade). ☐Communicate information or ideas (for example, orally, graphically, textually, and/or mathematically) on a topic from grades 6-8 STE standards (see core ideas at each grade). ☐Combine scientific information from multiple sources (for example, media, informational text, data display, observations from an investigation) to explain scientific information or phenomena.
	Grades 9–12	☐Research and present information on a topic from grades 9-12 STE standards (see core ideas at each grade). ☐Communicate information or ideas (orally, graphically, textually, and/or mathematically) on a topic from grades 9-12 STE standards (see core ideas at each grade span). ☐Evaluate the validity and reliability of information provided in multiple texts/media on the same topic.
More Complex		☐My student cannot perform any of the skills in this science practice.

Student's Name_______________________________ Grade_____ Date of Survey______________

High School Science and Technology/Engineering (STE)

Chemistry (Legacy standards)

(Note: For this high school STE discipline, conduct the Skills Survey below.)

Illustrate, demonstrate, or respond verbally to:		A 0% (unable)	B Up to 25% (rarely)	C Up to 50% (occasionally)	D Up to 75% (more often than not)	E Up to 100% (almost always)
1.	Group objects by one similar observable property (e.g., size, shape, color, weight, or texture)					
2.	Identify three properties of three different objects/materials (e.g., the ball is round, smooth, and blue; water is cold, wet, and clear)					
3.	Identify up to 3 given materials/objects as either solid, liquid, or gas					
4.	Give examples of a physical versus chemical change (i.e., a physical change doesn't change the substance (melting an ice cube, tearing paper, mixing flour and an egg); in a chemical change (e.g., combustion), a new substance is formed, and energy is either given off or absorbed) (e.g., rusting iron, baking a cake, burning wood)					
5.	Give examples of each basic form of energy (i.e., light, sound, heat, electrical, and/or magnetic)					
6.	Classify up to three substances as either a mixture (e.g., soil, sand, coffee with milk, sugar, and water) or a pure substance (e.g., air, water, diamonds, table salt, sugar)					

Student's Name_______________________________ Grade_____ Date of Survey______________

High School Science and Technology/Engineering (STE)

Technology/Engineering (Legacy standards)

(Note: For this high school STE discipline, conduct the Skills Survey below.)

Illustrate, demonstrate, or respond verbally to:		A 0% (unable)	B Up to 25% (rarely)	C Up to 50% (occasionally)	D Up to 75% (more often than not)	E Up to 100% (almost always)
1.	Name three tools and what they were designed to do.					
2.	Identify parts of the human body that act as tools (e.g., teeth for cutting, fingers for grasping).					
3.	Match various tools to their intended purpose.					
4.	Determine whether given objects are natural or human-made.					
5.	Identify different means of transportation.					
6.	Draw or describe a picture/diagram of a specific object you would like to construct.					
7.	Describe the materials you would use to build the object you would like to construct and why you chose those materials.					
8.	Name or describe at least one tool you would use to construct the object you chose and describe why you chose the tool.					
9.	Match a symbol (without text) used to communicate an idea to its message or meaning (e.g., symbols used for wheelchair access, danger, bicycle lane).					
10.	Calculate the actual length of an object from a scaled drawing.					

Appendix S
Guidelines for Scoring
2022 MCAS-Alt

Guidelines for Scoring 2022 MCAS-Alt

MCAS Alternate Assessment

Massachusetts Comprehensive Assessment System

This document was prepared by the
Massachusetts Department of Elementary and Secondary Education

Jeffrey C. Riley

Commissioner

Massachusetts Department of Elementary and Secondary Education
75 Pleasant Street, Malden, MA 02148-4906
Phone 781-338-3000 TTY: N.E.T. Relay 800-439-2370
www.doe.mass.edu

Purpose of the Scoring Guidelines

The purpose of the *Guidelines for Scoring 2022 MCAS-Alt* is to train scorers to evaluate the 2022 MCAS Alternate Assessment (MCAS-Alt). These guidelines provide important information so that scorers can give valid scores on statewide MCAS-Alt assessments and maintain consistency in applying the scoring rules during the scoring process. Massachusetts educators are also encouraged to use these guidelines to familiarize themselves with the process used to evaluate the MCAS-Alt assessments for their students.

MCAS-Alt is the state's alternate assessment for students with the most significant cognitive disabilities who cannot be assessed on standard MCAS tests, even with accommodations, due to the severity of their disabilities. It is important to assess the academic performance of all students in relation to the state's learning standards, and to include students with disabilities in MCAS reporting, so results provided to their schools can be used to improve instruction. The MCAS-Alt ensures that students with the most significant cognitive disabilities have an opportunity to show what they know academically and to receive instruction at a level that is challenging and attainable.

By participating in alternate assessments and including their scores in the results of their school and district, students have a greater chance of being considered when decisions are made to allocate staff and resources. Requirements for conducting the MCAS-Alt are provided in the *2022 Educator's Manual for MCAS-Alt*, available at https://www.doe.mass.edu/mcas/alt/resources.html.

Table of Contents

Introduction and Background

The MCAS Alternate Assessment (MCAS-Alt) has been administered annually in Massachusetts since 2001. According to state and federal laws, all students with disabilities are required to participate in statewide assessments, either by taking standard MCAS tests with or without accommodations, or by taking the MCAS-Alt. Decisions regarding how each student will participate in MCAS must be made by the student's IEP team and documented in the student's IEP; or listed in the student's 504 plan.

Contents and Structure of the MCAS-Alt

The MCAS-Alt consists of 1) the MCAS-Alt Skills Survey, which is a standardized, measurable, and scorable component that must be completed by teachers prior to selecting "entry points" for subsequent, deeper assessment in the required strand and subject; 2) a collection of "primary evidence" consisting of data charts, work samples, and photographs/video based on the selected entry points or access skills in the specific areas identified for submission in the required subject; and 3) optional "supporting documentation" that describes or shows the context of the assessment activities, including materials, setting, format, and student reflections. The collection of evidence is organized into "strands" according to the standards specified for assessment in each grade and content area**.** Each strand includes the following products and information related to the specific topics and domains being assessed:

- **MCAS-Alt Skills Survey** (see sample in Appendix D)
- **one data chart** showing the student's performance on at least eight different dates, based on a skill listed in the state's Resource Guide for Students with Disabilities in the learning standard and subject required for assessment
- at least **two pieces of evidence**, including work samples, video clips, and/or photographs, showing the student's performance based on the skill listed on the data chart, with a brief description of how the student demonstrated the skill
- examples of **supporting documentation**, including materials and tools used by the student, reflection sheets, and other supporting documentation at the discretion of the teacher

Exceptions to the above assessment requirements are described on pages 21–23 for ELA-Writing (all grades) and on page 24 for Science and Technology/Engineering (grades 5 and 8 and "next-generation" high school Biology and Introductory Physics).

Detailed instructions for conducting the MCAS-Alt are available in the Department's publication entitled the Educator's Manual for MCAS-Alt, which is updated annually. The Educator's Manual is posted on the Department's website at www.doe.mass.edu/mcas/alt/resources.html.

Scoring the MCAS-Alt

After the skills surveys and evidence collections are submitted to the Department on April 1, 2022, they are reviewed and scored at a scoring institute sponsored by the Department and Cognia, the state's alternate assessment contractor. The *Guidelines for Scoring 2022 MCAS-Alt* (this publication) provides detailed information on the process that will be used by scorers to review and rate each student's alternate assessment. This publication is available at www.doe.mass.edu/mcas/alt/results.html.

General Guidelines for Scorers

Carefully review the following guidelines and review each step of the scoring process included in this booklet, including all scoring rules and onscreen displays in the AltScore program.

Scorers must:

- **Score objectively and impartially.**
  Put aside opinions about the appropriateness of the student's placement, program, or services; opinions on why the student is participating in the alternate assessment; and personal feelings about statewide assessment in general.
- **Review all evidence in a strand before scoring the strand.**
- **Score only what is provided in each strand.**
  Do not make inferences or assumptions about what the student or teacher may have intended or should have included. Use *actual evidence*, rather than the description of the evidence provided by the teacher, as the basis for determining the score.
- **Avoid biases in reviewing the assessment based on overall presentation, neatness, and/or organization of the contents.**
- **Score each rubric area separately for each strand.**
- **Respect student and teacher confidentiality.**
  In accordance with the Family Educational Rights and Privacy Act (FERPA), do not discuss confidential student information with anyone. Do not use the names of teachers or students when discussing the contents of any assessment. Do not score any assessment if you are familiar with the student or teacher who submitted it.
- **Respect the contents of the assessments.**
  Student assessments must be returned in the same condition in which they were submitted. Maintain the order of all contents in the three-ring binder. Remove notes, flags, and placeholders you may have used during scoring.
- **Keep food and drinks away from the binders.** Store uncovered, sticky, or greasy edibles underneath the scoring table at all times.
- **Score at a reasonable pace, without rushing.**
  Read each question and answer it based on the evidence in front of you. Be methodical without taking too long. Each strand should take no more than about fifteen minutes to score. Ask for assistance only if you get stuck.

Content Areas Assessed by MCAS-Alt: Grades 3, 4, and 5

A student in this grade	Must be assessed in the following	
	Content areas	**Strands/Domains**
3	• English Language Arts	• One portfolio strand each in: ○ Reading (Literature or Informational Text) ○ Language (*Vocabulary Acquisition and Use*) ○ Writing (*Text Types and Purposes*)
	• Mathematics	• One portfolio strand each in: ○ Operations and Algebraic Thinking ○ Measurement and Data
4	• English Language Arts	• One portfolio strand each in: ○ Reading (Literature **or** Informational Text) ○ Language (*Vocabulary Acquisition and Use*) ○ Writing (*Text Types and Purposes*)
	• Mathematics	• One portfolio strand each in: ○ Operations and Algebraic Thinking ○ Number and Operations–Fractions
5	• English Language Arts	• One portfolio strand each in: ○ Reading (Literature **or** Informational Text) ○ Language (*Vocabulary Acquisition and Use*) ○ Writing (*Text Types and Purposes*)
	• Mathematics	• One portfolio strand each in: ○ Number and Operations in Base Ten ○ Number and Operations–Fractions
	• Science and Technology/Engineering (STE)*	• Three different STE disciplines, one core idea for each discipline

* STE assessments may include evidence collected during the <u>current</u> and <u>one immediately preceding</u> school year.

Content Areas Assessed by MCAS-Alt: Grades 6, 7, and 8

A student in this grade	Must be assessed in the following	
	Content areas	**Content areas**
6	• English Language Arts	• One portfolio strand each in: ○ Reading (Literature **or** Informational Text) ○ Language (*Vocabulary Acquisition and Use*) ○ Writing (*Text Types and Purposes)*
	• Mathematics	• One portfolio strand each in: ○ The Number System ○ Statistics and Probability
7	• English Language Arts	• One portfolio strand each in: ○ Reading (Literature **or** Informational Text) ○ Language (*Vocabulary Acquisition and Use*) ○ Writing (*Text Types and Purposes*)
	• Mathematics	• One portfolio strand each in: ○ Ratios and Proportional Relationships ○ Geometry
8	• English Language Arts	• One portfolio strand each in: ○ Reading (Literature **or** Informational Text) Language (*Vocabulary Acquisition and Use*) ○ Writing (*Text Types and Purposes*)
	• Mathematics	• One portfolio strand each in: ○ Expressions and Equations ○ Geometry
	• Science and Technology/Engineering *	• Three different STE disciplines, one core idea for each discipline

* STE assessments may include evidence collected during the current and one immediately preceding school year.

Content Areas Assessed by MCAS-Alt: High School

A student in this grade	Must be assessed in the following	
	Content areas	**Content areas**
9 **or** 10	• Science and Technology/Engineering *	Next-Generation STE:[1] Choose one discipline: ○ Biology or ○ Introductory Physics Legacy STE:[2] Choose **three** standards in any **one** discipline: ○ Chemistry **or** ○ Technology/Engineering
10	• English Language Arts	• One portfolio strand each in: ○ Reading (Literature **or** Informational Text) ○ Language (*Vocabulary Acquisition and Use*) ○ Writing (*Text Types and Purposes*)
	• Mathematics	• One portfolio strand each in **any three** of the following strands: ○ Number and Quantity/The Number System ○ Statistics and Probability ○ Algebra/Expressions and Equations ○ Geometry ○ Functions/Ratios and Proportional Relationships

* STE assessments may include evidence collected during the current and one immediately preceding school year. Review the STE assessment format on page 24.

[1] "Next generation" refers to standards in the 2016 Science and Technology/Engineering Curriculum Framework (for Biology and Intro Physics).

[2] "Legacy" refers to standards in the 2001/2006 Science and Technology/Engineering Curriculum Framework (for Chemistry and Tech/Eng).

Required Assessment Contents

Assessment Overview

The MCAS-Alt consists of 1) a completed MCAS-Alt Skills Survey for each assessed strand; and 2) either two or three assessed strands in each content area, depending on the subject and student's grade (see tables on pages 3–5) organized in a three-ring binder for each student. Guidelines for assembling the MCAS-Alt are provided in the 2022 Educator's Manual for MCAS-Alt, available at www.doe.mass.edu/mcas/alt/resources.

Required Forms

- Portfolio Cover Sheet
- Student's Weekly Schedule
- Student's Introduction
- Verification Form
- School Year Calendar

The overall score will not be affected if a required form is missing, but the scorer should provide comment 54 or 55 from the Comment Key (Appendix A), as appropriate.

Contents of Each Strand:

The "evidence" shown below must be included, at minimum, in each required strand (except ELA–Writing and next-generation STE which have different formats and requirements). Additional supporting documentation may be submitted at the teacher's discretion (see below). The measurable outcome being assessed must **remain the same** throughout each strand.

A complete strand includes the following components:

Strand Cover Sheet	+	**Completed Skills Survey**	+	**Data Chart** measurable outcome on at least 8 different dates, with brief descriptions of each	+	**Primary Evidence #1*** showing student's performance of the measurable outcome listed on Strand Cover Sheet	+	**Primary Evidence #2*** showing student's performance of the measurable outcome listed on Strand Cover Sheet

* Primary evidence may be a **work sample**, **video sample**, **photograph,** or **series of photos** clearly showing a final product. Video samples may be up to 3 minutes in duration. Evidence must be labeled with name, date, percent accuracy, percent independence, and must include a brief description of the activity (either written directly on the evidence or on a Work Sample Description form).

<u>**Supporting Documentation (Optional)**</u>:

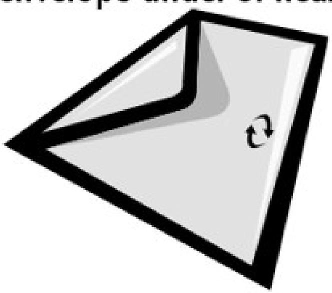
- Work Sample Description form(s)
- Tools, templates, organizers, reference sheets, computer screenshots, description, or sample screen of an Augmentative and Alternative Communication (AAC) or another technology-based device used by the student
- Reflection sheets or other examples of self-evaluation

Summary of Scoring Process: Scorers

The Scorer:

1

- Receives a three-ring binder from the Table Leader
- Removes it from unsealed white envelope
- Stores the envelope under or near the binder



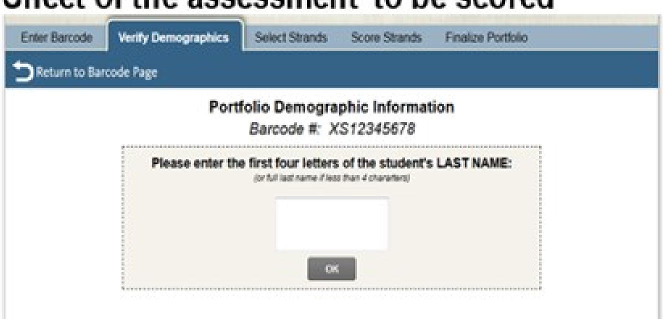
2

Enters the 10-digit barcode found on the white envelope (beneath the student name label) into the AltScore program

The barcode will always begin with 7049

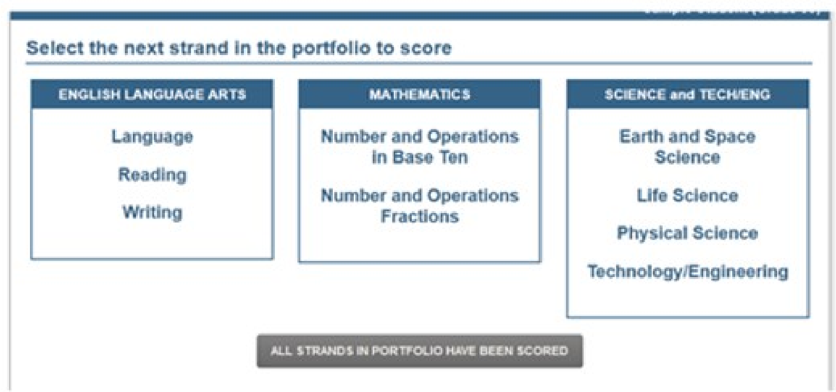
3

Confirms that demographic information in the AltScore program matches the Portfolio Cover Sheet of the assessment to be scored



4

Selects a strand to score



The Scorer:

5

- Scores each strand individually
- Answers each question in the AltScore program for each strand, in order to determine scores for:
  - Level of Complexity
  - Completeness
  - Demonstration of Skills and Concepts
  - Independence
  - Self-Evaluation
  - Generalized Performance

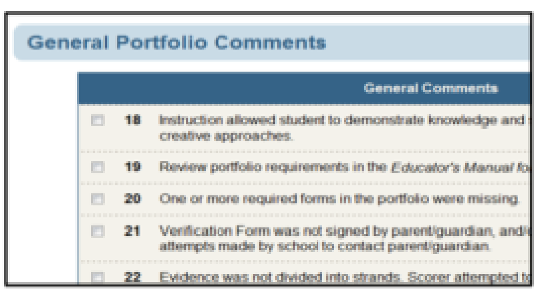
6

- Adds Strand Comments, as appropriate, for each strand
- Informs Table Leader of any scores of "M" or Level of Complexity (LOC)=1

  (Note: A score of "M" means that strand evidence was either missing or insufficient to score. "M" comments will be generated automatically, as needed, according to scorers' responses to the AltScore "Completeness" questions.)

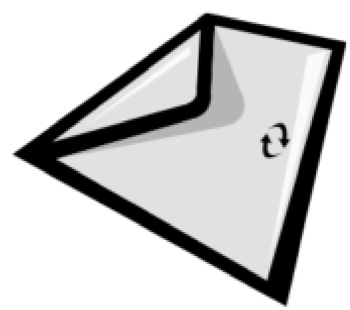
7

- Scores the remaining strands in each content area until all have been scored
- Adds General Portfolio Comment(s), as appropriate, for each content area



8

Places binder back in white envelope and returns it to the Table Leader



Summary of Scoring Process: Table Leaders

The Table Leader:

1

- Distributes binders to scorers at their table
- Answers questions from scorers at their table
- Uses AltScore "Arbitration" screen to complete steps 2, 3, and 4

2

- Double-scores each scorer every fifth binder (or at least once each morning and each afternoon), and as needed, at the Table Leader's discretion
- Determines whether a double or resolution score is needed
- Ensures that double scores are conducted by a scorer at another table.

3

- Tracks and maintains the flow of binders into and out of the double-score box.
- Follows procedure for "M" resolution and discrepancy resolution scores.

(Note: A score of "M" means that strand evidence was either missing or insufficient to score)

4

- Discusses any inaccurate scores with the scorer, based on resolution score
- Checks percent of inter-rater reliability (IRR) in AltScore for scorers based on their double-scored binders

5

- Returns binders to their original box when completely scored
- Confirms that all strands have been scored

6

- Returns completed boxes to the Quality Control room
- Retrieves a new box of binders from storage room

Scoring: *Complexity*

The following numbered questions appear in AltScore, the online program that guides scorers through the scoring process. Many of the AltScore questions will be different for **ELA–Writing** and **Science and Technology/Engineering**.

1. DOES THE MEASURABLE OUTCOME CONTAIN AN ACCEPTABLE ENTRY POINT OR ACCESS SKILL FOUND IN RESOURCE GUIDE FOR THIS STRAND/DOMAIN?

Scorer must confirm that:

- The strand includes a measurable outcome (listed on line 5 on the Strand Cover Sheet).
- The entry point or access skill is listed in the Resource Guide. Line 4 of the Strand Cover Sheet lists the **page number** in the Resource Guide on which the entry point or access skill is listed (If page number is not listed, use **CTRL+F** and type in a key word to search.)
- The wording of the entry point or access skill has not been **excessively modified** in the measurable outcome (i.e., the original meaning and intent of the entry point or access skill has been maintained).
- If the measurable outcome is not based on an entry point or access skill found in the Resource Guide, scorer reports to table leader who will request **floor manager's approval** prior to answering NO.

***Examples* of entry points that were modified in the measurable outcome:**

1. Entry point (Mathematics–The Number System): Represent a real-life negative quantity using a vertical or horizontal number line.

   Acceptable modification of the measurable outcome:
   - *Student will represent a real-life negative quantity using a number line with 80% accuracy and 100% independence*. (**Note**: "…vertical or horizontal" was deleted.)
   - Entry point (Mathematics–Number and Operations–Fractions): *Solve a multiplication word problem involving fractions using manipulatives.*

   Unacceptable modification of the measurable outcome:

   - *Student will solve a multiplication word problem using manipulatives with 80% accuracy and 100% independence.* (**Note:** Measurable outcome from the *Number and Operations–Fractions* domain must include "fractions.")

If the answer to question 1 is YES, scorer answers this follow-up question:

- **DOES THE MEASURABLE OUTCOME INCLUDE MULTIPLE SKILLS** (e.g., "addition and subtraction")?

Scoring: Complexity (Continued)

2. Is the skill addressed during a standards-based activity? (Only when LOC=2)

Scorers must confirm that:

- The student has addressed the skill in the context of an academic (i.e., standard-based) activity.
- If Level of Complexity =2 (i.e., "access skills"), the student addressed the skill in the context of an academic (i.e., standard-based) activity (see line 4, Strand Cover Sheet).

Examples:

Academic activities expose the student to the tools, concepts, and materials of the **content area** required for assessment, for example:

- Student will *turn her device on/off* to participate in a counting sequence activity within 10 seconds of a directive.
- Student will *visually track materials* representing informational text within a specified amount of time.
- Student will *orient or manipulate materials* used to create possible solution(s) to a simple design problem model.

Non-academic activities might include:

- Carrying a jug of water
- Engaging in personal hygiene (e.g., bathroom routines)
- Choosing a motivational reward

The scoring rubric below is the basis for the score in Level of Complexity. The AltScore program will score this area automatically, based on scorers' responses to the AltScore "Complexity" questions.

SCORING RUBRIC: Level of Complexity (LOC)				
1	**2**	**3**	**4**	**5**
Assessment reflects **little or no basis** in, or is **unmatched** to, *Curriculum Framework* learning standards required for assessment. **("NO" to *Complexity* questions 1 or 2)**	Student addresses social, motor, and communication **"access skills"** during instruction based on *Curriculum Framework* learning standards in this strand.	Student addresses *Curriculum Framework* learning standards that have been modified below grade-level expectations (i.e., **"entry points"**) in this strand.	Student addresses a narrow sample of *Curriculum Framework* learning standards **(1 or 2) at grade-level** expectations in this strand. **(Assessment must be reviewed by Content Experts)**	Student addresses a broad range of *Curriculum Framework* learning standards **(3 or more) at grade-level** expectations in this strand. **(Assessment must be reviewed by Content Experts)**

Scoring: *Completeness*

1. DOES THE STRAND INCLUDE A COMPLETED SKILLS SURVEY, A DATA CHART, AND AT LEAST TWO PIECES OF PRIMARY EVIDENCE?

For all strands (*except* ELA–Writing and "next-generation" STE), scorers must confirm that the strand includes at least:

Skills Survey		One data chart		Two pieces of primary evidence
One completed skills survey for **each** strand (Example shown in Appendix C)	+	Field Data or Bar Graph or Line Graph (Examples shown in Appendix D)	+	Any combination of Work samples, photographs, or videos that shows a final product of instruction

If the answer to question 1 is YES, then scorer will review primary evidence and determine which, if any, of the following are included:

__ Photographs and/or videos   __ Teacher-scribed work sample (see p.18)   __ None of these

(If photographs and/or videos, or teacher-scribed work samples are checked above, **Questions 11 and 12** will be activated in AltScore.)

If a completed skills survey, plus one data chart and two pieces of evidence are **not** included in the strand, scorer answers NO. Scorer will be directed to **Scoring: Self-Evaluation**

2. IS THE STUDENT'S NAME, % ACCURACY, AND % INDEPENDENCE LISTED ON THE DATA CHART?

Scorers must confirm that the following information is listed:

- Student's correct name
- Percent (%) accuracy and percent (%) independence for at least 8 data points

3. IS THE FIRST DATA POINT ON THE DATA CHART BELOW 80 PERCENT FOR ACCURACY AND/OR INDEPENDENCE?

Scorer must confirm that:

- The earliest data point on the data chart is **below 80%** for *either* Accuracy *or* Independence, or both.

4. DOES THE DATA CHART INCLUDE AT LEAST 8 DIFFERENT VALID DATES?

Scorer must confirm that:

- All dates for **English Language Arts** (**ELA)** and **Mathematics** occur in the current school year (i.e., between 7/1/21 and 4/1/22).
- All dates for **Science and Technology/Engineering (STE)** include the current and up to one previous school year (i.e., between 7/1/20 and 4/1/22)
- No data points are included that indicate 0% accuracy and 0% independence – those are not valid data points.

5. DO AT LEAST 8 BRIEF DESCRIPTIONS ADDRESS ONLY THE SKILL(S) IDENTIFIED IN THE MEASURABLE OUTCOME?

Scorer must confirm that:

- On at least 8 dates, the student was assessed on the same skill listed in the measurable outcome, as documented in the brief descriptions for each activity included at the bottom portion of the data chart.
- Scorer should not score any data point that assesses a skill that is different from the skill listed in the measurable outcome.

For example, in ELA–Literature, if the measurable outcome is:

Student will compare and contrast characters in a story with 80% accuracy and 100% independence.

- **An acceptable brief description might be**: *After reading Cinderella, student created a Venn diagram to compare and contrast character traits of Cinderella and her stepsisters.*
- **An unacceptable brief description might be:** *Student answered questions about Cinderella and her stepsisters after reading two chapters and recorded her answers on a worksheet.* ("Answering questions" is **not** the same skill as "comparing and contrasting.")

If the answer to Question 5 is NO, question 6 will not appear.

Scoring: *Completeness (Data Chart)* (Continued)

6. DO AT LEAST 8 BRIEF DESCRIPTIONS ON THE DATA CHART LIST THE SKILL BEING ASSESSED (I.E., WHAT THE STUDENT WAS ASKED TO DO) AND EXPLAIN HOW THE STUDENT ADDRESSED THE SKILL (I.E., WHAT ACTIVITY, INSTRUCTIONAL APPROACH, AND/OR MATERIALS WERE USED)?

Scorer must confirm that:

A minimum of 8 brief descriptions were provided that indicate what the student did (skill) and how the student demonstrated the skill (e.g., activity, instructional approach, materials used).

It should be clear to the scorer how the activity was conducted. If not, the scorer should click NO.

- The skill listed in the measurable outcome **and** the method(s) or approach(es) used by the student to demonstrate the skill or respond to questions should BOTH be included in the brief description.

For example, the following brief descriptions indicate **what** the student did and **how** they performed the activity:

In ELA–Reading, the measurable outcome is: Student will *answer simple comprehension questions about informational text.*

Acceptable brief descriptions:

- After reading *All about Penguins*, student **answered 5 questions** about penguins' habits (**SKILL** being assessed in the measurable outcome) on a **worksheet** (**HOW** the student demonstrated the skill).
- Student ***orally*** **answered 8 questions** about the possible reasons for extinction (**SKILL** being assessed in the measurable outcome), based on the class assignment to read *Gone but Not Forgotten* (**HOW** the activity was conducted).
- Student read *National Geographic for Kids* online and **answered 8 comprehension questions** (**SKILL** being assessed in the measurable outcome) on his ***computer*** (**HOW** the activity was conducted).

In ELA–Reading, the measurable outcome is: Student will *identify the main idea* about literary text.

Unacceptable brief description:

- Student identified the main idea in *Silly Penguins* (i.e., **HOW** was not addressed).

7. DO AT LEAST 8 BRIEF DESCRIPTIONS ADDRESS <u>ALL</u> OF THE SKILLS FOUND IN THE MEASURABLE OUTCOME, IN <u>EACH</u> BRIEF DESCRIPTION? (ONLY APPEARS IF SCORER ANSWERS **YES** TO "MULTIPLE SKILLS" QUESTION)

Scorer must confirm that:

- If multiple skills are listed in the measurable outcome (e.g., addition and subtraction), then **all** the skills must be addressed on at least 8 different dates (e.g., were <u>both</u> addition *and* subtraction included in the descriptions of at least 8 data points?)

This question only appears if scorer indicated that the measurable outcome included multiple skills (See bottom of page 10).

For example, in ELA–Reading, the measurable outcome is: Student will *identify the main idea* ***<u>and</u>*** *key details in an informational text* with 80% accuracy and 100% independence.

<u>Acceptable</u> Brief Description: Student read *Martin Luther King, Jr., and wrote the main idea from the first two paragraphs* **and** *listed the key details*. (NOTE: The brief descriptions on the data chart must show that <u>both</u> skills were addressed on at least 8 dates.)

<u>Unacceptable</u> Brief Description: Student read Martin Luther King, Jr., and found the main idea for each paragraph.

(Note: Student did not perform both skills listed in the measurable outcome, since the teacher said the student would *identify the main idea* ***and*** *<u>key details</u>*

Note to Scorers:

A scorer's response of "NO" to any of the preceding questions will result in a score of "M" in both Demonstration of Skills and Concepts (i.e., accuracy) and Independence, which will result in an overall score of *Incomplete* in the content area.

A score of "M" means that the required information in the strand was either missing or insufficient to provide a score.
"M" comments will be generated automatically, based on the scorer's "NO" response(s).

All scores of "M" will be double scored.

For ELA–Reading: Informational or Literary Text

R1. Do at least 8 brief descriptions include text titles? If not, are copies of the actual text included elsewhere in the strand?

Scorers must confirm that:

- At least 8 brief descriptions for ELA–Reading include the **title of the text**, a reference to the topic of the text (e.g., a text about ghosts) used during each activity, or a **photocopy** of the text (e.g., if it was teacher-created or taken from a website). If titles of texts are not listed on the data chart, look for a list elsewhere in the strand.

R2. Do <u>all</u> activities on the data chart assess either <u>informational</u> text or <u>literary</u> text?

After reviewing *Literature and Informational Text* hyperlink in AltScore (see Appendix H), scorers must confirm that:

- The activities listed on the data chart assessed **either *informational* <u>or</u> *literary* text**, but not both.

ELA–Reading: A definition of "Text"
For the ELA–Reading strand, "text" is considered to be at least one complete sentence (not phrases or isolated words). Isolated words or phrases may be assessed, but only if these have been extracted from the text listed on the data chart, and/or in brief descriptions, and/or from the photocopied text submitted in the strand.
The student may demonstrate **comprehension** of text either in writing (including scribed by the teacher), verbally, or through use of actions (e.g., pointing to one picture from an array that represents the text), symbols (e.g., selection of pictures, illustrations, or text), or technology (e.g., a computer or electronic communication system).

Scoring: Completeness (Primary Evidence)

8. Is the student's name, valid date, % accuracy, and % independence listed on at least two pieces of primary evidence, or listed on Work Sample Description labels?

Primary evidence includes any combination of work samples, videos, or photographs.

Scorers must confirm that:

- At least **two** pieces of evidence include the student's correct name, valid date, percent (%) accuracy, and percent (%) independence, listed either directly on the piece or on a Work Sample Description form attached (or adjacent) to the evidence.

9. Do at least two pieces of primary evidence directly address the skill identified in the measurable outcome?

Scorers must confirm that:

- At least two pieces of primary evidence address the skill listed in the measurable outcome.

10. Do at least two pieces of evidence address ALL of the skills found in the measurable outcome (e.g., "addition and subtraction")?

Scorers must confirm that:

- If multiple skills are listed in the measurable outcome, then all skills listed are addressed in at least two pieces of primary evidence (work samples, videos, or photographs).

  This question only appears if scorer indicated that the measurable outcome included multiple skills (See bottom of page 10).

11. Do the photograph(s) or video(s) show a final product and is each one clearly labeled?

If photographs or videos are **not** included, then scorers will not see this question. After reviewing the photographs or videos, scorers must confirm that:

- The photo or video documents the skill listed in the measurable outcome.
- A final product from the activity is clearly visible.
- Products are clearly labeled with name, valid date, % accuracy, and % independence.
- Video samples are no more than 3 minutes in length (i.e., scorers should view only the first 3 minutes of the video)

12. Does the "teacher-scribed work sample" included as primary evidence provide sufficient information to determine what the student did for each task and how the student addressed the measurable outcome?

A "**teacher-scribed work sample**" is a piece of primary evidence produced by the teacher on behalf of a student who is unable to generate his or her own written work samples. In the teacher-scribed work sample, a teacher may document one or more student responses on a single date that address the same measurable outcome.

- If teacher-scribed work samples are **not** included, then scorers will not see this question.
- See a sample "teacher-scribed work sample" in Appendix G.

Scorers must confirm that:

- The teacher-scribed work sample provides documentation of a series of trials conducted on the same date.
- The student's responses are recorded for each trial, task, or question, together with the % accuracy and % independence.
- The teacher-scribed work sample must include detailed information describing the context of each activity and how it was conducted. (Note: click the hyperlink in the AltScore program for further information and an example.)

For ELA—Reading

R3. Do at least two pieces of primary evidence include titles or photocopies of texts?

Scorers must confirm that:

- At least two pieces of primary evidence include the **title** of the text used during the activity or a **photocopy** of the text if it was teacher-created or taken from a website.

Note: In AltScore, refer to the list of informational texts that require only the title and do **not** require a photocopy of the text (see Appendix H or use the hyperlink located in AltScore to view).

R4. Do at least two pieces of primary evidence document activities based solely on Informational OR Literary Text?

After reviewing the *Literature and Informational Text* handout (Appendix H), scorers must confirm that:

- At least two pieces of primary evidence document the same text type (i.e., either Literary **or** Informational text, but not both) listed in the measurable outcome. Copies of the text should be provided when the text is teacher-created or internet-based, unless it is included on the supplementary list of well-known informational text in Appendix H.

Scoring: Demonstration of Skills & Concepts (DSC) and Independence (IND)

For all strands **except ELA–Writing** and **STE (**grades 5, 8, and High School Biology and Introductory Physics**)**, the scorer must determine the dates of the **final 1/3-time frame** of the data points on the data chart (or at least the last 3 dates on the data chart).

Scorer performs the following steps in AltScore:

1. Enters the **date, % accuracy, and % independence for each acceptable piece of primary evidence**.
2. Enters the **date, % accuracy, and % independence** in the final 1/3-time frame on the data chart (or last 3 data points).
3. AltScore will automatically calculate an average of all scores in the final 1/3-time frame (*including primary evidence, when applicable*) for DSC and IND, based on the scoring rubric shown below.
4. Scorer reviews the averages calculated by AltScore and confirms that the scores "appear to be correct," based on the scoring rubrics shown below.

Demonstration of Skills and Concepts (Accuracy)				
M	**1**	**2**	**3**	**4**
The strand contains insufficient information to determine a score.	Primarily inaccurate and demonstrates minimal understanding in this strand (**0–25% accurate).**	Limited and inconsistent with regard to accuracy, and demonstrates limited understanding in this strand (**26–50% accurate**).	Mostly accurate and demonstrates some understanding in this strand **(51–75% accurate)**.	Demonstrates consistent accuracy and understanding in this strand (**76–100% accurate**).

Independence				
M	**1**	**2**	**3**	**4**
The strand contains insufficient information to determine a score.	Student requires extensive verbal, visual, and physical assistance to demonstrate skills in this strand (**0–25% independent**).	Student requires frequent verbal, visual, and physical assistance to demonstrate skills in this strand (**26–50% independent**).	Student requires some verbal, visual, and physical assistance to demonstrate skills in this strand (**51–75% independent**).	Student requires minimal verbal, visual, and physical assistance to demonstrate skills in this strand (**76–100% independent**).

For ELA–Writing

W1. IS THERE A COMPLETED SKILLS SURVEY AND 3 DIFFERENT WRITING SAMPLES WITH CORRESPONDING PRE-SCORED WRITING RUBRICS?

Scorers must confirm that:

- A completed ELA–Writing Skills Survey is included.
- A minimum of **three different final writing samples** were submitted together with **three completed Writing scoring rubrics** attached or adjacent to each sample. If any are missing, the scorer clicks NO and follows prompts.
- If a student's writing sample contains personal bathroom-related activities, do not count the writing sample as one of the three required samples. Check with your table leader if you are uncertain.

Writing samples may be created using the student's primary mode of communication, including samples that are:

- handwritten or word-processed by the student
- dictated or signed to a scribe with the student's own words transcribed verbatim (scribes may assume correct capitalization and punctuation.)
- created using a symbol-based communication system or icons

Writing samples may be submitted in any combination of the following **text types**:

1. **Opinion / Argument:** stating a claim, opinion, preference, or analysis based on a text or topic, citing reasons and evidence from a text, where possible;
2. **Informative / Explanatory text:** conveying or explaining facts, information, or ideas on a topic, including descriptions taken and/or adapted from a text;
3. **Narrative (including poetry):** telling a story based on real or imagined events from a text or from personal experience, including fiction, drama (script), a personal reflection, or an event sequence; using figurative language (e.g., similes, metaphors), imagery, sounds of words (e.g., rhyme), meter, and/or repetition to express emotion or tell a story.

Teachers are required to pre-score their students' final writing samples (not the baseline sample) by completing a separate **writing scoring rubric** for each final writing sample.

W2. IS THE STUDENT'S NAME, VALID DATE, AND % INDEPENDENCE INCLUDED ON EACH OF THE THREE FINAL WRITING SAMPLES (EITHER ON THE SAMPLE OR THE WORK SAMPLE DESCRIPTION)?

Scorers must confirm that:

- •Each final writing sample includes the student's name, a valid date, and % independence, listed either on the piece or on a Writing Work Sample Description either attached or adjacent to the evidence.

W3. IS THERE A BASELINE SAMPLE SUBMITTED?

Scorers must confirm that:

- A **baseline writing sample** was submitted that consists of either a draft, outline, notes, completed graphic organizer, or partially completed writing sample. Check the Work Sample Description to determine whether the sample was considered "final" or "baseline."
- If a baseline sample was NOT submitted, then scorer clicks NO. (NOTE: This will not affect the final score in this strand)
- **Note:** Completed writing scoring rubrics are **not** required for baseline samples because these will not be included in the score.

W4. IS THE LEVEL OF COMPLEXITY ON THE SUBMITTED RUBRICS ACCESS SKILLS (2) or ENTRY POINTS (3)?

- Scorers review the pre-scored writing rubric to determine if Level of Complexity = 2 or 3.
- Scores will see questions 5 and 5A for entry points (Level of Complexity= 3).
- Scorers will see question 5B for access skills (Level of Complexity = 2).

W5. DOES THE WRITING SAMPLE INCLUDE ONLY…?

- Single words/pictures/symbols,
- list of single words,
- fill-in-the-blank, matching, true/false, circling correct responses, selecting multiple-choice response(s), **or**
- text provided by the teacher, with **no** evidence of original text expressed by the student.

If yes to W5, then scorer clicks YES and proceeds to question W5A.

If not, Scorer clicks NO and enters the writing rubric scores provided by the teacher. Scorers do NOT change any scores.

W5A. IF THE WRITING SAMPLE DOES INCLUDE ONE OR MORE OF THE EXAMPLES LISTED IN W5, DOES THE PRE-SCORED WRITING RUBRIC CONTAIN SCORES OF 3 OR 4 IN *EXPRESSION OF IDEAS AND CONTENT*, *KNOWLEDGE OF CONVENTIONS*, *TEXT STRUCTURE*, OR *USE OF VOCABULARY*?

Scorer must confirm that:

- A writing sample includes one or more of the examples listed in W5 above, **and** that
  - **scores of 3 or 4** are provided by the teacher for *Expression of Ideas and Content, Knowledge of Conventions, Text Structure,* or *Use of Vocabulary.*
    - If so, scorer clicks YES. **Scorer must change the scores of 3 or 4 in the areas available on the rubric, to scores of 1 or 2** (according to the writing rubric descriptions for each area) and must enter the revised scores onscreen, rather than the scores provided by the teacher.
  - **scores of 1 or 2** are provided by teacher for *Expression of Ideas and Content, Knowledge of Conventions, Text Structure,* or *Use of Vocabulary.*
    - If so, scorer clicks NO to this question and enters the writing rubric scores provided by the teacher.

NOTE: The scores in the four areas of the writing rubric listed above will be used to determine the score for Demonstration of Skills and Concepts.

W5B. DOES THE WRITING SAMPLE DOCUMENT THE STUDENT'S PARTICIPATION IN THE CREATION OF A WRITTEN PRODUCT (FOR LEVEL OF COMPLEXITY = 2 ONLY)?

Scorer confirms that a written product is provided for a student who is working on "access skills" with a description of the student's participation.

FOR SCIENCE AND TECHNOLOGY/ENGINEERING (STE) IN GRADES 5, 8 AND HIGH SCHOOL BIOLOGY AND INTRODUCTORY PHYSICS

S1. IS THERE ONE COMPLETED STE SKILLS SURVEY FOR THE ENTIRE STE DISCIPLINE, AND AT LEAST 3 STE SUMMARY SHEETS?

Scorers must confirm that:

- **One completed STE Skills Survey is included for the entire STE discipline** (i.e., all science practices have been surveyed with at least one checked box beneath each practice).
- At least **three** STE Summary Sheets per strand were submitted.
- If scorer answers NO, scorer will be redirected to **Scoring: Self-Evaluation**

S2. DO AT LEAST THREE STE SUMMARY SHEETS PER STRAND HAVE PRIMARY EVIDENCE ATTACHED WITH VALID NAME, DATE AND % ACCURACY AND INDEPENDENCE?

Scorers must confirm that:

- At least **three** STE summary sheets have primary evidence (e.g., work samples) attached.
- Each summary sheet includes the student's name, valid date and % accuracy and independence.
- If scorer answers NO, scorer will be redirected to Scoring: Self-Evaluation

S3. ARE THREE DIFFERENT SCIENCE PRACTICES REFLECTED ON EACH STE STRAND COVER SHEET?

Scorers must confirm that:

- The **three** summary sheets reflect **three** different science practice numbers. (See Sample STE Summary Sheet in Appendix F.)
- If scorer answers NO, scorer will be redirected to **Scoring: Self-Evaluation**

S4. DO ACTIVITIES ON THREE STE SUMMARY SHEETS ASSESS THE SAME CORE IDEA?

Core Idea is found on the Strand Cover Sheet (Line 4) (See Sample Strand Cover Sheet in Appendix F)

Scorers must:

- In AltScore, select from the dropdown menu the **Core Idea** listed on the Strand Cover Sheet.
- Review the list of related topics within the selected Core Idea.
- Confirm that the activities relate to *any* of the listed topics.

S5. DOES EACH PIECE OF EVIDENCE DOCUMENT THE ENTRY POINT/ACCESS SKILL LISTED ON THE STE SUMMARY SHEET?

Scorers must confirm that:

- The evidence documents the entry point/access skill listed on the STE Summary Sheet (e.g., the entry point states, *Illustrate, construct, and/or label a model to show/explain the parts of a plant.* The evidence shows a picture of a plant with parts labeled.)
- **Note:** If STE Summary Sheets were completed last year and this year, please alert your table leader.

STE Summary Sheet — Data Entry

In AltScore, scorers will enter the Science Practice numbers (1–8) and the overall percentages of accuracy and independence for the first three complete STE Summary Sheets in the strand.

Note: If three different science practices are not indicated on the STE Summary Sheet, click BACK to return to question #3 and answer NO.

Scoring: Self-Evaluation (S-E)

Instructions to Scorers

The scorer should review the evidence in the strand for examples of self-evaluation. The following examples should each be counted as one example of self-evaluation, if it is **performed by the student** (as indicated on the evidence, in an attached note, or on a Work Sample Description label):

- selecting student's own work for the assessment
- choosing materials/activities
- reflecting on performance
- goal-setting
- graphing or monitoring own performance
- completing a K-W-L chart (i.e., "What I know? What I want to know? What did I learn?")
- checking off or listing tasks as they are accomplished
- self-correcting errors in the work sample

The scorer indicates whether none, one, or multiple example(s) of self-evaluation were found in the strand.

Scoring Rules

1. If the same self-evaluation activity was used on multiple pieces of primary evidence, count each as an example of self-evaluation.
2. Do not count a stamp, sticker, or teacher expressing praise as examples of self-evaluation.
3. If a teacher scribes a student's responses to a self-evaluation question, that should count as an example.
4. Count any example that uses pictures and/or symbols, rather than words, to self-evaluate, as shown below.

The score for *Self-Evaluation* will be determined by AltScore based on the scoring rubric below:

	SCORING RUBRIC: Self-Evaluation	
M	**1**	**2**
Evidence of self-correction, monitoring, goal setting, and reflection was **not found** in this strand.	Student self-corrects monitors, sets goals, and reflects on only **one piece of evidence** in this strand.	Student self-corrects monitors, sets goals, and reflects on **two or more pieces of evidence** in this strand.

Scoring: *Generalized Performance (GP)*

Instructions to Scorers

The scorer should review all evidence and brief descriptions for examples of “generalized performance.” Generalized Performance reflects the number of **instructional approaches** and **activity formats** used by the student to acquire and demonstrate knowledge and skills, including any of the following variations:

- *Media and materials* (e.g., uses a variety of materials, such as printed text, manipulatives, art materials, computer, etc.)
- *Activity formats* (e.g., classroom projects, research, experiments, worksheets, open/constructed responses)
- *Presentation formats* (e.g., oral, written, multimedia)
- *Response formats* (e.g., handwritten, word-processed, oral presentation, or visual display)
- Application of skills and/or knowledge in a setting outside the school

The scorer should indicate in AltScore whether <u>one</u> or <u>multiple</u> example(s) of generalized performance were found in the strand.

Scoring Rules

a) Activities in **community settings** (i.e., outside the school, including homework) always count as one example of GP when this is indicated in the evidence or in the brief description.

b) **Use of age-inappropriate instructional materials** (e.g., dolls, nursery rhymes, etc.) by a student in grades 6–10 will result in a score of GP = 1, regardless of other factors contributing to the GP score. In this case, add Comment G from the Comment Key. Check with your Table Leader if you are uncertain.

For ELA–Writing and STE ONLY

The scorer does not need to indicate a score for Generalized Performance for strands in ELA–Writing and STE. When the minimum requirements are met, a score of GP=2 will be generated automatically for these strands.

The score for *Generalized Performance* will either be “**1” or “2**,” based on the rubric below:

SCORING RUBRIC FOR EACH STRAND:
Generalized Performance (GP)

1	2
Student demonstrates knowledge and skills in this strand using a **single** context or **one** instructional approach.	Student demonstrates knowledge and skills in this strand using **two or more** contexts or instructional approaches.

Scoring Rules in Special Cases

1) **Can pieces of primary evidence also be included as points on the data chart? If so, is the strand complete?**

   Yes. At the teacher's discretion, the work samples, videos, and other primary evidence may be included as data points on a data chart, but it is *not* required. Regardless of whether primary evidence is also included as data points on the chart, scorers will count the evidence for determining completeness, provided the work reflects the skill listed in the measurable outcome. If a work sample is also included on the data chart, the percent accuracy and independence will only be counted once by AltScore.

2) **What if a required strand is not submitted?**

   The scorer must indicate that the strand was not submitted by checking the box "strand required but not submitted" on the final AltScore screen.

3) **What if a strand was submitted that was not required for a student in that grade?**

   If a strand was submitted in a discipline or domain that was **not** required, scorers should not score the strand.

4) **Can primary evidence be submitted from previous school years?**

   The requirement is that submitted evidence should have been created during the current school year. Only **Science and Technology/Engineering (STE)** assessments in grades 5, 8, and high school may contain evidence accumulated over two consecutive school years, the current and one previous year (i.e., beginning July 1, 2020).

5) **What is a "legacy" alternate assessment?**

   The term "legacy" refers to the high school STE disciplines of Chemistry and Technology/Engineering which are based on earlier (2001/2006) STE curriculum frameworks. For these STE disciplines, three different entry points/access skills are selected based on three different standards, with one data chart and two pieces of primary evidence submitted for each entry point.

6) **Can photographs (or a series of photographs) and video samples be submitted as primary evidence?**

   Products submitted in a strand will be counted and scored as primary evidence if the final product of instruction is clearly visible and photo(s) or video(s) clearly describes how the student demonstrated the measurable outcome. Each product must be labeled with all required information. Video samples must be intelligible (or transcribed in writing), clear enough for a scorer to see the final product, and not longer than three (3) minutes in duration.

Maintaining Validity and Reliability

Training and Qualification of Scorers

Prior to the first day of actual scoring, prospective scorers receive intensive training supervised by Department staff. After training is completed, each prospective scorer, Table Leader, scoring specialist, and Floor Manager must pass a qualifying test before scoring any student assessments.

Qualifying Test

In order to qualify, prospective scorers must individually score several pre-calibrated, simulated MCAS-Alt strands using the AltScore onscreen scoring program. These "qualification strands" cover a range of scenarios scorers are likely to encounter in the actual scoring of student assessments. Prospective scorers are permitted to refer to the following publications while taking the qualifying test:

- *Guidelines for Scoring 2022 MCAS-Alt* (this publication)
- *Resource Guide to the Massachusetts Curriculum Frameworks for Students with Disabilities* (Fall 2021 edition) (digital version)
- *Training for MCAS-Alt Scorers* – PowerPoint presentation handout
- Sample strands used during scorer training

The passing scores for the qualifying test are as follows:

- Scorers must achieve a score of at least **85 percent** correct
- Table Leaders, Floor Managers, and MCAS-Alt scoring specialists must achieve a score of at least **90 percent** correct.

Prospective scorers, Table Leaders, scoring specialists, and Floor Managers who do *not* qualify on the first attempt are given an opportunity to review their tests and receive additional training, after which a second qualifying test is administered. Those who do not qualify on the second attempt will be excused from scoring. Table Leaders and scoring specialists who score 85–89 percent will be invited to participate as scorers, but not as Table Leaders or scoring specialists.

Maintaining the Accuracy and Consistency of Scores

All scoring discrepancies and scores of "M" for DSC and IND are resolved by a scoring specialist and Floor Managers.

Table Leaders and Department staff will track each scorer's inter-rater reliability (IRR). For assessments in grades 3–10, this is accomplished by double-scoring at least one student's entire assessment (i.e., skills surveys and strands) each morning and afternoon for each scorer, or at least one entire assessment out of every five scored. Table Leaders and scoring specialists will be double-scored on at least two complete assessments each week, with discrepancies resolved by a Floor Manager. Each scorer's rate of agreement with an expert scorer (i.e., inter-rater reliability) must be maintained at a level of 80 percent or higher for all rubric areas in the double-scored assessments. When the rate of agreement falls below 80 percent, scorers are retrained and subsequently double-scored for the remainder of that day and may be released from scoring at the discretion of the Department if their rate of agreement falls below 80 percent two or more subsequent times.

Appendix A: Scorer Comment Key

2022 MCAS-Alt

COMMENT KEY

STRAND COMMENTS	
A	Level of Complexity indicated on the Strand Cover Sheet (access skills, entry points, or grade level) was changed to match the evidence submitted.
B	Some brief descriptions or evidence contained additional skills not listed in the measurable outcome and were not included in the calculation of the final score.
C	Some data points or evidence were listed with 0% accuracy and 0% independence are not valid and were not included in the final score.
D	Some date(s) listed on primary evidence occurred on a non-school day and were not included in the final score.
E	Some date(s) listed on data chart occurred when school was not is session and were not included in the final score.
F	Some evidence was impossible to read and/or interpret and was not included in the final score.
G	Score for generalized performance was lowered to 1 because some activities did not use age-appropriate materials and/or activities.
H	Some photograph(s) could not be scored because the final product was not evident or the percent of acc. and/or ind. could not be verified.
I	Consult with a content specialist to ensure that evidence aligns with the strand or domain.
J	Strand showed evidence of open-ended, creative approaches that allowed the student to demonstrate knowledge and skills.
K	Evidence submitted as self-evaluation did not demonstrate choices or reflection by the student.
L	Audio/video sample could not be scored due to poor quality or inability to open one or more recorded segments.
M	Review the differences between Literature and Informational text for the ELA–Reading strand at www.mcas-alt.org/materials.
N	Two different data charts are not acceptable as a core set of evidence in the same strand.
O	At least 8 brief descriptions on the data chart did not clearly explain how the student addressed the measurable outcome.
P	Strand was well-organized.

STRAND COMMENTS — NEXT-GEN SCIENCE	
SM	Consult with a science content specialist to ensure that evidence aligns with the science practice.
SN	Unclear how the percent of accuracy and/or independence were determined on one or more STE Summary Sheets.
SO	STE Summary Sheet description(s) lacked clarity and/or specificity.
SP	STE Summary Sheet did not document a single science practice.
SQ	Supporting documentation described how the learning occurred and was helpful in determining the score.
SR	Evidence demonstrated creative application of science practices.

STRAND COMMENTS — WRITING	
WJ	Unclear whether the text in the sample was generated by the student or was the result of teacher's edits.
WK	Use of the student's primary mode of communication allowed the student to effectively express his or her knowledge and ideas.
WL	Consider other methods to document the student's expressive communication.
WM	One or more Writing rubric scores were changed to reflect that the evidence included use of single pictures or words, multiple-choice responses, or text provided by the teacher.
WN	A baseline writing sample was required but was not submitted.
WO	Supporting documentation described how learning occurred and was helpful in determining the score.
WP	Unclear how the percent of independence was calculated on one or more writing samples.
WQ	Writing samples showed evidence of open-ended and/or creative approaches.

LEVEL OF COMPLEXITY = 1 COMMENTS	
WI WRT only	Motor skills did not reflect communication and/or expression by the student and could not be scored (e.g., trace letters or scribble).
X	Skill was not addressed in the context of a standards-based activity or aligned to the required strand/domain.
Y	Entry point was not found in the Resource Guide and was either not pre-approved by DESE or was excessively modified.
Z	Standard and/or entry point was not selected from the Vocabulary Acquisition and Use cluster, as required for the ELA–Language strand.

GENERAL PORTFOLIO COMMENTS	
50	Portfolio showed evidence of a range of open-ended, creative approaches that allowed the student to demonstrate knowledge and skills.
51	Supporting documentation was helpful to the scorer in understanding the instructional strategies and/or context.
52	Please review requirements in the Educator's Manual for MCAS-Alt and consider attending additional Department-sponsored training sessions.
53	Review guidelines for selecting a measurable outcome in the Educator's Manual for MCAS-Alt.
54	One or more required forms were missing, but this did not affect the overall score.
55	Verification Form was not signed by parent/guardian and no information was provided documenting attempts by the school to contact parent/guardian.
56	Evidence was not included for three learning standards in a single discipline of High School Science and Technology/Engineering.
57	Consider showing evidence of varied instructional approaches used with the student (Generalized Performance).
58	Confidential information about the student should not be included in the portfolio.
59	3 different Mathematics conceptual categories were required in grade 10 but were not submitted.
60	3 different core ideas were not submitted for one discipline in High School Science and Technology/Engineering.
61	Binder was well-organized.

Appendix B: MCAS-Alt Glossary

The following terms are used to describe and score the MCAS-Alt:

Access Skills: Student outcomes that address a social or motor skill during a standards-based (i.e., academic) activity in the required strand.

Conceptual Category: The high school Mathematics standards are clustered in "conceptual categories:" Number and Quantity (N), Algebra (A), Functions (F), Modeling, Geometry, and Statistics and Probability (S) which together present a coherent view of high school mathematics.

Content Area: The subject assessed by the MCAS-Alt, including English Language Arts and Literacy (ELA), Mathematics, and Science and Technology/Engineering (STE)

Core set of evidence: The minimum amount of evidence required for a strand to receive a score. For most subjects, except ELA–Writing and next-generation STE, this includes

- **One data chart** showing a student's progress over time in learning the measurable outcome; **PLUS**
- **Two additional pieces of primary evidence** (e.g., work samples) showing student's performance of the same measurable outcome shown on the data chart

Domain: A topic or cluster of related Mathematics standards in grades PreK–8, according to the Massachusetts Curriculum Framework.

Entry Point: An academic outcome based on a learning standard that has been modified below grade-level expectations. Entry points are listed at progressively lower levels of complexity in the Fall 2021 *Resource Guide to the Massachusetts Curriculum Frameworks for Students with Disabilities (the "Resource Guide").*

Learning Standard: Specific statement of what *all* students should know and be able to do by the end of each grade.

Measurable Outcome: A specific goal for a student taking the MCAS-Alt that serves as the basis of his or her data charts and/or primary evidence. Measurable outcomes are based on entry points and access skills listed in the Resource Guide that identify the specific skill to be assessed in the strand/domain required for assessment of a student in that grade. Measurable outcomes have been individualized with percentages of accuracy and independence (e.g., "[Student] will add 3-digit numbers with 80 percent accuracy and 100 percent independence")

Primary evidence: A work sample, photograph, video sample, or teacher-scribed work sample that documents the student's knowledge or demonstration of a skill.

***Resource Guide to the Massachusetts Curriculum Frameworks for Students with Disabilities*:** The Resource Guides list the Massachusetts learning standards in each subject and grade and identifies student outcomes (i.e., entry points and access skills) based on each standard at successively lower levels of complexity (i.e., from more-to-less complex).

Strand: A unit of scorable evidence in the alternate assessment; a cluster of related standards in the Massachusetts Curriculum Framework.

Supporting documentation: Products that show the context and/or format of an instructional activity, but not the final product or performance of the activity; i.e., how did the instruction occur? Examples of supporting documentation might include a blank graphic organizer, computer screenshot of a program or application used by the student, a reflection sheet, or work description.

Appendix C: Sample MCAS-Alt Skills Survey

Student's Name: **Sample Student** Grade: **08** Date of Survey: **10/21/21**

ELA - All Grades

Language (Vocabulary Acquisition and Use)

	Based on exposure to vocabulary during academic activities, student can:	**A** 0% (unable)	**B** Up to 25% (rarely)	**C** Up to 50% (occasionally)	**D** Up to 75% (more often than not)	**E** Up to 100% (almost always)
1.	Communicate answers to simple questions about familiar objects.	○	○	○	◉	○
2.	Identify familiar objects/actions by name.	○	○	○	◉	○
3.	Match given words or symbols to pictures that mean the same or similar thing.	○	○	○	◉	○
4.	Answer questions about the meaning of words found in stories, poems, or during other academic activities.	○	○	◉	○	○
5.	Identify words/symbols/pictures that are opposite in meaning.	○	○	◉	○	○
6.	Identify words/symbols/pictures that are similar in meaning.	○	○	○	◉	○
7.	Use phrases to express a need, request, idea, or response during an academic activity.	○	○	◉	○	○
8.	Describe key attributes of different objects (e.g., the flower is colorful).	○	◉	○	○	○
9.	Communicate using common temporal words (e.g., before, after, now, later, first, next).	○	◉	○	○	○
10.	Identify examples of figurative language (e.g., idiom, metaphor, simile, hyperbole, or personification) used in a text.	◉	○	○	○	○

MCAS-Alt SKILLS SURVEY

Appendix D: Data Chart–Sample Field Data Chart

DATA METHOD 1: FIELD DATA CHART

COMPLETE ALL INFORMATION BELOW.

Student Name: Rosie Riverter

Content Area/Strand: English Language Arts - Language

Learning Standard: L.8.4a Use context (e.g., the overall meaning of a sentence or paragraph; a word's position or function in a sentence) as a clue to the meaning of a word or phrase.

Measurable Outcome: will attend visually, aurally, or tactilely to materials related to vocabulary acquisition within 15 seconds with 80% accuracy and 60% independence.

KEY	
+	Accurate
-	Incorrect
I	Independent
P	Prompt Used

Accurate (+ or -) / (I or P) Independence

At least eight (8) different dates are required.

Date (mo/day/yr):	10/7/21	11/12/21	11/19/21	11/22/21	11/23/21	12/1/21	12/2/21	12/3/21	12/7/21	12/9/21
Accuracy and Independence for each trial (see KEY):	+ / P	+ / P	+ / I	- / P	- / P	- / P	+ / P	- / P	+ / P	- / P
	- / P	- / P	+ / I	- / P	+ / P	+ / P	+ / I	+ / P	+ / I	+ / P
	+ / I	+ / P	+ / I	- / P	- / P	+ / I	+ / I	+ / I	- / P	+ / I
	+ / I	- / P	+ / I	- / P	- / P	+ / I	- / P	+ / I	+ / I	+ / I
	- / P	+ / I	+ / P	- / P	+ / P	+ / I		+ / P	+ / P	+ / I
	- / P	- / P	- / P	- / P	+ / P	- / P		+ / P	+ / I	- / P
	+ / I	+ / I	- / P	- / P	+ / P	- / P		+ / P	+ / I	- / P
	- / P	+ / I	+ / I	- / P	- / P	- / P		+ / P	+ / I	+ / I
		- / P	- / P	+ / I	+ / P			+ / I	+ / I	- / P
		+ / P	+ / P	+ / I	- / P			+ / I	+ / P	+ / I
% Accuracy: SUMMARY for this date	50	60	70	20	50	50	75	90	90	60
% Independence: SUMMARY for this date	38	30	50	20	0	38	50	40	60	50
Brief Description (What was student asked to do and how did he/she do it?)	During a literacy group, was read chapter 8 (Margalo) in Stuart Little. A story box of objects was used to represent vocabulary from the text.	During a literacy group, was read chapter 10 (Springtime) in Stuart Little. A story box of objects was used to represent vocabulary from the text.	During a literacy group, was read chapter 11 (The Automobile) in Stuart Little. A story box of objects was used to represent vocabulary from the text.	During a literacy group, was read chapter 13 (Ames' Crossing) in Stuart Little. A story box of objects was used to represent vocabulary from the text.	During a literacy group, was read chapter 15 (Heading North) in Stuart Little. A story box of objects was used to represent vocabulary from the text.	During literacy group, was read a poem about snow. During the reading, a story box of objects was used to represent vocabulary from the poem.	During morning meeting, the class discussed the topics of attendance, the calendar (month and day of the week), and the weather. Tactile objects and images were used to represent the vocabulary	During literacy group, was read chapter 1 (Peter Breaks Through) in Peter Pan. A story box of objects was used to represent vocabulary from the text.	During a literacy group, was read chapter 2 (The Shadow) in Peter Pan. A story box of objects was used to represent vocabulary from the text.	During a literacy group, was read chapter 3 (Come Away, Come Away) in Peter Pan. A story box of objects was used to represent vocabulary from the text.

Data was taken on whether the student attended within 15 seconds of being shown the object.

Appendix D: Data Chart–Sample Bar Graph

DATA METHOD 2: BAR GRAPH *(instructional data summarizing the student's performance on each date)*

Accuracy: (red) **Independence:** (blue)

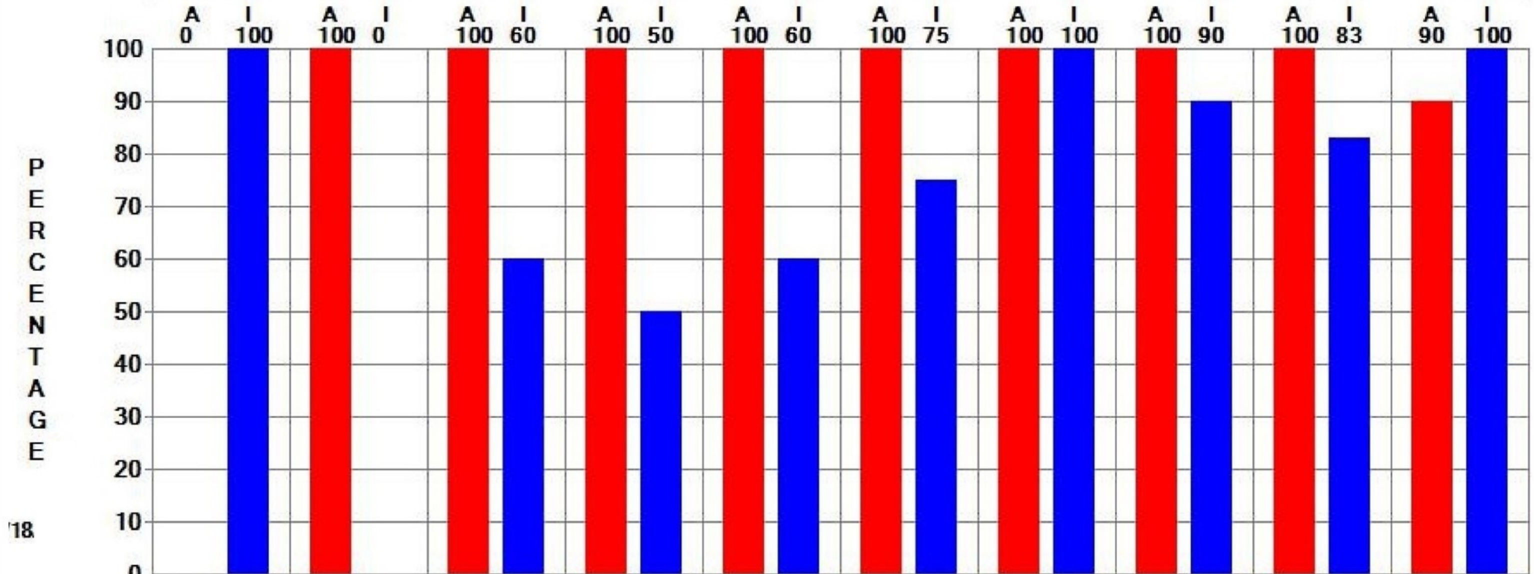
COMPLETE ALL INFORMATION BELOW. AT LEAST EIGHT (8) DIFFERENT DATES ARE REQUIRED.

Student Name: Amy Farrah Fowler

Content Area/Strand: English Language Arts/English Language Arts - Language

Learning Standard: L.4.5b Recognize and explain the meaning of common idioms, adages, and proverbs.

Measurable Outcome: Amy will show/express the meaning of common idioms with 80% accuracy and 100% independence.



Date (m/d/y)	**Brief Description** (What was student asked to do and how did he/she do it?)
9/10/21	Baseline: Student was given 10 idioms and asked to express their meaning either aloud or by drawing.
9/20/21	Student was given 4 idioms and asked to express their meanings aloud.
9/21/21	Student was given 5 idioms after reading Amelia Bedelia book. She was asked to express the meaning of the idioms on a worksheet.
9/28/21	Student was given 10 silly sayings and 10 idioms. She was asked to express the meaning of the idioms by matching the silly sayings to the idioms.
10/1/21	Student was given 10 silly sayings and 10 idioms and she was asked to express the meaning of the idioms by matching the silly sayings to the idioms.
10/8/21	Played a game about idioms with peers. Data is on ind/acc of expressing meanings on her turn only. 8 opportunities were given
10/13/21	During partner work, each student was given idioms and asked to express the silly and real meaning in pictures, drawings and words on a template, individual data taken.
11/5/21	After being read the idiom, student would express the meaning on the whiteboard. Small group activity, individual acc/ind taken by paraprofessional.
11/9/21	Student went through 12 flash cards that had idioms written on them. She had to express their meaning out loud.
11/19/21	Student was given a quiz on idioms. She had to match the "silly statement" with the actual meaning of the idioms by drawing a line between two columns. (10 idioms)

Appendix D: Data Chart–Sample Line Graph

LINE GRAPH *(instructional data summarizing the student's performance on each date)*

Accuracy: (solid line) **Independence:** (dashed line)

COMPLETE ALL INFORMATION BELOW. AT LEAST EIGHT (8) DIFFERENT DATES ARE REQUIRED.

Student Name: Sample Student

Content Area/Strand: English Language Arts/Language

Learning Standard: L.8.4 Determine or clarify the meaning of unknown and multiple-meaning words or phrases based on grade 8 reading and content, choosing flexibly from a range of strategies.

Measurable Outcome: Student will identify words/pictures/symbols that have the opposite meaning as a given word (antonym) with 80% accuracy and 80% independence.

Date (m/d/y)	Brief Description (What was student asked to do and how did he/she do it?)
10/15/21	Identified words that have the opposite meaning as a given word by completing a worksheet where he had to cut/paste text/pictures and match to antonym.
10/19/21	Worked 1:1 w/the teacher to identify words that have the opposite meaning as a given word by matching word/picture cards to antonym word/picture cards.
10/21/21	Worked 1:1 w/staff on a file folder to identify words that have the opposite meaning as a given word by matching pictures/text with their antonym picture/text.
10/22/21	Identified words that have opposite meanings as a given word, doing a worksheet where he drew a line, connecting pictures/text with opposite meanings.
10/25/21	Identified words that have the opposite meaning as a given word by matching puzzle pieces together that have antonyms on each puzzle piece.
10/26/21	Identified words that have the opposite meaning as a given word by doing a file folder, matching pictures/text to an antonym picture/text.
10/28/21	Identified words that have the opposite meaning as a given word in a group lesson where he had to stick a picture/text to an antonym picture/text on the front board.
11/2/21	Identified words that have the opposite meaning as a given word by working 1:1 w/staff to do an iPad activity where he had to match antonym pictures.
11/3/21	Identified pictures/words that have the opposite meanings as a given picture/word by doing a worksheet, circling the correct antonym from a field of three.
11/12/21	Identified words that have the opposite meaning as a given word in a lesson where he had to stick a picture/text to an antonym picture/text on the front board.

Appendix E: MCAS-Alt Rubric for Scoring Strands

	1	2	3	4	5
Level of Complexity	Strand reflects little or no basis in, or is unmatched to, curriculum framework learning standard(s) required for assessment.	Student primarily addresses motor and communication "access skills" during instruction based on curriculum framework standards in this strand.	Student addresses curriculum framework standards that have been modified below grade-level expectations in this strand.	Student addresses a narrow sample of curriculum framework standards (1 or 2) at grade-level expectations in this strand.	Student addresses a broad range of curriculum framework standards (3 or more) at grade-level expectations in this strand.

	M	1	2	3	4
Demonstration of Skills and Concepts (Accuracy)	The strand contains insufficient information to determine a score.	Student's performance is primarily inaccurate and demonstrates minimal understanding in this strand (0–25% accurate).	Student's performance is limited and inconsistent with regard to accuracy and demonstrates limited understanding in this strand (26–50% accurate).	Student's performance is mostly accurate and demonstrates some understanding in this strand (51–75% accurate).	Student's performance is accurate and is of consistently high quality in this strand (76–100% accurate).
Independence	The strand contains insufficient information to determine a score.	Student requires extensive verbal, visual, and physical assistance to demonstrate skills and concepts in this strand (0–25% independent).	Student requires frequent verbal, visual, and physical assistance to demonstrate skills and concepts in this strand (26–50% independent).	Student requires some verbal, visual, and physical assistance to demonstrate skills and concepts in this strand (51–75% independent).	Student requires minimal verbal, visual, and physical assistance to demonstrate skills and concepts in this strand (76–100% independent).
Self-Evaluation	Evidence of planning, self-correction, task-monitoring, goal-setting, and reflection was not found in this content area.	Student infrequently plans, self-corrects monitors, sets goals, and reflects in this content area — only one example of self-evaluation was found in this strand.	Student plans, self-corrects monitors, sets goals, and reflects in this content area — multiple examples of self-evaluation were found in this strand.		
Generalized Performance		Student demonstrates knowledge and skills in one context or uses one approach and/or method of response and participation in this strand.	Student demonstrates knowledge and skills in multiple contexts or uses multiple approaches and/or methods of response and participation in this strand.		

Appendix E: Rubric for Scoring ELA–Writing

		M	1	2	3	4
Level of Complexity			Writing sample not submitted or unmatched to requirement.	Student addressed Writing through "access skills."	Student addressed Writing through "entry points."	Student addressed Writing at "grade-level."
Demonstration of Skills and Concepts	Expression of Ideas and Content	Writing sample not submitted; or contained insufficient information to determine a score; or written in a language other than English; or could not be read or understood	No main idea (informative), point of view (opinion), event sequence (narrative), or focus (poetry); or was unclear or off-topic; or used single word, picture, or symbol to express ideas; or all text provided by teacher	Writing sample related to assignment only minimally; included no or only one detail or description; or used picture sequence to express ideas; or used no figurative language or poetry form (poetry)	Main idea (informative), point of view (opinion), or event sequence (narrative) was evident; limited use of facts, details, and/or descriptions; sometimes repetitive and/or off-topic; limited use of figurative language (poetry);	Main idea (informative), point of view (opinion), or event sequence (narrative) was clearly expressed; three or more accurate and relevant facts, details, or descriptions included; used vivid imagery and figurative language appropriately (poetry)
	Knowledge of Conventions		Little or no original text; or used pictures or isolated words; or could not be understood due to errors in grammar and/or usage	General meaning could be understood, though use of grammar was limited and/or contained errors or run-on sentences; or lacked poetry form (poetry)	Complete sentences with some errors; grammar was effective; correct noun-verb agreement; some evidence of poetry form (poetry)	Meaning was clear, with rare or no errors in grammar and overall usage; poetry form used appropriately (poetry)
	Text Structure		Used single words, pictures, symbols without text; or all text provided by teacher	Sentence fragments (phrases) or one complete sentence used to express ideas; produced two related lines (poetry)	At least two complete sentences were used to express ideas; produced up to four related lines (poetry)	A paragraph of at least three related, well-constructed sentences was used to express ideas; more than four related lines (poetry)
	Use of Vocabulary		Vocabulary was unrelated to assignment; or all text was provided by teacher	Vocabulary was related to assignment, but word choice was limited and/or sometimes inappropriate	Vocabulary was functional and relevant; used basic common words, with some descriptive language	Vocabulary was clear and precise; used descriptive language, modifiers, connecting words and/or phrases

Appendix F: STE Strand Cover Sheet for Grades 5 and 8 STE, and High School Biology and Introductory Physics

2022 MCAS-Alt

Science and Technology/Engineering
STRAND COVER SHEET

(A completed STE Strand Cover Sheet must be included at the beginning of each STE discipline)

(1) Student's Name: **New Student**

(2) Student's grade as reported in the Student Information Management System (SIMS): **10**

(3) STE Discipline: **BIOLOGY**

(4) Core Idea: **Heredity: Inheritance and Variation of Traits**

Below, list each STE Summary Sheet included in the portfolio (<u>three</u> are required):

Practice # (1-8)	Evidence Attached	Date	STE Summary Sheet Description	Self-Evaluation
3	Yes	11/3/21	Sample 1	Yes
1	Yes	12/1/21	Sample 2	Yes
6	Yes	12/5/21	Sample 3	Yes

Appendix F: STE Summary Sheet for Grades 5 and 8 STE, and High School Biology and Introductory Physics

2022 MCAS-Alt

Science and Technology/Engineering (STE)

STE SUMMARY SHEET

Directions: Complete and submit **one summary sheet for each selected entry point or access skill** in the core idea (total of 3 summary sheets for each core idea). Document at least **three different science practices** among the three summary sheets. Attach **three pieces of primary evidence**, each to its corresponding STE Summary Sheet.

Student's Name: **New Student** Date (m/d/y):

Grade: **08** Discipline (Strand): **Earth and Space Science**

Core Idea: **Earth's Place in the Universe**

Science Practice (#1-8):

☐ Entry Point

☐ Access Skill

Resource Guide Page:

Grade Span:

Brief Description of activity (including materials, instructional approach, and how the student addressed the entry point or access skill):

Self-Evaluation:

SUMMARY for this activity: Accuracy: Independence:

☐ **EVIDENCE IS ATTACHED (Check if YES)**

Three pieces of evidence must be attached to its corresponding STE Summary Sheet.

A clearly labeled photograph with a detailed description may be substituted for evidence that may be difficult or impossible to attach to a STE Summary Sheet, including large, fragile, or temporary products, such as a model or a large display.

Appendix G: Sample of Teacher-Scribed Work Sample

Example of a Teacher-Scribed Work Sample

Grade Level: 7^{th} Grade
Content Area (Subject): Math
Strand: Ratios and Proportional Relationships
Learning Standards: 7.RP.A.2 Recognize and represent proportional relationships between quantities.
Measureable Outcome: will turn on technology used to demonstrate ratios and proportional relationships by pressing an access switch to turn the page of a teacher made story on the computer about ratios and proportions with 80% accuracy and 100%independence. will turn on the technology within 15 seconds of a directive.

Brief Description: During a math work session, turned on technology by pressing an access switch to turn the page of a teacher made book on the computer within 15 seconds of a directive. The book taught about ratios and proportional relationships by showing her a series of farm animals using the phrase "for every" to talk about how many of each appendage each animal had. (ex: for every cow there are 4 legs)

Trial Number	Page Number	Did she turn on technology by pressing her switch to activate the reading?	Latency In seconds	What was the ratio on the page?	+/-	I/P
1	1	No	15+ seconds	For every pig there is one tail	-	I
2	1	Yes	4 seconds	For every pig there is one tail	+	I
3	2	Yes	14 seconds	For every sheep there are 2 ears	+	I
4	3	No	15+ seconds	For every cow there are 4 legs	-	I
5	3	No	15+ seconds	For every cow there are 4 legs	-	I
6	3	Yes	10 seconds	For every cow there are 4 legs	+	P
7	4	Yes	3 seconds	For every duck there is 1 beak	+	I
8	5	Yes	1 second	For every goat there are 2 horns	+	I
9	6	Yes	11 seconds	For every horse there are 4 legs	+	I
10						

Accuracy	Independence
67%	89%

Appendix H: Informational Text – Supplemental List

Teachers are directed to include a photocopy of any Internet-based or teacher-created texts being submitted in the student's ELA-Reading assessment. **The following *informational* texts do not require a photocopy for the ELA–Reading–Informational Text strand because they are widely used and well-known:**

- ***News-2-You*** (symbol and text-based)
- ***Scholastic for Kids***
  - ***Science Spin***
- ***Weekly Reader***
- ***Time for Kids***
- ***Newsweek for Kids***
- ***National Geographic for Kids***
- ***Newsela*** (daily online news articles at five different reading levels from grades 3–12)
- ***Unique Learning Systems*** (symbol and text-based)
- ***Wonderopolis*** or ***Camp Wonderopolis***
- **Digital Textbooks (provide name of textbook)**

Teachers may simply list the title and topic of articles, plus the name of the publication, from the sources listed above either in the brief description or directly on the evidence. For example:

"(Student) read an article about goats from National Geographic for Kids

and answered five comprehension questions on a worksheet."

Appendix H: Literature and Informational Text Types

READING: LITERATURE VS. INFORMATIONAL TEXT

(Adapted from engageny.org)

- Examples of literary text:
  - A. adventure stories
  - B. nursery rhymes
  - C. poems
  - D. fables and folktales
  - E. legends
  - F. myths
  - G. fantasy
  - H. plays
  - I. historical fiction
  - J. mysteries
  - K. science fiction
  - L. realistic fiction
  - M. allegories
  - N. parodies
  - O. satire
  - P. graphic novels

- Examples of Informational text:
  - A. literary nonfiction
  - B. biographies and autobiographies
  - C. exposition, argument, and functional text, including:
    - personal essays and speeches
    - opinion pieces
    - essays about art or literature
    - biographies and memoirs
    - journalism (articles)
    - historical, scientific, technical, or economic accounts
  - D. historical, scientific, and technical texts, including:
    - texts about history, social studies, science, and the arts
    - directions, forms, and digital sources on a range of topics
    - historical, scientific, technical, or economic accounts

APPENDIX T
SCORING RUBRIC FOR MCAS-ALT ELA—WRITING

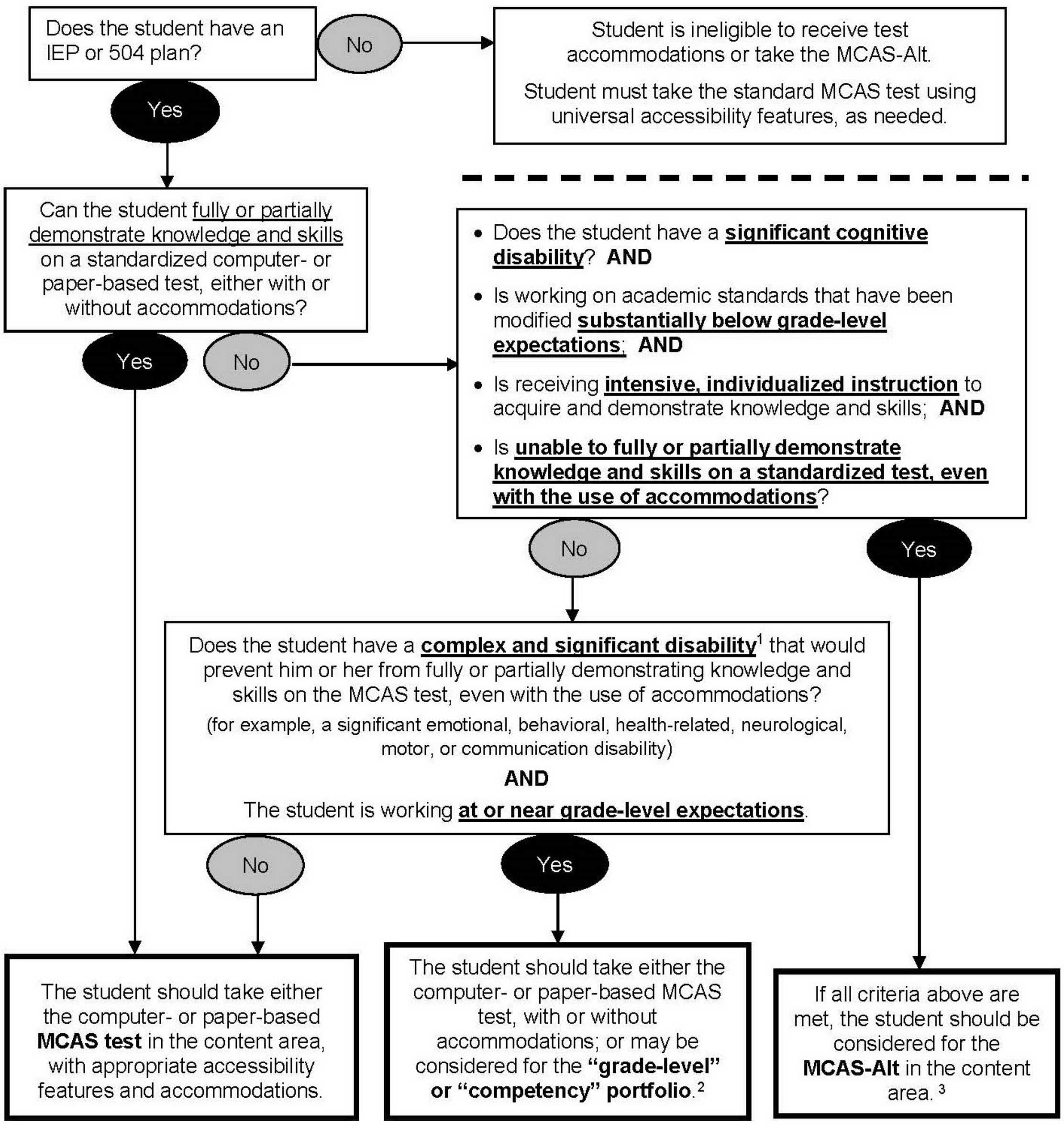
Student's Name: **SCORING RUBRIC for ELA–Writing (Check one) ____Narrative ____Opinion/Argument**
Date: **____Informative/Explanatory**

		M	1	2	3	4
Level of Complexity			Writing sample not submitted or unmatched to requirement.	Student addressed Writing through "access skills."	Student addressed Writing through "entry points."	Student addressed Writing at "grade-level."
Demonstration of Skills and Concepts	**Expression of Ideas and Content**	Writing sample not submitted; or contained insufficient information to determine a score; or written in a language other than English; or could not be read or understood	No main idea (informative), point of view (opinion), event sequence (narrative), or focus (poetry); or was unclear or off-topic; or used single word, picture, or symbol to express ideas; or all text provided by teacher	Writing sample related to assignment only minimally; included no or only one detail or description; or used picture sequence to express ideas; or used no figurative language or poetry form (poetry)	Main idea (informative), point of view (opinion), or event sequence (narrative) was evident; limited use of facts, details, and/or descriptions; sometimes repetitive and/or off-topic; limited use of figurative language (poetry);	Main idea (informative), point of view (opinion), or event sequence (narrative) was clearly expressed; three or more accurate and relevant facts, details, or descriptions included; used vivid imagery and figurative language appropriately (poetry)
	Knowledge of Conventions		Little or no original text; or used pictures or isolated words; or could not be understood due to errors in grammar and/or usage	General meaning could be understood, though use of grammar was limited and/or contained errors or run-on sentences; or lacked poetry form (poetry)	Complete sentences with some errors; grammar was effective; correct noun-verb agreement; some evidence of poetry form (poetry)	Meaning was clear, with rare or no errors in grammar and overall usage; poetry form used appropriately (poetry)
	Text Structure		Used single words, pictures, symbols without text; or all text provided by teacher	Sentence fragments (phrases) or one complete sentence used to express ideas; produced two related lines (poetry)	At least two complete sentences were used to express ideas; produced up to four related lines (poetry)	A paragraph of at least three related, well-constructed sentences was used to express ideas; more than four related lines (poetry)
	Use of Vocabulary		Vocabulary was unrelated to assignment; or all text was provided by teacher	Vocabulary was related to assignment, but word choice was limited and/or sometimes inappropriate	Vocabulary was functional and relevant; used basic common words, with some descriptive language	Vocabulary was clear and precise; used descriptive language, modifiers, connecting words and/or phrases
Independence		Writing sample not submitted; or contained insufficient information to determine a score; or written in a language other than English; or could not be read or understood	Student required extensive, almost continuous prompts to complete writing sample (0-25% independent) ______%	Student required frequent prompts to complete writing assignment (26-50% independent) ______%	Student required some prompts to complete writing assignment (51-75% independent) ______%	Student required no, or very few, prompts to complete writing assignment (76-100% independent) ______%

APPENDIX U
MCAS-ALT DECISION-MAKING TOOL
FOR PARTICIPATION

Decision-Making Tool for MCAS Participation by Students with Disabilities

The decision flowchart shown below may be useful to IEP teams and individuals responsible for developing 504 plans to make *annual* decisions regarding appropriate student participation in MCAS. Separate decisions must be made in each content area being assessed: ELA, mathematics, and science and technology/engineering.



[1] See the *Educator's Manual for MCAS-Alt* for additional details on and examples of "complex and significant disabilities."
[2] See the *MCAS Grade-level and Competency Portfolio Manual* for details on submission of "grade-level" and "competency" portfolios.
[3] Students who take the MCAS-Alt in high school will not earn a Competency Determination in the assessed subject and therefore will not be eligible to earn a high school diploma.

APPENDIX V

CRITERIA FOR PARTICIPATION–MCAS-ALT

Guidance on Designating Students for the MCAS-Alt

Decisions regarding participation in statewide assessments by students with disabilities must be discussed at the student's annual IEP team meeting and be documented in the IEP.

IEP team members should familiarize themselves with the criteria used to designate students for alternate assessments. The criteria listed below together with the Decision-Making Tool for MCAS-Alt Participation should be used by teams as the basis for making ***annual*** **assessment decisions for** ***each*** **student in** ***each*** **subject required for academic assessment.**

Criteria for Designating a Student for an Alternate Assessment

A student with the *most significant cognitive disability* should take the **MCAS-Alt** if he or she

- is working on *learning standards* in the content area that have been *substantially modified* due to the severity of the disability; **and**
- is receiving *intensive, individualized instruction* in order to acquire, generalize, and demonstrate knowledge and skills; **and**
- is *unable to demonstrate knowledge and skills on a standardized paper or online test*, even with accommodations.

Teams should **not** assume that a student should take an alternate assessment based on the fact that he or she

- has not been provided instruction in the general curriculum;
- has a specific disability (e.g., all students with intellectual disabilities should not automatically be designated for the MCAS-Alt);
- is placed in a program or classroom where it is expected that students will take the MCAS-Alt;
- has taken an alternate assessment previously (since this is an annual decision);
- has previously failed the MCAS test;
- is an English learner;
- is from a low-income family or is a child in foster care;
- requires the use of assistive technology or an alternative augmentative communication system; or
- attends a school in which the IEP team may have been influenced to designate the student for an alternate assessment in order for the school to receive disproportionate credit toward the school's accountability rating.

Other Considerations

When an IEP team (or 504 plan coordinator) is *undecided* as to which assessment format is most appropriate for a particular student, the Department recommends that the ***standard test*****, either with or without accommodations, be assigned as the default assessment format for the student**.

When assigning the standard test, teams should also deliberate as to whether it would be more appropriate for a student to take the computer-based next-generation MCAS test (for which universally designed accessibility features, tools, and accommodations are available) or a paper-based MCAS test (offered as an accommodation instead of the computer-based test).

When the decision is made to administer a standard MCAS test, with or without accommodations, the IEP team should evaluate after administration whether useful information was provided by the test results. If so, it may be preferable to have the student continue taking the standard MCAS test in that subject because of the broad range of standards that are assessed and reported on MCAS tests compared to the limited standards assessed in an MCAS-Alt portfolio. Students who take the MCAS-Alt will not be eligible to earn a Competency Determination and receive a high school diploma.

Questions on alternate assessment may be addressed to mcas@doe.mass.edu . Thank you for your attention to this important information.

APPENDIX W

SUMMARY OF ALT-SCORE FREQUENCIES

Table W-1. Frequency of Scores by Grade, by Strand, by Rubric Area—Alt/ELA

Grade	Strand	Rubric Area	Score 1	Score 2	Score 3	Score 4
3	1	Complexity	0	51	892	0
		Independence	10	45	140	664
		Skills	0	16	86	757
	2	Complexity	0	56	890	0
		Independence	12	34	145	612
		Skills	1	13	104	685
	3	Complexity	0	102	841	0
		Independence	33	102	227	498
		Skills	353	284	206	17
4	1	Complexity	0	38	839	1
		Independence	4	23	103	685
		Skills	0	9	84	722
	2	Complexity	0	43	834	2
		Independence	8	30	113	606
		Skills	1	9	92	655
	3	Complexity	0	78	798	2
		Independence	24	73	215	506
		Skills	303	261	241	13
5	1	Complexity	2	47	779	0
		Independence	2	21	91	633
		Skills	3	12	71	661
	2	Complexity	0	51	777	0
		Independence	5	26	115	561
		Skills	0	11	86	610
	3	Complexity	0	93	734	1
		Independence	13	75	206	442
		Skills	244	229	238	25
6	1	Complexity	0	43	756	0
		Independence	4	26	95	598
		Skills	0	14	84	625
	2	Complexity	0	52	749	0
		Independence	5	20	112	550
		Skills	1	12	79	595
	3	Complexity	0	76	721	0
		Independence	20	89	204	413
		Skills	254	249	204	19
7	1	Complexity	0	33	764	0
		Independence	7	23	97	603
		Skills	1	16	72	641
	2	Complexity	0	41	761	0
		Independence	9	15	111	534
		Skills	2	16	80	571
	3	Complexity	0	71	721	0
		Independence	17	73	190	436
		Skills	223	247	225	21
8	1	Complexity	1	45	766	1
		Independence	7	20	95	628
		Skills	3	9	96	642
	2	Complexity	0	56	764	1
		Independence	9	23	115	569
		Skills	3	16	83	614
	3	Complexity	0	78	738	1
		Independence	22	82	192	429
		Skills	254	219	225	27
HS	1	Complexity	0	37	812	1
		Independence	5	20	127	618
		Skills	1	8	85	676
	2	Complexity	0	39	820	3
		Independence	7	21	124	543
		Skills	4	6	80	605
	3	Complexity	1	74	775	2
		Independence	19	76	220	438
		Skills	210	228	273	42

Table W-2. Frequency of Scores by Grade, by Strand, by Rubric Area—Alt/Mathematics

Grade	Strand	Rubric Area	Score 1	Score 2	Score 3	Score 4
3	1	Complexity	0	65	890	1
		Independence	15	36	136	676
		Skills	0	17	78	768
	5	Complexity	0	53	901	1
		Independence	12	40	124	646
		Skills	1	16	72	733
4	1	Complexity	0	52	832	1
		Independence	3	44	129	624
		Skills	0	9	76	715
	3	Complexity	2	65	816	0
		Independence	9	25	121	637
		Skills	1	9	84	698
5	2	Complexity	0	70	761	2
		Independence	7	26	125	562
		Skills	1	10	79	630
	3	Complexity	1	60	768	2
		Independence	6	19	120	586
		Skills	1	17	78	635
6	2	Complexity	0	64	755	1
		Independence	8	36	100	596
		Skills	2	15	65	658
	5	Complexity	0	67	749	1
		Independence	11	30	128	573
		Skills	2	11	69	660
7	1	Complexity	1	74	724	0
		Independence	13	30	110	563
		Skills	0	11	73	632
	4	Complexity	0	32	765	0
		Independence	12	22	86	588
		Skills	0	10	73	625
8	2	Complexity	0	100	726	0
		Independence	8	42	114	567
		Skills	3	17	82	629
	4	Complexity	0	36	780	0
		Independence	6	25	95	610
		Skills	4	22	73	637
HS	1	Complexity	0	11	212	3
		Independence	1	12	41	140
		Skills	0	2	17	175
	2	Complexity	1	36	653	3
		Independence	8	28	75	500
		Skills	1	6	71	533
	3	Complexity	1	32	480	1
		Independence	4	16	77	363
		Skills	1	5	62	392
	4	Complexity	0	69	615	4
		Independence	12	25	107	456
		Skills	1	11	68	520
	5	Complexity	0	38	422	6
		Independence	9	16	65	317
		Skills	0	3	52	352

Table W-3. Frequency of Scores by Grade, by Strand, by Rubric Area—Alt/Science Grade 5

Grade	Strand	Rubric Area	Score 1	Score 2	Score 3	Score 4
5	1	Complexity	0	84	675	0
		Independence	25	64	157	432
		Skills	2	11	62	603
	2	Complexity	0	74	688	1
		Independence	27	75	160	412
		Skills	1	11	59	603
	3	Complexity	0	80	667	1
		Independence	23	69	177	389
		Skills	0	12	58	588

Table W-4. Frequency of Scores by Grade, by Strand, by Rubric Area—Alt/Science Grade 8

Grade	Strand	Rubric Area	Score 1	Score 2	Score 3	Score 4
8	1	Complexity	0	71	682	0
		Independence	32	59	200	396
		Skills	3	16	56	612
	2	Complexity	0	69	705	0
		Independence	18	58	182	428
		Skills	2	12	58	614
	3	Complexity	0	66	635	0
		Independence	30	63	155	398
		Skills	1	13	61	571

Table W-5. Frequency of Scores by Grade, by Strand, by Rubric Area—Alt/Biology

Grade	Strand	Rubric Area	Score 1	Score 2	Score 3	Score 4
HS	1	Complexity	0	44	478	2
		Independence	21	46	110	281
		Skills	0	7	64	387
	2	Complexity	0	39	460	2
		Independence	19	55	108	266
		Skills	2	7	43	396
	3	Complexity	0	37	455	3
		Independence	19	47	102	266
		Skills	0	5	55	374

Table W-6. Frequency of Scores by Grade, by Strand, by Rubric Area—Alt/Chemistry

Grade	Strand	Rubric Area	Score 1	Score 2	Score 3	Score 4
HS	1	Complexity	1	3	140	0
		Independence	0	2	10	120
		Skills	0	1	7	124
	2	Complexity	0	3	133	0
		Independence	0	0	15	111
		Skills	0	0	12	114
	3	Complexity	0	3	129	0
		Independence	0	1	11	111
		Skills	0	0	13	110

Table W-7. Frequency of Scores by Grade, by Strand, by Rubric Area—Alt/ Introductory Physics

Grade	Strand	Rubric Area	Score			
			1	2	3	4
HS	1	Complexity	0	15	68	2
		Independence	6	11	16	47
		Skills	0	2	22	56
	2	Complexity	0	8	72	2
		Independence	5	8	17	43
		Skills	0	3	16	54
	3	Complexity	0	10	65	2
		Independence	8	8	16	36
		Skills	0	4	8	56

Table W-8. Frequency of Scores by Grade, by Strand, by Rubric Area—Alt/Technology/Engineering

Grade	Strand	Rubric Area	Score			
			1	2	3	4
HS	1	Complexity	0	7	142	0
		Independence	1	0	17	119
		Skills	0	1	18	118
	2	Complexity	0	5	144	0
		Independence	1	3	14	118
		Skills	0	5	13	118
	3	Complexity	0	6	141	0
		Independence	1	4	14	117
		Skills	0	6	22	108

APPENDIX X

MCAS-ALT ACHIEVEMENT STANDARDS AND DESCRIPTORS

Grade-Level and Alternate Academic Achievement Standards and Descriptors

For each student who takes the standard MCAS tests, one of the following *grade-level academic achievement standards (levels)* will be reported in each content area.

Grades 3–10 (MCAS "Next-Generation" Grade-Level Academic Achievement Standards for ELA, Mathematics, and High School Biology and Introductory Physics):

- ***Not Meeting Expectations*—**Students performing at this level did not meet grade-level expectations in this subject. The school, in consultation with the student's parent/guardian, should determine the coordinated academic assistance and/or additional instruction the student needs to succeed in this subject.
- ***Partially Meets Expectations***—Students performing at this level partially meet grade-level expectations for knowledge, skills, and understanding. These students may need coordinated assistance and/or additional instruction to succeed at the next grade level.
- ***Meeting Expectations***—Students performing at this level meet grade-level expectations for knowledge, skills, and understanding, and are academically prepared to succeed at the next grade level.
- ***Exceeding Expectations***—Students performing at this level exceed grade-level expectations for knowledge, skills, and understanding, and are academically well prepared to succeed at the next grade level.

High School Chemistry and Technology/Engineering (MCAS "Legacy" Grade-Level Academic Achievement Standards):

- ***Needs Improvement***—Students demonstrate a **partial understanding of grade-level subject matter** and solve some simple problems.
- *Proficient*—Students demonstrate a solid understanding of challenging grade-level subject matter and solve a wide variety of problems.
- ***Advanced***—Students demonstrate a **comprehensive understanding of challenging grade-level subject matter** and provide sophisticated solutions to complex problems.

For each student who takes the MCAS-Alt, one of the following *alternate academic achievement standards (levels)* will be reported in each content area.

Grades 3–10 (Alternate Assessments Based on Alternate Achievement Standards)

- ***Awareness***—Students demonstrate **very little understanding** of standards and core knowledge topics contained in the Massachusetts curriculum framework for the content area. Students require extensive prompting and assistance, and their performance is mostly inaccurate.
- ***Emerging***—Students demonstrate a **simple understanding that is below grade-level expectations** of a limited number of standards and core knowledge topics contained in the Massachusetts curriculum framework for the content area. Students require frequent prompting and assistance, and their performance is limited and inconsistent.
- ***Progressing***—Students demonstrate a **partial understanding that is below grade-level expectations** of selected standards and core knowledge topics contained in the Massachusetts curriculum framework for the content area. Students are steadily learning new knowledge, skills, and concepts. Students require minimal prompting and assistance, and their performance is basically accurate.
- While not technically an achievement level, a score of ***Incomplete*** will be given if **insufficient evidence and information was included** to allow an achievement level to be determined.

Alternate Academic Achievement Standards

The state's alternate academic achievement standards (*Awareness, Emerging, Progressing*) and their descriptors reflect the collaboration, input, and professional judgment of numerous stakeholders who have affirmed that these achievement levels represent the highest possible standards achievable by students taking the MCAS-Alt; and that these standards are appropriate and aligned to ensure that a student who meets those standards is on track to pursue productive post-secondary education, vocational training, and/or competitive integrated employment.

APPENDIX Y
SAMPLE REPORTS—MCAS-ALT

Who must take MCAS?

All students in grades 3-8 and 10 who attend publicly funded school programs are required to participate in MCAS statewide assessments. A relatively small number of students with disabilities take the MCAS-Alt if they are unable to take regular MCAS tests, even with accommodations.

The decision to participate in an alternate assessment is made each year in each subject by the student's IEP team, which includes parents/guardians. Most students who take the alternate assessment receive individualized instruction that has been substantially modified from the instruction other students receive. Please be aware that participation in the MCAS-Alt may eventually delay, or otherwise affect, your child's ability to earn a high school diploma.

Why include students with disabilities in the MCAS and MCAS-Alt?

It's the law.
State and federal laws require the participation of all students in statewide assessments. The alternate assessment allows students with significant cognitive disabilities who cannot take regular MCAS tests to "show what they know" and to receive instruction at a level that is challenging and attainable for them.

MCAS helps to determine how much a student is learning.
An MCAS-Alt shows what the student has learned during the school year. Scores provide accurate and detailed feedback that can be used to identify challenging goals and instruction for the future.

Including all students in a school's or district's test results ensures that all students will be taught.
Counting the results of students who take the MCAS-Alt means that those students are more likely to be considered when resource decisions are made.

As learning improves, expectations are raised.
Evidence indicates that students learn more when they are engaged in instruction based on the state's learning standards and when they participate in assessments based on those learning standards.

How are the MCAS-Alt results used?

MCAS-Alt results should be used by the school and the IEP team to:

- identify challenging academic goals and plan instruction for the student
- measure the student's progress in achieving the academic standards in the Massachusetts curriculum frameworks
- allocate sufficient school resources for the student's education
- establish whether schools and districts are making progress in educating students with disabilities

Can students meet the state's graduation requirement and earn a diploma if they participate in the MCAS-Alt?

We want you to be aware that participation in an alternate assessment may eventually delay or affect your child's ability to complete the state's requirements to receive a high school diploma because the MCAS-Alt assesses learning standards that are **below** the expectations needed to meet the state's graduation requirement. Therefore, most students who participate in the MCAS-Alt will not be able to meet the state's graduation requirement.

The purpose of the state's graduation requirement is to ensure that a student earning a Massachusetts diploma can demonstrate basic competencies in English language arts, mathematics, and science and technology/ engineering before entering post-secondary education or the workplace. This requirement has been in place for all students beginning with the graduating class of 2003. You can learn more about graduation requirements on the Internet at www.doe.mass.edu/mcas/graduation.html.

To meet the state's graduation requirement, a student must do one of the following:

- take and pass the required MCAS tests;
- submit a "competency portfolio" that demonstrates the student's knowledge and skills at a grade 10 level of achievement; or
- be granted an MCAS Performance Appeal that documents his or her grade point average compared with other students who take grade-level courses. Information on MCAS appeals is available at https://www.doe.mass.edu/mcasappeals/.

For more information

Massachusetts Comprehensive Assessment System (MCAS) .... www.doe.mass.edu/mcas
MCAS Alternate Assessment (MCAS-Alt) .... www.doe.mass.edu/mcas/alt
MCAS participation requirements for students with disabilities .... www.doe.mass.edu/mcas/accessibility
Graduation requirements and MCAS performance appeals .... www.doe.mass.edu/mcas/graduation.html
If you have questions .... Email: mcas@doe.mass.edu

Spring 2022 MCAS Alternate Assessment (MCAS-Alt) Parent/Guardian Report

MASSACHUSETTS DEPARTMENT OF ELEMENTARY AND SECONDARY EDUCATION

Name:	**SASID:**
School:	**Grade:** 08
District:	**Date of Birth:**

Enclosed are your child's results from the 2022 MCAS Alternate Assessment (MCAS-Alt). All students are required to participate in MCAS, either by taking the standard MCAS tests or by participating in the MCAS Alternate Assessment (MCAS-Alt) for students with disabilities who meet certain requirements. Your child's school submitted his or her MCAS-Alt last spring, as indicated in his or her IEP or 504 plan. The MCAS-Alt is a record of your child's accomplishments, including a collection of his or her academic work. Before it was submitted, your child's school was required to invite you to review the assessment and review your child's progress.

Please meet with your child's teacher(s) to discuss the meaning of these results and talk about your child's goals for the coming school year. Your support is extremely important. The Department of Elementary and Secondary Education would like to acknowledge the hard work of your child's teachers in compiling the MCAS-Alt and contributing to this important and worthwhile effort.

Your Child's Overall Results

English Language Arts	Mathematics	Science and Technology/Engineering
Achievement Level	Achievement Level	Achievement Level
Emerging	**Progressing**	**Progressing**

Purposes of the MCAS-Alt

The MCAS-Alt is an assessment designed to measure the achievement of students with significant cognitive disabilities in selected areas of English Language Arts, Mathematics, and Science and Technology/Engineering. Your child is expected to demonstrate knowledge of the state's learning standards at a level that is challenging and appropriate.

The purpose of the MCAS-Alt is to make sure schools are teaching the standards to all students, regardless of their disability and even when they cannot show what they know on a standard test.

What is the MCAS-Alt?

Your child's MCAS-Alt includes samples of his or her schoolwork and a record of his or her progress in the subject(s) being assessed. Each assessment includes work samples and charts of progress in the same subjects that are assessed on the standard MCAS tests for a student in that grade. Students taking the MCAS-Alt are working on knowledge and skills at lower levels of difficulty than their peers who take the MCAS tests and their results reflect this. More details about the MCAS-Alt are provided in the *Educator's Manual for MCAS-Alt*, which is available at http://www.doe.mass.edu/mcas/alt/edmanual.docx.

Name:
SASID:

Grade: 08
Spring 2022

Achievement Level Descriptors

Achievement Level	Descriptor	English Language Arts	Mathematics	Science and Technology/ Engineering
Exceeding Expectations	A student who performed at this level **exceeded grade-level expectations** by demonstrating mastery of the subject matter.			
Meeting Expectations	A student who performed at this level **met grade-level expectations** and is academically on track to succeed in the current grade in this subject.			
Partially Meeting Expectations	A student who performed at this level **partially met grade-level expectations** in this subject. The school, in consultation with the student's parent/guardian, should consider whether the student needs additional academic assistance to succeed in this subject.			
Not Meeting Expectations	A student who performed at this level **did not meet grade-level expectations** in this subject. The school, in consultation with the student's parent/guardian, should determine the coordinated academic assistance and/or additional instruction the student needs to succeed in this subject.			
Progressing	A student at this level demonstrated a **partial understanding below grade-level expectations** of selected standards and core knowledge topics contained in the Massachusetts curriculum framework for the subject. Students at this level are steadily learning new knowledge, skills, and concepts. Students require minimal prompting and assistance, and their performance is basically accurate.		✓	✓
Emerging	A student at this level demonstrated a **simple understanding below grade-level expectations** of a limited number of standards and core knowledge topics contained in the Massachusetts curriculum framework for the subject. Students at this level require frequent prompting and assistance, and their performance is limited and inconsistent.	✓		
Awareness	A student at this level demonstrated **very little understanding** of standards and core knowledge topics contained in the Massachusetts curriculum framework for the subject. Students at this level require extensive prompting and assistance, and their performance is mostly inaccurate.			
Incomplete	**Sufficient evidence and information** was not included to allow an achievement level to be determined in the subject.			

(Table columns 3–5 are headed: Your Child's Achievement Level (✓))

The section above shows your child's overall achievement level in each subject of the alternate assessment.
The MCAS-Alt was scored in each area shown below. Scores for *Level of Complexity, Demonstration of Skills and Concepts (accuracy),* and *Independence* were combined to give the overall achievement level.

MCAS-Alt Scoring Areas and Your Child's Scores

ENGLISH LANGUAGE ARTS

	Level of Complexity (1 2 3 4 5)	Demonstration of Skills and Concepts (M 1 2 3 4)	Independence (M 1 2 3 4)	Self-Evaluation (M 1 2)	Generalized Performance (1 2)
Language	3	3	4	2	2
Reading	3	M	M	2	2
Writing	3	3	4	2	2

MATHEMATICS

	Level of Complexity (1 2 3 4 5)	Demonstration of Skills and Concepts (M 1 2 3 4)	Independence (M 1 2 3 4)	Self-Evaluation (M 1 2)	Generalized Performance (1 2)
Expressions and Equations	3	3	4	2	2
Geometry	3	3	4	2	2
The Number System					
Functions					
Statistics and Probability					

SCIENCE and TECHNOLOGY/ENGINEERING

	Level of Complexity (1 2 3 4 5)	Demonstration of Skills and Concepts (M 1 2 3 4)	Independence (M 1 2 3 4)	Self-Evaluation (M 1 2)	Generalized Performance (1 2)
Earth and Space Sciences	3	4	3	2	2
Life Science	3	4	3	2	2
Physical Sciences	3	4	4	2	2
Technology/ Engineering					

Your child's MCAS-Alt was scored in the following Scoring Areas:

Level of Complexity — How your child addressed the learning standards in each subject (strand)
5 - Student addresses a broad range of curriculum framework learning standards (three or more) at grade-level expectations in this strand.
4 - Student addresses a narrow sample of curriculum framework learning standards (one or two) at grade-level expectations in this strand.
3 - Student addresses curriculum framework learning standards that have been modified below grade-level expectations in this strand.
2 - Student primarily addresses social, motor, and communication "access skills" during instruction based on curriculum framework learning standards in this strand.
1 - Strand reflects little or no basis in, or is unmatched to, curriculum framework learning standard(s) required for assessment.

Demonstration of Skills and Concepts — The percentage of accurate (correct) responses
4 - Student's performance is accurate and is of consistently high quality in this strand (76-100% accurate).
3 - Student's performance is mostly accurate and demonstrates some understanding in this strand (51-75% accurate).
2 - Student's performance is limited and inconsistent with regard to accuracy and demonstrates limited understanding in this strand (26-50% accurate).
1 - Student's performance is primarily inaccurate and demonstrates minimal understanding in this strand (0-25% accurate).
M - Strand contains insufficient information to determine a score.

Independence — The amount of assistance your child received
4 - Student requires minimal verbal, visual, and physical assistance to demonstrate skills and concepts in this strand (76-100% independent).
3 - Student requires some verbal, visual, and physical assistance to demonstrate skills and concepts in this strand (51-75% independent).
2 - Student requires frequent verbal, visual, and physical assistance to demonstrate skills and concepts in this strand (26-50% independent).
1 - Student requires extensive verbal, visual, and physical assistance to demonstrate skills and concepts in this strand (0-25% independent).
M - Strand contains insufficient information to determine a score.

Self-Evaluation — Your child's awareness of his or her performance
2 - Student frequently plans, self-corrects, monitors, sets goals, and reflects in this subject; multiple examples of self-evaluation were found in this strand.
1 - Student infrequently plans, self-corrects, monitors, sets goals, and reflects in this subject; only one example of self-evaluation was found in this strand.
M - Evidence of planning, self-correction, task-monitoring, goal-setting, and reflection was not found in this strand.

Generalized Performance — The number of approaches used by your child to demonstrate knowledge and skills
2 - Student demonstrates knowledge and skills in multiple contexts, or uses multiple approaches and/or methods of response and participation in this strand.
1 - Student demonstrates knowledge and skills in one context, or uses one approach and/or method of response and participation in this strand.

APPENDIX Z

COGNITIVE SKILLS REVIEW AND UPDATE PROCESS

Appendix Z: Cognitive Skills Review and Update Process

Starting in 2020, the Department of Elementary and Secondary Education (DESE) test developers, as well as the contractor's test developers, reviewed and revised guidance on writing items to varying levels of cognitive complexity, as well as the definitions of cognitive complexity levels themselves. Within the Massachusetts Comprehensive Assessment System (MCAS) program, cognitive complexity is operationalized in terms of cognitive "skill levels" that are derived from Norman Webb's depth of knowledge framework.

The goal of review and revision work for the ELA and math cognitive skills was to do the following:

- Develop a deeper and shared understanding of each cognitive skill level.
- Update the cognitive skills attribute handouts.
- Create cognitive skill target ranges for operational tests.
- Develop grade-level examples for each cognitive skill level using released MCAS items.
- Provide guidance and training to item developers and item review committees, including the Assessment Development Committees (ADCs), on the revised cognitive skill level materials to support all future development.

Cognitive Skills Review and Revision Process

In 2018 and 2019, researchers from Boston College conducted two alignment studies, one study for grades 3–8 and another for grade 10. These two studies suggested several areas of improvement, including improvements related to cognitive complexity. In response, a series of meetings were held to review and revise the approach to cognitive complexity taken with the MCAS program. These meetings were conducted separately for English Language Arts (ELA) and mathematics but had the same overall structure and steps. Each meeting was co-facilitated by DESE and Cognia test development leads. As explained below, these steps started with a review of the results of the alignment studies and ended with the revision of the cognitive skills attribute handout, creation of targets for each grade level test and the collation of grade-level example items for each cognitive skill.

In each content area, test development leads facilitated review of (a) the cognitive skill guidance document, (b) the complexity skill levels assigned through the alignment studies, (c) the complexity skill levels assigned to the items through the development process and (d) the items and associated stimulus materials used within the alignment studies. Note that the alignment studies examined the 2017 operational form for grades 3–8 and the 2019 operational form for grade 10. Key in this review was understanding differences between (b) and (c), the complexity skill levels assigned through the alignment studies and those assigned through the item development process. Each content area used slightly different processes, but ultimately arrived at the same set of materials to inform future development.

English Language Arts

For ELA, grade-level team members independently assigned cognitive skills to each item on each grade level test, based on the language within the pre-existing cognitive skills guidance documents. The levels assigned were then compared to those from the alignment study as well as those originally assigned to the items to facilitate conversation around differences in assignments and as well as the assignments themselves. These conversations were used to inform the revision of the cognitive skills attribute handout, as well as targets for cognitive skills on the operational form and training materials.

Three meetings were held by the test developers. In preparation for the first meeting, test developers read the passages and accompanying items that were included in part of the alignment study. For grades 3–8, there were three passage sets from the 2017 tests and for grade 10, there were four passage sets from the 2019 test. During the meeting, test developer leads met with grade level test developer teams to review the current language of the cognitive skills within the cognitive skills handout. The teams then reviewed a selection of released items and discussed differences between the originally assigned cognitive skill level and those from the alignment study. The teams then assigned cognitive skill levels to each item on the grade level test. Following this meeting, the test developer leads combined the cognitive skill level assignments from the grade level teams with the assignments from the original item development along with those from the alignment study.

In the second meeting, the grade level teams reviewed the combined cognitive skill levels assignments. In this review the teams were asked to consider the following questions:

- Why might there be a difference of cognitive level assignment between groups?
- Why was a cognitive level selected for an item?

The grade-level teams then selected items to share with the whole group. They shared how each item was assigned to a cognitive skill level and sought feedback on items where discrepancies occurred. As part of the discussion, the teams were also asked to think about attributes for each cognitive skill to prepare for the next meeting, which involved building consensus for the alignment study document. Following the second meeting, the test content leads determined the target distribution of score points by cognitive skill level based on careful examination of the standards, operational item banks and cognitive skills handout.

In the third and final meeting, all the ELA test developers joined a whole group conversation focused on revisions to the cognitive skill attributes handout, as well as the target distribution of score points by cognitive skill level for each operational test. As part of this discussion, test developers were asked to think about how the target distribution should be considered during item development and forms construction. The test developer leads also worked after the meeting to finalize the cognitive skill attributes handout and create training materials for ADCs on the cognitive skill attributes handout. These training materials included carefully curated exemplar items at each cognitive skill level.

Mathematics

Similarly, in mathematics a team reviewed the cognitive skill levels assigned through the alignment studies, as well as the original assessments from test development. The team discussed differences in cognitive skill assignments to again develop a shared understanding of the differences as well as the levels themselves. Notably, the team spent a great deal of time examining variations in understanding and assignment of cognitive skill categories 2 and 3.The team also engaged with staff at education departments in Connecticut, Kentucky, North Carolina, Iowa, and Minnesota to understand other states' approaches to cognitive complexity. The team also drew on Karin Hess' "A Guide for Using Webb's Depth of Knowledge with Common Core State Standards" (Hess, 2013). As with ELA, this work was used to update the cognitive skills attribute handout. After updating the cognitive skills attribute handout, the team reviewed the items from the operational forms again, with a focus on cognitive skill category 3. Then, the team reviewed the cognitive categories assigned to the 2021 operational form. Both reviews were used to further refine the updated MCAS cognitive skill attribute handout.

The mathematics team then used the updated cognitive skill attribute handout in conjunction with a careful analysis of the standards and the 2021 operational forms to develop the target distribution of score points by cognitive skill level. Finally, like ELA, the mathematics team developed training materials, including released assessment items as exemplars of each cognitive skill category assigned to items for each grade level. These examples are meant to be used during ADC orientation to explain how to assign cognitive skill categories based on cognitive demand and *not* item difficulty. Each set of exemplars is also meant to provide a means to resolve any disagreements among ADC members. A consensus is reached by the ADC after discussions involving the descriptions and item exemplars.

Cognitive Skills Targets

The targets for score points by cognitive skill are given in the two tables below.

Table Z-1. Targeted Percentage of Score Points by Cognitive Skill Level in English Language Arts.

Grade	Cognitive Skill Level	Total Points	Percent of Score Points (+/-5%)	Score Points
3–4	I	44	5%	0–5
	II		70%	29–33
	III		25%	10–14
5	I	48	5%	0–5
	II		60%	26–31
	III		35%	14–17
6–8	I	50	5%	0–5
	II		60%	27–32
	III		35%	16–20
10	I	51	5%	0–5
	II		60%	28–33
	III		35%	16–21

Table Z-2. Targeted Percent of Score Points by Cognitive Skill Level in Mathematics.

Grade	Cognitive Skill Level	Total Points	Percent of Score Points	Score Points
3	I II III	48	25–40% 55–65% 6–15%	12–20 26–32 3–7
4–8	I II III	54	25–40% 55–65% 6–15%	13–22 29–35 3–8
10	I II III	60	25–35% 55–65% 7–20%	15–21 33–39 4 –12

Operational Implementation

Based on the cognitive skills attribute handout and exemplar items, all MCAS items are developed to a cognitive skill level, which is then recorded within the item metadata. The cognitive skill level for each item is first reviewed by DESE test developers along with standard alignment, content accuracy, readability, instructional worthiness, and other attributes of the item. The items are then reviewed by teacher committees, including the ADC, where they either accept or change the cognitive skill level.

Before ADC members review items, they are provided training, including definition of each cognitive skill level, along with examples of items that fall into each category. After items are field tested, the cognitive skill levels are again reviewed both by the test developers and by the teacher committees when they review the items with data after field testing. If the item is used as an operational item, the cognitive skill is again reviewed prior to the item being placed on the common form.

The targeted percentages of score points by cognitive skill are used by the contractor during the initial pull of each test for both ELA and math. The percentage of each cognitive skill is then reviewed and verified by DESE test developers during the test form construction period. If the targeted percentages are not reached, the contractor will focus on developing new items in the following year’s development cycle to address any shortcomings.

References

Hess, K. (2013). *A Guide For Using Webb's Depth Of Knowledge With Common Core Standards.* Retrieved from The Ohio Department of Education: https://education.ohio.gov/getattachment/Topics/Teaching/Educator-Evaluation-System/How-to-Design-and-Select-Quality-Assessments/Webbs-DOK-Flip-Chart.pdf.aspx