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|  | 2022 NAEP Reading and Mathematics:  Summary of State Results | |
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| December 2022 | |
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I. Executive Summary of the 2022 NAEP State Results in Reading and Mathematics

Fifty states took part in the 2022 state administration of the National Assessment of Educational Progress (NAEP) reading and mathematics assessments at grades 4 and 8. In Massachusetts, grade 4 students from 127 schools and grade 8 students from 124 schools participated in the 2022 NAEP state assessments; 5,000 students were assessed in reading, and 5,200 students were assessed in mathematics. This report provides state-level results for the reading and mathematics assessments.

□ **Interpreting this Report**

When reviewing this report, it is important to keep in mind that the NAEP results are based on a *sample* of students across Massachusetts and not on the *population* of Massachusetts students. In analyzing the results, tests of significance were used to determine differences in the data that could be confidently characterized as *not occurring by chance*. This type of difference is commonly referred to as a statistically *significant* difference. In the report’s tables, an asterisk is used to denote a value that is significantly different from the value for the nation’s public schools.

□ **Overall Performance for Reading**

*Massachusetts tied for first place on the grade 4 NAEP reading assessment and the grade 8 NAEP reading assessment.*

* Based on average scale scores, Massachusetts tied for first in the nation with five other states at grade 4. At grade 8, Massachusetts tied for first in the nation with two other states.
* In reading at grade 4, the percentage of Massachusetts students scoring at or above the *Proficient* level was higher than the percentage of students at or above the *Proficient* level in 45 states. At grade 8, the percentage of Massachusetts students scoring at or above the *Proficient* levelin reading was higher than the percentage of students at or above the *Proficient* levelin 46 states.

*Students in Massachusetts outperformed students nationally on the NAEP reading tests.*

* The average scale score of Massachusetts grade 4 students on the reading assessment was 227, higher than the national average of 216. Eighth-grade Massachusetts students also outscored their counterparts nationwide 269 to 259.

□ **Overall Performance for Mathematics**

*On the NAEP mathematics assessments, Massachusetts tied for first place at grade 4 and grade 8.*

* Based on average scale scores, Massachusetts tied for first in the nation with fifteen other states at grade 4. At grade 8, Massachusetts tied for first in the nation with eight other states.
* In mathematics at grade 4, the percentage of Massachusetts students scoring at or above the *Proficient* level was higher than the percentage of students at or above the *Proficient* level in 32 states and no different from the percentage of students at or above the *Proficient* level in 18 states. At grade 8, the percentage of Massachusetts students scoring at or above the *Proficient* levelin mathematics was higher than the percentage of students at or above the *Proficient* levelin 41 states and no different from the percentage of students at or above the *Proficient* level in nine states.

*Students in Massachusetts outperformed students nationally on the NAEP mathematics tests.*

* The average scale score of Massachusetts grade 4 students on the mathematics assessment was 242, higher than the national average of 235. Eighth-grade Massachusetts students also outscored their counterparts nationwide 284 to 273.

□ **Students Performing at or above the *Proficient* level in the Top Performing States**

The following table lists the top-performing states on the 2022 reading and mathematics assessments according to the ordinal rank of the percentage of students in each state who scored at or above the *Proficient* level.

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Table 1. 2022 NAEP Reading Assessment** | | | | |
| **Percentage of Students at or above *Proficient* in the Top 10 States** | | | | |
| **Grade 4** | | **Grade 8** | | |
| **Massachusetts** | **43** |  | New Jersey | **42** |
| Florida | 39 |  | **Massachusetts** | 39 |
| Wyoming | 38 |  | Utah | 36 |
| New Jersey | 38 |  | Connecticut | 35 |
| Colorado | 38 |  | Colorado | 35 |
| New Hampshire | 37 |  | Vermont | 34 |
| Utah | 37 |  | Ohio | 33 |
| Hawaii | 35 |  | New Hampshire | 33 |
| Connecticut  Ohio | 35  35 |  | Maryland  Wisconsin | 32  32 |
|  |  |  |  |  |

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Table 2. 2022 NAEP Mathematics Assessment** | | | | |
| **Percentage of Students at or above *Proficient* in the Top 10 States** | | | | |
| **Grade 4** | | **Grade 8** | | |
| Wyoming | **45** |  | **Massachusetts** | **35** |
| **Massachusetts** | 43 |  | Utah | 34 |
| Nebraska | 43 |  | Wisconsin | 33 |
| Wisconsin | 43 |  | New Jersey | 34 |
| Utah | 42 |  | Idaho | 32 |
| Florida | 41 |  | South Dakota | 32 |
| Minnesota | 41 |  | Minnesota | 32 |
| Iowa | 41 |  | Wyoming | 32 |
| North Dakota | 41 |  | Virginia | 31 |
| South Dakota | 41 |  | Nebraska | 31 |

□ **Student Subgroup Performance in Reading in Massachusetts Compared to the Nation**

**in 2022**

* Race/Ethnicity: At grade 4, African American/Black, White, and Asian students in Massachusetts outperformed their counterparts nationally. At grade 8, African American/Black, Hispanic, Asian, and White students outperformed their counterparts nationally.
* Gender: At grades 4 and 8, both female and male students in Massachusetts outscored their counterparts nationally.
* Student Status: At grades 4 and 8, students with disabilities and students eligible for free or reduced-price lunch in Massachusetts outscored their counterparts nationally. English learner students in Massachusetts at grades 4 and 8 scored lower than their counterparts in the nation.

□ **Student Subgroup Performance in Mathematics in Massachusetts Compared to the Nation in 2022**

* Race/Ethnicity: At grade 4, African American/Black, Asian, and White students in Massachusetts outperformed their counterparts nationally, while Hispanic students scored lower than their counterparts nationally. At grade 8, African American/Black, Asian, Hispanic, and White students in Massachusetts outperformed their counterparts nationally.
* Gender: At grades 4 and 8, both female and male students in Massachusetts outscored their counterparts nationally.
* Student Status: At both grades 4 and 8, students with disabilities outscored their counterparts nationally. At grades 4 and 8 students eligible for free or reduced lunch scored higher than their counterparts in the nation. At grade 8, English learner students in Massachusetts scored higher than the national average.

II. Background Information on the 2022 NAEP Reading and Mathematics Assessments

Participation in NAEP state assessments in reading and mathematics at grades 4 and 8 is mandated by the Every Student Succeeds Act (ESSA). Students from 50 states participated in the 2022 NAEP state assessments in reading and mathematics. Across the nation, roughly 280,000 fourth- and eighth-grade students were assessed in reading, and 285,000 fourth- and eighth-grade students were assessed in mathematics.

□ **Test Content of the Reading Assessment**

The 2022 NAEP reading framework approved by the National Assessment Governing Board carries forward changes that were made in 2009 to include more emphasis on literary and informational texts, a redefinition of reading cognitive processes, a systemic assessment of vocabulary knowledge, and the addition of poetry at grade 4. Results from special analyses conducted in 2009 determined that, even with these changes to the assessment, results could continue to be compared to those from earlier assessment years.

|  |  |  |
| --- | --- | --- |
| **Table 3. 2022 NAEP Reading Assessment**  **Distribution of Questions by Cognitive Skill across the Test** | | |
| **Field of Reading** | Grade 4 | Grade 8 |
| **Locate and Recall**: When locating or recalling information from what they have read, students may identify explicitly stated main ideas or may focus on specific elements of a story.  **Integrate and Interpret**: When integrating and interpreting what they have read, students may make comparisons, explain character motivation, or examine relations of ideas across the text.  **Critique and Evaluate**: When critiquing or evaluating what they have read, students view the text critically by examining it from numerous perspectives or may evaluate overall text quality or the effectiveness of particular aspects of the text. | 30%  50%  20% | 20%  50%  30% |

□ **Test Content of the Mathematics Assessment**

The 2022 NAEP mathematics framework approved by the National Assessment Governing Board specifies that each question on the assessment measure one of five mathematical content areas. Although the names of the content areas, as well as some of the topics in those areas, have changed over the years, there has been a consistent focus across frameworks on collecting information about students’ performance in the following five areas: number properties and operations; measurement; geometry; data analysis, statistics, and probability; and algebra.

|  |  |  |
| --- | --- | --- |
| **Table 4. 2022 NAEP Mathematics Assessment**  **Distribution of Questions By Content Area Across the Test** | | |
| **Field of Mathematics** | Grade 4 | Grade 8 |
| **Number properties and operations** measures students’ understanding of ways to represent, calculate, and estimate with numbers.  **Measurement** assesses students’ knowledge of units of measurement for such attributes as capacity, length, area, volume, time, angles, and rates.  **Geometry** measures students’ knowledge and understanding of shapes in two and three dimensions and relationships between shapes, such as symmetry and transformations.  **Data analysis, statistics, and probability** measures students’ understanding of data representation, characteristics of data sets, experiments and samples, and probability.  **Algebra** measures students’ understanding of patterns, using variables, algebraic representation, and functions. | 40%  20%  15%  10%  15% | 20%  15%  20%  15%  30% |

□ **Types of Questions on the Reading and Mathematics Assessments**

The 2022 NAEP reading and mathematics assessments contained three types of questions or items: multiple-choice, short constructed-response, and extended constructed-response.

□ **Student Participation**

Each student selected for NAEP participates in only one subject-area test, and he/she takes only a portion of the entire test in that subject. For instance, a student chosen for the 2022 reading or mathematics test took two 25-minute blocks, or sets of test items, out of a total of 10+ blocks of items at that grade level.

NAEP spirals blocks of items into different test “booklets,” administers them to representative samples of students, and combines the results in order to produce average scale scores for the entire group and for subgroups of student populations. This approach reduces the burden on each individual student.

□ **Reporting**

Student performance on NAEP is indicated in two ways—scale scores and achievement levels. The NAEP reading and mathematics assessment scales range from 0 to 500. Performance for each grade is scaled separately, so average scale scores cannot be compared across grades.

Achievement levels are used to describe expectations for student performance according to a set of standards for what students should know and be able to do. The three achievement levels are *Basic*, *Proficient*, and *Advanced*.

* ***Basic*** denotes partial mastery of prerequisite knowledge and skills that are fundamental for proficient work at a given grade. Examples of skills demonstrated by students performing at the *Basic* level include the following:

• In reading, fourth-grade students should be able to locate relevant information, make simple inferences, and use their understanding of the text to identify details that support a given interpretation or conclusion. Students should be able to interpret the meaning of a word as it is used in the text.

• In reading, eighth-grade students should be able to locate information; identify statements of main idea, theme, or author’s purpose; and make simple inferences from texts. They should be able to interpret the meaning of a word as it is used in the text. Students performing at this level should also be able to state judgments about content and presentation of content and provide some support for those judgments.

• In mathematics, fourth-grade students should show some evidence of understanding the mathematical concepts and procedures in the five NAEP content areas.

• In mathematics, eighth-grade students should exhibit evidence of conceptual and procedural understanding in the five NAEP content areas. This level of performance signifies an understanding of arithmetic operations—including estimation—on whole numbers, decimals, fractions, and percents.

* ***Proficient***represents solid academic performance. Students reaching this level have demonstrated competency over challenging subject matter. Examples of skills demonstrated by students performing at the *Proficient* level include the following:

• In reading, fourth-grade students should be able to integrate and interpret texts and apply their understanding of the text to draw conclusions and make evaluations.

• In reading, eighth-grade students should be able to provide relevant information and summarize main ideas and themes. They should be able to make and support inferences about a text, connect parts of a text, and analyze text features. Students performing at this level should also be able to fully substantiate judgments about content and presentation of content.

• In mathematics, fourth-grade students should be consistent in applying integrated procedural knowledge and conceptual understanding to solve problems in the five NAEP content areas.

• In mathematics, eighth-grade students should be consistent in applying mathematical concepts and procedures to complex problems in the five NAEP content areas.

* ***Advanced***represents superior academic performance. Examples of skills demonstrated by students performing at the *Advanced* level include the following:

• In reading, fourth-grade students should be able to make complex inferences and construct and support their inferential understanding of the text. Students should be able to apply their understanding of a text to make and support a judgment.

• In reading, eighth-grade students should be able to make connections within and across texts and to explain causal relations. They should be able to evaluate and justify the strength of supporting evidence and the quality of an author’s presentation. They should be able to manage the processing demands of analysis and evaluation by stating, explaining, and justifying.

• In mathematics, fourth-grade students should apply integrated procedural knowledge and conceptual understanding to solve complex and non-routine real-world problems in the five NAEP content areas.

• In mathematics, eighth-grade students should be able to reach beyond the recognition, identification, and application of mathematical rules in order to generalize and synthesize concepts and principles in the five NAEP content areas.

III. 2022 NAEP Reading and Mathematics Results by Subgroup

Student performance data are reported for public school students in Massachusetts and the nation according to the following demographic characteristics:

* race/ethnicity
* gender
* student eligibility for the National School Lunch Program
* type of school location
* parents’ highest level of education

Results for each of the characteristics are reported in tables that include the percentage of students in each subgroup in the first column. The columns to the right show the average scale score and the percentage of students at each achievement level.

The reader is cautioned against making causal inferences about subgroup differences, as a complex mix of educational and socioeconomic factors may affect student performance.

□ **Race/Ethnicity**

The race/ethnicity of each student was reported by the schools. The next four tables show population percentages, average scale scores, and achievement-level data for reading and mathematics by race/ethnicity subgroup for public school students at grades 4 and 8 in Massachusetts and the nation.

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| **Table 5-A. 2022 NAEP Reading Assessment:**  **Grade 4 Performance by Race/Ethnicity** | | | | | | | |
|  |  |  |  | **Percentage of Students** | | | |
| **Race/Ethnicity** |  | **Percentage of Students** | **Average Scale Score** | **Below *Basic*** | **At or Above *Basic*** | **At or Above *Proficient*** | **At *Advanced*** |
| **White** | |  |  |  |  |  |  |
|  | Nation | 45 | 226 | 28 | 72 | 41 | 11 |
|  | Massachusetts | 56 | 235 | 20 | 80 | 51 | 17 |
| **African American/Black** | |  |  |  |  |  |  |
|  | Nation | 15 | 198 | 57 | 43 | 16 | 2 |
|  | Massachusetts | 10 | 207 | 49 | 51 | 24 | 5 |
| **Hispanic** | |  |  |  |  |  |  |
|  | Nation | 28 | 204 | 51 | 49 | 20 | 4 |
|  | Massachusetts | 22 | 204 | 52 | 48 | 21 | 5 |
| **Asian/Pacific Islander** | |  |  |  |  |  |  |
|  | Nation | 6 | 238 | 20 | 80 | 55 | 23 |
|  | Massachusetts | 8 | 247 | 16 | 84 | 63 | 32 |

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| **Table 5-B. 2022 NAEP Reading Assessment:**  **Grade 8 Performance by Race/Ethnicity** | | | | | | | |
|  | | | | **Percentage of Students** | | | |
| **Race/Ethnicity** |  | **Percentage of Students** | **Average Scale Score** | **Below *Basic*** | **At or Above Basic** | **At or Above Proficient** | **At Advanced** |
| **White** | |  |  |  |  |  |  |
|  | Nation | 45 | 267 | 23 | 77 | 37 | 4 |
|  | Massachusetts | 60 | 275 | 17 | 83 | 45 | 6 |
| **African American/Black** | |  |  |  |  |  |  |
|  | Nation | 15 | 243 | 48 | 52 | 15 | 1 |
|  | Massachusetts | 8 | 254 | 37 | 63 | 23 | 2 |
| **Hispanic** | |  |  |  |  |  |  |
|  | Nation | 29 | 250 | 40 | 62 | 20 | 1 |
|  | Massachusetts | 21 | 252 | 38 | 62 | 23 | 2 |
| **Asian/Pacific Islander** | |  |  |  |  |  |  |
|  | Nation | 6 | 281 | 15 | 85 | 55 | 12 |
|  | Massachusetts | 7 | 289 | 11 | 89 | 64 | 15 |
| **Table 6-A. 2022 NAEP Mathematics Assessment:**  **Grade 4 Performance by Race/Ethnicity** | | | | | | | |
|  |  |  |  | **Percentage of Students** | | | |
| **Race/Ethnicity** |  | **Percentage of Students** | **Average Scale Score** | **Below *Basic*** | **At or Above *Basic*** | **At or Above *Proficient*** | **At *Advanced*** |
| **White** | |  |  |  |  |  |  |
|  | Nation | 45 | 245 | 15 | 85 | 47 | 10 |
|  | Massachusetts | 56 | 248 | 13 | 87 | 52 | 12 |
| **African American/Black** | |  |  |  |  |  |  |
|  | Nation | 15 | 216 | 46 | 54 | 15 | 1 |
|  | Massachusetts | 10 | 223 | 40 | 60 | 18 | 3 |
| **Hispanic** | |  |  |  |  |  |  |
|  | Nation | 28 | 224 | 37 | 63 | 21 | 2 |
|  | Massachusetts | 22 | 222 | 39 | 61 | 17 | 1 |
| **Asian/Pacific Islander** | |  |  |  |  |  |  |
|  | Nation | 6 | 257 | 11 | 89 | 62 | 24 |
|  | Massachusetts | 8 | 269 | 5 | 95 | 73 | 33 |

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| **Table 6-B. 2022 NAEP Mathematics Assessment:**  **Grade 8 Performance by Race/Ethnicity** | | | | | | | |
|  |  |  |  | **Percentage of Students** | | | |
| **Race/Ethnicity** |  | **Percentage of Students** | **Average Scale Score** | **Below *Basic*** | **At or Above *Basic*** | **At or Above *Proficient*** | **At *Advanced*** |
| **White** | |  |  |  |  |  |  |
|  | Nation | 45 | 284 | 28 | 72 | 34 | 9 |
|  | Massachusetts | 60 | 290 | 22 | 78 | 41 | 12 |
| **African American/Black** | |  |  |  |  |  |  |
|  | Nation | 15 | 252 | 62 | 38 | 9 | 1 |
|  | Massachusetts | 8 | 260 | 51 | 49 | 10 | 1 |
| **Hispanic** | |  |  |  |  |  |  |
|  | Nation | 29 | 261 | 52 | 48 | 14 | 2 |
|  | Massachusetts | 21 | 262 | 50 | 50 | 15 | 2 |
| **Asian/Pacific Islander** | |  |  |  |  |  |  |
|  | Nation | 6 | 304 | 16 | 84 | 56 | 26 |
|  | Massachusetts | 7 | 321 | 8 | 92 | 73 | 38 |

□ **Gender**

Information on student gender is reported by the student’s school when rosters of the students eligible to be assessed are submitted to NAEP. The next four tables show population percentages, average scale scores, and achievement-level data for reading and mathematics by gender subgroup for public school students at grades 4 and 8 in Massachusetts and the nation.

**Table 7-A. 2022 NAEP Reading Assessment:**

**Grade 4 Performance by Gender**

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
|  | | | | **Percentage of Students** | | | |
| **Gender** |  | **Percentage of Students** | **Average Scale Score** | **Below *Basic*** | **At or Above *Basic*** | **At or Above *Proficient*** | **At *Advanced*** |
| **Male** | |  |  |  |  |  |  |
|  | Nation | 51 | 213 | 42 | 58 | 30 | 8 |
|  | Massachusetts | 50 | 224 | 33 | 67 | 40 | 14 |
| **Female** | |  |  |  |  |  |  |
|  | Nation | 49 | 219 | 36 | 64 | 34 | 9 |
|  | Massachusetts | 50 | 230 | 26 | 74 | 45 | 16 |

**Table 7-B. 2022 NAEP Reading Assessment:**

**Grade 8 Performance by Gender**

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
|  | | | | **Percentage of Students** | | | |
| **Gender** |  | **Percentage of Students** | **Average Scale Score** | **Below *Basic*** | **At or Above *Basic*** | **At or Above *Proficient*** | **At *Advanced*** |
| **Male** | |  |  |  |  |  |  |
|  | Nation | 51 | 255 | 36 | 64 | 26 | 3 |
|  | Massachusetts | 51 | 263 | 27 | 73 | 34 | 4 |
| **Female** | |  |  |  |  |  |  |
|  | Nation | 49 | 263 | 27 | 73 | 33 | 4 |
|  | Massachusetts | 49 | 274 | 18 | 82 | 46 | 7 |

**Table 8-A. 2022 NAEP Mathematics Assessment:**

**Grade 4 Performance by Gender**

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
|  | | | | **Percentage of Students** | | | |
| **Gender** |  | **Percentage of Students** | **Average Scale Score** | **Below *Basic*** | **At or Above *Basic*** | **At or Above *Proficient*** | **At *Advanced*** |
| **Male** | |  |  |  |  |  |  |
|  | Nation | 51 | 238 | 24 | 76 | 39 | 9 |
|  | Massachusetts | 50 | 246 | 18 | 82 | 48 | 14 |
| **Female** | |  |  |  |  |  |  |
|  | Nation | 49 | 232 | 28 | 72 | 31 | 5 |
|  | Massachusetts | 50 | 238 | 24 | 76 | 38 | 8 |

**Table 8-B. 2022 NAEP Mathematics Assessment:**

**Grade 8 Performance by Gender**

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
|  | | | | **Percentage of Students** | | | |
| **Gender** |  | **Percentage of Students** | **Average Scale Score** | **Below *Basic*** | **At or Above *Basic*** | **At or Above *Proficient*** | **At *Advanced*** |
| **Male** | |  |  |  |  |  |  |
|  | Nation | 51 | 274 | 39 | 61 | 27 | 8 |
|  | Massachusetts | 51 | 284 | 31 | 69 | 36 | 11 |
| **Female** | |  |  |  |  |  |  |
|  | Nation | 49 | 272 | 40 | 60 | 24 | 6 |
|  | Massachusetts | 49 | 283 | 29 | 71 | 34 | 10 |

□ **Student Eligibility for the National School Lunch Program**

NAEP collects data on student eligibility for the federal program providing free or reduced-price school lunches. The free/reduced-price lunch component of the National School Lunch Program (NSLP) offered through the U.S. Department of Agriculture (USDA) is designed to ensure that children near or below the poverty line receive nourishing meals. Eligibility is determined through the USDA’s Income Eligibility Guidelines and is included as an indicator of lower family income.

The following four tables show population percentages, average scale scores, and achievement-level data for reading and mathematics by status of eligibility for the NSLP for public school students at grades 4 and 8 in Massachusetts and the nation.

**Table 9-A. 2022 NAEP Reading Assessment:**

**Grade 4 Performance by Free/Reduced-Price Lunch Eligibility**

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
|  | | | | **Percentage of Students** | | | |
| **Eligibility Status** |  | **Percentage of Students** | **Average Scale Score** | **Below *Basic*** | **At or Above *Basic*** | **At or Above *Proficient*** | **At *Advanced*** |
| **Eligible** | |  |  |  |  |  |  |
|  | Nation | 52 | 203 | 52 | 48 | 19 | 3 |
|  | Massachusetts | 45 | 209 | 47 | 53 | 24 | 5 |
| **Not Eligible** | |  |  |  |  |  |  |
|  | Nation | 47 | 231 | 24 | 76 | 46 | 14 |
|  | Massachusetts | 55 | 242 | 15 | 85 | 58 | 23 |

**Table 9-B. 2022 NAEP Reading Assessment:**

**Grade 8 Performance by Free/Reduced Price-Lunch Eligibility**

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
|  | | | | **Percentage of Students** | | | |
| **Eligibility Status** |  | **Percentage of Students** | **Average Scale Score** | **Below *Basic*** | **At or Above *Basic*** | **At or Above *Proficient*** | **At *Advanced*** |
| **Eligible** | |  |  |  |  |  |  |
|  | Nation | 50 | 248 | 42 | 58 | 18 | 1 |
|  | Massachusetts | 41 | 254 | 36 | 64 | 24 | 2 |
| **Not Eligible** | |  |  |  |  |  |  |
|  | Nation | 49 | 270 | 21 | 79 | 41 | 6 |
|  | Massachusetts | 59 | 279 | 13 | 87 | 51 | 8 |

**Table 10-A. 2022 NAEP Mathematics Assessment:**

**Grade 4 Performance by Free/Reduced-Price Lunch Eligibility**

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
|  | | | | **Percentage of Students** | | | |
| **Eligibility Status** |  | **Percentage of Students** | **Average Scale Score** | **Below *Basic*** | **At or Above *Basic*** | **At or Above *Proficient*** | **At *Advanced*** |
| **Eligible** | |  |  |  |  |  |  |
|  | Nation | 52 | 223 | 38 | 62 | 20 | 2 |
|  | Massachusetts | 43 | 225 | 36 | 64 | 23 | 3 |
| **Not Eligible** | |  |  |  |  |  |  |
|  | Nation | 47 | 248 | 13 | 87 | 51 | 13 |
|  | Massachusetts | 56 | 254 | 9 | 91 | 58 | 17 |

**Table 10-B. 2022 NAEP Mathematics Assessment:**

**Grade 8 Performance by Free/Reduced-Price Lunch Eligibility**

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
|  | | | | **Percentage of Students** | | | |
| **Eligibility Status** |  | **Percentage of Students** | **Average Scale Score** | **Below *Basic*** | **At or Above *Basic*** | **At or Above *Proficient*** | **At *Advanced*** |
| **Eligible** | |  |  |  |  |  |  |
|  | Nation | 50 | 260 | 54 | 46 | 13 | 2 |
|  | Massachusetts | 41 | 263 | 48 | 52 | 16 | 2 |
| **Not Eligible** | |  |  |  |  |  |  |
|  | Nation | 49 | 287 | 25 | 75 | 38 | 11 |
|  | Massachusetts | 58 | 298 | 17 | 83 | 49 | 17 |

□ **Students with Disabilities and/or English Learners**

To ensure that samples are representative, NAEP has established policies and procedures to maximize the inclusion of all students in the assessment. Every effort is made to ensure that all selected students who can participate meaningfully in NAEP are assessed. While some students with disabilities (SD) and/or English learner (EL) students can be assessed without any special procedures, others require accommodations to participate. Still other SD and/or EL students selected by NAEP may not be able to participate.

Tables 11-A, 11-B, 12-A, and 12-B show population percentages, average scale scores, and achievement-level data for reading and mathematics by disability status for public school students at grades 4 and 8 in Massachusetts and the nation.

Tables 13-A, 13-B, 14-A, and 14-B show population percentages, average scale scores, and achievement level data for reading and mathematics by EL status for public school students at grades 4 and 8 in Massachusetts and the nation.

**Table 11-A. 2022 NAEP Reading Assessment:**

**Grade 4 Performance by Disability Status**

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
|  | | | | **Percentage of Students** | | | |
| **Disability Status** |  | **Percentage of Students** | **Average Scale Score** | **Below *Basic*** | **At or Above *Basic*** | **At or Above *Proficient*** | **At *Advanced*** |
| **SD** | |  |  |  |  |  |  |
|  | Nation | 15 | 183 | 71 | 29 | 11 | 2 |
|  | Massachusetts | 19 | 192 | 64 | 36 | 13 | 2 |
| **Not SD** | |  |  |  |  |  |  |
|  | Nation | 85 | 222 | 33 | 67 | 36 | 10 |
|  | Massachusetts | 81 | 235 | 22 | 78 | 49 | 18 |

**Table 11-B. 2022 NAEP Reading Assessment:**

**Grade 8 Performance by Disability Status**

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
|  | | | | **Percentage of Students** | | | |
| **Disability**  **Status** |  | **Percentage of Students** | **Average Scale Score** | **Below *Basic*** | **At or Above *Basic*** | **At or Above *Proficient*** | **At *Advanced*** |
| **SD** | |  |  |  |  |  |  |
|  | Nation | 14 | 228 | 65 | 35 | 9 | 1 |
|  | Massachusetts | 20 | 242 | 51 | 49 | 14 | 1 |
| **Not SD** | |  |  |  |  |  |  |
|  | Nation | 86 | 264 | 26 | 74 | 33 | 4 |
|  | Massachusetts | 80 | 275 | 16 | 84 | 46 | 6 |

**Table 12-A. 2022 NAEP Mathematics Assessment:**

**Grade 4 Performance by Disability Status**

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
|  | | | | **Percentage of Students** | | | |
| **Disability Status** |  | **Percentage of Students** | **Average Scale Score** | **Below *Basic*** | **At or Above *Basic*** | **At or Above *Proficient*** | **At *Advanced*** |
| **SD** | |  |  |  |  |  |  |
|  | Nation | 15 | 211 | 54 | 46 | 15 | 2 |
|  | Massachusetts | 19 | 215 | 51 | 49 | 13 | 2 |
| **Not SD** | |  |  |  |  |  |  |
|  | Nation | 85 | 239 | 21 | 79 | 39 | 8 |
|  | Massachusetts | 81 | 248 | 14 | 86 | 50 | 13 |

**Table 12-B. 2022 NAEP Mathematics Assessment:**

**Grade 8 Performance by Disability Status**

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
|  | | | | **Percentage of Students** | | | |
| **Disability**  **Status** |  | **Percentage of Students** | **Average Scale Score** | **Below *Basic*** | **At or Above *Basic*** | **At or Above *Proficient*** | **At *Advanced*** |
| **SD** | |  |  |  |  |  |  |
|  | Nation | 14 | 242 | 73 | 27 | 7 | 1 |
|  | Massachusetts | 20 | 254 | 62 | 38 | 10 | 2 |
| **Not SD** | |  |  |  |  |  |  |
|  | Nation | 86 | 278 | 34 | 66 | 29 | 7 |
|  | Massachusetts | 80 | 291 | 22 | 78 | 41 | 13 |

**Table 13-A. NAEP 2022 Reading Assessment:**

**Grade 4 Performance by EL Status**

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
|  | | | | **Percentage of Students** | | | |
| **EL Status** |  | **Percentage of Students** | **Average Scale Score** | **Below *Basic*** | **At or Above *Basic*** | **At or Above *Proficient*** | **At *Advanced*** |
| **EL** | |  |  |  |  |  |  |
|  | Nation | 14 | 190 | 67 | 33 | 10 | 1 |
|  | Massachusetts | 13 | 186 | 71 | 29 | 6 | # |
| **Not EL** | |  |  |  |  |  |  |
|  | Nation | 86 | 220 | 34 | 66 | 36 | 10 |
|  | Massachusetts | 87 | 233 | 24 | 76 | 48 | 17 |

**Table 13-B. NAEP 2022 Reading Assessment:**

**Grade 8 Performance by EL Status**

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
|  | | | | **Percentage of Students** | | | |
| **EL Status** |  | **Percentage of Students** | **Average Scale Score** | **Below *Basic*** | **At or Above *Basic*** | **At or Above *Proficient*** | **At *Advanced*** |
| **EL** | |  |  |  |  |  |  |
|  | Nation | 9 | 225 | 69 | 31 | 5 | # |
|  | Massachusetts | 6 | 215 | 81 | 19 | 1 | # |
| **Not EL** | |  |  |  |  |  |  |
|  | Nation | 91 | 263 | 28 | 72 | 32 | 4 |
|  | Massachusetts | 94 | 272 | 19 | 81 | 42 | 6 |

**Table 14-A. NAEP 2022 Mathematics Assessment:**

**Grade 4 Performance by EL Status**

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
|  | | | | **Percentage of Students** | | | |
| **EL Status** |  | **Percentage of Students** | **Average Scale Score** | **Below *Basic*** | **At or Above *Basic*** | **At or Above *Proficient*** | **At *Advanced*** |
| **EL** | |  |  |  |  |  |  |
|  | Nation | 14 | 215 | 48 | 52 | 14 | 1 |
|  | Massachusetts | 13 | 216 | 48 | 52 | 12 | 1 |
| **Not EL** | |  |  |  |  |  |  |
|  | Nation | 86 | 238 | 23 | 77 | 39 | 8 |
|  | Massachusetts | 87 | 246 | 17 | 83 | 47 | 12 |

**Table 14-B. NAEP 2022 Mathematics Assessment:**

**Grade 8 Performance by EL Status**

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
|  | | | | **Percentage of Students** | | | |
| **ELL Status** |  | **Percentage of Students** | **Average Scale Score** | **Below *Basic*** | **At or Above *Basic*** | **At or Above *Proficient*** | **At *Advanced*** |
| **EL** | |  |  |  |  |  |  |
|  | Nation | 9 | 241 | 76 | 24 | 4 | # |
|  | Massachusetts | 5 | 227 | 89 | 11 | # | # |
| **Not EL** | |  |  |  |  |  |  |
|  | Nation | 91 | 276 | 36 | 64 | 28 | 7 |
|  | Massachusetts | 95 | 287 | 26 | 74 | 37 | 11 |

IV. 2022 NAEP Reading and Mathematics Results by School Location

Each school that participated in the assessment was classified as being located in one of four mutually exclusive geographic categories: city, suburb, town, or rural. The following four tables show population percentages, average scale scores, and achievement-level data for reading and mathematics, by school location category, for public school students at grades 4 and 8 in Massachusetts and the nation.

**Table 15-A. NAEP 2022 Reading Assessment:**

**Grade 4 Performance by School Location**

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
|  | | | | **Percentage of Students** | | | |
| **Location** |  | **Percentage of Students** | **Average Scale Score** | **Below *Basic*** | **At or Above *Basic*** | **At or Above *Proficient*** | **At *Advanced*** |
| **City** | |  |  |  |  |  |  |
|  | Nation | 29 | 210 | 45 | 55 | 28 | 7 |
|  | Massachusetts | 17 | 216 | 41 | 59 | 33 | 11 |
| **Suburb** | |  |  |  |  |  |  |
|  | Nation | 40 | 221 | 34 | 66 | 37 | 10 |
|  | Massachusetts | 68 | 228 | 29 | 71 | 43 | 15 |
| **Town** | |  |  |  |  |  |  |
|  | Nation | 11 | 211 | 44 | 56 | 26 | 6 |
|  | Massachusetts | 3 | ‡ | ‡ | ‡ | ‡ | ‡ |
| **Rural** | |  |  |  |  |  |  |
|  | Nation | 20 | 218 | 36 | 64 | 32 | 7 |
|  | Massachusetts | 12 | 240 | 15 | 85 | 57 | 20 |

‡ Reporting standards not met

**Table 15-B. NAEP 2022 Reading Assessment:**

**Grade 8 Performance by School Location**

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
|  | | | | **Percentage of Students** | | | |
| **Location** |  | **Percentage of Students** | **Average Scale Score** | **Below *Basic*** | **At or Above *Basic*** | **At or Above *Proficient*** | **At *Advanced*** |
| **City** | |  |  |  |  |  |  |
|  | Nation | 29 | 255 | 36 | 64 | 27 | 3 |
|  | Massachusetts | 17 | 258 | 34 | 66 | 30 | 4 |
| **Suburb** | |  |  |  |  |  |  |
|  | Nation | 39 | 263 | 28 | 72 | 34 | 4 |
|  | Massachusetts | 72 | 271 | 20 | 80 | 42 | 6 |
| **Town** | |  |  |  |  |  |  |
|  | Nation | 12 | 255 | 34 | 66 | 24 | 2 |
|  | Massachusetts | 4 | ‡ | ‡ | ‡ | ‡ | ‡ |
| **Rural** | |  |  |  |  |  |  |
|  | Nation | 20 | 259 | 31 | 69 | 28 | 3 |
|  | Massachusetts | 7 | ‡ | ‡ | ‡ | ‡ | ‡ |

‡ Reporting standards not met

**Table 16-A. NAEP 2022 Mathematics Assessment:**

**Grade 4 Performance by School Location**

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
|  | | | | **Percentage of Students** | | | |
| **Location** |  | **Percentage of Students** | **Average Scale Score** | **Below *Basic*** | **At or Above *Basic*** | **At or Above *Proficient*** | **At *Advanced*** |
| **City** | |  |  |  |  |  |  |
|  | Nation | 29 | 229 | 34 | 66 | 29 | 6 |
|  | Massachusetts | 17 | 232 | 31 | 69 | 30 | 7 |
| **Suburb** | |  |  |  |  |  |  |
|  | Nation | 40 | 239 | 23 | 77 | 40 | 9 |
|  | Massachusetts | 68 | 244 | 19 | 81 | 46 | 12 |
| **Town** | |  |  |  |  |  |  |
|  | Nation | 11 | 232 | 27 | 73 | 31 | 4 |
|  | Massachusetts | 3 | ‡ | ‡ | ‡ | ‡ | ‡ |
| **Rural** | |  |  |  |  |  |  |
|  | Nation | 20 | 238 | 21 | 79 | 37 | 7 |
|  | Massachusetts | 12 | 247 | 14 | 86 | 50 | 12 |

‡ Reporting standards not met

**Table 16-B. NAEP 2022 Mathematics Assessment:**

**Grade 8 Performance by School Location**

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
|  | | | | **Percentage of Students** | | | |
| **Location** |  | **Percentage of Students** | **Average Scale Score** | **Below *Basic*** | **At or Above *Basic*** | **At or Above *Proficient*** | **At *Advanced*** |
| **City** | |  |  |  |  |  |  |
|  | Nation | 29 | 268 | 45 | 55 | 22 | 6 |
|  | Massachusetts | 17 | 269 | 44 | 56 | 22 | 6 |
| **Suburb** | |  |  |  |  |  |  |
|  | Nation | 39 | 278 | 36 | 64 | 30 | 9 |
|  | Massachusetts | 72 | 287 | 27 | 73 | 38 | 12 |
| **Town** | |  |  |  |  |  |  |
|  | Nation | 12 | 268 | 43 | 57 | 20 | 4 |
|  | Massachusetts | 4 | ‡ | ‡ | ‡ | ‡ | ‡ |
| **Rural** | |  |  |  |  |  |  |
|  | Nation | 20 | 274 | 37 | 63 | 25 | 5 |
|  | Massachusetts | 7 | ‡ | ‡ | ‡ | ‡ | ‡ |

‡ Reporting standards not met

V. 2022 NAEP Reading and Mathematics Results by Parents’ Highest Level of Education

Eighth-grade students who participated in the NAEP 2022 assessment were asked to indicate the highest levels of education they thought their fathers and mothers had completed. Five response options were offered: 1) did not finish high school 2) graduated from high school 3) some education after high school 4) graduated from college and 5) “I don’t know.” The highest level of education reported for either parent was used in the analysis. Tables 17 and 18 show population percentages, average scale scores, and achievement-level data in reading and mathematics, by highest level of parental education, for public school students at grades 4 and 8 in Massachusetts and the nation. The three levels with the most responses are shown in the table.

Fourth graders were not asked about their parents’ education levels because responses in previous NAEP assessments at that grade level had been unreliable, and a large percentage of responses were “I don’t know.”

**Table 17. NAEP 2022 Reading Assessment:**

**Grade 8 Performance by Parents’ Highest Level of Education**

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
|  | | | **Percentage of Students** | | | |
| **Parent Education** | **Percentage of Students** | **Average Scale Score** | **Below *Basic*** | **At or Above *Basic*** | **At or Above *Proficient*** | **At *Advanced*** |
| **Did Not Finish High School** |  |  |  |  |  |  |
| Nation | 7 | 246 | 43 | 57 | 17 | 1 |
| Massachusetts | 4 | 249 | 39 | 61 | 21 | 1 |
| **Graduated from High School** | |  |  |  |  |  |
| Nation | 14 | 246 | 44 | 56 | 17 | 1 |
| Massachusetts | 11 | 275 | 33 | 67 | 28 | 2 |
| **Graduated from College** |  |  |  |  |  |  |
| Nation | 51 | 269 | 22 | 78 | 40 | 6 |
| Massachusetts | 60 | 278 | 15 | 85 | 50 | 8 |

**Table 18. NAEP 2022 Mathematics Assessment:**

**Grade 8 Performance by Parents’ Highest Level of Education**

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
|  | | | **Percentage of Students** | | | |
| **Parent Education** | **Percentage of Students** | **Average Scale Score** | **Below *Basic*** | **At or Above *Basic*** | **At or Above *Proficient*** | **At *Advanced*** |
| **Did Not Finish High School** |  |  |  |  |  |  |
| Nation | 7 | 256 | 57 | 43 | 10 | 1 |
| Massachusetts | 4 | 258 | 58 | 42 | 13 | 2 |
| **Graduated from High School** | |  |  |  |  |  |
| Nation | 15 | 258 | 55 | 45 | 12 | 1 |
| Massachusetts | 13 | 264 | 48 | 52 | 14 | 1 |
| **Graduated from College** |  |  |  |  |  |  |
| Nation | 51 | 285 | 28 | 72 | 37 | 11 |
| Massachusetts | 60 | 296 | 19 | 81 | 48 | 17 |

VI. 2022 NAEP Grade 4 Reading Achievement Level Descriptions

NAEP achievement levels are cumulative: student performance at the *Proficient* level includes the competencies associated with the *Basic* level and, at the *Advanced* level, student performance includes the skills and knowledge associated with both the *Basic* and the *Proficient* levels. In the table below, the cut score indicating the lower end of the score range for each level is noted in parentheses.

| **Achievement Level** | **Description** |
| --- | --- |
| *NAEP Basic* (208) | Fourth-grade students performing at the *Basic* level should be able to locate relevant information, make simple inferences, and use their understanding of the text to identify details that support a given interpretation or conclusion. They should be able to interpret the meaning of a word as it is used in the text.  When reading **literary** texts such as fiction, poetry, and literary nonfiction, fourth-grade students performing at the *Basic* level should be able to make simple inferences about characters, events, plot, and setting. They should be able to identify a problem in a story and relevant information that supports an interpretation of a text.  When reading **informational** texts such as articles and excerpts from books, fourth-grade students performing at the *Basic* level should be able to identify the main purpose and an explicitly stated main idea, as well as gather information from various parts of a text to provide supporting information. |
| *NAEP Proficient* (238) | Fourth-grade students performing at the *Proficient* level should be able to integrate and interpret texts and apply their understanding of the text to draw conclusions and make evaluations.  When reading **literary** texts such as fiction, poetry, and literary nonfiction, fourth-grade students performing at the *Proficient* level should be able to identify implicit main ideas and recognize relevant information that supports them. They should be able to judge elements of an author’s craft and provide some support for their judgment. Students at this level should be able to analyze character roles, actions, feelings, and motivations.  When reading **informational** texts such as articles and excerpts from books, fourth-grade students performing at the *Proficient* level should be able to locate relevant information, integrate information across texts, and evaluate the way an author presents information. They should demonstrate an understanding of the purpose for text features and an ability to integrate information from headings, text boxes, and graphics and their captions. Students at this level should be able to explain a simple cause-and-effect relationship and draw conclusions. |
| *NAEP Advanced* (268) | Fourth-grade students performing at the *Advanced* level should be able to make complex inferences and construct and support their inferential understanding of the text. They should be able to apply their understanding of a text to make and support a judgment.  When reading **literary** texts such as fiction, poetry, and literary nonfiction, fourth-grade students performing at the *Advanced* level should be able to identify the theme in stories and poems and make complex inferences about characters’ traits, feelings, motivations, and actions. They should be able to recognize characters’ perspectives and evaluate characters’ motivations. Students at this level should be able to interpret characteristics of poems and evaluate aspects of text organization.  When reading **informational** texts such as articles and excerpts from books, fourth-grade students performing at the *Advanced* level should be able to make complex inferences about main ideas and supporting ideas. They should be able to express a judgment about the text and about text features and support the judgments with evidence. Students at this level should be able to identify the most likely cause given an effect, explain an author’s point of view, and compare ideas across two texts. |

VII. 2022 NAEP Grade 8 Reading Achievement Level Descriptions

| **Achievement Level** | **Description** |
| --- | --- |
| *NAEP Basic* (243) | Eighth-grade students performing at the *Basic* level should be able to locate information; identify statements of main idea, theme, or author’s purpose; and make simple inferences from texts. They should be able to interpret the meaning of a word as it is used in the text. Students at this level should also be able to state judgments and give some support about content and presentation of content.  When reading **literary** texts such as fiction, poetry, and literary nonfiction, eighth-grade students performing at the *Basic* level should recognize major themes and be able to identify, describe, and make simple inferences about setting and about character motivations, traits, and experiences. They should be able to state and provide some support for judgments about the way an author presents content and about character motivation.  When reading **informational** texts such as exposition and argumentation, eighth-grade students performing at the *Basic* level should be able to recognize inferences based on main ideas and supporting details. They should be able to locate and provide relevant facts to construct general statements about information from the text. Students at this level should be able to provide some support for judgments about the way information is presented. |
| *NAEP Proficient* (281) | Eighth-grade students performing at the *Proficient* level should be able to provide relevant information and summarize main ideas and themes. They should be able to make and support inferences about a text, connect parts of a text, and analyze text features. Students at this level should also be able to fully substantiate judgments about content and presentation of content.  When reading **literary** texts such as fiction, poetry, and literary nonfiction, eighth-grade students performing at the *Proficient* level should be able to make and support a connection between characters from two parts of a text. They should be able to recognize character actions and infer and support character feelings. Students at this level should be able to provide and support judgments about characters’ motivations across texts. They should be able to identify how figurative language is used.  When reading **informational** texts such as exposition and argumentation, eighth-grade students performing at the *Proficient* level should be able to locate and provide facts and relevant information that support a main idea or purpose, interpret causal relations, provide and support a judgment about the author’s argument or stance, and recognize rhetorical devices. |
| *NAEP Advanced* (323) | Eighth-grade students performing at the *Advanced* level should be able to make connections within and across texts and to explain causal relations. They should be able to evaluate and justify the strength of supporting evidence and the quality of an author's presentation. Students at the *Advanced* level also should be able to manage the processing demands of analysis and evaluation by stating, explaining, and justifying.  When reading **literary** texts such as fiction, literary nonfiction, and poetry, eighth-grade students performing at the *Advanced* level should be able to explain the effects of narrative events. Within or across texts, they should be able to make thematic connections and make inferences about characters feelings, motivations, and experiences.  When reading **informational** texts such as exposition and argumentation, eighth-grade students performing at the *Advanced* level should be able to infer and explain a variety of connections that are intra-textual (such as the relation between specific information and the main idea) or inter-textual (such as the relation of ideas across expository and argument texts). Within and across texts, they should be able to state and justify judgments about text features, choice of content, and the author’s use of evidence and rhetorical devices. |

VIII. 2022 NAEP Grade 4 Mathematics Achievement Level Descriptions

|  |  |
| --- | --- |
| **Achievement Level** | **Description** |
| *NAEP Basic* (214) | Fourth-grade students performing at the *Basic* level should show some evidence of understanding the mathematical concepts and procedures in the five NAEP content areas.  Fourth graders performing at the *Basic* level should be able to estimate and use basic facts to perform simple computations with whole numbers, show some understanding of fractions and decimals, and solve some simple real-world problems in all NAEP content areas. They should be able to use—although not always accurately—four-function calculators, rulers, and geometric shapes. Their written responses are often minimal and presented without supporting information. |
| *NAEP Proficient* (249) | Fourth-grade students performing at the *Proficient* level should consistently apply integrated procedural knowledge and conceptual understanding to problem solving in the five NAEP content areas.  Fourth graders performing at the *Proficient* level should be able to use whole numbers to estimate, compute, and determine whether results are reasonable. They should have a conceptual understanding of fractions and decimals; be able to solve real-world problems in all NAEP content areas; and use four-function calculators, rulers, and geometric shapes appropriately. Students at this level should employ problem-solving strategies, such as identifying and using appropriate information. Their written solutions should be organized and presented both with supporting information and explanations of how they were achieved. |
| *NAEP Advanced* (282) | Fourth-grade students performing at the *Advanced* level should apply integrated procedural knowledge and conceptual understanding to complex and non-routine real-world problem solving in the five NAEP content areas.  Fourth graders performing at the *Advanced* level should be able to solve complex and non-routine real-world problems in all NAEP content areas. They should display mastery in the use of four-function calculators, rulers, and geometric shapes. Students at this level are expected to draw logical conclusions and justify answers and solution processes by explaining why, as well as how, they were achieved. They should go beyond the obvious in their interpretations and be able to communicate their thoughts clearly and concisely. |

IX. 2022 NAEP Grade 8 Mathematics Achievement Level Descriptions

| **Achievement Level** | **Description** |
| --- | --- |
| *NAEP Basic* (262) | Eighth-grade students performing at the *Basic* level should exhibit evidence of conceptual and procedural understanding in the five NAEP content areas. This level of performance signifies an understanding of arithmetic operations—including estimation—on whole numbers, decimals, fractions, and percents.  Eighth graders performing at the *Basic* level should complete problems correctly with the help of structural prompts such as diagrams, charts, and graphs. They should be able to solve problems in all NAEP content areas through the appropriate selection and use of strategies and technological tools, including calculators, computers, and geometric shapes. Students at this level also should be able to use fundamental algebraic and informal geometric concepts in problem solving.  As they approach the *Proficient* level, students at the *Basic* level should be able to determine which of the available data are necessary and sufficient for correct solutions and use the data in problem solving. However, these eighth graders show limited skill in communicating mathematically. |
| *NAEP Proficient* (299) | Eighth-grade students performing at the *Proficient* level should apply mathematical concepts and procedures consistently to complex problems in the five NAEP content areas.  Eighth graders performing at the *Proficient* level should be able to conjecture, defend their ideas, and give supporting examples. They should understand the connections among fractions, percents, decimals, and other mathematical topics such as algebra and functions. Students are expected to have a thorough understanding of *Basic* level arithmetic operations—an understanding sufficient for problem solving in practical situations.  Quantity and spatial relationships in problem solving and reasoning should be familiar to them, and they should be able to convey underlying reasoning skills beyond the level of arithmetic. They should be able to compare and contrast mathematical ideas and generate their own examples. These students should make inferences from data and graphs, apply properties of informal geometry, and accurately use the tools of technology. Students at this level should understand the process of gathering and organizing data and be able to calculate, evaluate, and communicate results within the domain of statistics and probability. |
| *NAEP Advanced* (333) | Eighth-grade students performing at the *Advanced* level should be able to reach beyond the recognition, identification, and application of mathematical rules in order to generalize and synthesize concepts and principles in the five NAEP content areas.  Eighth graders performing at the *Advanced* level should be able to probe examples and counterexamples in order to shape generalizations from which they can develop models. They should use number sense and geometric awareness to consider the reasonableness of an answer. Students at this level are expected to use abstract thinking to create unique problem-solving techniques and explain the reasoning processes underlying their conclusions. |

**NAEP Assessment Reporting Glossary**

**Accommodations.** Accommodations are alterations in the way tasks are presented that allow children with learning disabilities to complete the same assignments as other students. Accommodations do not alter the content of assignments, give students an unfair advantage, or in the case of assessments such as NAEP, change what a test measures.

**Achievement levels.** Performance standards set by the National Assessment Governing Board that provide a context for interpreting student performance on NAEP, based on recommendations from panels of educators and members of the public. The levels, *Basic*, *Proficient*, and *Advanced*, measure what students should know and be able to do at each grade assessed. See each NAEP subject for a detailed description of what students should know and be able to do at each level at grade 4, 8, or 12.

* ***Basic*.** One of the three NAEP achievement levels, which denotes partial mastery of prerequisite knowledge and skills that are fundamental for proficient work at each grade assessed. NAEP also reports the proportion of students whose scores place them below the *Basic* achievement level. See each NAEP subject for a detailed description of what students should know and be able to do at grades 4, 8, or 12 at the *Basic* level. The [cut scores](http://nces.ed.gov/nationsreportcard/glossary.aspx#cut_score) determining each level are available with these descriptions.
* ***Proficient*.** One of the three NAEP [achievement levels](http://nces.ed.gov/nationsreportcard/glossary.aspx#achievement_levels), which represents solid academic performance for each grade assessed. Students reaching this level have demonstrated competency over challenging subject matter, including subject-matter knowledge, application of such knowledge to real-world situations, and analytical skills appropriate to the subject matter. See each NAEP subject for a detailed description of what students should know and be able to do at grades 4, 8, or 12 at the *Proficient* level. The [cut scores](http://nces.ed.gov/nationsreportcard/glossary.aspx#cut_score) determining each level are available with the descriptions.
* ***Advanced*.** One of the three NAEP [achievement levels](http://nces.ed.gov/nationsreportcard/glossary.aspx#achievement_levels), which denotes superior performance at each grade assessed. See each NAEP subject for a detailed description of what students should know and be able to do at grades 4, 8, or 12 at the *Advanced* level. The [cut scores](http://nces.ed.gov/nationsreportcard/glossary.aspx#cut_score) determining each level are available with these descriptions.

**Achievement-level percentages.** The percentage of students within the total [population](http://nces.ed.gov/nationsreportcard/glossary.aspx#population), or in a particular [student group](http://nces.ed.gov/nationsreportcard/glossary.aspx#student_group), who meet or exceed expectations of what students should know and be able to do. Specifically, it is the weighted percentage of students with NAEP composite scores that are equal to, or exceed, the achievement-level [cut scores](http://nces.ed.gov/nationsreportcard/glossary.aspx#cut_score) specified by the [National Assessment Governing Board](http://nces.ed.gov/nationsreportcard/glossary.aspx#national_assessment_governing_board).

**Gender.** NAEP results are reported separately for males and females, based on students’ self-reported gender.

**English language learners (ELL).** A term used to describe students who are in the process of acquiring English language skills and knowledge.

**NAEP.** The National Assessment of Educational Progress, also known as “the Nation’s Report Card,” is the only nationally representative and continuing assessment of what America’s students know and can do in various [subject areas](http://nces.ed.gov/nationsreportcard/glossary.aspx#subject_area). Since 1969, assessments have been conducted periodically in mathematics, reading, science, writing, U.S. history, geography, civics, the arts, and other subjects.

**NAEP scales.** The scales common across age or grade levels and assessment years used to report NAEP results.

**National Assessment Governing Board.** An independent organization whose members are appointed by the U.S. Secretary of Education. The Governing Board provides overall policy direction to the NAEP program. It is an independent, bipartisan group, whose members include governors, state legislators, local and state school officials, educators, business representatives, and members of the general public.

**National School Lunch Program (NSLP).** A federally assisted meal program that provides low-cost or free lunches to eligible students. It is sometimes referred to as the free/reduced-price lunch program. Free lunches are offered to those students whose family incomes are at or below 130 percent of the poverty level; reduced-price lunches are offered to those students whose family incomes are between 130 percent and 185 percent of the poverty level.

**Parental education.** A [NAEP](http://nces.ed.gov/nationsreportcard/glossary.aspx#naep) [reporting group](http://nces.ed.gov/nationsreportcard/glossary.aspx#reporting) defined by the highest level of education of the mother or father of an assessed student as derived from the student’s response to two background questionnaire items.

**Percentile.** A score location below which a specified percentage of the [population](http://nces.ed.gov/nationsreportcard/glossary.aspx#population) falls. For example, in 1998, the tenth percentile of fourth-grade reading scores was 167. This means that in 1998, ten percent of fourth graders had NAEP reading scores below 167, while 90 percent scored at or above 167.

**Race/ethnicity.** In order to allow comparisons across years, assessment results presented are based on information for six mutually exclusive racial/ethnic categories: White, Black, Hispanic, Asian/Pacific Islander, American Indian (including Alaska Native), and Other. Students who identified with more than one of the first five categories, or had a background other than those listed, were categorized as Other. In all NAEP assessments, data about student race/ethnicity is collected from two sources: school records and student self-reports. Before 2002, NAEP used students’ self-reports of their race and ethnicity on a background questionnaire as the source of race/ethnicity data. In 2002, the decision was made to change the student race/ethnicity variable highlighted in NAEP reports. Since 2002, NAEP reports of students’ race and ethnicity have been based on school records, with students’ self-reports used only if school data are missing. Information based on student self-reported race/ethnicity will continue to be reported in the NAEP Data Explorer for assessments after 2001.

**Reporting group.** Groups within the national [population](http://nces.ed.gov/nationsreportcard/glossary.aspx#population) for which NAEP data are reported; for example, gender, [race/ethnicity](http://nces.ed.gov/nationsreportcard/glossary.aspx#race_ethnicity), grade, age, level of [parental education](http://nces.ed.gov/nationsreportcard/glossary.aspx#parental_education), [region](http://nces.ed.gov/nationsreportcard/glossary.aspx#region), and [type of location](http://nces.ed.gov/nationsreportcard/glossary.aspx#type_of_location).

**Sample.** A subset of a [population](http://nces.ed.gov/nationsreportcard/glossary.aspx#population) whose characteristics are studied to gain information about the entire population. NAEP assesses a representative sample of students each year, rather than the entire population of students.

**Sampling error.** The error in survey estimates that occurs because only a [sample](http://nces.ed.gov/nationsreportcard/glossary.aspx#sample) of the [population](http://nces.ed.gov/nationsreportcard/glossary.aspx#population) is observed. Measured by sampling [standard error](http://nces.ed.gov/nationsreportcard/glossary.aspx#standard_error).

**Scale score.** A score derived from student responses to assessment items that summarizes the overall level of performance attained by that student. While NAEP does not produce scale scores for individual students, NAEP does produce summary statistics describing scale scores for groups of students. NAEP [subject area](http://nces.ed.gov/nationsreportcard/glossary.aspx#subject_area) scales typically range from 0 to 500 (reading, mathematics, U.S. history, and geography) or from 0 to 300 (science, writing, and civics).

**School location.** The physical location of a school. NAEP reporting includes city, suburb, town, and rural.

**Significantly different, statistically significant, statistically significant difference.** Statistical tests are conducted to determine whether the changes or differences between two result numbers are statistically significant. The term “significant” does not imply a judgment about the absolute magnitude or educational relevance of changes in student performance. Rather, it is used to indicate that the observed changes are not likely to be associated with sampling and measurement error but are statistically dependable [population](http://nces.ed.gov/nationsreportcard/glossary.aspx#population) differences. NAEP uses widely accepted statistical standards in analyzing data. For instance, this website discusses only findings that are statistically significant at the .05 level. However, some differences that are statistically significant appear small, particularly in recent assessment years, when the [sample](http://nces.ed.gov/nationsreportcard/glossary.aspx#sample) sizes have been larger.

NOTE: Differences between [scale scores](http://nces.ed.gov/nationsreportcard/glossary.aspx#scale_score) or percentages are calculated using unrounded values. In some instances, the result of the subtraction differs from what would be obtained by subtracting the rounded values shown in the accompanying figure or table.

**Standard error.** In NAEP, a measure of sampling variability and measurement error for a NAEP scale score. However, for other statistics, it reflects the sampling variability. Because of NAEP’s complex student sampling design, sampling standard errors are estimated by jackknifing the [samples](http://nces.ed.gov/nationsreportcard/glossary.aspx#sample) from first-stage sample estimates. Standard errors may also include a component because of the error of measurement of individual scores estimated using plausible values.

**Student sample.** A portion of a [population](http://nces.ed.gov/nationsreportcard/glossary.aspx#population), or a subset from a set of units, that is selected by some probability mechanism for the purpose of investigating the properties of the population.

**Students with disabilities (SD).** A student with a disability may need specially designed instruction to meet his or her learning goals. A student with a disability will usually have an [Individualized Education Plan](http://nces.ed.gov/nationsreportcard/glossary.aspx#iep) (IEP), which guides his or her special education instruction. Students with disabilities are often referred to as special education students and may be classified by their school as learning disabled (LD) or emotionally disturbed (ED). The goal of NAEP is that students who are capable of participating meaningfully in the assessment are assessed, but some students with disabilities selected by NAEP may not be able to participate, even with the [accommodations](http://nces.ed.gov/nationsreportcard/glossary.aspx#accommodation) provided.

**Subject area.** One of the areas assessed by NAEP: the arts, civics, economics, foreign language, geography, mathematics, reading, science, U.S. history, world history, or writing.

**Weighted percentage.** A percentage that has been calculated by differentially weighting observations to account for complex sampling procedures. A weighted percentage differs from a simple percentage in which all cases are equally weighted.

In [NAEP](http://nces.ed.gov/nationsreportcard/glossary.aspx#naep), each sampled student is assigned a weight that makes proper allowances for the sampling design and reflects adjustments for school and student nonparticipation.

Weighted percentages are estimates of the percentages of the total [population](http://nces.ed.gov/nationsreportcard/glossary.aspx#population) of the [student group](http://nces.ed.gov/nationsreportcard/glossary.aspx#student_group) that share a specified characteristic. For example, the weighted percentage of fourth-grade students in the NAEP [sample](http://nces.ed.gov/nationsreportcard/glossary.aspx#sample) that correctly answered a particular NAEP test item is an estimate of the percentage of fourth-grade students in the nation that can correctly answer that question.