

## Spring 2010 MCAS Mathematics Multiple-Choice Results Interpretive Guide

The Department of Elementary and Secondary Education has provided school and district personnel with an early look at the multiple-choice results for the MCAS Mathematics tests administered to students in late May 2010. The goal in providing these partial results is to give instructional staff immediate feedback on student, school, and district performance before summer vacation.

### What is available?

On June 11, student-level data files were posted to school and district dropboxes in DropBox Central in the Department's Security Portal at [www4.doemass.org/auth/Login/](http://www4.doemass.org/auth/Login/). Two data files, one in Excel format and the other in .dat format, were provided. The records in those data files contain, in addition to full preliminary English Language Arts results, the Mathematics multiple-choice results for each student.

The Excel files contain the student name, SASID, date of birth, the Mathematics multiple-choice results, and a Mathematics raw score for each student. The data files in .dat format also contain the demographic variables included in all student-level MCAS data files; these can be loaded into virtually any data analysis software package, including Excel, for analysis by users capable of manipulating data files. Paginated school roster reports in .pdf format containing information similar to that in the Excel files will be posted to the dropboxes on June 14.

On June 24, these data will also be loaded into the Education Data Warehouse (EDW) and ready for use. Twelve different reports will be available through the EDW, including several that summarize the data by item and by curriculum framework strand.

The 2010 released item documents will be posted to the public website by June 14 at [www.doe.mass.edu/mcas/testitems.html](http://www.doe.mass.edu/mcas/testitems.html). For the second year, approximately half the test items administered in grades 3–8 are released. All high school items used for student scores will be released at that time.

### How should these results be used? What is not allowed?

All data released prior to the official release of school and district results in mid-September are embargoed, which means the data cannot be released to the public or discussed in public meetings. These data are subject to change based on discrepancy reports filed by schools, districts, and state officials who have not yet had time to review their accuracy. In addition, some data will change based on the June SIMS submission your district is providing to the Department in July. These data files do not include students who were not tested. Students not tested will be added based on the June SIMS.

Preliminary MCAS data, including the Mathematics multiple-choice results, can and should be used for educational planning purposes. They should be shared with instructional leaders and teachers who should be encouraged to reflect on the past year's efforts as they plan for the opening of school in September or for summer programs. Whenever preliminary results,

especially partial results, are printed for planning purposes they should be clearly dated and labeled “preliminary,” keeping in mind that some results may change with the official release in September.

### Using the Mathematics files

Many users will want to start with the Excel files posted on June 11, or wait for the school rosters to be published in dropboxes on June 14. The records in the data files contain one row of test information for each student, listed alphabetically for each grade. For each Mathematics test item

- a “+” symbol in the column indicates that the student answered the question correctly
- a letter indicates that an incorrect answer (A, B, C, or D) was selected for a released item, and a “-” symbol indicates an incorrect answer was selected for an unreleased item
- a blank space indicates that the student did not respond to the question. (Note that cells for short-answer and open-response items will be blank for the preliminary Mathematics multiple-choice release.)
- an asterisk (\*) indicates that the student provided more than one answer
- a row with no results indicates that the student did not take the standard MCAS Mathematics test (for example, the student may have participated in the MCAS Alternate Assessment)
- the total raw score points column (mrawsc) contains the total number of points the student earned on the multiple-choice portion of the test; the multiple-choice raw score is equal to the number of “+” symbols in the row.

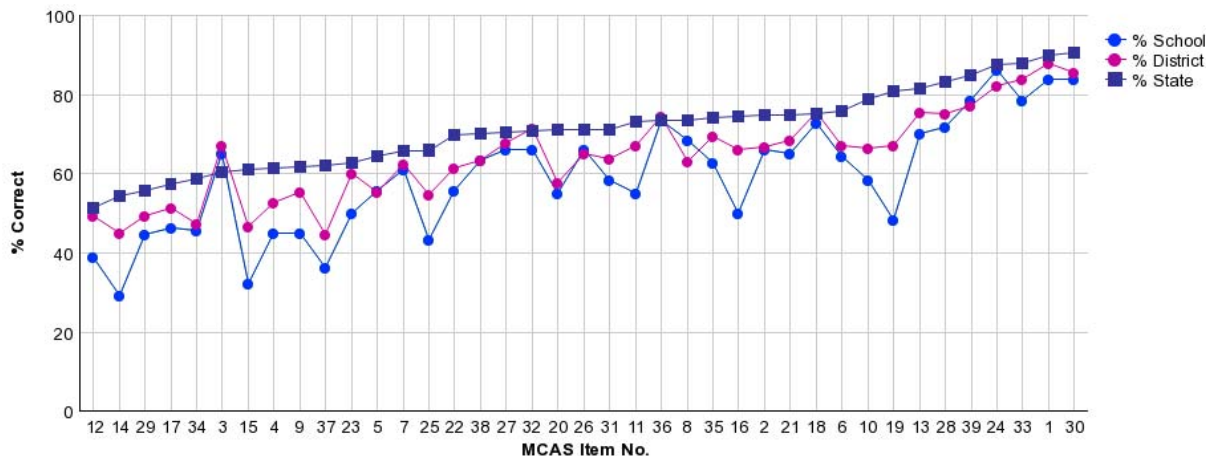
### Item analysis

Multiple-choice results vary widely from item to item and from test to test. Statewide the percentage of students answering a question correctly can range from the low 20s for the most difficult questions to the 90s for the easiest questions. If 60 percent of the students in your school answered a question correctly, it is impossible to gauge whether this is an area of strength or weakness without comparing your local performance to the performance of other students across the state.

Reports showing school, district, and state percent correct for each item can be viewed in the Education Data Warehouse beginning on June 24 using reports **R-302 District Item Analysis Graph** and **R-402 School Item Analysis Graph** in the ESE MCAS Reports folder. The figure on the following page provides an example of an R-402 report from 2009. This report automatically arranges the items from the most difficult to the easiest based on state results. By following the line formed by the blue dots it is evident that the students in this sample school generally performed a little lower than the students in the district and state. There are several items, such as number 3, where the student performance was relatively strong, and several items, including 15, 16 and 19, where this school’s performance was well below its trend line. Curriculum specialists should be encouraged to review the areas of relative strength and weakness for patterns.

**School Item Analysis Graph**  
Sample School - 2009 MCAS Grade 7 Math

Students Included: On Oct 1 (118)



Prior to June 24 when the EDW will be loaded, users will have to compare the percentage of students answering an item correctly in a group to the state averages in the table below. Experienced Excel users will be able to calculate school percent correct values using the “countif” function.

**Spring 2010 MCAS Mathematics Tests: Percentage of Students Answering Multiple-Choice Items Correctly**

Item number	Grade 3	Grade 4	Grade 5	Grade 6	Grade 7	Grade 8	Grade 10
Item 1	91%	90%	90%	85%	51%	92%	77%
Item 2	89%	82%	88%	83%	49%	66%	68%
Item 3	69%	70%	68%	94%	64%	64%	49%
Item 4	63%	77%	43%	76%	73%	70%	55%
Item 5	83%	83%			71%		53%
Item 6	81%	82%		77%	55%	79%	65%
Item 7			89%	73%		81%	67%
Item 8	93%		75%	46%			60%
Item 9	78%		75%	73%	55%	29%	56%
Item 10	73%	69%	70%	69%	74%	72%	66%
Item 11	71%	73%			81%	78%	55%
Item 12		83%	86%	44%	35%	71%	88%
Item 13		78%	89%	63%	67%	80%	75%
Item 14		68%	70%	76%	83%		62%
Item 15		85%	90%	67%		84%	
Item 16	81%	79%				59%	

Item number	Grade 3	Grade 4	Grade 5	Grade 6	Grade 7	Grade 8	Grade 10
Item 17	83%					80%	
Item 18	70%		52%		57%		
Item 19	84%	75%	44%	58%	63%	74%	
Item 20		63%	28%	55%	87%	74%	
Item 21		43%	81%	82%	72%		
Item 22	83%	94%	84%	87%	84%	95%	79%
Item 23	86%	56%	69%	69%	67%	83%	80%
Item 24			85%	81%	79%	87%	60%
Item 25		69%	83%	80%	61%	58%	44%
Item 26	75%	64%				77%	42%
Item 27	80%	85%			85%	78%	62%
Item 28	80%	69%	63%		87%		55%
Item 29	54%	68%	69%	79%			81%
Item 30	70%		73%	86%	70%	82%	75%
Item 31	69%	74%	72%	70%	51%	78%	
Item 32	78%	79%	67%	94%			82%
Item 33	63%	82%	62%	75%	89%	92%	85%
Item 34	82%	75%	71%	78%	74%	81%	61%
Item 35	63%	67%	73%	57%	89%	73%	68%
Item 36		71%	63%	84%	73%	52%	60%
Item 37			68%	66%	37%	55%	56%
Item 38					66%	64%	71%
Item 39		82%		73%			56%
Item 40		70%	67%	64%	82%		57%
Item 41		72%	48%	75%	54%	79%	
Item 42						85%	
<b>Number of tested students</b>	<b>69,443</b>	<b>69,210</b>	<b>69,242</b>	<b>69,860</b>	<b>69,495</b>	<b>70,370</b>	<b>69,618</b>

When reviewing how students performed on items compared to the state, you may also want to compare this year's trends to past performance. In addition to the R-402 report in the EDW, any member of the public has access to item-level data. These data can be accessed by visiting the School and District Profiles on the Department's website. Select your school or district, click the Assessment tab, and click the link to Item by Item Results (for each Grade/Subject).

### **Estimating student performance on the entire test using multiple-choice results**

The multiple-choice test items represent approximately half of the total points available on the grades 4–10 Mathematics tests and 63 percent on the grade 3 test. Performance on the multiple-choice portion is strongly correlated with performance on the constructed-response portion (short-answer and open-response items); however, there are exceptions, ranging from students

who do not respond to constructed-response questions to those who perform their best on questions where they are expected to show their work.

The table below can help you interpret the multiple-choice results of each student. When using the table, be careful to put the information in its full context. For example, “Jane’s multiple-choice performance on the grade 5 math test was similar to the performance of students in the upper level of the *Proficient* category (the scaled scores ranging from 250–258).” Or “The multiple-choice scores of half of our grade 5 students in 2010 were similar to those of students in the state who are *Proficient* or higher.” By framing the information with words like “similar” and specifying that the study is of multiple-choice results, users can avoid over-interpreting the results.

For grades 3–8, the precise threshold scores for each performance level will not be established until August when the constructed-response results are available, but the Department knows within a point or two where those cut scores will be. In 2010, the threshold scores for grade 10 Mathematics are set at 17 for *Needs Improvement*, 30 for *Proficient*, and 43 for *Advanced*.

The table below should be used only to approximate student achievement levels. Individual results will vary depending on the results from the short-answer and open-response sections of the test, which will be available in August. In all but the most extreme cases, a student’s final performance level will be in the corresponding category listed below or one of the adjacent two categories. Students at the upper or lower end of the raw score range are more likely to fall into an adjacent category than those in the middle of the range.

**Spring 2010 MCAS Mathematics Tests: Relationship between Multiple-Choice Score and Likely Performance Level**

<b>Total Score on Multiple-Choice Items</b>	<b>Approximate Performance Level, Based on Multiple-Choice Items</b>
<b>Grade 3</b>	
0–12	<i>Warning</i>
13–18	<i>Needs Improvement</i>
19–23	<i>Proficient</i>
24–26	<i>Above Proficient</i>
<b>Grade 4</b>	
0–6	Low <i>Warning</i> (200–208)
7–14	High <i>Warning</i> (210–218)
15–19	Low <i>Needs Improvement</i> (220–228)
20–24	High <i>Needs Improvement</i> (230–238)
25–27	Low <i>Proficient</i> (240–248)
28–29	High <i>Proficient</i> (250–258)
30	Low <i>Advanced</i> (260–268)
31–32	High <i>Advanced</i> (270–280)
<b>Grade 5</b>	
0–6	Low <i>Warning</i> (200–208)
7–13	High <i>Warning</i> (210–218)

<b>Total Score on Multiple-Choice Items</b>	<b>Approximate Performance Level, Based on Multiple-Choice Items</b>
14–18	<i>Low Needs Improvement (220–228)</i>
19–21	<i>High Needs Improvement (230–238)</i>
22–25	<i>Low Proficient (240–248)</i>
26–28	<i>High Proficient (250–258)</i>
29–30	<i>Low Advanced (260–268)</i>
31–32	<i>High Advanced (270–280)</i>
<b>Grade 6</b>	
0–6	<i>Low Warning (200–208)</i>
7–14	<i>High Warning (210–218)</i>
15–19	<i>Low Needs Improvement (220–228)</i>
20–22	<i>High Needs Improvement (230–238)</i>
23–26	<i>Low Proficient (240–248)</i>
27–28	<i>High Proficient (250–258)</i>
29–31	<i>Low Advanced (260–268)</i>
32	<i>High Advanced (270–280)</i>
<b>Grade 7</b>	
0–7	<i>Low Warning (200–208)</i>
8–14	<i>High Warning (210–218)</i>
15–18	<i>Low Needs Improvement (220–228)</i>
19–21	<i>High Needs Improvement (230–238)</i>
22–25	<i>Low Proficient (240–248)</i>
26–27	<i>High Proficient (250–258)</i>
28–30	<i>Low Advanced (260–268)</i>
31–32	<i>High Advanced (270–280)</i>
<b>Grade 8</b>	
0–7	<i>Low Warning (200–208)</i>
8–16	<i>High Warning (210–218)</i>
17–21	<i>Low Needs Improvement (220–228)</i>
22–24	<i>High Needs Improvement (230–238)</i>
25–27	<i>Low Proficient (240–248)</i>
28–29	<i>High Proficient (250–258)</i>
30–31	<i>Low Advanced (260–268)</i>
32	<i>High Advanced (270–280)</i>
<b>Grade 10</b>	
0-5	<i>Low Warning (200–208)</i>
6-9	<i>High Warning (210–218)</i>
10-13	<i>Low Needs Improvement (220–228)</i>
14-15	<i>High Needs Improvement (230–238)</i>
16-18	<i>Low Proficient (240–248)</i>
19-21	<i>High Proficient (250–258)</i>
22-29	<i>Low Advanced (260–268)</i>
30-32	<i>High Advanced (270–280)</i>