

## **Spring 2011 MCAS Mathematics and Science and Technology/Engineering Multiple-Choice Results Interpretive Guide**

The Department of Elementary and Secondary Education is providing school and district personnel with an early look at the multiple-choice results for the MCAS Mathematics and, for the first time ever, grades 5 and 8 Science and Technology/Engineering (STE) 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 data are available?**

On June 16, 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 and grades 5 and 8 STE multiple-choice results for each student.

The Excel files contain the student name, SASID, date of birth, Mathematics and STE multiple-choice results, and Mathematics and STE raw scores 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 17.

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 2011 released item documents are posted on the Department's public website at [www.doe.mass.edu/mcas/testitems.html](http://www.doe.mass.edu/mcas/testitems.html). For the third year, approximately half the test items administered in grades 3–8 are released. All high school items used for student scores are released.

### **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 and STE 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 data files

Many users will want to start with the Excel files posted on June 16, or wait for the school rosters to be published in dropboxes on June 17. The records in the data files contain one row of test information for each student, listed alphabetically for each grade. The column for each Mathematics and STE test item shows one of the following:

- a "+" symbol, which indicates that the student answered the question correctly;
- a letter (A, B, C, or D), which indicates that an incorrect answer was selected for a released item;
- a "-" symbol, which indicates that an incorrect answer was selected for an unreleased item;
- a blank space, which indicates that the student did not respond to the question (note that cells for short-answer and open-response items are blank for the preliminary Mathematics and STE multiple-choice release);
- an asterisk (\*), which indicates that the student provided more than one answer.

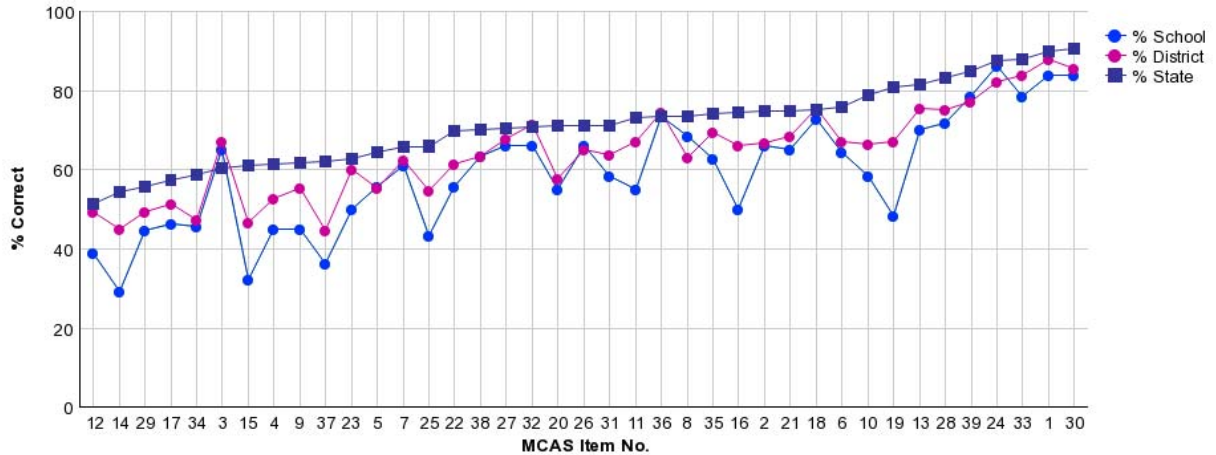
A row with no results indicates that the student did not take the standard MCAS Mathematics and/or STE test (for example, the student may have participated in the MCAS Alternate Assessment). The total raw score points column (mrawsc and srawsc) contains the total number of points the student earned on 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 not possible 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. The line formed by the blue dots shows 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 item 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.

Students Included: On Oct 1 (118)



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

**Spring 2011 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	83%	80%	89%	70%	80%	73%	80%
Item 2	82%	85%		90%	89%	81%	63%
Item 3		53%	66%	62%	74%	82%	72%
Item 4		37%	90%		78%		76%
Item 5	71%		80%			86%	53%
Item 6	74%		75%	52%	60%	70%	52%
Item 7	57%		73%	70%	46%	69%	62%
Item 8	87%	76%		88%			81%
Item 9	73%	87%	91%	54%			52%
Item 10	69%	65%	79%		70%	71%	50%
Item 11		78%	92%	69%	82%	62%	60%
Item 12	64%	85%	46%	86%	53%	55%	80%
Item 13	67%	87%	64%	57%	84%	83%	85%
Item 14		82%	74%	73%	67%	79%	57%
Item 15	84%	80%		85%	90%	71%	
Item 16	76%	31%					

<b>Item number</b>	<b>Grade 3</b>	<b>Grade 4</b>	<b>Grade 5</b>	<b>Grade 6</b>	<b>Grade 7</b>	<b>Grade 8</b>	<b>Grade 10</b>
Item 17	83%		65%		74%	62%	
Item 18			66%	64%	79%	57%	
Item 19	77%	49%	90%	74%	64%	74%	
Item 20	85%	41%	53%	52%		72%	
Item 21	71%	78%		44%	83%		
Item 22		92%	90%	92%	88%	87%	86%
Item 23		74%	88%	83%	84%	70%	75%
Item 24	78%	87%	69%	84%	65%	80%	51%
Item 25	68%	84%	50%	78%	64%	74%	55%
Item 26	68%		87%	66%	69%	72%	60%
Item 27	89%	78%	79%		53%	81%	62%
Item 28	82%	90%	69%				49%
Item 29	93%	89%		79%	67%	70%	65%
Item 30				56%		69%	40%
Item 31		80%		57%	70%	64%	
Item 32	87%	71%	87%	81%	52%		90%
Item 33		95%	82%	88%	60%	82%	89%
Item 34	79%	72%	74%	66%	70%	76%	88%
Item 35	43%	66%	70%	87%	91%	65%	50%
Item 36	87%	61%	59%	72%	58%	51%	89%
Item 37			56%	68%		64%	56%
Item 38			88%				89%
Item 39		74%			65%		84%
Item 40		59%		64%	58%		86%
Item 41		88%	60%	87%	71%	72%	
Item 42			47%			66%	
<b>Number of tested students</b>	<b>68,528</b>	<b>68,825</b>	<b>69,178</b>	<b>68,377</b>	<b>69,973</b>	<b>68,990</b>	<b>68,961</b>

**Spring 2011 MCAS Science and Technology/Engineering Tests: Percentage of Students Answering Multiple-Choice Items Correctly**

<b>Item number</b>	<b>Grade 5</b>	<b>Grade 8</b>
Item 1	44%	91%
Item 2	71%	87%
Item 3	81%	53%
Item 4	75%	71%
Item 5	56%	83%
Item 6	69%	60%
Item 7	79%	77%
Item 8		63%
Item 9	50%	95%
Item 10	84%	61%
Item 11	71%	
Item 12	91%	72%
Item 13	84%	67%
Item 14	75%	26%
Item 15	47%	63%
Item 16	81%	62%
Item 17	81%	77%
Item 18	71%	79%
Item 19	46%	55%
Item 20	92%	43%
Item 21		
Item 22	85%	83%
Item 23	63%	71%
Item 24	84%	81%
Item 25	87%	58%
Item 26	39%	73%
Item 27	81%	77%
Item 28	66%	53%
Item 29	64%	
Item 30	59%	94%
Item 31	63%	86%
Item 32		77%
Item 33	93%	90%
Item 34	91%	65%
Item 35	89%	67%
Item 36	47%	77%
Item 37	87%	81%
Item 38	75%	47%
Item 39	85%	70%

<b>Item number</b>	<b>Grade 5</b>	<b>Grade 8</b>
Item 40	58%	60%
Item 41	77%	67%
Item 42		
<b>Number of tested students</b>	<b>69,247</b>	<b>68,942</b>

When comparing student performance to state performance, you may also want to review 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 65 percent of the total points available on the grade 3 Mathematics test, 60 percent on the grades 4–8 Mathematics tests, 53 percent on the grade 10 Mathematics test, and 70 percent on the grades 5 and 8 STE tests. Performance on the multiple-choice portion is strongly correlated with performance on the constructed-response portion (short-answer and/or 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 tables on the following pages can help you interpret the multiple-choice results of each student. When using the tables, be careful to consider 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 2011 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 achievement 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 2011, the threshold scores for grade 10 Mathematics are set at 17 for *Needs Improvement*, 29 for *Proficient*, and 41 for *Advanced*.

The tables 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 tests, which will be available in August. In all but the most extreme cases, a student’s final achievement 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 2011 MCAS Mathematics Tests: Multiple-Choice Score and Likely Achievement Level**

<b>Total Score on Multiple-Choice Items</b>	<b>Likely Achievement Level, Based on Multiple-Choice Items</b>
<b>Grade 3</b>	
0–10	<i>Warning (200–218)</i>
11–17	<i>Needs Improvement (220–238)</i>
18–23	<i>Proficient (240–258)</i>
24–26	<i>Advanced (260–280)</i>
<b>Grade 4</b>	
0–7	<i>Low Warning (200–208)</i>
8–14	<i>High Warning (210–218)</i>
15–19	<i>Low Needs Improvement (220–228)</i>
20–23	<i>High Needs Improvement (230–238)</i>
24–26	<i>Low Proficient (240–248)</i>
27–28	<i>High Proficient (250–258)</i>
29–30	<i>Low Advanced (260–268)</i>
31–32	<i>High Advanced (270–280)</i>
<b>Grade 5</b>	
0–7	<i>Low Warning (200–208)</i>
8–14	<i>High Warning (210–218)</i>
15–19	<i>Low Needs Improvement (220–228)</i>
20–22	<i>High Needs Improvement (230–238)</i>
23–25	<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 6</b>	
0–6	<i>Low Warning (200–208)</i>
7–13	<i>High Warning (210–218)</i>
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>
26–27	<i>High Proficient (250–258)</i>
28–30	<i>Low Advanced (260–268)</i>
31–32	<i>High Advanced (270–280)</i>
<b>Grade 7</b>	
0–7	<i>Low Warning (200–208)</i>
8–15	<i>High Warning (210–218)</i>
16–19	<i>Low Needs Improvement (220–228)</i>
20–22	<i>High Needs Improvement (230–238)</i>
23–25	<i>Low Proficient (240–248)</i>
26–28	<i>High Proficient (250–258)</i>
29–31	<i>Low Advanced (260–268)</i>
32	<i>High Advanced (270–280)</i>

<b>Total Score on Multiple-Choice Items</b>	<b>Likely Achievement Level, Based on Multiple-Choice Items</b>
<b>Grade 8</b>	
0–7	Low <i>Warning</i> (200–208)
8–14	High <i>Warning</i> (210–218)
15–19	Low <i>Needs Improvement</i> (220–228)
20–22	High <i>Needs Improvement</i> (230–238)
23–26	Low <i>Proficient</i> (240–248)
27–28	High <i>Proficient</i> (250–258)
29–31	Low <i>Advanced</i> (260–268)
32	High <i>Advanced</i> (270–280)
<b>Grade 10</b>	
0–5	Low <i>Failing</i> (200–208)
6–10	High <i>Failing</i> (210–218)
11–14	Low <i>Needs Improvement</i> (220–228)
15–17	High <i>Needs Improvement</i> (230–238)
18–20	Low <i>Proficient</i> (240–248)
21–22	High <i>Proficient</i> (250–258)
23–29	Low <i>Advanced</i> (260–268)
30–32	High <i>Advanced</i> (270–280)

**Spring 2011 MCAS Science and Technology/Engineering Tests: Multiple-Choice Score and Likely Achievement Level**

<b>Total Score on Multiple-Choice Items</b>	<b>Likely Achievement Level, Based on Multiple-Choice Items</b>
<b>Grade 5</b>	
0–8	Low <i>Warning</i> (200–208)
9–17	High <i>Warning</i> (210–218)
18–23	Low <i>Needs Improvement</i> (220–228)
24–27	High <i>Needs Improvement</i> (230–238)
28–31	Low <i>Proficient</i> (240–248)
32–33	High <i>Proficient</i> (250–258)
34–36	Low <i>Advanced</i> (260–268)
37–38	High <i>Advanced</i> (270–280)
<b>Grade 8</b>	
0–9	Low <i>Warning</i> (200–208)
10–19	High <i>Warning</i> (210–218)
20–24	Low <i>Needs Improvement</i> (220–228)
25–28	High <i>Needs Improvement</i> (230–238)
29–32	Low <i>Proficient</i> (240–248)
33–35	High <i>Proficient</i> (250–258)
36	Low <i>Advanced</i> (260–268)
37–38	High <i>Advanced</i> (270–280)