

starting NOW



Communities Improving Student Achievement With New Academic Standards and Testing

Preparing Students: MCAS Is Not Your Typical Test

See for yourself. This issue of *Starting Now* shares sample student responses to an actual 8th-grade math question from the 1998 MCAS (Massachusetts Comprehensive Assessment System) test and shows why four students scored at the levels they did. This test item, like many others, requires students to write a clear, focused conclusion and show the steps taken to solve the problem.

In other words, it's not enough for students simply to get the "right" answer. They also need to show that they really understand *how* to get the right answer — that they can use their math knowledge and skills to solve the kinds of problems they're likely to encounter in college and at work.

Outside school, students won't be given nice, neat questions about mathematical means and medians. But as with the sample problem inside, they will need to know how to use data to solve problems. For example, they may need to choose between two candidates for a job, compare the costs of owning a home in one community versus another or review the performance of two mutual funds.

Just as important, the MCAS tests require students to communicate their answers effectively — even in subjects like math and science. Again, writing is a skill that students will need to be successful — at work, with friends and families, and in their communities.

The MCAS tests focus schools on important skills.

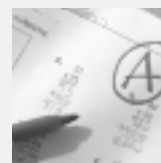
Because of the standards and tests, schools and teachers are putting a renewed emphasis on writing and problem solving, making this a case where "teaching to the test" helps students gain the skills they need to succeed in life. And the test results show schools and teachers whether students have mastered those skills and, if not, where they need to improve.

The Massachusetts standards and tests will help make our students the best prepared in the nation.

Starting now.

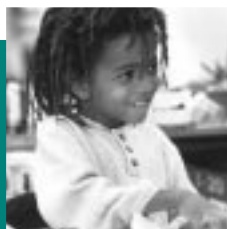
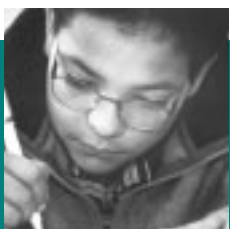
Inside:

- Sample Student MCAS Work: What Makes the Grade?



- Shorter Tests Coming This Spring

Spring 1999



Massachusetts Coalition
for Higher Standards

What Does It Mean to Score “Proficient” ? See for Yourself.

Student work samples help eliminate the mystery about the tests. You can see for yourself the difference between student work that makes the grade and work that doesn't. The following actual 8th-grade student responses to a spring 1998 math question are typical of the work that defines each of the four performance levels.

The process for scoring MCAS open-response questions is similar to that used for other exams, such as the Advanced Placement tests and the state Bar exams. Responses are graded according to a scoring guide, or “rubric,” that specifies the quality of work required at each level. Scorers take part in a rigorous training process and must pass periodic qualifying tests to ensure their scoring accuracy.

How schools are preparing students

All MCAS test questions are based on the state's academic standards, which set challenging expectations for what students should know and be able to do by the time they graduate. To do well on the following question, students need to know that a “mean” is the average value of a group of numbers, while the “median” is the middle value (half of the numbers are higher and half are lower than the median). They also need to be able to organize and describe data and to make inferences and convincing arguments based on data analysis.

The standards and tests require students to complete more advanced work at earlier grade levels — so that they gradually build up the knowledge and skills they'll need after graduation. Schools that previously had not introduced these concepts by the 8th grade now must shift their curriculum.

8th-Grade Math Question, 1998 MCAS Test

The coach for the All-Star Basketball Game needs to pick one of two players for the team. The table below shows the number of points each of the players scored in his last 10 games.

Name of player	Number of points scored in last 10 games
Geltz	18, 32, 28, 18, 14, 28, 10, 16, 36, 20
Luna	22, 17, 23, 8, 24, 24, 22, 20, 18, 22

- Find the mean (average) number of points scored by each player. Show or describe how you found the means.
- Find the median number of points scored by each player. Show or describe how you found the medians.
- Based on the data, which player would you recommend for the All-Star team? Explain your recommendation. Use the data and include a comparison of the means and medians you calculated.

Sample Student Responses

Advanced

The student correctly answers parts a and b. The work demonstrates a solid understanding of how to find the mean (average score) and the median (middle score) — and the difference between the two.

On part c, the student explains that the mean and median scores offer conflicting findings. The student accurately notes that Luna's scores are consistently higher, which is a convincing argument for choosing him for the team. In general, the response shows in-depth understanding and effective communication skills.

A Geltz averaged 22 points a game
Luna averaged 20 points a game
I got the answers by adding all their points together and then dividing by 10 because that's how many games the table show

B. 10, 14, 16, 18, 20, 22, 24, 26, 28, 30 - 19 - Geltz
8, 17, 18, 20, 22, 22, 22, 23, 24, 24 - 20 - Luna.

I found the median by putting the 10 numbers in order then taking # 5 and 6 (the middle ones) and adding those two together and dividing by 2.

c. It would be a tough decision because they were very close in scoring. Geltz averaged two more points a game (22-Geltz and 20 Luna) but Luna's median was higher (19-Geltz and 22-Luna). I would say Luna would be the better choice because she/he seemed more consistent (shown by median) Geltz had a game of 36 that brought his average up. Luna was pretty consistent with her scoring.

median
← Geltz 10 14 16 18 20 22 24 26 28 30 →
Luna 8 17 18 20 22 22 22 23 24 24 →
mean Average
Luna 22+17+23+8+24+24+22+20+18+22
= 200 / 10 = 20
Geltz 218+32+28+18+14+28+10+16+36
+20 = 220 / 10 = 22

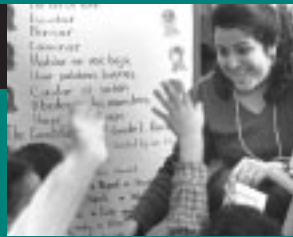
I would choose Geltz because his Average was higher. Although Luna's Median was higher I would still choose Geltz.

Proficient

The student correctly answers parts a and b. Although the response is sloppy and fails to include Luna's third score of 22 in finding the median in part b, it is clear the student knows how to find the median.

On part c, the student recognizes the conflicting conclusions that means and medians produce, but the student doesn't explain why the mean should be used as the basis for giving Geltz the higher overall score.





Needs improvement

The student correctly answers only part a, showing the correct strategy to find the mean.

On part b, the student shows a limited understanding of how to find the median. The student averages the two "middle" scores in each list but fails to put the scores in numerical order first.

On part c, the student shows some logical reasoning by adding the two statistics (21 and 22 for Geltz and 24 and 20 for Luna) to get an "overall" score for each player. However, that approach is inappropriate to solve this particular problem.

a.) Geltz

$$\begin{array}{r} 18 \\ 32 \\ 28 \\ 18 \\ 14 \\ 28 \\ 10 \\ 16 \\ 36 \\ + 20 \\ \hline 220 \end{array}$$

Geltz = 22
Luna = 20

$$10 \overline{)220} \\ \underline{22} \\ 0$$

Luna

$$\begin{array}{r} 22 \\ 17 \\ 23 \\ 8 \\ 24 \\ 24 \\ 22 \\ 20 \\ 18 \\ + 22 \\ \hline 200 \end{array}$$

b.)

$$\begin{array}{r} +14 \\ +28 \\ \hline 42 \end{array} \quad 2 \overline{)21} \\ \underline{2} \\ 1$$

$$\begin{array}{r} 24 \\ +24 \\ \hline 48 \end{array} \quad 2 \overline{)48} \\ \underline{4} \\ 0$$

c.) Luna would be the best one. She has a higher median and higher overall score. Geltz had a higher mean and Luna had a higher median and overall score. Luna should be on the team.

Geltz	Luna
$\frac{21}{43}$	$\frac{24}{44}$

PUBLICATION SPONSORS

This brochure was produced by the Mass Insight Education and Research Institute for its Coalition for Higher Standards, a statewide group of urban and suburban school districts. The Coalition works to:

- Build support for higher academic standards and involve parents and the public in community efforts to raise student and school achievement.
- Develop collaborative projects among Coalition schools, such as training school leaders and teachers in how to use assessment data to improve teaching.

The Mass Insight Education and Research Institute is an independent 501c3 nonprofit organization focused on improving Massachusetts public schools.

Coalition members:

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- Gloucester
- Greenfield
- Marblehead
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- Milton
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- Newton
- Pioneer Valley Regional Education and Business Alliance (REBA)
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- Rockport
- Salem
- Springfield
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The numbers are 18 32 28 18 14 28 10 16 36 20 = 170

The numbers are 22 17 23 8 24 22 20 18 20 = 176

The median numbers are 8, 24, 22, 20, 18 they are all evens.

I would recommend Luna because she got the highest points in the game. I added up all of her points and she got 176. Geltz got 170 that's how I picked out Luna to be on the All Star team.

Failing

This student answered none of the parts correctly and clearly doesn't understand any of the concepts.

How Students Did Overall

Statewide Results on the 1998 8th-Grade Math MCAS Test

Advanced	8%
Proficient	23%
Needs Improvement	26%
Failing	42%

The Massachusetts Department of Education (DOE) supported the publication and distribution of this brochure to all public school teachers and parents in Massachusetts. The DOE oversees and supports all 1,800 public schools in Massachusetts and works with teachers and school administrators to implement curriculum and tests based on Massachusetts' academic standards. The Commissioner and staff also respond to parents and concerned citizens about education reform issues, programs and policies.



Photos courtesy of the Boston Plan for Excellence (photographs by Mike Sleeper).

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"In reviewing candidates for Northeastern University, we look for students who can write effectively and analyze and solve complex problems. Students who master the content and skills of the state's academic standards and tests will find themselves well prepared to succeed in college and beyond."

— *Richard Freeland, president, Northeastern University*

For more information on the new standards and tests, contact the **Massachusetts Department of Education's** MCAS support line at (800) 737-5103, call (781) 388-3300, ext. 327, or visit the Web site: www.doe.mass.edu/mcas.

For more information on the Coalition, contact the **Mass Insight Education and Research Institute**, 18 Tremont Street, Suite 930, Boston, MA 02108; (617) 722-4160; insight@massinsight.com.

How Schools Are Using MCAS Results to Improve Teaching

Now comes the most important part of the standards and testing program — helping students improve. Last December, each public school in Massachusetts received a detailed diagnostic report on how its students performed on every section of the 1998 MCAS test. Schools should be using these results to strengthen their programs at all grade levels.

In some cases, strengthening programs might mean revising the curriculum (what's taught). In other cases, it might mean adjusting teaching practices (how subjects are taught). Some adjustments will help students who take the test this year. Many changes, such as introducing more effective teaching practices, will take longer to implement.

The Mass Insight Education and Research Institute is training more than 400 school leaders and teachers in Coalition districts to use assessment data to improve teaching. Working in school and district teams, participants:

- Identify broad trends and patterns in the test results and then pinpoint specific trouble spots. If students have difficulty with math, for example, is the problem with fractions and decimals or statistics and probability?
- Identify strategies to respond to those problems and determine the type of training teachers will receive to help students improve.
- Set clear, measurable goals for improvement.

Schools across the state are taking these same steps. Find out what your schools are doing.

How Parents Can Get Involved in Raising Standards

Improving student achievement is a shared task for educators, parents and the community as a whole. Parents should review their children's schoolwork and start a conversation — with their children, schools and community leaders — about preparing students to meet today's higher standards. Here are some questions parents should ask:

- Are my children being offered challenging coursework that matches the state's academic standards?
- Can I see examples of student work — like those in this brochure — to help me better understand what my children must do to reach proficient levels in each subject?
- How much reading and writing are my children expected to do in school and at home? What is being done to help improve those skills?
- How often are my children asked to explain and demonstrate their work on a problem (as the MCAS requires them to do)?
- What can I do at home with my children to build on what they are learning in the classroom?

Refined Tests Coming

Responding to the feedback received from teachers and parents across the state, the Department of Education will be refining the MCAS test over the next few years.

Spring 1999 MCAS test

- The test will be **shorter**, with slightly fewer open-response questions and slightly more multiple-choice questions. The short-composition section has been eliminated.
- To provide students **a break in the testing schedule**, the long-composition segment of the English/language arts test will be given during the week of April 26–30. The remainder of the test will be administered May 17–June 2.
- **External review teams** will take an even closer look at test questions to make sure they are stated clearly and appropriate for that grade level.
- This year, all 8th- and 10th-graders will be tested in **history/social science**. Fourth-grade students will take a test with trial questions.

Other changes will be introduced in coming years. For instance, an alternate test for students with disabilities who cannot take the regular "paper-and-pencil" MCAS test is scheduled for 2001.

"Manufacturing jobs now require technical savvy, familiarity and comfort with math, and solid writing and communications skills. At American Saw & Manufacturing, we continually are faced with high school graduates who come seeking work but are ill prepared for these jobs."

— *John Davis, CEO, American Saw & Manufacturing, Springfield, Mass.*