

Math Gains Reported for U.S. Students

Sam Dillon, New York Times | Friday, December 12, 2008



American fourth- and eighth-grade students made solid achievement gains in math in recent years and in two states showed spectacular progress, an international survey of student achievement released on Tuesday found. Science performance was flat. "We were pleased to see improvements in math, and wished we'd seen more in science," said Stuart Kerachsky, acting commissioner of the National Center for Education Statistics at the Education Department, which carried out an analysis of the performance of American students on the test. The study is directed by the International Study Center at Boston College.

The results showed that several Asian countries continued to outperform the United States greatly in science and math, subjects that are crucial to economic competitiveness and research. The survey, the Trends in International Mathematics and Science Study, or Timss, found that fourth-grade students in Hong Kong and eighth-grade students in Taiwan were the world's top scorers in math, while Singapore dominated in science at both grade levels. The latest Timss study, the world's largest review of math and science achievement, involved testing a representative sample of students in each country in 2007, the first time the tests had been administered since 2003. The results included fourth-grade scores from 36 countries and eighth-grade scores from 48 countries. The tests cover subjects taught in all the participating countries, including algebra, chemistry, geometry and physics.

Asia's continuing dominance in math and science, first demonstrated in the 1990s, was especially apparent in the latest results, which showed rising percentages of high-scoring students there. Nearly half of eighth graders scored at the advanced level in math in Taiwan, Korea and Singapore, compared with 6 percent of American students. Comparing educational performance in the United States, a diverse country of 300 million people with 50 state educational systems, with city-states like Singapore and Hong Kong, which have populations of 4.5 million and 6.9 million people, respectively, is a bit of apples and oranges. In the fourth-grade math survey, scores in Hong Kong, Singapore, Taiwan, Japan, Kazakhstan, Russia, England and Latvia were higher than in the United States. Average scores were equal to the United States in the Netherlands, Lithuania, Germany and Denmark. Scores in 23 other countries were significantly lower.

Students in Massachusetts and Minnesota, which participated in a special study that attributed a score to the states as if they were individual countries, also demonstrated stellar achievement, outperforming classmates in all but a handful of countries. In eighth-grade science, for instance, Massachusetts students, on average, scored higher than or equal to students in all countries but Singapore and Taiwan. And in Minnesota, which has worked to improve its math curriculum, the proportion of fourth-grade students performing at the advanced level jumped from 9 percent in 1995 to 18 percent in 2007, a gain that was one of the world's largest.

1. In appropriate paragraph form, compare and contrast the statistical data compiled from Asian countries with the U.S. Additionally, discuss multiple ways in which U.S. students have progressively demonstrated academic growth in the field of mathematics. **(GPS – Grades 6 – 8: MRC a, d)**
2. Understanding the concept of ratios to represent quantitative relationships, at a consistent rate of growth use proportions to determine the percentage of Minnesota fourth-grade students performing at the advanced level in math for the next decade. What conclusions can be made as a direct result of this inquiry? What conjectures may be made provided this data? Explain. **(GPS - Grade 6: M6P1 – M6P5; MRC; M6A1; M6A2 c, g)**
3. Analyze the results of question two using measures of central tendency and solve for mean, median, and mode, including recognition of outliers. In regards to the number of students in your building who qualify for advanced math coursework, formulate three questions and collect data from a census of at least ten students' reaction to the results of this study. Analyze and draw conclusions about the data provided in your survey. Design and complete three of the following: a pictograph, histogram, bar graph, line graph, circle graph, and/or line plot to accurately and effectively convey the census results. Communicate your mathematical thinking clearly and coherently in each of your responses. **(GPS Grade 7: M7P1 – M7P5; MRC; M7D1 a, c, e, f)**
4. Translate each of the following word sentences into algebraic expressions and/or equations in one variable in terms of others which model the situation and determine the solution regarding students' performance in math: a) nearly half of eighth graders scored at the advanced level in math in Taiwan, Korea and Singapore, compared with 6 percent of American students, b) U.S., a diverse country of 300 million people with 50 state educational systems, c) average scores were equal to the United States in the Netherlands, Lithuania, Germany and Denmark. Scores in 23 other countries were significantly lower, and d) the proportion of fourth-grade students performing at the advanced level jumped from 9 percent in 1995 to 18 percent in 2007. **(GPS Grade 8: M8P1 – M8P5; M8A1 a - e)**
5. Upon completion of this assignment, how far have we progressed through the 2008-09 series of *The Daughtry Times*®? Express your answer interchangeably as a fraction, decimal, percentage, and circle graph. **(GPS – Grade 6: M6N1 f, g; M6D1c; Grade 7: M7D1 f)**
6. Using contextual clues only, define the following italicized words: *proportion*, *attributed*, *stellar*, *diverse*, and *analysis* obtained from the passage above. Additionally, use each word in a complete sentence to demonstrate further comprehension. **(GPS – Grades 6 – 8: MRC a, c, d)**

Georgia Performance Standards (GPS) adapted from georgiastandards.org. Standards specifically addressed in this edition are strategically aligned with the curriculum map and annotated adjacent to the respective grade level inquiry.

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