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Less than half of students proficient in science

Associated Press

By CHRISTINE ARMARIO, Associated Press
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Very few students have the advanced skills that could lead to careers in science and technology, according to results of a national exam released Tuesday that education leaders called alarming.

Only 1 percent of fourth-grade and 12th-grade students, and 2 percent of eighth-graders scored in the highest group on the 2009 National Assessment of Educational Progress, a federal test known as the Nation's Report Card. Less than half were considered proficient, with many more showing minimal science knowledge.

"It's very disappointing for all educators to see students performing below the level we'd like them to be," said Bonnie Embry, an elementary school science lab teacher in Lexington, Ky. "These low scores should send a message to educators across our nation that we're not spending enough time teaching science."

U.S. Education Secretary Arne Duncan said the results mean students aren't learning at a rate that will maintain the nation's role as an international leader in the sciences. He and others expressed concern that more students aren't prepared for careers as inventors, doctors and engineers in a world increasingly driven by technology.

"Our ability to create the next generation of U.S. leaders in science and technology is seriously in danger," said Alan Friedman, former director of the New York Hall of Science, and a member of the board that oversees the test.

The results also show a stark achievement gap, with only 10 percent of black students proficient in science in the fourth grade, compared to 46 percent of whites. At the high school level, results were even more bleak, with 71 percent of black students scoring below the basic knowledge level, and just 4 percent proficient.

Fifty-eight percent of Hispanic 12th-grade students scored below basic, as did 21 percent of whites.

"These are really stunning and concerning numbers," said Amy Wilkins, vice president for government affairs and communications at The Education Trust. She noted that minority and low-income students are the fastest growing parts of the youth population, making the need to increase their achievement levels all the more urgent.

The exam tests knowledge and understanding of physical, life, Earth and space sciences. Examples of skills students need to demonstrate to perform at the advanced level include: designing an investigation to compare types of bird food in fourth grade; predicting the sun's position in the sky in eighth grade; and recognizing a nuclear fission reaction for those in 12th grade.

Overall, 34 percent of fourth-graders, 30 percent of eighth-graders and 21 percent of 12th-graders scored at the proficient level or above. Seventy-two percent of fourth-graders, 63 percent of eighth-graders and 60 percent of 12th-graders showed a basic level or above of science knowledge and skills.

"I'm at least as concerned, maybe even more, about the large number who fall at the low end," Friedman said. "Advanced is advanced. But basic is really basic. It doesn't even mean a complete understanding of the most simple fundamentals."

The results also indicated there are significant differences between states.

Twenty-four states had scores that were higher than the national average at fourth grade, and 25 had higher scores at eighth grade. The achievement gap was also more notable in certain states. In Mississippi, for example, 68 percent of black fourth grade students scored below basic, and just 4 percent were proficient.

The test was given to more than 150,000 students in both fourth and eighth grade, and a nationally representative sample of 11,100 high school seniors. The last time it was given was in 2005, but the test was significantly updated in 2009, making a comparison between years unreliable.

Results from the 2005 exam were also concerning: Only 29 percent of fourth and eighth-grade students scored proficient or better, as did just 18 percent of 12th-graders tested.

Friedman said the 2009 exam tested students more on how well they understand and know how to apply scientific knowledge, rather than memorization of scientific terms and formulas.

He and others said that while there are too many differences between the 2005 and 2009 exams to make a comparison, the overall trend is one of stagnation. He pointed to the

Programme for International Student Assessment, a key international assessment, which shows U.S. students trailing many other nations in science.

The 2009 PISA results placed U.S. students within the same range of countries including Poland, France, and Portugal. The average U.S. score was 502, far below the average score of 575 for students in Shanghai, China.

Duncan said President Barack Obama has called for an "all hands on deck" approach and set a goal of recruiting 10,000 new science and math teachers over the next two years.

"Our nation's long-term economic prosperity depends on providing a world class education to all students, especially in mathematics and science," Duncan said.

Experts pointed to a variety of factors that likely contribute to the lackluster results.

Friedman said one unintended side effect of the No Child Left Behind law has been less emphasis on science, history, arts and other subjects in order to emphasize performance in math and reading.

Wilkins was skeptical of that explanation, noting that strong reading and math skills are the underpinnings for a strong science education as well. Schools that are doing well in reading and math are also doing well in science, she said.

"Yes, we have to be intentional about science education, and we have to ensure that all schools have working science labs, but you can't introduce a kid to a science lab and expect them to do well if they can't read the text," she said.

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