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**STATEMENT ON 2005 NATIONAL AND STATE SCIENCE RESULTS
FROM THE NATION'S REPORT CARD™**

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The news this morning from The Nation's Report Card is decidedly mixed.

The NAEP 2005 Science assessment reports gains nationwide over the past five years at grade 4. Almost all of the improvement was by students reaching the *Basic* achievement level. This compares to flat performance at grade 4 from 1996 to 2000. It shows that efforts to improve early science education are beginning to pay off.

At eighth- and 12th-grades, however, there has been almost no change since 2000. Achievement overall remains static at an inadequate level. This is a serious problem for the nation as we move into the 21st century.

The science assessment of the National Assessment of Educational Progress is not just a test of factual knowledge, though knowledge of science content is a crucial part of what NAEP tests. The NAEP science assessment framework also requires students to understand science concepts, to apply what they know to a new situation, and to use the skills and reasoning of scientific investigation. It is in these additional steps, I'm afraid, that too many of our students fall short of the scientific literacy they need.

The progress at fourth-grade is encouraging. The NAEP results show that 68 percent of fourth-graders nationwide have reached the *Basic* achievement level, compared to 63 percent five years earlier.

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At the other end of the score distribution, 62 percent of Black fourth-graders nationwide are below the *Basic* level, but this is down from 71 percent below *Basic* when the current NAEP science assessment was first given in 1996. The proportion of Whites below *Basic* has dropped over the decade from 24 to 18 percent.

The NAEP achievement levels are standards set by the National Assessment Governing Board. Based on recommendations from panels of educators, scientists, and members of the public, they provide benchmarks of what students know and can do in science at each grade tested.

The achievement levels on NAEP are different than the standards that states are now setting on their own exams. Standards in any one state are different from others. As a national assessment given to representative samples of students, only NAEP provides a common yardstick, and the differences it shows from state to state are quite striking. For example, the proportion of fourth-grade students reaching *Basic* ranges from 80 percent or slightly above in five states to just 50 percent and a few points below in two others. At eighth-grade, the proportion reaching *Proficient* is slightly above 40 percent in six states and below 20 percent in seven others.

In every state, gaps between the races are substantial, but there are notable differences from state to state in the proportion of students of the same race reaching particular NAEP achievement levels. For example, the proportion of White eighth-graders reaching *Proficient* in different states ranges from 24 percent up to 48 percent. The proportion of Black eighth-graders at or above *Proficient* ranges from 3 to 15 percent.

Of course, the content descriptions of achievement levels and the questions that exemplify them are progressively more difficult in each grade. Generally, though, students at *Basic* can demonstrate a grasp of basic factual knowledge and procedures. To be *Proficient* requires them to do something more: to apply scientific knowledge, to reason with it and draw sound, well-supported conclusions, which they can explain.

This is the crux of the scientific literacy that all citizens need in our increasingly technological society. Yet, only 18 percent of 12th-graders reach the *Proficient* level, a proportion that is unchanged from 2000 and down from 21 percent in 1996. We can see the problem even more clearly in the proportion of 12th-graders below *Basic*, which has gone up from 43 percent a decade ago to 46 percent last year.

The disparities in who is in the different categories of academic achievement also deserve a great deal of attention. Hispanics, for example, comprise 13 percent of 12th-graders nationwide, but they are seriously underrepresented among those reaching *Proficient*, making up just 4 percent of that high-achieving group. Conversely, Hispanics are overrepresented among those below *Basic*, comprising 20 percent of students in that category. Black students are 14 percent of U.S. 12th-graders, but they make up just 2 percent of those at or above *Proficient* and 24 percent of all students below *Basic*.

Obviously, differences like this at the end of high school play a significant role in determining who is prepared to pursue a science curriculum in college or career-tech education and who can have a productive career in our global, digital age society. It is crucial that these academic disparities be eliminated so that opportunities in the high-tech economy are open to all.

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There is another interesting point in the profiles of high-achieving and low-achieving students. In the group reaching *Proficient*, 40 percent said they took at least one Advanced Placement science course. In the group below *Basic*, 18 percent took at least one AP science course. What is surprising is not that more AP students are high achieving, but that so many in the low-achieving group said they took AP science. Obviously, not all courses called Advanced cover the same material or make the same demands. The College Board, which sponsors AP, now is trying to audit the courses to make sure they use a common syllabus and have teachers who are well prepared.

As you know, the National Assessment is a survey. It does not follow the same students from grade to grade. While it can show the correlation of various factors to student achievement, it cannot be used to prove cause and effect. In this context, some of the data that NAEP collects on teacher preparation is quite interesting.

For example, at eighth-grade, where NAEP has extensive data on teachers, students taught by those with the most experience (20 years or more) have the highest average scores. Also, low-income students have fewer teachers with that much experience or even 10 years in the classroom, compared to others, whose family income is not low enough to qualify for subsidized lunch.

Among eighth-graders, students having a science teacher with a college major or minor in both science and education have the highest achievement. White and Asian students are much more likely to have such teachers than Blacks and Hispanics.

The NAEP national samples include both public and private schools. Unfortunately, in 2005 the school participation rates for private schools were less than 70 percent in each grade tested, and no separate data could be reported for the private school sector as a whole. There was an adequate NAEP sample of Catholic schools at grades 4 and 8, but not at grade 12. Once again the new 2005 results show average scores for Catholic schools more than a dozen points higher than the national average at both fourth- and eighth-grades, but there were no significant changes from 2000.

Science education has changed significantly since 1992 when the current NAEP science framework was adopted. Recently, the Governing Board approved a new framework for 2009, which is the next time NAEP will give a science assessment. The current framework, which we are reporting on today, shows us the patterns of achievement over the past decade.

The National Academy of Science has said, "Scientific literacy is important throughout students' lives as they participate in public policy issues... as they stay current with advances in areas such as biotechnology, medicine, and space exploration; and especially as they enter an increasingly scientifically based workforce." This was stated 11 years ago.

It is even more urgent now. Clearly, the need for scientific literacy is great and becoming increasingly critical. Even with some forward movement in the elementary grades, most students in American schools have not reached that goal yet, and much more needs to be done.

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