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STATEMENT ON THE NATION'S REPORT CARD:
Science in Action: Hands-On and Interactive Computer Tasks from the 2009 Science Assessment

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The *Science In Action* report being released today is an important evaluation of student achievement in a critical subject area. The hands-on and interactive computer tasks found on the National Assessment of Educational Progress (NAEP) provide students with more challenging problems than those that are possible on paper-and-pencil, item-based tests. I believe assessments like this can provide a more comprehensive measure of how well students are doing.

The report shows relatively low scores when students were faced with situations that posed a bigger challenge—whether the investigations required more variables to manipulate, strategic decision-making in collecting data, or the explanation of why a certain result was the correct conclusion. For example, 84 percent of eighth-graders could use a simulated laboratory to test how much water flowed through two different soil samples. But only about one-quarter of eighth-graders could appropriately decide how to manipulate four metal bars made of unknown materials to determine which ones were the magnets—a process that required knowledge of how to test for magnetic properties.

This indicates that overall student preparation in basic scientific inquiry—which requires students to predict, observe, and explain as indicated in *Science in Action*—is inadequate for 21st century work and citizenship. Through their increased emphasis on inquiry, the Next Generation Science Standards, just released in draft form, underscore this issue. Because inquiry, which is essentially drawing meaning from complexity, is an important skill not just in science but also throughout life, this is a serious shortfall in educational outcomes. Many teachers struggle to provide students with engaging, sophisticated science inquiry experiences because the classroom materials available for instruction and assessment are often simplistic. To attain better outcomes, educators must have higher-quality curricular materials and classroom assessments.

At Harvard, I'm part of a research team that is developing and studying authentic simulations that complement more conventional forms of science education. With funding from the U.S. Department of Education's Institute of Education Sciences (IES), our EcoMUVE curriculum

(http://ecomuve.gse.harvard.edu) is a collaborative, inquiry-based, simulated ecosystem experience, which consists of 2-week virtual world modules, called "Pond" and "Forest." Each module centers on a simulated ecosystem that represents a complex ecological scenario. Our research findings from EcoMUVE have shown promising gains in student learning and motivation, including inquiry skills.

Using a similar interface, our Virtual Performance Assessment project (http://vpa.gse.harvard.edu), also funded by IES, is designing and studying assessments of science inquiry. Our studies and design-based research by other scholars are developing more powerful ways of helping students learn science and understanding what they need next to master inquiry.

I commend NAEP for its development and evolution of interactive computer tasks for assessment. These types of tasks truly measure the value of instruction that enhances students' advanced intellectual and psychosocial skills. Innovations in assessment help to validate more powerful methods of teaching and learning. Because assessment drives curriculum even more than standards, continued progress in assessment formats is essential to measure students' sophisticated learning.

Assessment and instruction are intimately linked and should not be thought of separately. It will take improvement in each area to produce higher-order thinking skills among our students. They don't need those skills just for science. They will need them to have successful lives.