

National Science Resources Center

THE NATIONAL ACADEMIES  Smithsonian Institution

Changing the Course of Science Education

**2009 NATIONAL SCIENCE
EDUCATION SYMPOSIUM
FOR SCIENTISTS,
ENGINEERS, AND
COMMUNITY LEADERS**

June 14–16, 2009
Washington, D.C.

THE NSRC BASE CENTER
BUILDING AWARENESS OF SCIENCE EDUCATION

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AN ALARMING PICTURE

Continuing assessments of U.S. science, technology, engineering, and mathematics (STEM) education have been harsh. Shortcomings in U.S. STEM education have implications in the workforce and for citizenship in a knowledge-driven world:

Education

“When I compare our high schools to what I see when I’m traveling abroad, I am terrified for our workforce of tomorrow.”¹

—Bill Gates
Chairman, Microsoft Corporation

- Only 5% of Hispanic students and 2% of African-American students scored at the “proficient” level in science, according to the 2005 National Assessment of Educational Progress.²
- U.S. 12th graders ranked 16th in an international science test given to students in 21 countries in 1998. “Just 40 percent of students grasped basic concepts such as the relationship between pressure and volume.”³
- 68% of parents and 64% of elementary school teachers do not consider themselves to be scientifically literate.⁴

Workforce

“When everyone has access to the same technology platform, human talent . . . is the only sustainable edge.”⁵

—Thomas Friedman
Writer

- Currently, almost half of employers report having trouble finding qualified U.S. workers in a wide range of occupations, from engineers to entry-level workers.⁶
- Over two-thirds of employers report that high school graduates are “deficient” in almost all essential workplace skills.⁷
- Business executives ranked education and workforce preparedness as their top concern, ahead of healthcare, energy, global competitiveness, and national security.⁸

Economy

“We can’t hope to keep intact our standard of living, our national security, our way of life, if Americans aren’t competitive in science. Period.”⁹

—David Baltimore
President
California Institute of Technology
Nobel Laureate

- In 2005, for the first time, the United States lost its lead in world economic competitiveness, and dropped to sixth place.¹⁰
- American investors made more new investments in foreign stock funds than in domestic stock portfolios in 2005.¹¹
- An estimated 14 million U.S. jobs are now at risk of being sent offshore.¹²

Children need to learn science for reasons that are even more crucial than our need for future workers. All people need to know science because good citizenship demands at least a basic understanding of how the world works. Today’s students are tomorrow’s voters; they will be asked to pass judgment on many issues—environmental, biomedical, technological—in which science literacy will be necessary to help them reach intelligent, well-reasoned conclusions.

¹ February 26, 2005. National Education Summit on High Schools.

² <http://nces.ed.gov/nationsreportcard/>

³ Adler, Robert. October 21, 2006. Doing It for the Kids. *New Scientist*: Vol. 192, Issue 2574, p. 24.

⁴ Bayer Facts of Science Education I. 1995. An Assessment of Elementary School Parent and Teacher Attitudes toward Science Education.

⁵ Friedman, T.L. March 24, 2006. Worried about India’s and China’s Booms? So Are They. *The New York Times*.

⁶ The Business Council Survey of Chief Executives in Collaboration with The Conference Board: CEO Survey Results, February 2007, pp. 6–7.

⁷ Are They Really Ready to Work? Employers Perspectives on the Basic Knowledge and Applied Skills of New Entrants to the 21st Century U.S. Workforce. 2006. p 13.

⁸ The Business Council Survey of Chief Executives in Collaboration with The Conference Board: CEO Survey Results, February 2007, pp. 6–7.

⁹ Wallace, Kathryn. December 2005. America’s Brain Drain Crisis. Tarrytown, N.Y.: *The Reader’s Digest*. <http://www.rd.com/content/america-s-brain-drain-crisis/>

¹⁰ Adler, Robert. October 21, 2006. Doing It for the Kids. *New Scientist*: Vol. 192, Issue 2574, p. 24.

¹¹ Lim, Paul J. January 8, 2006. “Looking Ahead Means Looking Abroad.” *The New York Times*.

¹² Bardhan, A. and C. Kroll. Nov. 2, 2003. *The New Wave of Outsourcing*. Fisher Center Research Reports #1103. Berkeley, Calif.: University of California, Berkeley, Fisher Center for Real Estate and Urban Economics.

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2009 NATIONAL SCIENCE EDUCATION SYMPOSIUM FOR SCIENTISTS, ENGINEERS, AND COMMUNITY LEADERS

The National Science Resources Center (NSRC), an organization of the Smithsonian Institution and the National Academies, has worked with school districts and states for over two decades to develop science programs that help students grasp and retain science thinking skills and concepts and that foster scientific habits, such as respect for evidence and respect for living things.

Why Attend?

The NSRC has found that the most effective science programs operate with support from leaders in the community and from scientists and engineers. The 2009 National Science Education Symposium is part of an ongoing program to increase public understanding of the research and practices in science education, and will explore ways in which you can become involved in the reform efforts of the NSRC which are grounded on recommendations from the National Research Council, including the following¹³:

- *Science should be seen as a process of building theories and models using evidence, checking them for internal consistency and coherence, and testing them empirically. Discussions of scientific methodology should be introduced in the context of pursuing specific questions and issues rather than as templates of invariant recipes.*
- *State and local leaders in science education should provide teachers with models of classroom instruction that provide opportunities for interaction in the classroom, where students carry out investigations and talk and write about their observations of phenomena, their emerging understanding of scientific ideas, and ways to test them.*
- *The next generation of standards and curricula at the national and state levels should be structured to identify a few core ideas in a discipline and elaborate how those ideas can be cumulatively developed over the school years.*

Who Should Attend?

- Leaders from both the public and private sectors,
- Directors of research,
- Directors of human resources, and
- Deans and department chairs in science, engineering, and education.



The NSRC strongly recommends that your organization support a two-person team who can co-lead and manage your efforts to advance K–16 science education.

When and Where?

The symposium will open with a reception and program on Sunday evening, June 14, 2008, at the Westin Alexandria, Alexandria, VA. Working sessions will take place all day Monday, June 15 and until 12:30 p.m. on Tuesday, June 16.

Register online at <http://www.nsrconline.org>. The registration fee of **\$500 per participant** supports the program and all materials provided; the Sunday evening reception; breakfast and lunch on Monday and Tuesday; and dinner on Monday evening. All registration fees are fully refundable until **May 15, 2009**, and non-refundable after that date. Participants are responsible for the cost of transportation and lodging.

¹³ National Research Council, 2007. *Taking Science to School: Learning and Teaching Science in Grades K–8*. The National Academies Press.

What is the agenda?

The symposium program is designed to address four critical themes related to the role that leaders, including scientists and engineers, can play in preparing a new generation for study, employment, and citizenship in the twenty-first century. Sessions will engage you in focused discussions that will tap your expertise and set strategic directions for your involvement in science education, as well as give you opportunities to network with other leaders who are interested in working in science education.



Theme	Focus Questions		Session Leaders
	<i>First-Time Attendees</i>	<i>Previous Attendees</i>	
<i>Understanding the Breadth and Depth of the Problem</i>	<ul style="list-style-type: none"> What is the state of K-16 science learning and teaching? What is the impact of our current K-16 science education system on the workforce pipeline and the scientific and technological literacy of our citizens? 	<ul style="list-style-type: none"> What are the most recent policies and issues in science education? 	Discussion leaders and facilitators at the Symposium will be drawn from a network of educators experienced in leading science education reform programs, as well as from the ranks of business, university, government, and community leaders who have developed successful partnerships within the educational community.
<i>Examining the Research Supporting Effective K-16 Science Learning and Teaching</i>	<ul style="list-style-type: none"> What research currently exists about how people learn science? What research is known about the preparation of competent K-16 teachers, and about effective teacher preparation programs? What evidence currently exists about programs that are effective? 	<ul style="list-style-type: none"> What are the newest research-based curriculum resources available? 	
<i>Investigating the Characteristics of Effective K-16 Science Education Programs</i>	<ul style="list-style-type: none"> What strategies and resources are required to help teachers transition from novice to expertise? How can scientists and engineers make effective contributions to teacher professional development and to the development and implementation of research-based instructional materials? What are some examples of exemplary science curricula? What systems and infrastructure are required to support the systemic implementation of a research-based science program? 		
<i>Learning from Scientists and Engineers Who Are Working to Improve K-16 Science Education Programs</i>	<ul style="list-style-type: none"> What are some models for elementary, secondary, and undergraduate science education reform? What are the roles of scientists, engineers, business, and higher education in statewide initiatives? 		

Symposium Support

2009 National Science Education Symposium for Scientists, Engineers, and Community Leaders is hosted by the National Science Resources Center (NSRC) with support from Symantec Corporation.



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The **National Science Resources Center** was established in 1985 by the **Smithsonian Institution** and the **National Academies** to improve the learning and teaching of science for all students in the United States and throughout the world. The prestige and credibility of these two world-renowned institutions provide the NSRC with access to research, scientific expertise, and resources to inform our work. They provide the NSRC with the unique opportunity to catalyze the reform of science education with leaders representing school districts, academic institutions, businesses, museums, foundations, government agencies, scientific and engineering societies, publishers of education resources, and nonprofit organizations working to improve K–16 science education.

The NSRC advances the missions of its parent institutions by expanding and extending their important work in the following ways:

- Translating their research, resources, and best practices into products and services which are disseminated to leaders working to improve K–16 science education;
- Building leadership capacity, especially within the science and engineering communities, to leverage change at the school district and state levels; and
- Educating a broad constituency of leaders about the important work of both institutions in science education.

The National Academies are composed of three academies—the National Academy of Sciences, the National Academy of Engineering, and the Institute of Medicine—and their operating arm, the National Research Council. These institutions work outside the framework of government to ensure independent advice to the nation on matters of science, technology, and medicine.



The Smithsonian Institution was established in 1846 with a mission of increasing and diffusing knowledge. For more than 160 years, the Smithsonian has used its unique, publicly accessible collections, research, and staff to inform, educate, and inspire a diverse public. In doing this, it has become one of the most widely recognized institutions in the world for both its contributions to science and its unparalleled ability to make its research and collections accessible to people of all ages.

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Advisers to the Nation on Science, Engineering, and Medicine

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