

Supporting a National Competitiveness Agenda

The science and math scores for our high school graduates are disastrous. We're underfunding research in the physical sciences and we're lagging seriously on publications in these sciences. This is a problem for our economy, and we have to think about where we want to be 20 to 40 years from now.

—MIT President Susan Hockfield, *Business Week* interview, October 4, 2004

America's global competitiveness depends not only on investment in research, science, and technology, but also on an investment in human capital — higher education.

—*Mortgaging Our Future*, 2006

Principles for a National Competitiveness Agenda

- ▶ Generate talent by funding students and allowing them to select the colleges or universities that best serve their needs. Access must be at the forefront of federal policy.
- ▶ Advance talent by funding academic research and innovation, and supporting the development of skills and abilities basic to a liberal arts education.
- ▶ Sustain talent by supporting partnerships and programs that enhance K-12 teaching in the Science, Technology, Engineering & Math (STEM) disciplines, as well as mentoring and early awareness programs to help students prepare for college.

Background Facts

- ▶ A liberal arts education develops critical thinking, written and oral communication, quantitative literacy, ethical reasoning, and problem solving. These skills ensure a citizenry that is engaged locally and globally, creative, and able to collaborate with others and address complex issues from multiple perspectives.
- ▶ America's global leadership is built on its strength in science and technology. It is vital we prepare future generations to replace our current scientists and engineers.
- ▶ In the fourth grade, U.S. students score above the international average in math and near first in science. By eighth grade, they score below the international average in math and only slightly above the international average in science. By twelfth grade, U.S. students rank near the bottom. In 2003, they outperformed only Cyprus and South Africa in a 49-country survey.
- ▶ The U.S. ranks 17th in the proportion of the college-age population earning science and engineering degrees. This is down from third place in 1975.
- ▶ The percentage of undergraduate degrees in science and engineering is 66 percent in Japan and 59 percent in China, compared to 32 percent in the United States.

- ▶ A wave of retirements will hit the aging science and engineering labor force in the next decade. Currently, 29 percent of science and engineering degree holders in the labor force, and 44 percent of comparable doctorate holders, are age 50 or over.
- ▶ In 2002, the Advisory Committee on Student Financial Assistance reported that over 400,000 college-qualified lower-income high school graduates would not seek four-year degrees due to financial barriers. In 2006, the Committee reported that at least 2.4 million to 4 million bachelor's degrees had been or would be lost in the current and past decades because of needy academically qualified students passing up college.

Recommendations

Pipeline K-16 Students

- ▶ **Budget for a significant increase in the need-based financial aid programs.** All qualified high school graduates must have the ability to attend college regardless of family income. Their personal success and our nation's economic future and security depend on it.
- ▶ **Advocate for a default college prep curriculum.** Call on State Boards of Education to adopt rigorous core curricula that align high school graduation requirements with college admission standards. This would prepare high school students for success on the job and in college, and would reduce college remediation efforts.
- ▶ **Support programs that identify talented middle school students in low-income areas.** Expand TRIO, GEAR UP, and similar programs to give more bright but disadvantaged students enrichment opportunities. This includes preparation and career support, and guaranteed financial aid for students who meet certain criteria.
- ▶ **Provide stipends for undergraduate internships.** College students must have a fuller understanding of available careers. To supplement classroom learning, they need relevant, real-world work and research experiences.
- ▶ **Create a STEM Skill Pipeline Fund to support programs that encourage students to pursue STEM careers.** Young students must be aware of the significance of STEM in our society, careers in the sector, and the skills and education necessary to perform these jobs. Resources should be directed to support matching money, out-of-school enrichment opportunities, and corporate math/science programs in middle- and high schools.
- ▶ **Provide grants to colleges and universities that start schools,** or transform existing low-performing schools into new specialty math and science schools.
- ▶ **Support recruitment and mentoring efforts** that increase the number of women and minorities in STEM majors and careers.
- ▶ **Support the development of college and university curricula** that increase the number of STEM majors, as well as non-majors, taking STEM courses.

STEM Teaching

- ▶ **Fund summer STEM Fellows Programs for K-12 teachers** at colleges and universities to strengthen the teaching skills of math and science educators.
- ▶ **Provide matching grants or tax credits to companies** that volunteer their math/science experts as STEM mentors or trainers for school districts, or become certified as substitute teachers.
- ▶ **Support the educational costs of students who want to teach** in STEM areas through scholarships, loan forgiveness, and tax incentives.
- ▶ **Provide grants for colleges and universities** to increase the number of STEM majors who graduate with concurrent teacher certification.
- ▶ **Provide loan forgiveness for STEM graduates** who commit to teaching in middle schools for a certain period of time.

STEM Research

- ▶ **Enhance federally funded university research dollars.** Keep funding in pace with inflation, and provide incentives for graduate and undergraduate research opportunities.
- ▶ **Develop a research fund for colleges and universities** to support cutting edge technology.
- ▶ **Develop a STEM laboratory fund for colleges and universities** that allow science and engineering programs to upgrade equipment and renovate science labs.