

**THE NEW ENGLAND COUNCIL'S AND THE NEW ENGLAND BOARD OF
HIGHER EDUCATION'S PRINCIPLES ON SCIENCE, TECHNOLOGY,
ENGINEERING AND MATHEMATICS (STEM) EDUCATION**

Numerous business and education organizations including The New England Council and the New England Board of Higher Education have raised serious concerns with the United States' ability to compete economically with China, India and other countries, which are producing significantly more math and science college graduates. If current trends continue, by 2010 more than 90 percent of all scientists and engineers in the world will be living in Asia. These trends create significant concerns about the United States' ability to remain as the world leader in innovation.

The New England Council, the New England Board of Higher Education and many of our members believe that the STEM education concerns are even more pressing in New England than the rest of the country. The region is a world leader in areas such as information technology, defense technology, biotechnology, environmental services, health care and university research. These industries drive our regional economy and are especially dependent on workers with superior science, math, engineering and technology skills. Unlike other regions that depend on natural resources or geography as their economic strength, our region's greatest economic strength is its highly educated technical workforce. New England is able to thrive because of our capacity to innovate.

We are greatly concerned that our region's high school graduates are deciding to pursue careers in areas other than STEM and there may not be enough STEM graduates to sustain the region's innovation economy going forward. In 2005, only 20.2% of high school students taking the SATs in New England indicated a desire to major in a STEM field. New England's rate is below the national average of 26.3% and significantly below North Carolina's -- a major competitor of the New England states -- where 33% of SAT test takers indicated a desire to major in a STEM field.

While there are significant roles for the states and the private sector to play in aiding the STEM education effort, we think the federal government must play a key role. Accordingly, we urge New England's congressional delegation to propose and support a significant nationwide federal government initiative to encourage and promote STEM education. This initiative must involve a long-term strategy that focuses on K-12 and higher education. A potential model for this new initiative is the National Defense Education Act of 1958, enacted in response to the former Soviet Union's achievement in its space program, which provided new funding for mathematics and science education and training at all education levels. The NDEA inspired generations of U.S. students to pursue study in fields vital to national security and aided the nation in establishing its dominance in science and technology for the next half century.

As part of this major initiative, we urge New England's congressional delegation to support:

I. An Increased Investment in STEM Teachers

Top-notch, well-trained teachers at the K-12 level are the key to greater student achievement and interest in STEM education. The provisions in the No Child Left Behind Law providing guidelines for math and science teachers are important and must be enforced. However, federal support for STEM education must go further and address teacher quality issues including:

- Greater support for the educational costs of potential STEM teachers including scholarships, loan forgiveness and tax incentives for STEM graduates who commit to teaching;
- Strengthening resources to fund pre-service and in-service teacher training to improve K-12 STEM instruction;
- Greater flexibility and pre-service training for mid-career professionals and retirees who have advanced degrees in STEM fields to teach STEM education full-time and part-time in our public schools;
- Increased market- and performance-based compensation and incentive packages to attract and retain effective STEM teachers at all levels. Too many of the nation's STEM graduates are going into STEM fields other than teaching in part because of the discrepancy in pay; and
- Launching a “Finally, Science, Technology and Engineering” initiative as a logical next step to the U.S. Department of Education's focus on “Reading First” and “Math Next”.

II. An Increased Investment in STEM Higher Education

The federal government needs to provide more incentives and more support for programs aimed at getting a greater number of students to major in STEM fields as part of their higher education. These incentives and programs should include:

- More scholarships and loan-forgiveness programs for students who pursue two-year, four-year and graduate degrees in STEM fields including building on existing programs such as the National Science & Mathematics Access to Retain Talent Grant administered by the U.S. Department of Education; the Science, Mathematics and Research for Transformation at the Department of Defense; the Science and Technology Scholarship Program at NASA; and the Robert Noyce Scholarships at NSF;

- Extending the authorization and expanding NSF's STEP program which provides grants to colleges and universities for increasing the number of students majoring in STEM fields;
- Funding for the establishment of Centers for Undergraduate Education in STEM fields at universities to improve the quality of undergraduate courses and increase the number of students taking these courses;
- Expanding financial incentives for colleges and universities to partner with industry in creating professional science master's degree programs. Such programs should respond to local and regional demand for workers with skills beyond a bachelor's degree, diversifying and expanding the science, engineering and technology workforce;
- Additional financial support to community colleges to increase the success of high-ability students in transferring to four year STEM programs in colleges and universities; and
- Expanded funding and the creation of new programs that succeed in graduating women and minorities in STEM fields.

III. An Increased Investment in Technology in Schools

We are greatly concerned about the state of technology in our K-12 public schools in New England and throughout the country. Technology offers excellent teaching tools that grab students' attention, making learning fun, while allowing students to develop technology skills. Students will not be able to succeed in STEM careers without a firm base in technology.

We propose a National Technology Funding Program that would (i) assist schools in the planning, purchasing and deployment of educational technology tools and (ii) require school leadership and teachers to focus on strategies and tactics that will increase the capacity for and interest in STEM fields of study. The key components of this Program would include:

- In order for a school system to receive any funding assistance, the district must prepare and submit an acceptable STEM plan that indicates its goals and strategies/tactics for improvement over the subsequent three to five years;
- For every one dollar from the National Funding Program, the district must commit a one dollar match of either financial or "in kind" resources (limited to a certain percentage); and
- The implementation plan for each district would be over a three-year period with key milestones for each year. Districts would be able to count on the funding for

the three-year period as long as the milestones are being met. If not, the funding would be reallocated to other districts.

IV. An Increased Investment in Our Communities' Role in STEM Education

Outside of the K-12 and higher education fields, the federal government must play a role in ensuring that STEM education becomes a national priority. Efforts should include:

- Restoring and increasing the federal share of total research and development funding, particularly for the National Institutes of Health and the NSF, by ensuring that funding at least keeps pace with inflation;
- Encouraging federal Cabinet secretaries with a stake in STEM -- Defense, Education, Homeland Security, Commerce, Labor and Energy -- to convene to develop a strategy to best address the role of the federal government and to discuss the creation of a national public awareness campaign that focuses on the importance of STEM education. This effort should be assisted by the Executive Office of Science and Technology Policy;
- Reforming visa and immigration policies to provide an expedited process to obtain permanent residence for foreign students who receive advanced degrees in STEM fields at U.S. universities and to relax restrictions on foreign students and legal aliens who want to study STEM at U.S. universities; and
- Encouraging businesses to continue their leadership role on STEM by offering incentives for businesses to develop partnership roles with public schools and universities to donate technology, to encourage mentoring and training especially of women and minorities, and to provide externship programs for teachers.