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A Commitment to America's Future:

Responding to the Crisis in Mathematics & Science Education

Business-Higher Education Forum

"If America is to sustain its international competitiveness, its national security, and the quality of life of its citizens, then it must move quickly to achieve significant improvements in the participation of all students in mathematics and science."

BHEF Co-Chairs of the Mathematics and Science Education Initiative

Warren J. Baker
President, California Polytechnic State University

L. Dennis Smith
President Emeritus, University of Nebraska

William H. Swanson
Chairman & CEO, Raytheon Company

Business-Higher Education Forum

America's business and academic leaders are alarmed by the erosion of the United States' preeminence in science and technology caused, in part, by the dramatic advances of other nations. As a result, America is in danger of losing its unique leadership in innovation and creativity.

In turn, this erosion has direct impact on the economic security of individual citizens, the international leadership of American companies, and the national security of the country. Business and university leaders, who are starkly aware of the ramifications of ignoring this danger, point to three significant education indicators that relate directly to America's economic and national security:

- **The number of science and engineering degrees awarded to U.S. citizens is decreasing at a time when job growth in these fields is predicted.**
- **The performance trends of American students on comparative international assessments in mathematics and science chart a course of decline from near the top in elementary school to near the bottom by the end of high school.**
- **The failure of America to enroll all students in core mathematics and science curricula continues, while the skill levels in mathematics and science required for postsecondary education and employment are not only rising but converging.**

Mathematics and science education in this country is falling short of what is required to keep America productive, stable, and secure. It is not producing the quantity of mathematics and science talent that America needs to meet the challenges it now faces. Neither is it preparing all students to be scientifically literate citizens capable of participating in a democracy increasingly influenced by scientific and technological innovations.

Research repeatedly has pointed to teachers as the principal variable in the mathematics and science education equation. Teachers with a depth of content knowledge and the ability to communicate that knowledge in a variety of ways are absolutely necessary to ensuring that students reach the higher levels of mathematics and science achievement required by the new economy. Despite this need, and as a result of an increasing retirement rate of existing teachers and a low production rate of new teachers, many states have already declared a critical shortage of qualified mathematics and science teachers.

To halt the erosion of America's science and technology talent base, the Business-Higher Education Forum (BHEF) is calling for a nationwide commitment to improve mathematics and science education for all students. BHEF challenges business, higher education, and policy leaders to organize and implement a nationwide plan that addresses the quality of the mathematics and science education provided to all students, especially those who are traditionally underserved. This plan must be undertaken in collaboration with classroom teachers and school administrators, and it must take advantage of the promising work they have already initiated.

Working together, business, education, and policy leaders must therefore:

1. Commit, state-by-state, to a sustained, nationwide agenda to ensure that every American student reaches the mathematics and science achievement levels required for participation in today's global economy.

2. Establish a leadership council in each state to define, initiate, and benchmark a statewide plan for improving mathematics and science education from pre-kindergarten through undergraduate study.

3. Urge states to reassess the teaching and learning of mathematics and science and to establish a high-quality core curriculum in both subjects for all elementary and secondary school students.

4. Implement coordinated five-year national and state-specific information programs that promote the importance of a strong preparation in mathematics and science for all students and that seek to increase the number of students entering the mathematics, science, and engineering fields.

Within this collaborative effort, specific tasks would be best led by one of the three constituencies of business, higher education, or policy leaders:

Business

- **Lead state-level councils to organize and guide the complex work of system-wide change in mathematics and science education.**
- **Initiate and sustain a professionally designed national public information campaign to make mathematics and science education a public priority.**
- **Act locally to assist school districts in attracting and supporting qualified mathematics and science teachers.**

Higher Education

- **Raise the priority of developing highly qualified mathematics and science teachers to a central role in the mission of their institutions.**
- **Lead the alignment of pre-kindergarten through high school (P-12) and higher education requirements to ensure that students are prepared for the challenges of the changing workplace.**
- **Mobilize business partners to participate in the training of mathematics and science teachers and to provide assistance and support when teachers reach the classroom.**

Policy Leaders

- **Establish a balanced accountability system that requires that the contribution of each stakeholder group be subject to continuous assessment.**
- **Give priority attention to policies and programs to attract highly qualified mathematics and science students into teaching and to retain them in the profession over the long term.**
- **Establish policies to ensure that all students have the opportunity to take an adequate number and the appropriate kind of high-quality mathematics and science courses that emphasize the skills necessary for successful entry into postsecondary education and the workplace.**

These actions promise no immediate solutions. However, if the United States is to regain its economic and educational momentum, the proposed work must begin immediately, and leaders must stay committed to implementing sweeping and coordinated changes in the entire education system from pre-kindergarten through undergraduate study.

A Commitment to America's Future: Responding to the Crisis in Mathematics and Science Education is the result of a two-year long BHEF initiative on mathematics and science education. It consists of three products:

- ***The Main Report*** — presents a four-part plan for systematic reform in P-12 mathematics and science education.
- ***The Handbook: A Toolkit for Leaders of State-level P-16 Councils*** – provides P-16 council leaders with a toolkit of background information and proposed procedures for structuring and guiding implementation of BHEF's proposed action plan.
- ***The Brochure*** — gives an overview of the crisis in mathematics and science education in the United States and outlines proposed solutions.

These pieces can be found on the BHEF Web site, **www.bhef.com**

The Business-Higher Education Forum (BHEF) is a non-profit membership organization of leaders from American businesses, colleges and universities, museums, and foundations. The purpose of the group is to join together to examine issues of national importance and, when appropriate, to speak with one voice by issuing reports, white papers, and policy positions, and by sponsoring roundtable discussions with elected public officials, representatives from both the corporate and the academic communities, and with the general public.

Founded in 1978, the Forum was hosted by the American Council on Education until it became an independent organization in September 2004.

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