



*Goal: Enhance Florida's Economic Development by Preparing a Workforce Educated in Science and Mathematics*  
*Objective: Strengthen Student Achievement in Science and Mathematics by Increasing Teacher Effectiveness*

## Summary and Recommendations

The Florida Summit on Mathematics and Science Education was held February 2 and 3, 2005 (<http://www.flsummit.usf.edu/>). Speakers from Florida business and industry, Enterprise Florida, NASA, national organizations, the Armed Forces, and the National Science Board presented convincing evidence that Florida is facing a major threat to economic strength and growth that could lead to disaster in less than a decade because:

1. Our schools are not producing new job entrants sufficiently knowledgeable in mathematics and science to fill even low-level positions for replacement of retirees and planned growth of high-tech industries.
2. The increasingly technological nature of the workplace requires greater numbers of college graduates in science, technology, engineering and mathematics (STEM disciplines); however, the number of degrees awarded in these disciplines has decreased in the last two decades.
3. We can no longer rely on bringing technology workers from other countries to Florida. National security concerns have reduced the number permitted to enter by one half. In addition, other countries are establishing technology industries and research centers, using state policies to educate a large fraction of their youth in STEM fields for their own economic development.
4. Contracting STEM tasks to professionals living in other countries reduces domestic professional employment and builds long-term foreign competition for American leadership in technology-related business and industry.

The urgent threat can become a special opportunity for Florida if the state government acts decisively, quickly, and with high visibility by establishing programs to dramatically reverse these trends.

The Summit Steering Committee agreed on the following goals for such a program:

1. Strengthen achievement in Mathematics and Science of all Florida K-12 students
2. Increase dramatically the number of K-12 students actively engaged in mathematics and science learning.
3. Increase substantially the number of college students receiving degrees in the STEM disciplines to fill business/industry needs.
4. Increase the number of graduates in mathematics and science education to meet 75% of Florida's needs (only 6% of the need is met currently).

The strategies to bring this about require:

1. Enhancing effectiveness of continuing teachers at ALL levels (K-12) by providing teachers with the tools and training necessary to respond to current conditions in schools, using programs that last at least three years.
2. Induction and mentoring programs for all new teachers that focus on knowledge and pedagogy in mathematics and science.

3. Intensive, continuing induction/training/mentoring programs for secondary school teachers entering teaching from other careers.
4. Aligning teacher education programs with current classroom needs and conditions.
5. Incentive programs, such as tuition remission and scholarships, to encourage greater numbers of students to pursue careers in science, mathematics, and science or mathematics education.
6. Incentives and rewards programs for schools and/or districts that increase the fraction of high school graduates who complete baccalaureate degrees in the STEM and STEM education disciplines.
7. Incentives and rewards programs for universities and colleges that increase the number of graduates in the STEM disciplines, including science/mathematics education.
8. Special programs to attract women and minorities to the STEM disciplines, including STEM education disciplines.
9. An evaluation program that recognizes the need for long-term, sustained effort to produce lasting change.

### **Florida Legislature and Governor**

1. Establish a Governor's Commission similar to the one created by Executive Order 01-260 that established "Just Read, Florida!". The charge to the Commission should include conducting a public education/marketing campaign to create wide awareness of the issue and include a funded speaker's bureau and proactive work with the media.
2. Develop and approve substantive legislation and adequate appropriations for a comprehensive, statewide, systemic program to enhance effectiveness of mathematics and science teachers.
3. Develop and approve substantive legislation and adequate appropriations for incentive and rewards programs to increase production of college graduates in STEM and STEM education fields.

### **Florida Department of Education**

1. Direct all districts to develop and present to the Department a comprehensive district plan to strengthen mathematics and science education at all levels.
2. Continue reviewing and revising the Sunshine State Standards.
  - a. Clearly identify "big ideas"
  - b. Provide greater depth and narrower focus
  - c. Enhance rigor and relevance
3. Specify and require content-specific knowledge for recertification and professional development that is aligned with standards and the rigor and relevance framework.
4. Create endorsements for mathematics and science for preK-3 and grades 4-6.
5. Make middle grades integrated certification consistent with the middle grades reform act.
6. Lead planning for a Florida Center for Mathematics and Science Research modeled after the successful Florida Center for Reading Research, and include funding for such a center in its budget request for 2006. Center tasks may include:
  - a. Documenting and promoting research-validated best practices in mathematics and science education.
  - b. Mapping curriculum conceptual flow and relationships to other fields within each content area.
  - c. Integrating process strands within each content area.
  - d. Assuring incorporation of technology and engineering concepts in mathematics and science curricula.
  - e. Building on the Chancellor's Rigor and Relevance Framework to facilitate the integration of strands and benchmarks.

## **District Superintendents and Local Business**

1. Develop a comprehensive district plan to strengthen mathematics and science education at all levels.
  - a. Use a participatory process to develop the district plan.
  - b. Establish mechanisms to implement the plan.
2. Work with local business and industry to develop a program and funding for summer internships for mathematics and science teachers.
3. Assign compensated mentors to new mathematics and science teachers.
4. Assure that professional development in mathematics and science emphasizes content and content-specific pedagogy.
5. Provide incentives for elementary school teachers to secure endorsements in mathematics and/or science.
6. Earmark a percentage of total budgets for mathematics and science, as is now done for reading.
7. Secure year-round extended employment for teachers in critical shortage areas, and require that extended employment be dedicated to job-embedded professional development.
8. Establish formalized programs for informing parents of the dependence of future employability of students on mathematics and science competencies, and involve business and industry in this endeavor.
9. Direct guidance counselors to counsel students into rigorous mathematics and science classes, and into STEM-related career paths.
10. Establish comprehensive plans for recruitment of mathematics and science teachers, especially career-change entrants. Plans should include programs to provide public advocacy of teaching.
11. Create vertical teams in each school, with separate teams for mathematics and science, to assure a holistic approach to curriculum.

Finally, Summit participants made the following additional observations:

1. In our rapidly changing world, we must provide students with a foundation of knowledge and skills that make them adaptable to changing needs of the work place, rather than train them narrowly for specific types of work. For example, six years ago Orlando-based chip manufacturers could not find enough technicians to meet their needs. Today once-thriving plants stand idle.
2. It is not enough to prepare just the elite. The level of competence of all students must be increased in order to enlarge the pool of candidates for business, industry, and STEM professional programs.
3. Assessment is essential to measure progress but does not in itself produce progress. Business and industry, especially knowledge industry, invest in the effectiveness of their workforce. Florida must do the same for its education workforce: teachers.
4. Government investment in mathematics and science education will send a highly visible message that Florida is doing what is needed to secure its future in high technology business.

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