



Board of Regents, State of Iowa

Mathematics and Science Education Collaborative Initiative



Board of Regents FY 09 Request: \$5.5 million

Challenges Facing Iowa and the Nation:

New Economy Requires Math and Science Proficiency

- Of the 20 fastest-growing occupations of the 21st century, 15 require substantial mathematics and science preparation (Rising Above the Gathering Storm, National Academies of Science, 2006).
- The three industry sectors of Iowa's new economy: bioscience, advanced manufacturing and information solutions require substantial mathematics and science preparation. The foundation of those skills is built during the pre-K through 12 years.

Teacher Shortages

- More than half of all U.S. 8th grade students receive math instruction from a teacher who doesn't hold a degree or certification in mathematics; in 2000, 93% of students in 5th through 9th grade were taught physical science by a teacher lacking a major or certification in the physical sciences (Rising Above the Gathering Storm, NAS, 2006).
- By 2015, there will be a shortage of 283,000 highly-qualified math and science teachers for pre-K through 12, with the shortage being more pronounced in rural, low-income and urban areas (Rising Above the Gathering Storm).
- Schools invest an average of \$3,600 in recruiting, processing and training a new teacher. Fifty percent of new science teachers

depart the profession within five years, costing districts nationwide \$7 billion annually (National Commission on Teaching and America's Future, 2007).

Lack of Proficiency and Rigor

- In science, only one-third of 4th and 8th graders scored at the proficiency level and nearly one-half of the high school seniors didn't reach the basic level of competence (National Assessment of Educational Progress Test).
- According to ACT, approximately 66% of Iowa high school graduates take the ACT. Of that percentage, only 50% are on target for college algebra (Ken Mullen, ACT, Nov. 14, 2007).
- As of 2006, only 26.3% of Iowa students took physics; 22.5% took a computer course; two-thirds took chemistry (The Annual CONDITION OF EDUCATION Report of the Iowa Department of Education, 2006).

The Opportunity

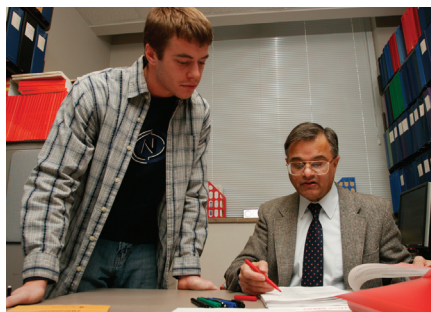
To address these challenges, the Board of Regents, State of Iowa, has created a Mathematics and Science Education Collaborative Initiative.

Goals:

- To improve mathematics and science performance of Iowa students.
- To prepare more high-quality mathematics and science teachers for Iowa's schools.
- To promote statewide collaboration and coordination.

Desired Outcomes:

- Double the number of pre-K through 12 and community college math and science teachers produced by Iowa universities in 3 to 5 years.
- Decrease the number of unlicensed math and science teachers in Iowa.
- Decrease the attrition rate for math and science teachers in Iowa.
- Increase the quality and quantity of science and mathematics coursework available to students pre-K through 12 and at community colleges.
- Improve the content and pedagogical knowledge of Iowa math and science teachers pre-K through 12, community colleges and the Regent universities.
- Increase the ethnic, racial and socioeconomic diversity of math and science teachers in Iowa.
- Improve the performance of Iowa pre-K through 16 students in math and science courses.
- Increase the number and diversity of students who major in math and science fields at Iowa's Regent universities.
- Enhance collaboration among the Regent institutions, community colleges, pre-K through 12 systems, governmental bodies and private sector within the state of Iowa.
- Leverage taxpayer investment in math and science education.



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Regents Mathematics and Science Education Institute

The institute will be located at UNI and will work in collaboration with the University of Iowa and Iowa State University. The institute will leverage state collaborations and partnerships between businesses, industries, government agencies, education and other organizations to address student learning and teacher recruitment and retention in math and science. The institute will:

- Become a research center for Science, Technology, Engineering and Mathematics (STEM) teaching innovations.
- Provide mentorship and support for new math and science teachers in Iowa.
- Design and implement elementary math and science specialist degree programs at the Regent universities.
- Coordinate and enhance professional development opportunities for math and science teachers.
- Gather and coordinate information on activities of Iowa universities, businesses, industries, governmental agencies and pre-K through 12 schools in math and science education. Leverage state support to attract private and federal support for projects and initiatives.

Initial Collaborative Programs

Star Math and Science Majors to Teaching

- Based on the highly successful program UTeach, established at the University of Texas.
- Targeted students would be recruited to math and science majors to address the teacher shortage.
- Incentives would be offered to freshman and sophomore college students in math and science to encourage the exploration of teaching.
- Under-represented populations would be targeted for rural and urban placements.

Science and Math Teacher Real World Internships

- Paid summer internships in the private and public sector for math and science teachers.
- Retention of math and science teachers, modernizing curriculum and facilitating on-going relations with professionals.
- Credit toward licensure for those teaching out of field.

Project Lead the Way (PLTW)

- PLTW is an established, national pre-engineering program that works with middle and high school curriculum. Certified engineering faculty from the University of Iowa and Iowa State University train teachers at Iowa high schools and middle schools; pre-engineering high school courses are introduced; middle school pre-engineering modules are incorporated into science, technology and mathematics courses.

- Funding will provide wider implementation across Iowa.
- Focus will be on student recruitment to math and science careers.

Community College STEM Instructor Preparation and Updates

- Address critical shortage of instructors at community colleges.
- Offer distance-education math and science courses.
- Offer a special STEM learning and teaching community college teaching certificate program.
- Serve as a template for other community college certification programs at Regent universities.

For more information:

www.uni.edu/pres/math-science or contact:

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