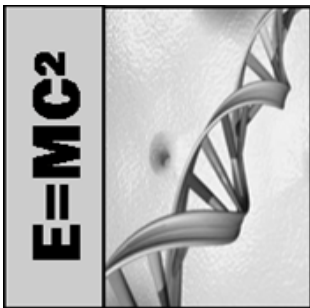


What can *we* do to improve mathematics and science education in New Mexico?



NEW MEXICO PARTNERSHIP FOR  
MATHEMATICS & SCIENCE EDUCATION  
TOWN HALL

*Convened by New Mexico First*

On behalf of:  
The New Mexico Partnership for  
Mathematics & Science Education  
NM EPSCOR  
ITP  
NASA  
NASSMC

November 17, 18, & 19, 2005  
Glorieta Conference Center  
Glorieta, New Mexico

**Overview:**

For two days, 100 New Mexicans from diverse backgrounds, including: teachers, higher education faculty, students, scientists, business owners, museum staff, policy leaders, and representatives from large scale mathematics and science initiatives, came together to discuss the future of mathematics and science in New Mexico. Sponsoring agencies, including, NASA, the U.S. Department of Education, and the National Alliance of State Science and Mathematics Coalition (NASSMC), offered presentations, with a welcome and encouragement from the Secretary of Higher Education, Dr. Beverlee J. McClure. Participants wrestled with discouraging data regarding the current state of student achievement in mathematics and science. Their focus: to achieve consensus on no more than 10 specific and doable recommendations that will dramatically increase mathematics and science literacy in New Mexico. Participants were given the following working definition of mathematics and science literacy: The ability to understand and apply concepts and principles. This report is reflective of the emerging themes that resulted from the dialogue, and also captures those recommendations on which the whole group achieved consensus.

**Emerging Themes:**

More than \$40 million has been spent specifically to improve mathematics and science education in New Mexico since 1991. Yet the background report<sup>1</sup>, summarized by Dr. Patrick (Rick) Scott during dinner on Thursday, offered a bleak view of student achievement. Preliminary data was presented showing student performance against state standards for the first time in 2005 using a new Criterion-Based Test (CRT). Other data showed the percentage of New Mexico students scoring at or above the proficiency level in national assessments<sup>2</sup>:

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<sup>1</sup> A copy of the background report can be obtained from the New Mexico First website: [www.nmfirst.org](http://www.nmfirst.org).

<sup>2</sup> State assessments are based on statistics from the New Mexico, Standards-Based Assessments (NMSBA). National assessments are based on statistics from the National Assessment of Educational Progress (NAEP). For further information about these statistics, see the background report.

	Math 2005		Math 2003		Science 2000	
	New Mexico	Nation	New Mexico	Nation	New Mexico	Nation
Grade 4	19%	36%	17%	31%	18%	27%
Grade 8	14%	29%	15%	27%	21%	30%

The blunt reality is that we are failing to inspire and prepare today's youth to achieve the high level of education and critical thinking that will enable the United States to retain a competitive edge in the global marketplace. Mathematics and science are vital to the health of our economy. The lack of students graduating with mathematics and science degrees also has been identified as a national security issue. For these reasons, participants felt a particular urgency to address this topic in a meaningful and comprehensive way.

"In China today, Bill Gates is Britney Spears. In America today, Britney Spears is Britney Spears - and that is our problem." This statement, which one participant quoted from the book *The World is Flat* (Friedman 2005), perfectly characterized the issue. Mathematics and science literacy are not held by the public as valuable attributes. There are actually negative connotations regarding these disciplines, as is evidenced by individuals stating with pride: "I never used the math and science that I had to learn."

Mathematics and science disciplines are perceived as being isolated from the real world, abstract and difficult. Science requires that we test our world-view, which, in the United States, makes us uncomfortable. This discomfort, combined with the lack of seeming relevancy in how science is taught, results in people settling for easy answers.

Because the public holds this "science and math-phobia," parents condone their children's poor performance. This is further underscored by popular culture, with T-shirts being marketed to girls that read: "I'm too pretty to do math." The media also contribute to this, by having a distinct absence of coverage related to mathematics and science-related issues. All of this combines to support students feeling like "geeks" and "outcasts" if they even show interest in, let alone are proficient at, mathematics and science. Finally, because the public does not value mathematics and science, elected officials are left without an adequate charge to invest resources in mathematics and science literacy.

The Town Hall participants acknowledged that these issues relate not only to mathematics and science, but to the public's view of education in general. There is a popular mistrust of the intellect. When it comes to mathematics and science literacy specifically, it is difficult for the public to make connections between mathematics and science literacy, classroom education, and relevant applications.

Noteworthy is how participants saw the breakdown in mathematics and science achievement as a "systems" issue. These systems included: alignment of content standards, curriculum, and assessment; how programs are administered and organized; how teachers are trained and licensed; how monies are distributed and handled; and how initiatives are adopted and sustained. Overall, participants ultimately saw the system as the major contributor to classroom experiences that lack practical, timely, and relevant applications; collaborative models; emphasis on high student achievement; the positive attitudes of students, and literacy.

Participants were concerned about the "shot-gun" approach to initiatives. Programs that are adopted without the necessary mind-set, support, or funding for long-range success. Comprehensive follow-through and ongoing mentorship were identified as crucial components of success. Participants want to see programs that place responsibility across the board, from principals to students. Learning initiatives also must be structured to address the challenges inherent in ensuring that all students, including minority and low-income, succeed.

Participants expressed concern as to the mathematics and scientific literacy levels of teachers. Points cited as contributing to the concern include: a lack of sufficient understanding of mathematical and scientific approaches and processes as teachers enter the system; lack of sufficient mentorship for new teachers as well as lack of ongoing mentorship and relevant professional development for seasoned teachers; programs and teaching styles that do not adequately take into account diversity (including: gender, race, language, culture, socio-economic status, and abilities), and classroom content and teaching styles that lack relevancy for today's student.

### **Recommendations: Looking Forward**

Relevancy of mathematics and science education, in terms of the content and how concepts are taught, was a key theme throughout the discussions. Panelists also focused on ways to address the concerns expressed earlier.

Everyone involved agreed that strong leadership is necessary to adopt these recommendations. Those impacted by these issues must join with the implementation team to work with the Governor, the Legislature, the Public Education Department, higher education institutions, and school districts to move forward a statewide effort to improve the achievement of our students in mathematics and science. After discussing those factors that contributed to the lack of student achievement, participants came up with the following consensus recommendations:

1. Create a New Mexico mathematics and science initiative that establishes consistency between how teachers are educated, what they teach, the standards that govern what is taught, student learning, and assessment.
2. Establish a statewide mathematics and science initiative to improve mathematics and science instruction and narrow the achievement gap. This initiative will be based on leadership from those who can best assist with the success of the effort, including: the Office of the Governor, the Secretary of Education, the Secretary of Economic Development, the Secretary of Higher Education, and the Legislature. The initiative also will be supported by an advisory council, with members that are representative of the education community and all stakeholders. Permanent staff will be assigned to provide additional leadership and implementation. The initiative will be further supported by a statewide strategic plan for mathematics and science education crafted by the advisory council with input from key decision makers and stakeholders. The strategic planning process will include budget projections. The advisory council will advise the legislature annually as to the budget. Representatives from the Public Education Department, Higher Education Department, Pre K-12 teachers and students, post-secondary institutions, research labs, and other relevant stakeholders will be involved in developing and sustaining an ongoing collaborative partnership and process to develop and implement an action plan for the state to address mathematics and science literacy. This body will utilize statewide and national data, best practices and exemplary models, and student input to foster student and educator learning and achievement.
3. Create a unit at the Public Education Department for science and mathematics with sufficient staff to cover the state. This unit will report to a high level, (e.g. a cabinet level) position. This unit will inject expertise into the system at every level from the building level to the state department level, and will build and support infrastructure. It will also work to staff schools with appropriate mathematics and science experts in content and pedagogy.

4. Create a New Mexico Mathematics and Science educational model that allows districts to align mathematics and science curriculum, provides teacher professional development and school based support, provides leadership development (for principals and district leaders), aligns district funds, partners with Higher Education and Local Education Agencies, and aligns licensure programs. The curriculum and the process will be flexible and fluid and allow for different entry points based on district needs. The state will provide technical and financial assistance to districts willing to adopt this model.
5. Colleges and universities will increase the rigor of mathematics and science requirements for teachers entering teacher education programs and licensure by increasing the number of credit hour requirements and/or the quality of mathematics and science courses, and recruitment of teachers.
6. Increase opportunities for both teachers and students to translate knowledge from the standard classroom experience to practical, timely and relevant applications. Examples of strategies in this area include: internships, expanded lab and fieldwork opportunities, exposure to professionals in the area of science and mathematics, and student-identified research projects and family activities (such as camping trips, museum activities, field trips and/or summer camps).
7. Develop and implement a structure for comprehensive longitudinal on-going professional development for teachers to develop and refine the pedagogical and content knowledge they need to effectively teach mathematics and science to all students. Provide teachers with the funding and time they need to participate. Adopt the National Staff Development Council standards. Protect dedicated time within the school day for professional development in mathematics and science.
8. Create ongoing public awareness programs to raise public interest and enthusiasm for science and mathematics. Provide support for new and existing outreach programs. Include a marketing and media campaign such as has never been seen in New Mexico. Identify the strong leaders that can be advocates at the legislature.