

New Mexico Partnership for Math and Science Education

A Sample of Major National Reports on the Math and Science Crisis

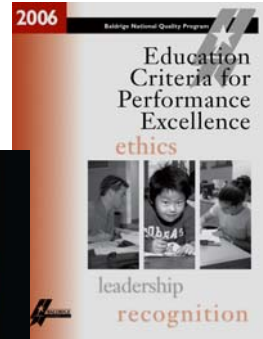
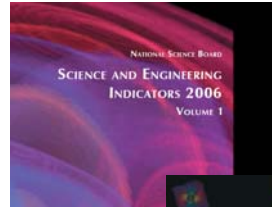


<http://www.nassmc.org/>

Science and Engineering Indicators – NSF
Jan. 2006

<http://www.nsf.gov/statistics/seind06/>

http://www.quality.nist.gov/Education_Criteria.htm



Baldrige Education Criteria - 2006

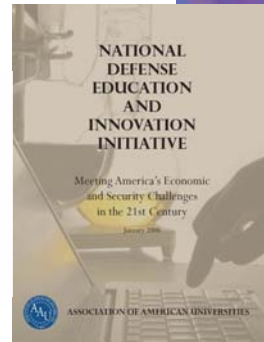
<http://www.internationaleled.org/mathsciencereport.htm>



- National Standards and Aligned Instruction
- Strong Core Curriculum
- Rigorous Teacher Preparation
- Examinations Motivate Students
- Time on Task

National Defense Education and Innovation Initiative – AAU
Jan. 2006

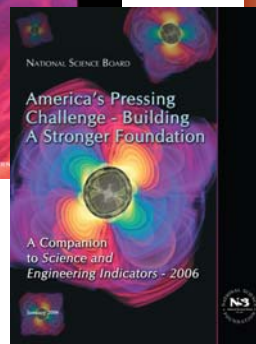
“...the foundation upon which these capabilities have stood is threatened by serious problems in our education system...”



<http://www.aau.edu/reports/NDEII.pdf>

America’s Pressing Challenge – Building a Stronger Foundation - NSF
Feb. 2006

<http://www.nsf.gov/statistics/nsb0602/nsb0602.pdf>



“...Our Nation must devote the necessary resources now to revitalize our pre-college STEM education system...we must recognize the existing crisis and take the necessary actions.”

Math and Science Education in a Global Age: What the U.S. can Learn from China
May 2006

2006

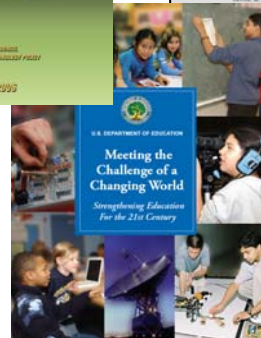
<http://www.whitehouse.gov/stateoftheunion/2006/aci/>

“...we must ensure a continuous supply of highly trained mathematicians, scientists, engineers, technicians, and scientific support staff as well as a scientifically, technically, and numerically literate population.”

American Competitiveness Initiative - Jan. 2006

“Innovating and improving education is critical not only to America’s financial security but also to our national security...the highest priority is to vastly improve K-12 math and science education.”

<http://www.ed.gov/about/inits/ed/competitiveness/challenge.html>

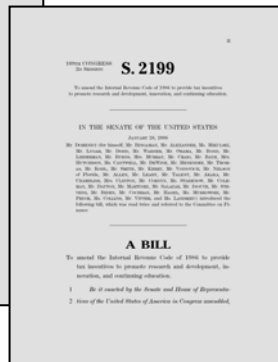
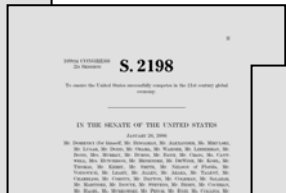
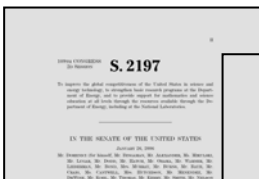


The PACE Acts – Protecting America’s Competitive Edge

S.2197 PACE – Energy Act

S.2198 PACE – Education Act

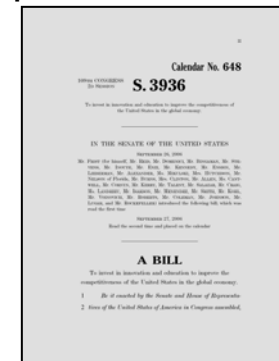
S.2199 PACE – Finance Act



U.S. Dept of Education Strengthening Education

<http://www.govtrack.us/congress/bill.xpd?bill=s109-2197>
<http://www.govtrack.us/congress/bill.xpd?bill=s109-2198>
<http://www.govtrack.us/congress/bill.xpd?bill=s109-2199>

S.3936 The National Competitiveness Investment Act



<http://thomas.loc.gov/cgi-bin/query/z?c109:S.3936>
http://www.aau.edu/research/NCIA_Section_by_section.pdf

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Innovative Technology Partnerships, LLC



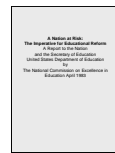
October, 2006

New Mexico Partnership for Math and Science Education: A Sample of Major National Reports on the Math and Science Crisis

March 8, 2006



<http://www.nassmc.org>



Report Issue	Nation at Risk April 1983	Science for All Americans 1989	Hart-Rudman Commission February 2001	Glenn Commission Sept. 2000	No Child Left Behind January 2002	Betraying the College Dream - March 2003	Keeping America Competitive - April 2003	Understanding University Success - 2003	Student Success 2003
Teacher Preparation <ul style="list-style-type: none"> Content Knowledge Engagement with Employers Collaboration between Colleges of Ed and Arts & Sciences 	<ul style="list-style-type: none"> Raise educational standards for teachers Increase salaries for teachers Develop 11-month contract Develop career ladders Increase number of science and math teachers Increase incentives including grants and loans Master teachers should help in developing new materials and mentoring 	<ul style="list-style-type: none"> NSF, NSTA, and NCTM should work together to review criteria for awards Accelerate process for quality teachers Colleges of science and math should design new courses for elementary and high school teachers Education faculty should review the content and pedagogical standards 	<p>Use new National Security Science and Technology Education Act to produce the needed numbers of science and engineering professionals as well as qualified teachers in science and math</p> <p>Loan forgiveness incentives to attract those who have graduated and scholarships for those still in school in exchange for a period of K-12 teaching in science or math, also raise teacher compensation, improve infrastructure, and reform certification.</p>	<p>Goal 1: Establish an ongoing system to improve the quality of math and science teaching in K-12</p> <p>Goal 2: Increase significantly the number of math and science teachers and improve the quality of their preparation</p> <p>Goal 3: Improve the working environment and make the teaching profession more attractive for K-12 math and science teachers</p>	<ul style="list-style-type: none"> Create an Adjunct Teacher Corps Reward teachers for making progress in closing achievement gaps Provided incentives for effective teachers who choose to teach in low-income schools Increase AP teachers workforce Loan forgiveness for highly qualified math, science, and special education teachers 		<p>Open manufacturing plants and facilities to young people, teachers, and parents on National Manufacturing Day</p>		<p>Enhance teacher quality:</p> <ul style="list-style-type: none"> Bring Arts and Sciences and Colleges of Ed together Provide substantial apprenticeship and mentoring Incorporate technology into the curriculum Make effective use of student achievement data to provide feedback for effective teaching Align key policies and practices
Curriculum Alignment <ul style="list-style-type: none"> Pre K-20, even among grades in K-12 Focus on H.S. Diploma competencies and Higher Ed entrance requirements Dynamic content and pedagogy based on current societal drivers 	<p>Strengthen state and local high school graduation requirements that includes:</p> <ul style="list-style-type: none"> 4 years of English 3 years of math 3 years of science 3 years of social studies one-half year of computer science 2-years of foreign language for college-bound students Revise, update, improve and make available more diverse curricular materials with help from American Chemical Society, AAAS, Modern Language Association, and NCTM <p>Raise requirements for admission to universities and 4-year colleges</p>	<ul style="list-style-type: none"> Convene a national meeting to assist in curriculum development and future editions of books Review national tests and modify 			<p>K-12 math and science education will be strengthened through math and science partnerships for states to work with institutions of higher education to improve instruction and curriculum.</p>	<ul style="list-style-type: none"> Provide all students, their parents, and educators with accurate, high quality information about, and access to, courses that will help prepare students for college-level standards Examine the relationship between the content of postsecondary education placement exams and K-12 exit-level standards and assessments Review postsecondary education placement exams for reliability, validity, efficacy, and the extent to which they promote teaching for understanding Allow students to take placement exams in high school Link senior-year courses to postsecondary general ed courses Expand dual or concurrent enrollment programs 	<p>Bring students and guidance counselors to a modern manufacturing facility on National Manufacturing Day</p>	<p>Standards identified for secondary graduation to match knowledge and skills needed for university studies in:</p> <ul style="list-style-type: none"> English Mathematics Natural Science Social Science Second Languages The Arts 	<ul style="list-style-type: none"> Make college preparatory curriculum the "default" Link scholarships and financial assistance to college preparatory work Forge agreements between K-12 and postsecondary institutions Clearly aligned assessments Provide end-of-course assessments
Public Awareness <ul style="list-style-type: none"> Employer participation Community Support Parental engagement 	<p>Increase school days to 7 hours, and school years to 200 or 220 days.</p> <p>Enhance leadership role of principals and superintendents</p> <p>Educators, parents and public officials must help.</p>	<ul style="list-style-type: none"> The President and others should speak forcefully on the need for scientific literacy Joint resolution from Congress Governors should issue statements Business leaders should engage Media should report more 			<ul style="list-style-type: none"> Improved adult literacy Reformed student aid programs Providing information on early learning 	<p>Focus on institutions that serve the majority of students. Shift media, policy, and research attention to include broad access to colleges and universities attended by the vast majority of students (approximately 80%).</p>			<p>Make clear to young students the importance of postsecondary education. Engage young students in the context of their own culture and community</p>
Valid Metrics <ul style="list-style-type: none"> Monitor individual student progression New IT systems Research driven 	<p>Standards and Expectations:</p> <ul style="list-style-type: none"> Standardize tests and administer at major transition points Upgrade textbooks and other tools to include more rigorous content Provide funds for special needs students Establish quality criteria for publishers 				<p>Increase assessments and make data more accessible to teachers, administrators and the public to identify improvement opportunities and choices.</p>	<ul style="list-style-type: none"> Collect and connect data from all education sectors Establish data collection standards 			<p>Develop exemplary data and accountability systems:</p> <ul style="list-style-type: none"> Establish standards for K-12 achievement that lead seamlessly to postsecondary education Track performance of students throughout their educational careers
Federal Investment <ul style="list-style-type: none"> Research opportunities from High School to Post-doc Education incentives for Employers R&D investments 	<p>Help meet the needs of key groups of students, including socio-economically disadvantaged, minorities, and handicapped.</p> <p>Protect constitutional and civil rights; collect data, statistics, and information; support curriculum improvement; fund research on teaching, learning, and management of schools; support teacher training in critical needs areas; and provide student financial assistance.</p>		<p>Recommend doubling the federal research and development budget by 2010.</p> <p>Recommend the President's Science Advisor be elevated to oversee the resuscitation of the national laboratory system, and the institution of better inventory stewardship over the nation's science and technology assets</p> <p>Recommend a new National Security Science and Technology Education Act</p>		<p>Increased funding for Math and Science Partnership program, AP, Adjunct Teacher Corps</p>	<p>Expand the focus of local, state, and federal programs from access to college to include access to success in college – access to resources and information students need to prepare well for college and to make informed decisions.</p> <p>Establish federal grants to stimulate more P-16 policymaking</p>			<p>Provide additional federal assistance for students who are academically prepared to attend college no matter what their financial situation is.</p>
Other <ul style="list-style-type: none"> Immigration reform Business involvement and practical curriculum 			<p>The inadequacies of our systems of research and education pose a greater threat to U.S. national security over the next quarter century than any potential conventional war that we might imagine</p>	<p>What you can do: School Boards and Superintendents; Principals; Teachers; Parents; State Leadership; Higher Education Institutions; Business;</p>			<ul style="list-style-type: none"> Declare U.S. manufacturing a national priority Establish "National Manufacturing Day" to recognize this priority 		



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March 8, 2006



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Report Issue	U.S. Dept. of Education Math and Science Initiative May 2003	NSF Science and Eng. Workforce August 2003	American Diploma Project 2004	A Commitment to America's Future – BHEF Jan. 2005	The Knowledge Economy Bus. Rdtble. Feb. 2005	Tapping America's Potential Bus. Rdtble. July 2005	Rising Above the Gathering Storm Oct. 2005	National Summit on Competitiveness Dec. 2005	NMPMSE Math and Science Town Hall
Teacher Preparation <ul style="list-style-type: none"> Content Knowledge Engagement with Employers Collaboration between Colleges of Ed and Arts & Sciences 	<ul style="list-style-type: none"> Initiate a major campaign to recruit, prepare, train and retrain teachers with strong backgrounds in mathematics and science <ul style="list-style-type: none"> Increase number of new teachers who have strong background in math and science Strengthen the math and science knowledge of current and future teachers Retain significantly more teachers Work with colleges of arts and sciences and education 	<ul style="list-style-type: none"> The Federal Government should act now to attract and retain an adequate cadre of well-qualified precollege teachers of math, science and technology Expedite teacher certification of scientists and engineers Enhance classroom skills and subject matter expertise Support integration of faculty and curricula with schools of Engineering and Science and Education 				Upgrade K-12 math and science teaching to foster higher student achievement, including differentiated pay scales	Increase America's talent pool by vastly improving K-12 math and science education: <ul style="list-style-type: none"> Recruit 10,000 teachers, educate 10 million minds Strengthen 250,000 teachers' skills, inspire students every day – summer institutes, master's programs, AP 	Increase the number of those students who become K-12 science and math teachers	Create a NM math 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. Implement a comprehensive longitudinal PD for teachers. Provide funding and time to participate. Adopt National Staff Development Council standards. Protect dedicated time within the school day.
Curriculum Alignment <ul style="list-style-type: none"> Pre K-20, even among grades in K-12 Focus on H.S. Diploma competencies and Higher Ed entrance requirements Dynamic content and pedagogy based on current societal drivers 	Develop a major academic research base to improve our knowledge of what boosts student learning in math and science in the classroom. <ul style="list-style-type: none"> Identify workforce requirements and citizenship needs related to STEM Understand student learning in math and science Explain the dynamics of successful interventions Develop and apply valid assessments to measure progress of students and programs 		Anchor academic standards in the real world: <ul style="list-style-type: none"> Align academic standards in high school with knowledge and skills required for college and the workplace Map standards to create a coherent, focused, grade-by-grade progression from kindergarten to high school Define specific requirements in English and math for high school graduation Ensure that other disciplines reinforce college and workplace readiness expectations Use high school assessments for college admission and placement 	Address and align the five P-12 system components: <ul style="list-style-type: none"> Standards Curricula Assessments Teachers preparation Accountability practices Engage business and higher education in more effective P-12 reform roles		Motivate U.S. students and adults, using a variety of incentives, to study and enter science, technology and engineering and math careers, with a special effort geared to those in currently underrepresented groups.	<ul style="list-style-type: none"> K-12 curriculum materials modeled on world-class standards Enlarge the pipeline: <ul style="list-style-type: none"> Create statewide specialty high schools Implement inquiry-based learning 	Double the number of bachelor's degrees awarded annually to U.S. students in science, math and engineering	Create a unit in the Public Education Department for Science and Math and work to staff schools with appropriate math and science experts and pedagogy. Create a NM math and science educational model that allows districts to align math and science curriculum, provides teacher professional development and school based support, provides leadership development, aligns district funds, partners with Higher Education and LEAs and aligns licensure programs.
Public Awareness <ul style="list-style-type: none"> Employer participation Community Support Parental engagement 	Conduct a broad-based public engagement campaign that draws attention to the need for math and science education. Work with business community and professional organizations to: <ul style="list-style-type: none"> Sponsor events Bring professionals to school Teachers work with STEM professionals 		Provide information to high schools on the academic performance of their graduates in college	Implement coordinated national and state-supported public information programs.		Build public support for making improvement in science, technology, engineering and math performance a national priority		Provide incentives for the creation of public-private partnerships to encourage U.S. students at all levels to pursue studies and/or careers in science, math, technology and engineering.	Create ongoing public awareness programs to raise public interest and enthusiasm for science and math. Provide support for new and existing outreach programs. Include a marketing and media campaign such as has never been seen in NM. Identify the strong leaders that can be advocates in the Legislature.
Valid Metrics <ul style="list-style-type: none"> Monitor individual student progression New IT systems Research driven 		Build a base of information on: <ul style="list-style-type: none"> The current status of the S&E workforce National S&E skill needs and utilization Strategies that attract high-ability students and professionals to S&E careers 	Measure what matters and make it count: <ul style="list-style-type: none"> Use graduation exams to ensure students meet standards – don't set floor too low Validate frequently and don't exclusively rely on large-scale assessments 	Establish a P-16 Council in each state and charge them with defining, benchmarking, and initiating a statewide P-16 plan for ensuring that all P-12 students successfully complete a high-quality math and science education.	<ul style="list-style-type: none"> Number of undergraduate S&E degrees U.S. share of S&E degrees U.S. share of S&E PhDs Decline in Asian students in U.S. Increasing retirements from S&E # of S&E papers 		Increase number and proportion of U.S. citizens who earn physical and life sciences, engineering, and math bachelor's degrees, and increase U.S. citizens pursuing graduate study in areas of national need.		Colleges and universities will increase the rigor of math and science requirements for teachers in education programs and licensure by increasing the number of credit hour requirements
Federal Investment <ul style="list-style-type: none"> Research opportunities from High School to Post-doc Education incentives for Employers R&D investments 		The Federal Government and its agencies must step forward to ensure the adequacy of the U.S. science and engineering workforce. All stakeholders must mobilize and initiate efforts that increase the number of U.S. citizens pursuing science and engineering studies and careers: <ul style="list-style-type: none"> Support research and graduate postdoctoral education 	<ul style="list-style-type: none"> Provide incentives to meet college and workplace readiness requirements Require accountability for postsecondary education institutions Align 12th grade NAEP in English and math with the ADP benchmarks 		Increase significantly the research budgets of agencies that support basic research in the physical sciences and engineering, and complete the commitment to double the NSF budget. These increases should strive to ensure that the federal commitment of research to all federal agencies totals one percent of U.S. GDP	Boost and sustain funding for basic research, especially in the physical sciences and engineering.	<ul style="list-style-type: none"> Increase federal investment in long-term basic research Create ARPA-E in DOE Enact stronger research and development tax credit to encourage private investment Provide tax incentives for U.S. based innovation Ensure ubiquitous broadband Internet access Institute Presidential Innovation Award 	<ul style="list-style-type: none"> Increase federal investment in long-term basic research by 10% per year Allocate 8% of federal research budgets for discretionary funding 	Engage state leadership through an Advisory Council that will utilize state and national data, best practices, exemplary models, and student input to foster student and educator learning and achievement.
Other <ul style="list-style-type: none"> Immigration reform Business involvement and practical curriculum 		Strengthen U.S. research universities, participation in international S&E education and research and attract internationally competitive researchers, faculty and students.	Businesses should consider evidence of high school assessments and transcripts in making hiring decisions	Engage business and higher education in more effective P-12 reform roles		Reform visa and immigration policies to enable the U.S. to attract and retain the best and brightest science, technology, math and engineering students from around the world.	Improve visa processing, skills-based, preferential immigration option, and reform current system of "deemed exports". Enhance intellectual-property protection for the 21 st Century economy	Reform U.S. immigration policies to enable the education and employment of individuals from around the world with the knowledge and skills in science, engineering, technology and math to boost the U.S. competitive advantage.	Increased opportunities for teachers and students to translate knowledge from standard classroom experience to practical, timely, and relevant applications.