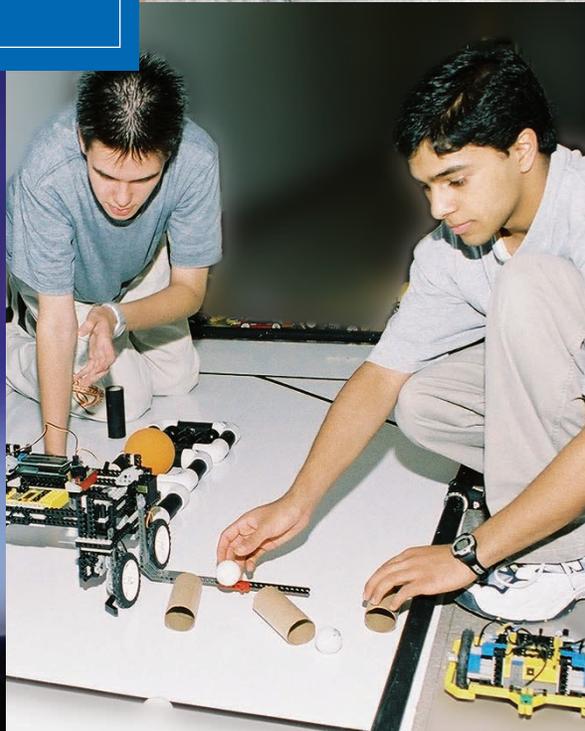


U.S. DEPARTMENT OF EDUCATION

# Meeting the Challenge of a Changing World

*Strengthening Education  
For the 21st Century*



**U.S. Department of Education**

Margaret Spellings

*Secretary*

January 2006

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**Meeting the Challenge of a  
Changing World:**  
*Strengthening Education  
For the 21st Century*

**U.S. Department of Education**

**2006**

*We live in a competitive world. And so policies must be put in place to recognize the competition of the global economy and prepare our people to be able to continue to compete so America can continue to lead.*

**—President George W. Bush**

*High school reform is not just an “education issue.” It’s also an economic issue, a civic issue, a social issue and a national security issue. And it’s everybody’s issue.*

**—Margaret Spellings, U.S. secretary of education**



# Meeting the Challenge of a Changing World: *Strengthening Education for the 21st Century*

## Introduction

### The Challenge: To Innovate Education

America has long been innovation's home. It's in our very DNA, born from a desire to be free that was ahead of its time. When faced with a challenge, we invent the answer: from the first telephone to global satellite communications; from the first computer to the World Wide Web; from the Wright Brothers to Neil Armstrong. To Americans, innovation means much more than the latest gadget. It means creating a more productive, prosperous, mobile and healthy society. Innovation fuels our way of life and improves our quality of life. And its wellspring is education.

President Bush has made innovation and education top priorities. The president worked with Congress to pass the most far-reaching education reform in decades, the *No Child Left Behind Act (NCLB)*. The law has brought high standards and accountability to public schools and sparked a mathematics and reading revival in the early grades.

The rest of the world, meanwhile, has not stood still. America no longer holds the sole patent on innovation. Inspired by our example, countries such as China, India and South Korea have invested heavily in education, technology and R and D. Billions of new competitors are challenging America's economic leadership. Our educational leadership has been challenged as well, with many developed nations' students outperforming ours in international tests, particularly in math and science. These test scores are linked to a lack of challenging course work, an ominous sign for many American schools. The impact may be felt well into the future: According to some estimates, America's share of the world's science and engineering doctorates is predicted to fall to 15 percent by 2010.

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In 2005, a majority of the top 10 recipients of patents from the U.S. Patent and Trademark Office were foreign-owned companies.

This global challenge requires bold action and leadership. America has done it before. Following the Soviet Union's 1957 launch of Sputnik, the world's first satellite, Congress passed and President Eisenhower signed into law the *National Defense Education Act of 1958*. The law accelerated the study of mathematics and science and helped improve foreign language teaching in our schools. It brought together the public and private sectors behind the effort. And it worked. Within a decade, the number of science and engineering doctorates awarded in the U.S. annually had tripled, accounting for more than half the world's total by 1970.

*Every kid can graduate ready for college. Every kid should have the chance. Let's redesign our schools to make it happen.*

—**Bill Gates, chairman, Microsoft Corporation**

Today, America faces not a streaking satellite but a rapidly changing global workforce. The spread of freedom is spurring technological innovation and global competition at a pace never before seen. We have to run to keep up. A high school diploma, once desirable, is now essential—and, increasingly, insufficient. About 80 percent of the fastest-growing jobs of the future will require some postsecondary education. It is therefore unacceptable that among all ninth-graders, about three in 10 do not graduate on time; or that for black and Hispanic students the figure is about five in 10.

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The U.S. is now a net importer of high-tech products (from plus-\$33 billion in 1990 to minus-\$24 billion in 2004).

Whether filling “blue collar” or “white collar” positions, employers seek workers with “pocket protector” skills—practical problem-solvers fluent in today's technology. If current trends continue, by 2012, over 40 percent of factory jobs will require postsecondary education, according to the National Association of Manufacturers. And yet, almost half of our 17-year-olds do not have the basic understanding of math needed to qualify for a production associate's job at a modern auto plant.

Innovating and improving education is critical not only to America's financial security but also to our national security. Today, not one but 3,000 satellites circle the earth. U.S. soldiers use the latest technology and communications to fight the global war on terrorism. Advanced math skills are needed to identify and undermine terrorist networks. Government and the private sector engineer new ways to protect lives and infrastructure from harm. And the effort to spread freedom to other nations and cultures demands speakers fluent in languages such as Arabic, Farsi, Chinese and Russian. Addressing these challenges will advance opportunity and entrepreneurship at home and promote democracy and understanding abroad.

*The first bulwark in the face of rapidly changing economies and job markets is the flexibility and adaptability of the labor force. This adaptability begins with the formal educational system, especially the public schools.*

—**Dr. Ben Bernanke,**  
**incoming Federal Reserve**  
**Board chairman**

Rigorous instruction, high standards and accountability for results are helping to raise achievement in the early grades. Now America must complete the task. With our students working to achieve proficiency in math and reading by 2014, innovative education reform is needed. America's civic, political and business leaders agree: To sustain our quality of life and way of life, we must act now. And President Bush is leading the charge.

### **The Answer: President Bush's 2006 Education Agenda**

**P**resident Bush's answer to America's newest challenge begins with the **American Competitiveness Initiative**. The American Competitiveness Initiative will commit \$5.9 billion in FY 2007, and more than \$136 billion over the next 10 years, to strengthen education, promote research and development and encourage entrepreneurship. It will bring together leaders from the public sector, private sector and education community to better prepare our students for the 21st century. The initiative will place a greater emphasis on math instruction from the earliest grade levels. It will ensure that

*The Congress hereby finds and declares that the security of the Nation requires the fullest development of the mental resources and technical skills of its young men and women.*  
—National Defense Education Act of 1958

high schools offer more rigorous course work, including Advanced Placement and International Baccalaureate programs in math, science and critical-need foreign languages. It will inform teachers of the most effective, research-based approaches to teaching math and science. It will encourage professionals in those fields to become teachers themselves. And it will coordinate federal math and science education programs to ensure the most effective use of the

taxpayer dollars.

The president's **High School Reform Initiative** will help ensure that a diploma becomes a ticket to success for *all* graduates, whether they enter the workforce or go on to higher education. It will bring high standards and accountability to high schools by aligning their academic goals and performance with the *No Child Left Behind Act*. Through assessments and targeted interventions, it will help educators raise achievement levels and close the achievement gap. It will also help alleviate the dropout problem by focusing more attention on at-risk students struggling to reach grade level in reading or math.

Finally, the president's **National Security Language Initiative**, announced on Jan. 5, 2006, will help more American students master critical-need foreign languages in order to advance global competitiveness and national security. This joint project, in collaboration with the Department of State, Department of Defense and the director of national intelligence, will train teachers and aid students in those fields.

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Students who take two or more Advanced Placement classes are twice as likely to graduate from college in four years or less than students who do not take any AP courses, according to the CollegeBoard.

## The Challenge: Knowledge of Math and Science

In this changed world, knowledge of math and science is paramount. In the words of *BusinessWeek*, “It’s a magnificent time to know math.” “Math entrepreneurs” are translating the world into numbers—which translates into big salaries. And according to the Bureau of Labor Statistics, jobs requiring science, engineering or technical training will increase by more than 24 percent by 2014 to 6.3 million.

Of all of the recommendations contained in the National Academies’ report *Rising Above the Gathering Storm*, the highest priority is to vastly improve K–12 math and science education. Schools must help students develop the skills they will need to compete and succeed in higher education and the workforce, which are increasingly connected in this changed world. They must develop a pool of technically adept and numerically literate Americans and a continual supply of highly trained mathematicians, scientists and engineers.

We clearly have a long way to go. High school test scores in math have barely budged since the early 1970s. And less than half of high school graduates in 2005 were ready for college-level math and science course work, according to ACT.

In 1983, the landmark *A Nation at Risk* report recommend that high school students be required to take a minimum of three years of math and three years of science to graduate. Yet today, only 22 states and the District of Columbia require at least this amount to graduate in the class of 2006. Even fewer require high school exit exams (which are often administered in 10th or 11th grade, leading many employers and universities to discount the results). Just one state—Alabama—calls for current students to take four years of both science and math to graduate.

*U.S. manufacturing will no longer employ millions in low-skilled jobs. Tomorrow’s jobs will go to those with education in science, engineering, and mathematics and to high-skill technical workers. Such a workforce is an important key to future growth, productivity, and competitiveness.*

—*The Looming Workforce Crisis*, **National Association of Manufacturers**

*If you want good manufacturing jobs, one thing you could do is graduate more engineers. We had more sports exercise majors graduate than electrical engineering grads last year.*

**—Jeffrey Immelt,  
chairman and CEO,  
General Electric Company**

The result is that as America's students grow older, the rest of the world catches up with them. Our 15-year-olds ranked 24th out of 29 developed nations in mathematics literacy and problem-solving, according to the 2003 Programme for International Student Assessment (PISA) test. The U.S. had a smaller percentage of top performers and a larger percentage of low performers than the average of all developed countries.

A major part of the answer is teacher training. Three out of four fourth-grade math and science teachers in the U.S. do not have a specialization in those subjects. And students from low-income communities are far less likely to have teachers certified in the subject they teach. Shadowing it all is that two-thirds of our math and science teachers are expected to retire by 2010, according to the National Commission on Mathematics and Science Teaching for the 21st Century.

Strengthening math and science curricula is an economic imperative, for the nation and for individual citizens. Students who take advanced math courses in high school (such as trigonometry, pre-calculus and calculus) are far more likely to earn a bachelor's degree. Just taking an AP class can make a real difference. AP Calculus students ranked first in the world on the TIMSS test; U.S. students overall ranked second to last.

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T** Just 7 percent of America's fourth- and eighth-graders achieved the "advanced" level on the Trends in International Mathematics and Science Study (TIMSS) test. In Singapore, 38 percent of fourth-graders and 44 percent of eighth-graders did.

Still, old attitudes about math die hard. A recent survey commissioned by the Raytheon Company found that 84 percent of middle school students would rather clean their rooms, take out the garbage or go to the dentist than do their math homework. And according to the Business Roundtable, just 5 percent of parents say they would “try to persuade their child toward careers in science, technology, mathematics or engineering.” Many people still view math and science as “nerdy” subjects with little relevance to the “real world.” Like it or not, that world has changed forever.

*You've got to know math if you're going to compete in this 21st-century world.*  
—President George W. Bush

## The Answer: American Competitiveness Initiative

President Bush’s **American Competitiveness Initiative** seeks to improve learning and instruction in mathematics and science through the following:

- **National Math Panel:** Based on the influential National Reading Panel, the National Math Panel would convene experts to empirically evaluate the effectiveness of various approaches to teaching math, creating a research base to improve instructional methods for teachers. It would lay the groundwork for the Math Now program for grades K–7 to prepare every student to take and pass algebra.
- **Math Now for Elementary School Students:** Like the successful and popular Reading First program, Math Now for Elementary School Students would promote promising, research-based practices in mathematics instruction and prepare students for more rigorous math course work in middle and high school.

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Students from low-income families who acquire strong math skills by the eighth grade are 10 times more likely to finish college than peers of the same socioeconomic background who do not.

*It's a percolating laboratory full of surprising connections, and a birthplace for new industries. Yes, it's a magnificent time to know math.*

— **“Math Will Rock Your World,”** *BusinessWeek*

- **Math Now for Middle School**

**Students:** Similar to the current Striving Readers Initiative, Math Now for Middle School Students would diagnose students' deficiencies in math proficiency and provide intensive and systematic instruction to enable them to take and pass algebra.

- **Advanced Placement-International Baccalaureate (AP-IB) Incentive Program:** The AP-IB Incentive Program would train 70,000 additional teachers to lead AP-IB math and science courses. It would increase the number of students taking AP-IB tests to 1.5 million over the next five years, tripling the number of passing test-takers to approximately 700,000.

- **Adjunct Teacher Corps:** The Adjunct Teacher Corps would encourage 30,000 qualified math and science professionals to become adjunct high school teachers by 2015.

- **Evaluating the Effectiveness of Federal Science, Technology, Engineering and Math (STEM) programs:** An administration-wide effort would be undertaken to determine which federal education programs are most effective in raising achievement in math and science, which deserve more funding and which should be consolidated to save taxpayer money. The initiative would also align these education programs with the goals and aims of the *No Child Left Behind Act*. Thirteen agencies reported spending \$2.8 billion on 207 education programs in FY 2004. About half of the programs dedicated to math and science received less than \$1 million in funding, with most targeted to postsecondary education.

- **Including Science Assessments in NCLB:** NCLB requires every state to develop and administer science assessments once in each of three grade spans by the 2007-08 school year, and including these assessments in the accountability system will ensure students are learning the necessary content and skills to be successful in the 21st-century workforce.

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Sixty percent of college students who took Algebra II and other high-level math courses in high school say they felt well-prepared for college-level math, compared to 26 percent of students who did not take those courses, according to Achieve, Inc.

## Other Math and Science Initiatives

- **Academic Competitiveness grants and SMART Grant Program:** These two higher education grant programs would build on the success of the Pell Grant program and benefit more than 500,000 students in need.

Academic Competitiveness grants would provide increased funds for low-income students who take a rigorous academic curriculum in high school. Grants in the amount of \$750 would be awarded to qualified first-year college students who had completed a rigorous high school program; grants in the amount of \$1,300 would be awarded to second-year students who had completed a rigorous program and who maintain a 3.0 grade-point average (GPA) in college.

*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.*

— **U.S. Commission on National Security / 21st Century (Hart-Rudman Commission)**

SMART grants would go to college juniors and seniors studying math, science or critical-need foreign languages who also maintain a 3.0 GPA. This will encourage more students to go into fields that improve America's security and competitiveness.

- **Mathematics and Science Partnerships:** This program supports the American Competitiveness Initiative by providing state formula grants to help improve students' academic achievement in rigorous math and science courses. It also assists teachers by integrating proven, research-based teaching methods into the curricula.
- **Expanded Teacher Loan Forgiveness:** This popular program offers up to \$17,500 (up from \$5,000) in loan forgiveness for highly qualified math, science and special education teachers serving challenging, low-income schools and communities.

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More than half of the undergraduate degrees awarded in China are in the fields of science, technology, engineering and math, compared to 16 percent in the U.S.

## The Challenge: Accelerating Our Schools' Progress

Innovating and improving America's schools will not occur overnight. It took time for eight other developed nations to surpass America's high school graduation rate among adults aged 25 to 34; and it will take time for the U.S. to regain its leadership. We must start by accelerating our progress.

*One of the best standard predictors of academic success at Harvard is performance on Advanced Placement examinations.*

—**Bill Fitzsimmons,**  
**dean of Admissions**  
**and Financial Aid,**  
**Harvard University**

A comprehensive problem demands a comprehensive solution, extending from kindergarten through high school graduation. The good news is that educators and policy-makers are learning more and more about what works. A half-century ago, the U.S. turned the threat of Soviet competition into proof of our ability to improve our schools and quality of life. Just four years ago, the U.S. turned a growing achievement gap into

the bipartisan *No Child Left Behind Act*.

The law set a course for proficiency for all students in the core subjects of reading and math by the year 2014. Students in grades 3 through 8 are now learning under high standards. Teachers are using proven instructional methods. Schools are being held accountable for results. Parents have more information and choices. And states have more flexibility to spend federal K–12 education resources, which have increased by 40 percent since 2001.

The early results are in. Across the country, academic achievement has risen significantly in the earliest grades, with math scores at all-time highs, including among African-American and Hispanic students. In the last two years, the number of fourth-graders who learned their fundamental math skills increased by 235,000—enough to fill 500 elementary schools. More reading progress was made among 9-year-olds over the last five years than in the previous 28 years combined. Meanwhile, according to the Nation's Report Card, the Achievement gaps in reading and math between white and

African American nine-year-olds and between white and Hispanic nine-year-olds are at all time lows. Educators use terms like “amazing,” “stunning” and “remarkable” to describe the progress.

*No Child Left Behind* has set the goal of every child achieving, but the states and schools themselves have done the heavy lifting to make the law work.

For the first time, all 50 states have unique accountability plans in place, with real consequences attached. The results can be seen in schools like Maryland’s North Glen Elementary. In 2003, just 57 percent of North Glen’s students were proficient in reading, while 46 percent were proficient in math. Those numbers have skyrocketed to 82 percent and 84 percent, respectively.

As First Lady Laura Bush said during a recent visit to North Glen, “They’ve taken advantage of all the aspects of the *No Child Left Behind* law.”

*In the 21st Century, economic power will be derived from skills and innovation. Nations that don’t invest in skills will weaken: it is that straightforward.*

—**Louis Gerstner Jr., former chairman and CEO, IBM**

Another example is Charles L. Gideons Elementary School in Atlanta. The number of its students meeting Georgia’s standards in reading increased by 23 percentage points since 2003. For math the news is even better: a 34 percentage-point improvement during the same period.

A districtwide success story occurred in Garden Grove, Calif. Three-fourths of the Garden Grove Unified School District’s students do not speak English. Nearly 60 percent are from low-income families. Nevertheless, all but two of the district’s 67 schools met or exceeded their Adequate Yearly Progress goals under the law.

The *No Child Left Behind Act* was designed to improve achievement. But it has also shown us what is achievable as a nation. Educators, administrators and public officials are working together, united behind a worthy goal. Now it’s time to apply the act’s successful principles to our nation’s high schools.

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Only one in five recent high school graduates in the workforce say they were challenged with high academic expectations in high school, according to Achieve, Inc.

*If you can solve the education problem, you don't have to do anything else. If you don't solve it, nothing else is going to matter all that much.*

—**Alan Greenspan,**  
**outgoing Federal Reserve**  
**Board chairman**

There is not a moment to waste. Governors and business leaders are united in calling for urgent reform. Every year approximately 1 million students drop out of high school, costing the nation more than \$260 billion in lost wages, taxes and productivity over the students' lifetimes. A high school graduate can expect to earn about \$275,000 more over the course of his or her lifetime than a student who doesn't finish high school; a college graduate with a bachelor's degree can expect to earn about \$1 million more. Dropouts are also three-and-a-half times more likely to be arrested, according to reports. Encouraging at-risk students to stay in school by addressing their academic needs will improve their quality of life and that of their fellow Americans.

### **The Answer: The President's High School Reform Initiative**

Giving Americans the math and science skills they need will help us remain a world economic leader. Teaching students under the highest standards and offering more rigorous course work will help us remain an education leader.

The president's **High School Reform Initiative** would hold high schools accountable for providing high-quality education to all students. And it would help educators implement strategies to meet the needs of at-risk high school students. The proposed program would make formula grants to states to support:

- The development, implementation and evaluation of targeted interventions designed to improve the academic performance of students most at risk of failing to meet state academic standards; and

- Expanded high school assessments that would assist educators in increasing accountability and meeting the needs of at-risk students.

Interventions would be designed to increase the achievement of high school students; eliminate achievement gaps between students from different ethnic and racial groups and income levels; and help ensure that students graduate with the education, skills and knowledge necessary to succeed in postsecondary education and in the technology-based global economy.

A key strategy would be the development of individual performance plans for students entering high school, using eighth-grade assessment data in consultation with parents, teachers and counselors. Specific interventions could include programs that combine rigorous academic courses with vocational and technical training, research-based dropout prevention activities, and the use of technology-based assessment systems to closely monitor student progress. In addition, programs that identify at-risk middle school students for assistance would help prepare them to succeed in high school and enter postsecondary education. This includes college preparation and awareness activities for students from low-income families.

The president's proposal also would require states to develop and implement reading and mathematics assessments in two additional grade levels in high school, building on the current *NCLB* requirement for testing once in grades 10–12. The new assessments would inform strategies to strengthen school accountability and meet the needs of at-risk students.

*We've seen the results in my own state of Massachusetts. Student achievement is up across the board in both reading and math. We've made significant progress in educating children with disabilities. We're seeing the results of the **No Child Left Behind** reforms in other parts of the country, too. ... Research-based instruction, assessments, and targeted interventions are working.*  
—**Sen. Edward Kennedy [D-Mass.]**

## Additional Support

*We use **No Child Left Behind** to set the targets we want to hit. We align all our actions and resources to hit those targets. And we believe the kids can do it.*

—**Laura Schwalm,**  
superintendent,  
**Garden Grove Unified**  
**School District**

- **Striving Readers:** First funded in 2005, this program would be expanded significantly to reach more secondary students reading below grade level, which puts them at risk of dropping out. Students would benefit from research-based interventions coupled with rigorous evaluations. Schools would benefit from activities and programs designed to improve the overall quality of literacy instruction across the entire curriculum.

## The Challenge: Promoting Freedom and Understanding

America faces a severe shortage of people who speak languages that are critical to its national security and global competitiveness:

- According to the Center for Applied Linguistics, less than one-fourth of public elementary schools report teaching foreign languages, even though a child's early years are the best years in which to learn a new language.
- Less than 1 percent of American high school students study Arabic, Chinese, Farsi, Japanese, Korean, Russian or Urdu—combined.
- Less than 8 percent of undergraduates in American universities take foreign language courses, and less than 2 percent study abroad in any given year.

While only 44 percent of U.S. high school students were studying a foreign language in 2002, learning a second or even a third foreign language is compulsory for students in the European Union, China, Thailand and elsewhere.

*High schools are failing to prepare too many of our students for work and higher education.*  
—**National Governors Association**

More than 200 million children in China study English. By comparison, only about 24,000 elementary and secondary school children in the U.S. study Chinese. Many students in other nations begin learning another language before they're even 10 years old. They will have an edge over monolingual Americans and others in developing new relationships and business connections in countries other than their own.

### **The Answer: The President's National Security Language Initiative**

Critical-need foreign language skills are necessary to advance the twin goals of national security and global competitiveness. Together with the Department of State, Department of Defense and the director of national intelligence, the Department of Education will propose to offer grants and training for teachers under President Bush's National Security Language Initiative.

The initiative will increase the number of Americans who speak and teach foreign languages, with an emphasis on critical-need languages. It will strengthen and refocus the Federal Foreign Language Assistance Program, and will initially enable 24 school districts across the country to create partnerships with colleges and universities to develop critical-need language programs. Among the critical-need languages targeted under the initiative are Arabic, Chinese, Korean, Japanese and Russian, as well as languages in the Indic, Iranian and Turkic families.

The National Security Language Initiative will also provide funding to create a Language Teacher Corps, with the goal of having 1,000 new foreign language teachers in U.S. schools by the end of the decade. And it will enable the creation of an e-learning language clearinghouse and expanded teacher-to-teacher seminars to assist foreign language teachers anytime, anywhere.

## Conclusion

Thanks to our schools, the 20th century was known as the “American Century.” The 21st century remains to be claimed. But Americans have never backed

*More than three-quarters of Americans believe that if our high schools don't change soon, our country will be less able to compete in the global marketplace. And almost as many favor extending (NCLB) by asking states to set standards for high schools and to make sure that those standards are met.*

—Margaret Spellings, U.S. secretary of education

down from a challenge. This changing world offers another opportunity for Americans to shine, and the president’s American Competitiveness Initiative and the rest of his 2006 education agenda will help set the course.

America’s schools have made great progress in improving academic achievement in the early grades. But like athletes or musicians, children of all ages must work hard each and every day if they wish to compete, perform and succeed, and their schools must show them the way. The president’s 2006 education agenda will help prepare the students of today to become

the successful leaders—the pioneers, discoverers and Nobel Prize winners—of the next American Century.

<b>PRESIDENT’S ACI INITIATIVE: EDUCATION</b>	
<i>FY 2007 Budget Request</i>	
Math Panel	\$ 10 million
Math Now for Elementary Students	\$125 million
Math Now for Middle School Students	\$125 million
AP-IB	\$122 million *
Adjunct Teacher Corps	\$ 25 million
Evaluation of Federal STEM programs	\$ 5 million

\* includes \$32 million for AP-IB from FY 2006



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