

**Remarks by
U.S. Secretary of Education Richard W. Riley**

**National Commission on Mathematics and Science Teaching for
the 21st Century – Presentation of Commission's Report**

**Smithsonian Institution's National Air and Space Museum
Washington, D.C.**

September 27, 2000

Thank you for that kind introduction. I am happy to be in this magnificent building, which stands in tribute to America's accomplishments in space and to be with my good friend John Glenn. He is the very embodiment of the heights of American achievement in mathematics and science. On behalf of the U.S. Department of Education and a grateful nation, I thank you for your many contributions and for leading the commission's preparation of this report.

And to all of the Commission's members, my thanks for your willingness to strive to improve American mathematics and science teaching and learning. I'd also like to thank Dr. Linda Rosen, the commission's executive director and my chief mathematics advisor, for her tireless work in seeing the Commission through to this day. I am told that this panel did not always agree -- and that their discussions were sometimes spirited, and their hours long.

Through it all, Commission members shared their considerable knowledge and vision for educational excellence in these two important fields of learning. The Commission members may be well skilled at adding up numbers and understanding formulas, but I think it is safe to say that here, their contribution is immeasurable.

I called for the creation of this Commission because I saw the urgent need to recruit new teachers to meet the current and coming shortage in the fields of mathematics and science. I welcome its recommendations today. The Commission calls for much greater investments in the teaching profession, particularly in the math and science disciplines. I couldn't agree more.

And while this is a comprehensive blueprint and a long term prescription for success, Congress can still do something that will make a difference right now. Unfortunately, it has failed to act on our proposed overhaul of elementary and secondary programs. It can and must still approve the President's budget request to improve the quality of teachers, reduce class size and strengthen accountability for results and make other crucial investments in our schools. This kind of support would be a strong down payment on the kind of investment that this Commission has called for.

We know we must continue to take steps to immediately to meet the current shortage of math and science teachers, as well as invest wisely in the recruitment, professional development and retention of these teachers if we are going to accommodate the explosion of knowledge in these fields, as well as the uninterrupted increase in school enrollments projected through this century. I can attest to the strength, purpose, and dedication of many thousands of classroom teachers working today who will welcome the support called for in this report.

Many of us have known for some time that math and science learning is at a crossroads. One reason, of course, is the sheer amount of innovation and new knowledge in these fields just in the past decade. Our increasing reliance on computers, the growing globalization in business, and other consequences of the Information Age -- all are placing greater on our schools and students. We need to meet these demands if we are going to maintain our preeminence in these areas in the 21st century. This is our national mission.

This Commission has worked hard to identify how this can and should be done. It is a starting point -- a blueprint for building a program of success that will ensure American children meet the math and science challenges that surely will come. We have worked hard to lay a foundation for a strong future. We know what is needed.

**This report makes clear, the convergence of several factors -- higher learning standards, a strong economy, a richer knowledge base about math and science teaching, an increased spirit of volunteerism, and a historic public awareness of the importance of education -- make this the ideal time to move forward with a sense of urgency. This Administration has played a role in helping bring about this convergence of factors, from high standards to building a strong economy.**

As Senator Glenn might well remind us, when it comes to math and science learning - as well as all our educational endeavors -- we must remember to be on solid ground before we reach for the stars.

This report provides an excellent launch pad, and I thank you again for your efforts here. I look forward to sharing this report with the President and to continuing our progress toward educational excellence in these important areas.

PRESIDENT CLINTON AND VICE PRESIDENT GORE:
Supporting Women and Families

Expanding Economic Opportunity

Moving From Record Deficits to Record Surplus. In 1992, the deficit was \$290 billion, a record dollar high. In 2000, we have a projected budget surplus of \$211 billion -- the third consecutive surplus and the largest surplus ever, even after adjusting for inflation. This is the first time we have had three surpluses in a row in more than a half century.

More Than 22 Million New Jobs. 22.1 million new jobs have been created since 1993, the most jobs ever created under a single Administration -- and more new jobs than Presidents Reagan and Bush created during their three terms. 92 percent (20 million) of the new jobs have been created in the private sector, the highest percentage in 50 years. [National Economic Council, 7/29/00]

Tax Cuts for Working Families. 15 million additional working families received additional tax relief because of the President's expansion of the Earned Income Tax Credit. In 1998, the EITC lifted 4.3 million people out of poverty -- double the number lifted out of poverty by the EITC in 1993. This year, the President proposed expanding the EITC to provide tax relief to an additional 6.8 million hard-pressed working families.

Highest Median Family Income in History. Since the President launched his economic plan in 1993, median family income is the highest it has ever been. The typical family's income is up over \$5,000. In 1998, median household income is up 3.5 percent to a new high of \$38,885.

Helping Parents Balance Work and Family. The Family & Medical Leave Act (FMLA) -- the first piece of legislation the President signed into law -- enables workers to take up to 12 weeks unpaid leave to care for a new baby or ailing family member without jeopardizing their job. Since its enactment, millions of Americans have benefited from FMLA, and the President has expanded leave options for Federal employees. President Clinton has called for extending this benefit to 12 million more working families and expanding the law to allow workers to take leave for family obligations such as doctors appointments and parent-teacher conferences. Additionally, in his FY 2001 budget, the President is proposing new grants to enable states and regions to develop innovative paid leave options for working parents.

Fighting for Fair Pay. The Clinton-Gore Administration has worked to ensure fair pay for women and close the wage gap. The average woman who works full-time now earns about 75 cents for each dollar that an average man earns. The President and Vice President have called on Congress to pass the Paycheck Fairness Act, which would strengthen laws prohibiting wage discrimination. This year, the President has proposed a \$27 million initiative to help the Equal Opportunity Employment Commission and the Labor Department fight wage discrimination.

Increased the Minimum Wage. The minimum wage has risen from \$4.25 to \$5.15 per hour, increasing wages for six million women. The President and Vice President have called for an additional increase to \$6.15.

Highest Homeownership Rate in History. The homeownership rate reached 67.2 percent in the second quarter of 2000 -- the highest ever recorded. In contrast, the homeownership rate *fell* from 65.6 percent in the first quarter of 1981 to 63.7 percent in the first quarter of 1993. There are almost 9 million more homeowners than in 1993. Women's homeownership has increased 14% with 1.9 million new women homeowners since the first quarter of 1994.

Providing Incentives to Save. President Clinton signed legislation creating Individual Development Accounts, providing incentives for low-income families to save for a first home, higher education, or to start a new business, a key part of his 1992 community empowerment agenda. In FY 1999, \$10 million was awarded to establish savings accounts for over 10,000 low-income workers in 40 communities, and an additional \$10 million will be awarded in FY 2000. The President's budget provides \$25 million for IDAs in FY 2001 and proposes to allow low-income working families to use IDAs to save for a car that will allow them to get or keep a job. [White House Fact Sheet, 10/27/98, White House Fact Sheet, 2/23/00]

Increasing Pension Security. President Clinton proposed and signed the Retirement Protection Act of 1994, protecting the benefits of more than 40 million American workers and retirees. The President also signed the Small Business Job Protection Act of 1996, which provided a tax credit to small business that adopt pension plans; created a simplified and better defined contribution plan for small businesses; and promoted portability.

Saving Social Security. President Clinton and Vice President Gore have coupled fiscal discipline with a commitment to preserve and protect Social Security. Under the Clinton-Gore Administration, the life of the Social Security trust fund has been extended to 2037. President Clinton has proposed extending the program's solvency to at least 2054 by paying down the national debt and dedicating the interest savings to Social Security. In April 2000, President Clinton signed legislation to eliminate the confusing and out-dated Retirement Earnings Test in order to encourage work and earnings for older Americans. These steps would be a down payment on truly saving Social Security.

Social Security Reform is Critical to Women. Women live an average of six years longer than men, and because they live longer they become increasingly dependent on Social Security benefits as they age. Women represent 60 percent of all Social Security recipients at age 65, and by age 85, 71 percent of recipients are women. Social Security provides 90 percent of income for 41 percent of all older women; 25 percent have no other source of income. The poverty rate among elderly women is twice the poverty rate among seniors as a whole. President Clinton and Vice President Gore are committed to reforming Social Security in a manner that will ensure fairness and reduce the poverty rate of single elderly women.

Tripled the Number of Small Business Loans to Women Entrepreneurs. Between FY 1992 and FY 1999 the SBA approved nearly 73,000 loans, amounting to more than \$11 billion, to women entrepreneurs under the 7(a) and 504 loan programs. In FY 1999 alone, the Small Business Administration granted 10,244 loans, worth \$1.85 billion, to women small business owners, triple the number of loans granted in 1992; in FY 2000 to date the SBA has approved 3,612 loans worth \$711 million dollars. [as of 2/00]

Women Are Starting Businesses at Twice the Rate of All Businesses. Women are starting

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businesses at twice the rate of all businesses and staying in business longer. There are an estimated 9.1 million women-owned firms today, employing 27.5 million people and contributing \$3.6 trillion in sales and revenue to the U.S. economy. The Small Business Administration's Office of Women's Business Ownership is working to foster this growth.

Expanded Small Business Opportunities for Women. The Clinton-Gore Administration won \$9 million in FY 2000 for Women's Business Centers, which provide resources to foster increased entrepreneurship among women. In his FY 2001 budget, President Clinton has proposed to expand the Women's Business Center network budget to \$12 million, an increase of 33 percent. Today this network includes more than 80 women's business centers, including an Online Women's Business Center. Of those, 59 centers are currently funded by SBA grants; 22 have graduated from funding and are operating independently. In May 2000, President Clinton issued an executive order requiring departments and agencies to develop long-term comprehensive strategies to expand opportunities for women-owned small businesses, including mentor-protégé programs to include women-owned firms and industry-wide -- and industry-specific -- outreach, training, and technical assistance programs for women-owned small businesses. [Executive Order 13157, 5/23/00]

Creating New Tools to Help Families Move from Welfare to Work. Since enactment of the 1996 welfare reform law, millions of families have moved from welfare to work. With the President's leadership, the 1997 Balanced Budget Act included \$3 billion to move long-term welfare recipients and low-income non-custodial fathers into jobs. To fully implement this initiative, the President's FY 2001 budget allows grantees an additional two years to spend Welfare-to-Work funds. It also proposes \$255 million for Fathers Work/Families Win grants to promote responsible fatherhood and support working families. The Welfare-to-Work Tax Credit provides tax incentives to encourage businesses to hire long-term welfare recipients. The President's Access to Jobs initiative helps communities design innovative transportation solutions, such as van services, to help former welfare recipients and other low-income workers get to work, and this year the President is proposing \$150 million for this initiative, double last year's level. President Clinton has secured 110,000 new housing vouchers in the last two years to help welfare recipients and hard-pressed working families move closer to job opportunities, and this year he is proposing \$690 million for 120,000 new housing vouchers.

Doubled Child Support Collections. President Clinton signed into law the toughest child support crackdown in history. Federal and state child support programs broke new records in 1999, collecting nearly \$16 billion -- double the amount collected in 1992. The number of paternities established rose to a record 1.5 million in 1998 -- more than triple the number from 516,000 in 1992. The number of child support cases with collections rose 59 percent, from 2.8 million 1992 to 4.5 million in 1998. [HHS Release, 1/27/00]

Signed the Landmark Work Incentives Improvement Act. Americans with disabilities often become ineligible for Medicaid or Medicare if they work, forcing a choice between health care and employment. The Work Incentives Improvement Act keeps people with disabilities from losing their Medicare or Medicaid health coverage when they go to work. It also includes a \$250 million demonstration, which the President insisted on fully funding, that allows people with disabilities who are still working and are not yet sufficiently disabled to qualify for Medicaid to buy into the program.

Caring For Our Children

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Largest Five-Year Drop in Child Poverty Rate Since the '60s. Under President Clinton and Vice President Gore, child poverty has declined from 22.7 percent in 1993 to 18.9 percent in 1998 -- the biggest five-year drop in nearly 30 years.

Fought For and Won \$500 Child Tax Credit for 27 Million Families with 45 Million Children under Age 17. Twelve million children from families with income below \$30,000 will receive the child tax credit as a result of the President's efforts.

Nutrition for Women, Infants and Children (WIC). President Clinton won over \$4 billion for nutrition assistance to millions of women, infants, and children through the WIC program, an increase of \$108 million over FY 1999. The additional funds will allow the program to provide a monthly package of nourishing supplemental foods, nutrition education, and health care referrals to 7.3 million low-income women, infants and children who are at nutritional risk -- 1.4 million more people than in 1993. Research shows that every \$1 increase in the prenatal care portion of the WIC program cuts between \$1.77 and \$3.90 in medical expenses in the first 60 days following childbirth.

Ensuring Safe Food for America's Families. President Clinton created the President's Council on Food Safety to develop a comprehensive food safety strategic plan for federal agencies. The Clinton-Gore Administration has implemented a new science-based inspection system -- Hazard Analysis and Critical Control Points -- and reduced the prevalence of *salmonella* in raw meat and poultry by as much as 50 percent. The Administration formed national computer network of public health laboratories, called PulseNet, to help rapidly identify and stop outbreaks of foodborne illness by performing DNA "fingerprinting" on foodborne pathogens. The President signed the Food Quality Protection Act, which included special safeguards for kids and strengthened laws governing pesticides and food safety. The Administration also issued new rules to prevent foodborne illness caused by pathogens such as *E. coli*.

Held First-Ever White House Conferences on Early Child Development and Learning; on Child Care; and on Teenagers. In April 1997, the President and First Lady held the White House Conference on Early Child Development and Learning to highlight the benefits of early nurturing by parents. And in October 1997, the White House Conference on Child Care began a dialogue on the child care challenges facing parents today -- availability, affordability, and assuring safety and quality. In May 2000, the President and First Lady hosted the first-ever White House Conference on Teenagers, which brought together parents, teens, policy makers and other experts to discuss strategies for raising responsible and resourceful youth.

Improved Access to Affordable, Quality Child Care and Early Childhood Programs. Under the Clinton-Gore Administration, federal funding for child care has more than doubled, helping parents pay for the care of about 1.5 million children in 1998, and the 1996 welfare reform law increased child care funding by \$4 billion over six years to provide child care assistance to families moving from welfare to work. Since 1993, the Clinton-Gore Administration has increased funding for the Head Start program by 90 percent, and in FY 2000, the program will serve approximately 880,000 children -- over 160,000 more children than in 1993. President Clinton and Vice President Gore have proposed a \$817 million increase in FY 2001 for the Child Care and Development Block Grant, which helps working families struggling to

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afford child care. These new funds, combined with the child care funds provided in welfare reform, will enable the program to serve over 2.2 million children in 2001.

Signed the Adoption and Safe Families Act. The Adoption and Safe Families Act, which was based in large part on the recommendations of the Clinton-Gore Administration's Adoption 2002 report, made sweeping changes in adoption law so that thousands of children in foster care move more quickly into safe and permanent homes. In 1998, 36,000 children in foster care were adopted, up from 28,000 in 1996. This is the first significant increase in adoption since the national foster care program was established nearly 20 years ago.

Using the Internet to Increase Adoptions. In November 1998 the President directed the Department of Health and Human Services to expand the use of the Internet as a tool to link children in foster care more quickly with possible adoptive families. HHS will launch a national web site by September 2001 to break down geographic barriers to adoption.

Enacted the Foster Care Independence Act. Nearly 20,000 young people leave foster care each year when they reach age 18 without an adoptive family or other guardian. The Foster Care Independence Act will ensure that those young people will get the tools they need to make the most of their lives by providing them better educational opportunities, access to health care, training, housing assistance, counseling, and other services.

Raised Immunization Rates to All Time High. Since 1993, childhood immunization rates have reached all-time highs, with 90 percent or more of America's toddlers receiving the most critical doses of vaccines for children by age 2. For the most critical childhood vaccines, vaccination levels are nearly the same for preschool children of all racial and ethnic groups, narrowing a gap that was estimated to be as wide as 26 percentage points a generation ago. **With childhood vaccination levels at an all-time high, disease and death from diphtheria, pertussis, tetanus, measles, mumps, rubella and Hib are at or near record lows.** [HHS Fact Sheet, 9/23/99; HHS Fact Sheet, 12/31/99]

Enacted Single Largest Investment in Health Care for Children since 1965. The five year, \$24 billion State Children's Health Insurance Program (SCHIP) will provide health care coverage for up to five million children. Two million children have already been enrolled, and in October 1999 President Clinton announced new outreach initiatives to enroll millions more uninsured, eligible children. Last year, the President launched a nationwide "Insure Kids Now" campaign that will bring together major TV and radio networks, healthcare organizations, religious groups and other community-based organizations to help enroll more children in the Children's Health Insurance Program, with the goal of enrolling 5 million of the estimated 10 million children eligible for health insurance under CHIP within 5 years. This year, the budget includes several of Vice President Gore's proposals to accelerate enrollment of children in CHIP. The President is also proposing a new FamilyCare program, which would give States the option to cover parents in the same plan as their children.

Issued Regulation that Drug Companies Provide Adequate Testing for Children. President Clinton directed an important Food and Drug Administration regulation requiring manufacturers to do studies on pediatric populations for new prescription drugs -- and those currently on the market -- to ensure that prescription drugs have been adequately tested for the unique needs of children.

Teen Births Down to the Lowest Rate on Record. The teen birth rate has fallen eight years in a row, dropping 20 percent from 1991 to 1999 to the lowest rate in the 60 years data on teen births have been recorded. The teen pregnancy rate is also at the lowest rate on record. To build on this progress, the President's budget includes funding for "second chance homes" for teen parents. [Centers for Disease Control, National Center for Health Statistics, "Births: Preliminary Data for 1999," 8/8/00; White House Office of the Press Secretary, 08/12/00]

Standing Up to the Tobacco Industry. The President and Vice President developed and implemented the first-ever plan to protect our children from tobacco, including: proposing to hold the tobacco industry accountable by charging the tobacco industry an assessment for every underage smoker and increasing the price of cigarettes by 25 cents a pack; urging Congress to grant FDA the authority to regulate tobacco products, prohibit advertising aimed at children and curb minors' access to tobacco products; pursuing the suit filed against the tobacco industry by the Justice Department to recover the federal costs of smoking-related illnesses; advocating that states use tobacco settlement money for tobacco prevention and control; and helping people to quit by proposing a smoking cessation program for Medicaid.

Investing in Education

Largest Investment in Education in Thirty Years. President Clinton and Vice President Gore have been committed to maintaining our nation's investment in education. The Clinton-Gore Administration enacted the largest investment in education in 30 years – and the largest investment in higher education since the G.I. Bill by doubling student aid to nearly \$60 billion.

Providing Early Education to Nearly 900,000 Children with Head Start. The President and Vice President have expanded Head Start funding by 90 percent since 1993. Head Start will reach approximately 880,000 low-income children in FY 2000 and, with the President's proposed increase for the program, will be on the way to reaching the President's goal of serving one million children and their families by the year 2002. The Administration also created Early Head Start, bringing Head Start's successful comprehensive services to families with children ages zero to three, and set high quality standards for both programs.

More High-Quality Teachers with Smaller Class Sizes. The Clinton-Gore Administration won a second installment of \$1.3 billion for the President's plan to hire an additional 100,000 well-prepared teachers to reduce class size in the early grades, when children learn to read and master the basic skills. Already, 29,000 teachers have been hired through this initiative. This year's budget provides \$1.75 billion, a \$450 million increase -- enough to fund nearly 49,000 teachers.

Turning Around Failing Schools. 11 million low-income students now benefit from higher expectations and a challenging curriculum geared to higher standards through Title I-Aid to Disadvantaged Students. The FY 2000 budget provides a \$134 million accountability fund to help turn around the worst performing schools and hold them accountable for results through such measures as overhauling curriculum, improving staffing, or even closing schools and reopening them as charter schools. This year, the President is proposing to double funding for this fund to turn around the nation's failing schools to ensure all children receive a quality education.

Protecting Title IX. The Clinton-Gore Administration firmly supports and enforces Title IX, which has

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enabled young women to participate fully in high school and college athletics. When Title IX was passed more than 25 years ago, only 300,000 girls participated in high school sports. In 1999, well over two million participated. In June 2000, on the anniversary of Title IX, President Clinton issued an Executive Order prohibiting discrimination in federal education and training programs -- ensuring that the federal government holds itself to the same principles of nondiscrimination that it applies to the education programs and activities of state and local governments, and to private institutions receiving federal financial assistance. [Executive Order 13160, 6/23/00]

Teaching Every Child to Read by the 3rd Grade. The President challenged Americans to unite to be sure that every child can read well and independently by the third grade. More than 1,400 colleges and universities joined the President's America Reads Challenge, and 26,700 college work-study students now serve as reading tutors to help every child to read well and independently by the third grade. [Education Department, "Challenging the Status Quo: The Education Record, 1993-2000," 4/00]

Expanding Choice and Accountability in Public Schools. The Clinton-Gore Administration has worked to expand public school choice and support the growth of public charter schools, which have increased from one public charter school in the nation when the President was first elected to more than 1,700 today. More than 250,000 students nationwide are now enrolled in charter schools in 30 states and the District of Columbia. The President won \$145 million in FY 2000 -- and has proposed \$175 million in his FY01 budget -- to continue working toward his goal of establishing 3,000 quality charter schools by 2002.

Establishing the GEAR-UP Mentoring Program for Middle School Children. President Clinton and Vice President Gore created and expanded GEAR-UP, a nationwide mentoring initiative, to help over 750,000 low-income middle school children finish school and prepare for college. GEAR-UP will expand mentoring efforts by states and provide new grants to partnerships of middle schools, institutions of higher education, and community organizations, to provide intensive early intervention services to help prepare over 750,000 students at high-poverty middle schools for college. The President's FY 2001 budget would expand services to 1.4 million students with a 63 percent increase.

Providing Safe After-School Opportunities for 850,000 Students Each Year. The 21st Century Community Learning Centers program provides enriching after-school and summer school opportunities for 850,000 school-age children in rural and urban communities in FY 2000. Extended learning time has not only been shown to increase achievement in reading and math, but to decrease youth violence and drug use. Funding for this program more than doubled from FY 1999 to FY 2000. For FY 2001, the President's budget calls on Congress to invest \$1 billion in the 21st Century Program and to ensure that all children in failing schools have access to quality after-school and summer school opportunities. This proposal will double funding and nearly triple the number of students served to 2.5 million.

Expanding Access to Technology. With the Vice President's leadership, the Clinton-Gore Administration has made increasing access to technology a top priority. The President and Vice President created the Technology Literacy Challenge Fund to help connect every school to the Internet, increase the number of multimedia computers in the classroom and provide technology training for teachers. They increased overall investments in educational technology from \$23 million in 1993 to \$769 million in FY 2000, and tripled funding for Community Technology Centers to reach at least 120 low-income communities. Through the E-rate program, they secured low-cost connections to the

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Internet for schools, libraries, rural health clinics and hospitals, benefiting more than 80 percent of America's public schools. They also increased investment in education research to ensure all children benefit from educational technology. In 1999, 95 percent of public schools were connected to the Internet -- up from just 35 percent in 1994.

Paying for College Through Community Service. In just five years, AmeriCorps has allowed 150,000 young people to serve in their communities while earning money for college or skills training.

Enacted Hope Scholarships and Lifetime Learning Tax Credits. President Clinton proposed and passed the HOPE Scholarships and Lifetime Learning tax credits, which in 1999 were claimed by an estimated 10 million American families struggling to pay for college. The Hope Scholarship helps make the first two years of college universally available by providing a tax credit of up to \$1,500 for tuition and fees for the first two years of college. The Lifetime Learning tax credit provides a 20 percent tax credit on the first \$5,000 of tuition and fees for students beyond the first two years of college, or taking classes part-time (in 2003, this increases to \$10,000 of tuition and fees). In his FY 2001 budget, the President has proposed expanding the Lifetime Learning tax credit with a College Opportunity tax cut, which will give families the option of taking a tax deduction or claiming a 28 percent credit for the first \$5,000 of college tuition and fees through 2002, and \$10,000 thereafter.

Expanding Work Study and Pell Grants. One million students will be able to work their way through college because of the President's expansion of the Work Study Program, and nearly four million students will receive a Pell Grant of up to \$3,300, the largest maximum award ever. The maximum award has increased 43 percent under the Clinton-Gore Administration. This year President Clinton proposed a \$77 million increase in Work Study to continue to support one million awards, and a \$200 increase in the Pell Grant maximum award, to raise it to \$3,500.

Improving Our Nation's Health

Protected and Strengthened Medicare, Benefiting 22 Million American Women Enrollees. In the 1997 Balanced Budget, the Clinton-Gore Administration protected, modernized and extended the life of the Medicare Trust Fund while offering new options for patient choice and preventive care. New preventive benefits passed include coverage of annual mammograms, cervical cancer screening, and tests to help detect osteoporosis. The President proposed a plan to reform and modernize Medicare's benefits, including an optional prescription drug benefit that is affordable and available to all beneficiaries. The President has also proposed a reserve fund to help Medicare beneficiaries with extremely high prescription drug costs. In March 1999, the Medicare Trustees reported that the life of the Medicare Trust Fund has been extended until 2025. In 1993, Medicare was expected to run out of money in 1999.

Increased Funding for Breast Cancer Research. Since President Clinton and Vice President took office, funding for breast cancer research, prevention and treatment has more than doubled. This year, the Administration's budget will provide \$27 million in funding -- a 56 percent increase -- to learn more about environmental causes of diseases like breast cancer. In addition, the President has implemented the Mammography Quality Standards Act to ensure the quality of mammograms. Women can now find a certified mammography facility by calling 1-800-4-CANCER.

Created Office of Cancer Survivorship. President Clinton unveiled the new Office of Cancer Survivorship at the National Cancer Institute. The Office will support research covering the range of issues facing survivors of cancer.

Providing Protection with the Patients' Bill of Rights. The President and Vice President have called on Congress to pass Federally enforceable consumer health care protections that include: guaranteed access to needed health care specialists including direct access to an OB-GYN; access to emergency room services when and where the need arises; access to a timely internal and independent external appeals process for consumers to resolve their differences with their health plans; and assurances that doctors and patients can openly discuss treatment options. Women are particularly vulnerable without these health care protections because they are greater users of health care services, they make three-quarters of the health care decisions for their families, and they have specific health care needs that are directly addressed by a patients' bill of rights. Leading by example, the President directed all federal agencies to ensure that their employees and beneficiaries have the benefits and rights guaranteed under the proposed Patients' Bill of Rights. 85 million Americans covered by federal health plans have the security of knowing they will have fair access to health care thanks to the President's work.

Preventing Discrimination Based on Genetic Information Both by Health Plans and Employers. The Clinton-Gore Administration has urged Congress to pass bipartisan legislation to prohibit health plans from inappropriately using genetic screening information to deny coverage, set premiums, or to distribute confidential information. The President also has supported legislation that ensures that employers do not use genetic information to discriminate against employees. President Clinton signed an executive order banning the use of genetic information in federal hiring and promotion actions and strengthening privacy protections of federal employees' genetic information.

Passed Meaningful Health Insurance Reform. The President signed into law the Kennedy-Kassebaum Health Insurance Portability and Accountability Act, which helps individuals keep health insurance when they change jobs, guarantees renewability of coverage, and ensures access to health insurance for small businesses. As many as 25 million people will benefit from this law. The bill also eliminated the discriminatory tax treatment of the approximately 10 million Americans who are self-employed; strengthened efforts to combat health care fraud, waste and abuse by creating a stable source of funding; and provided consumer protections and tax incentives for private long-term care insurance.

Released Strong New Protections for the Privacy of Electronic Medical Records. The Clinton-Gore Administration released a new regulation to protect the privacy of electronic medical records held by health plans, health care clearinghouses, and health care providers. This rule would limit the use and release of private health information without consent; restrict the disclosure of protected health information to the minimum amount of information necessary; establish new requirements for disclosure of information to researchers and others seeking access to health records; and establish new administrative and criminal sanctions for the improper use or disclosure of private information.

Ended Drive-Through Deliveries. President Clinton proposed and signed into law legislation requiring insurers to cover at least 48 hours of a post-natal hospital stay (72 hours for a Cesarean).

Endorsed Legislation That Would Ban Drive-Through Mastectomies. President Clinton endorsed the Breast Cancer Patient Protection Act, which would allow women to stay in the hospital at least 48

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hours following a mastectomy.

Promoting Reproductive Health Services for Women

Expanding Family Planning Services. President Clinton and Vice President Gore have taken strong steps to promote safe reproductive health services for women. They won a nearly \$25 million increase for Title X family planning, the largest increase since 1993, bringing the program to almost \$240 million in FY 2000. This year, the President's budget includes a \$274 million investment -- a 15 percent increase -- to prevent unintended pregnancy and ensure access to safe, high quality family planning services. This investment will help fund clinics and community-based health services that reach more than 5 million women and families. In 1998 and 1999, the Clinton-Gore Administration successfully defeated parental consent restrictions on contraceptive services for minors.

Provided Contraceptive Coverage to More than a Million Women. The FY 1999 and FY 2000 budgets require the 300 Federal Employees Health Benefits Plans (FEHBP) to cover contraceptive drugs and devices, providing coverage to approximately 1.2 million women of childbearing age.

Protected FDA's Role in Testing RU-486. In 1993, President Clinton reversed the ban on the importation of Mifepristone or RU-486. In 1998 and 1999, the President and Vice President successfully fought for removal of a provision that would prohibit the FDA from testing, developing or approving RU-486, thereby usurping the Agency's role in making scientific determinations about the effect of drugs on the safety and health of the American people.

Signed the Freedom of Access to Clinic Entrances Act. President Clinton signed into law the Freedom of Access to Clinic Entrances Act, establishing a safety-zone around women's health clinics. Throughout the Administration, the President and Vice President have worked hard to protect a woman's right to choose.

Reversed the "Gag Rule." President Clinton reversed the "Gag Rule," which limited the information federally funded family planning clinics could give to women.

Making Our Communities Safer

Lowest Crime Rates in a Generation. When President Clinton and Vice President Gore took office in 1993, the violent crime rate in America had more than quadrupled during the previous three decades. Since then, America has experienced the longest continuous drop in crime on record. The overall crime rate is the lowest in 25 years, and in 1999 crime fell for the eighth consecutive year nationwide. Violent crime rate fell 7 percent in 1999 and 27 percent since 1993. Since 1993, the murder rate is down more than 25 percent to its lowest point since 1967, and gun violence has declined by more than 35 percent. [Bureau of Justice Statistics, 1998 National Crime Victimization Survey; Federal Bureau of Investigation, Uniform Crime Reports for the United States 1998, 1999; FY 2001 Budget, p. 107]

Putting 100,000 More Police on the Streets. In 1999, ahead of schedule and under budget, the Clinton-Gore Administration met its commitment to fund an additional 100,000 police officers for our communities. As a part of the COPS Program, the President announced a distressed neighborhood grant program to increase community policing in high-crime and underserved neighborhoods. To help keep crime at record lows, in fall 1999, the President won funding for the first installment toward his goal to hire up to 50,000 more officers by 2005. This year, the Clinton-Gore budget includes over \$1 billion to

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continue the successful COPS initiative to hire more officers, hire new community prosecutors, give police the tools and technology they need to fight crime, and to fund community-wide crime fighting efforts. [Justice Department, COPS Program, 5/12/99; National Economic Council, 11/18/99; FY 2001 Budget, p. 109]

More Than Half a Million Felons, Fugitives and Domestic Abusers Denied Guns. Since taking effect in 1994, the Brady Law has helped to prevent a total of more than 536,000 felons, fugitives, domestic abusers, and other prohibited purchasers from buying guns. In November 1998, the National Instant Criminal Background Check System (NICS) took effect under the Brady Law, allowing access to a fuller set of records that law enforcement officials can use to conduct checks of all prospective gun purchases -- not just for handguns. As of March 2000, NICS has conducted over 10 million background checks on gun purchasers, and stopped an estimated 179,000 illegal gun sales. [Bureau of Justice Statistics, Background Checks for Firearm Transfers, 1999, 6/00]

Held the First-Ever White House Conference on School Safety. On October 15, 1998, the President hosted the White House Conference on School Safety. The participants explored solutions to this national challenge: how do schools, families and communities work together to make sure that every child is safe in every school in America.

Coordinating the Federal Government's Response to Youth Violence. In 1999, President Clinton created the White House Council on Youth Violence to coordinate youth violence research and programs throughout the federal government, and to make information derived from the federal government's efforts more accessible to the public. Members of the Council include the Attorney General and the Secretaries of Health and Human Services, Education, and Labor, as well as the Director of the Office of Management and Budget.

National Campaign Against Youth Violence. In August 1999, President Clinton announced the formation of an independent, national campaign to address the problem of youth violence. The Campaign plans to launch anti-violence activities including a major media campaign, concerts, town hall meetings, in- and after-school programs. The Campaign will also highlight effective youth violence initiatives in cities across the country.

New Tools in the Fight Against Domestic Violence. President Clinton championed and signed into law the Violence Against Women Act, bolstering local law enforcement, prosecution, and victims' services to better address these crimes. The Clinton-Gore Administration more than quadrupled funding to domestic violence shelters and signed the Interstate Stalking Punishment and Prevention Act, making it a Federal crime to cross state lines intending to injure or harass another person. And the Administration established a nationwide 24-hour Domestic Violence Hotline, which provides immediate crisis intervention, counseling and referrals for those in need.

Protecting Children from Sex Offenders. President Clinton signed Megan's Law and the Jacob Wetterling Crimes Against Children and Sexually Violent Offender Registration Act, requiring states to set up sex offender registration systems and require community notification when sex offenders are released from prison.

Fighting for Equal Opportunity

Appointed More Women Than Any Other President. Women make up 44 percent of Clinton

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Administration appointees, and 29 percent of the positions requiring Senate confirmation are held by women. Additionally, 30 percent of the President's judicial nominees are women, including Ruth Bader Ginsburg, the second woman in history to serve on the Supreme Court.

Appointed the First Women Ever to Serve as Attorney General, Janet Reno; and Secretary of State, Madeleine Albright. Other women who serve in the Clinton Cabinet include Alexis Herman, Secretary of Labor; Donna Shalala, Secretary of Health and Human Services; Carol Browner, Administrator of the Environmental Protection Agency; Aida Alvarez, Administrator of the Small Business Association; Charlene Barshefsky, United States Trade Representative and Janice LaChance, Director of the Office of Personnel Management.

Working to Expand Civil Rights Enforcement. In FY 2000, the President won a six percent increase in funding for federal civil rights enforcement agencies including \$82 million for the Civil Rights Division at the Justice Department, a 19 percent increase. And this year, President Clinton has proposed \$698 million for civil rights enforcement -- a 13 percent increase -- to prosecute criminal civil rights cases (including hate crimes and police misconduct), enforce the American with Disabilities Act, pursue Equal Employment Opportunity Commission employment actions and prevent housing discrimination, and other civil rights enforcement efforts.

Ordered an Assessment of Affirmative Action Programs. The President ordered a comprehensive review of the government's affirmative action programs, which concluded that affirmative action is still an effective and important tool to expand educational and economic opportunity to all Americans. This review of federal affirmative action programs has helped to ensure that these programs are fair and effective and that they can survive legal challenges. As a result, programs that benefit African Americans, including students, working men and women, and business owners, remain in effect and are more likely to be upheld by the courts.

Celebrating Women in American History. President Clinton established the President's Commission on the Celebration of Women in American History, which recommended the best ways to celebrate women's role in our history -- including a traveling exhibit to celebrate women in history; a how-to handbook for communities to celebrate women's history; and a national women's history umbrella website. In October 1998, the President signed legislation creating the Women's Progress Commemoration Commission, which will work with the President's Commission to help commemorate, celebrate, and preserve women's history in America. [Executive Order 13090, 7/2/98; White House, Office of the Press Secretary, 10/31/98]

September 2000

PRESIDENT CLINTON VISITS KENTUCKY TO TOUT ACCOUNTABILITY STRATEGY FOR TURNING AROUND LOW-PERFORMING SCHOOLS

May 3, 2000

Today, in Owensboro, Kentucky, President Clinton will visit Audubon Elementary School to kick off his School Reform Tour and to highlight the Clinton-Gore agenda of investing more in our schools and demanding more from them. Audubon Elementary School is an award-winning school in the Daviess County School District. Although two-thirds of its students are in poverty, Audubon ranks 18th in the state in student achievement. The President will highlight Audubon to illustrate how an agenda of high standards, real accountability, and proven investments can raise student achievement and turn around failing schools across the country. In a speech to Kentucky educators and policymakers, the President will announce that he is directing the U.S. Department of Education to take new executive actions that will help states and localities turn around failing schools. The President will also call on Congress to enact his \$250 million Education Accountability Fund, to help communities turn around failing schools or shut them down. And citing the success of Audubon and other schools in Kentucky, he will remind Americans that with the right tools and expectations, every child can learn.

PRESIDENT SIGNS EXECUTIVE ORDER ON TURNING AROUND FAILING SCHOOLS. The President will announce he is signing an Executive Order that directs the Department of Education to compile and publish key data on low-performing schools across the country, and to help states fix those schools. The Order directs Secretary of Education Richard Riley to: 1) help states and districts turn around low-performing schools, by providing technical assistance and disseminating research; 2) make federal education programs more responsive to low-performing schools; 3) submit an annual education accountability report that identifies trends in low-performing schools, the resources they are receiving to turn themselves around, and what strategies are most effective; and 4) send teams of monitors into up to 15 states each year to make sure states are complying with accountability requirements and help them get results.

PRESIDENT HIGHLIGHTS KENTUCKY'S ACCOUNTABILITY STRATEGY AND REFORM RESULTS. Speaking ten years after Kentucky's landmark education reform legislation was passed, President Clinton today will praise the state for its leadership in standards-based reform and accountability. Kentucky has successfully intervened to improve many of its low-performing schools, by providing critical resources to offer extended learning, teacher training, expanded technology and literacy initiatives. [After having been identified as performing below expectations on state assessments, Audubon Elementary today ranks 18th statewide in student performance among elementary schools. Since 1994, even with two-thirds of its students in poverty, Audubon has boosted the percentage of students scoring at a level of "proficient" and "distinguished" on state assessments from 12 percent to 57 percent in writing; 5 percent to 70 percent in reading; and 0 percent to 64 percent in science.] All across Kentucky, some of the highest performing schools are former low-performing and high-poverty schools.

AN AGENDA OF STANDARDS, ACCOUNTABILITY AND INVESTMENT. Since taking office, President Clinton and Vice President Gore have made accountability and investment in

proven strategies the core of their education reform agenda. In 1994, the President made standards a core part of federal education policy, through Goals 2000 and the Elementary and Secondary Education Act. Since the President took office in 1992, the federal investment in elementary and secondary education has nearly doubled. Last year, the President also proposed and Congress enacted a \$134 million Accountability Fund, which provides funds to states and school districts to turn around failing schools and gives students in a failing school the right to choose a higher-performing public school. Today, the President will call on Congress to send him a true reform bill that includes the education accountability measures he has proposed – require states and school districts to turn around failing schools or shut them down, make sure teachers know the subject they're teaching, end social promotion by giving students the help they need to meet high standards, adopt sound, fair discipline codes, and give parents school report cards. He will also call on Congress to pass an education budget that invests in reducing class size, strengthening teacher quality, expanding after school and summer school, repairing and modernizing schools and other key priorities. Only by investing more and demanding more, the President will point out, can we make school reform work for all our students.

**PRESIDENT CLINTON HIGHLIGHTS RESULTS OF ADMINISTRATION'S
INVESTMENT IN AMERICA'S EDUCATION PRIORITIES
SEPTEMBER 11, 2000**

Today, President Clinton will release a White House report on educational progress, which highlights the progress America's students are making, and will call on Congress to continue to make critical investments in education. The President will also announce the award of \$46 million in new GEAR UP grants to help disadvantaged students prepare for college and will release a letter from 104 college presidents calling for full funding for GEAR UP. When President Clinton and Vice President Gore took office in 1992, they embarked on a strategy of improving education by setting high standards for all students, insisting on accountability for results and investing in what works to help students succeed. Since that time, this Administration has doubled the federal investment in education and training, while maintaining a balanced budget and paying down the debt. These investments have resulted in more high quality teachers in our children's classrooms, more after school and summer school programs and more financial assistance available for students to attend college.

THEN AND NOW: INVESTMENT AND PROGRESS. The report released by the President today confirms what research tells us – money matters if it is invested in the right things. More importantly, the report underscores the payoffs from the Clinton-Gore commitment to investing more in our schools, while also demanding more from them. President Clinton and Vice President Gore will continue to fight for more than just higher funding levels, they will also insist that money be spent on America's priorities, like smaller classes, high quality teachers, more after school programs and modern school buildings. The report shows that:

- Math SAT scores are at a thirty-year high. The average SAT math score has gone from 501 in 1992 to 514 in 2000, and the average verbal score has gone from 500 to 505;
- Since 1992, reading and math scores on the National Assessment of Educational Progress (NAEP) have increased for fourth, eighth, and twelfth graders, including those students in the highest poverty schools;
- The achievement gap between low-income and minority students and their peers has decreased;
- More students are taking a rigorous high school curriculum and enrolling in higher education; and
- Nearly all of the nation's highest poverty schools receive Title I funds compared to fewer than 80 percent before 1992.

AWARDING \$46 MILLION IN NEW GEAR UP GRANTS FOR COLLEGE

MENTORING AND ACADEMIC SUPPORT FOR AT-RISK CHILDREN. With President Clinton's leadership, GEAR UP, or Gaining Early Awareness and Readiness for Undergraduate Programs, was proposed and enacted in 1998 with broad bipartisan support. Today President Clinton will release 80 new GEAR UP grants totaling \$46 million. This year, GEAR UP will promote college opportunities for more than 700,000 at-risk children. The President will also release a letter from 104 college and universities presidents endorsing his request for \$325 million for GEAR UP, as well as other important college programs including the TRIO programs for disadvantaged students. According to the presidents, without full funding for GEAR UP, "tens of thousands of needy students will be denied the opportunity to gain the skills and information essential for going to college."

- **GEAR UP supports partnerships of schools, colleges and universities, and community organizations** to strengthen academics and tutoring, mentor students, share college information, and provide college scholarships. It also funds state efforts to promote college awareness and provide scholarships for needy students.
- **For the second year in a row, interest in GEAR UP far exceeded available funding**, allowing the Department of Education to fund only one application in four. President Clinton has requested \$325 million for GEAR UP in FY 2001 to help meet the obvious need, but Congress plans to freeze it at \$200 million, denying aid for up to 600,000 students.

CALLING ON CONGRESS TO COMPLETE WORK ON AMERICA'S PRIORITIES.

The President proposed a balanced and fiscally responsible budget that extends the solvency of Social Security and Medicare and makes investments in key priorities for the American people, such as modernizing 6,000 schools and repairing 25,000 more, meeting our commitment to hire 100,000 quality teachers to reduce class sizes, improving teacher quality, increasing accountability by turning around failing schools, and expanding after school opportunities. To pay for fiscally irresponsible tax cuts, Congressional Republicans have cut key priorities, resulting in fewer quality teachers for schools, fewer law enforcement officers and prosecutors to fight crime, reduced environmental protection, and less funding for National Science Foundation research. The President will also call on Congress to put the people's interest above the interests of big tobacco by fully funding federal tobacco litigation and letting the American taxpayers have their day in court to recover tobacco-related health care costs.



THE

U.S. Department of EDUCATION

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President's & Secretary's Priorities

FY 2000 Grants Under Major Programs

Major New Initiatives for Fiscal Year 2000

1. All students will read independently and well by the end of 3rd grade.
2. All students will master challenging mathematics, including the foundations of algebra and geometry, by the end of 8th grade.
3. By 18 years of age, all students will be prepared for and able to afford college.
4. All states and schools will have challenging and clear standards of achievement and accountability for all children, and effective strategies for reaching those standards.
5. There will be a talented, dedicated and well-prepared teacher in every classroom.
6. Every classroom will be connected to the Internet by the year 2000 and all students will be technologically literate.
7. Every school will be strong, safe, drug-free and disciplined.

Secretary Riley and senior Department officials developed seven priorities (see Working Document and the Strategic Plan) for the Department, based on the "Call to Action" issued by the President in his State of the Union Address (February 4, 1997). These seven priorities are as follows...

All students will read independently and well by the end of 3rd grade.

- America Reads Challenge
- Reading Excellence Program
- The Reading Summit
- Class Size Reduction and Teacher Quality Initiative
- America Goes Back to School: Get Involved!
- Voluntary National Tests
- Family Involvement

All students will master challenging mathematics, including the foundations of algebra and geometry, by the end of 8th grade.

Visit the America Counts website, where you will find information such as speeches, fact sheets, publications, reports and the Third International Math and Science Study (TIMSS).

By 18 years of age, all students will be prepared for and able to afford college.

- America's HOPE Scholarship
- Direct Loan Program
- Department of Education's Office of Postsecondary Education
- Project EASI

- Think College-- Learn for a Lifetime

All states and schools will have challenging and clear standards of achievement and accountability for all children, and effective strategies for reaching those standards.

- Voluntary National Tests
- Goals 2000
- School-to-Work
- Improving America's Schools Act of 1994 -- Elementary and Secondary Education Act
- Comprehensive School Reform Demonstration Program

There will be a talented, dedicated and well-prepared teacher in every classroom.

The Teacher Quality Website offers information for policymakers and educators on a range of issues -- recruiting and preparing teachers, providing professional development opportunities, and raising teaching standards. It includes classroom resources, research, and information for individuals interested in becoming a teacher.

Every classroom will be connected to the Internet by the year 2000 and all students will be technologically literate.

- U.S. Department of Education Technology Initiatives
- The Mid-continent Regional Educational Laboratory (McREL)
- North Central Regional Educational Laboratory
- Regional Technology in Education Consortia (R*TEC)

Every school will be strong, safe, drug-free and disciplined.

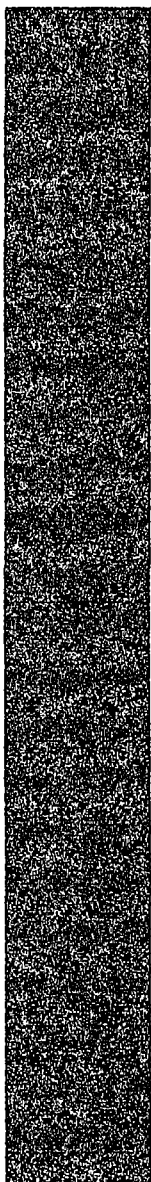
- School Construction and Design
- Safe & Drug Free Schools Program
- US Charter Schools
- Flexibility and Waivers
- Improving America's Schools Act of 1994 -- Elementary and Secondary Education Act

The Partnership for Family Involvement in Education supports the seven priorities through family and community involvement in children's learning. As members of the Partnership, thousands of family-school partners, employers, community organizations, and religious groups work together to help all children learn to high academic standards.

International Education: The U.S. Departments of Education and State are working together to help prepare our citizens for the global economy, attract future leaders from abroad to study in the United States, and enhance mutual understanding with other nations. This joint effort responds to the President's April 19, 2000, Executive Memorandum on International Education Policy.



This page last modified -- June 21, 2000 (pjk)



THE WHITE HOUSE

Education

Help S

The Clinton-Gore Administration

A Record of Progress

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PRESIDENT CLINTON AND VICE PRESIDENT GORE

Expanding Educational Opportunity for All Americans

"Our administration has made education a high priority, focusing on standards, accountability and choice in public schools, and on making a college education available to every American -- with increased Pell Grant scholarships, better student loan and work-study programs, and the HOPE scholarship and other tax credits to help families pay for college tuition. Because of these efforts, more young people have the chance to make the most of their God-given abilities, and take their place in the high-tech world of the 21st century. "

-- President Bill Clinton
August 7, 1999

SUPPORTING QUALITY EDUCATION FOR ALL CHILDREN

Largest Investment in Education in Thirty Years. President Clinton and Vice President Gore have been committed to maintaining our nation's investment in education. The Clinton-Gore Administration enacted the largest investment in education in 30 years - and the largest investment in higher education since the G.I. Bill by doubling student aid to nearly \$60 billion.

Providing Early Education to Nearly 900,000 Children with Head Start. The President and Vice President have expanded Head Start funding by 90 percent since 1993. Head Start will reach approximately 880,000 low-income children in FY 2000 and, with the President's proposed increase for the program, will be on the way to reaching the President's goal of serving one million children and their families by the year 2002. The Administration also created Early Head Start, bringing Head Start's successful comprehensive services to families with children ages zero to three, and set high quality standards for both programs.

Modernizing Our Schools. This year, the President and Vice President have proposed federal tax credits to pay the interest on nearly \$25 billion in state and local bonds to modernize and rebuild up to 6,000 public schools that are overcrowded, out-of-date, and unsafe. In addition, the Administration's FY 2001 budget includes a new \$1.3 billion school urgent renovation loan and grant proposal to repair 5,000

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schools. An estimated \$12.7 billion is needed to bring America's schools into good overall condition, according to the U.S. Department of Education. Public and elementary enrollment is expected to increase by another million students between 1999 and 2006, to a record 44.4 million elementary and secondary students.

Providing Safe After-School Opportunities for 850,000 Students Each Year. The 21st Century Community Learning Centers program provides enriching after-school and summer school opportunities for 850,000 school-age children in rural and urban communities in FY 2000. Extended learning time has not only been shown to increase achievement in reading and math, but to decrease youth violence and drug use. Funding for this program more than doubled from FY 1999 to FY 2000. For FY 2001, the President's budget calls on Congress to invest \$1 billion in the 21st Century Program and to ensure that all children in failing schools have access to quality after-school and summer school opportunities. This proposal will double funding and nearly triple the number of students served to 2.5 million.

Expanding Access to Technology. With the Vice President's leadership, the Clinton-Gore Administration has made increasing access to technology a top priority. The President and Vice President created the Technology Literacy Challenge Fund to help connect every school to the Internet, increase the number of multimedia computers in the classroom and provide technology training for teachers. They increased overall investments in educational technology from \$23 million in 1993 to \$769 million in FY 2000, and tripled funding for Community Technology Centers to reach at least 120 low-income communities. Through the E-rate program, they secured low-cost connections to the Internet for schools, libraries, rural health clinics and hospitals, benefiting more than 80 percent of America's public schools. They also increased investment in education research to ensure all children benefit from educational technology. In 1999, 95 percent of public schools were connected to the Internet -- up from 35 percent in 1994. In 1999, 63 percent of all public school classrooms were connected to the Internet -- up from just 3 percent in 1994.

Turning Around Failing Schools. 11 million low-income students in 13,000 school districts now benefit from higher expectations and a challenging curriculum geared to higher standards through Title I-Aid to Disadvantaged Students. The FY 2000 budget provides a \$134 million accountability fund to help turn around the worst performing schools and hold them accountable for results through such measures as overhauling curriculum, improving staffing, or even closing schools and reopening them as charter schools. This year, the President is proposing to double funding for this fund to turn around the nation's failing schools to ensure all children receive a quality education.

Placing High-Quality Teachers in Underserved Areas. President Clinton and Vice President Gore won \$98 million in the FY 2000 budget to enhance teacher quality and attract teachers to high need, high poverty school districts. This year, the President and Vice President have proposed a new \$1 billion teacher quality plan to recruit, train and reward good teachers. The Teaching to High Standards Initiative includes a Hometown Teacher Recruitment program to empower high-poverty school districts to develop programs to recruit homegrown teachers to address the shortage of qualified teachers.

English Literacy/Civics Initiative. The Clinton-Gore budget requests \$75 million for the English Language/Civics Initiative -- a nearly \$50 million increase to help an additional estimated 250,000 limited English proficient (LEP) individuals. This program helps states and communities provide LEP individuals with expanded access to quality English-language instruction linked to civics and life skills instruction, including understanding the U.S. government system, the public education system, the workplace, and other key institutions of American life.

Strengthening Bilingual and Immigrant Education. The President is committed to ensuring that students with limited English skills get the extra help they need in order to learn English and meet the same high standards expected for all students. The Clinton-Gore Administration fought for and won a 35% increase in bilingual and immigrant education in the 1997 budget deal, and in FY 1999 the Administration fought for and won a doubling of the investments in bilingual teacher training as part of its Hispanic Education Action Plan. Bilingual education funding helps school districts teach English to more than a million limited English proficient (LEP) children and helps LEP students to achieve to the same high standards as all other students. It also provides teachers with the training they need to teach LEP students. The Immigrant Education program helps more than a thousand school districts provide supplemental instructional services to more than 800,000 recent immigrant students. In his proposal to reauthorize the Elementary and Secondary Education Act, the President has proposed additional help to ensure that all teachers are well-trained to meet the needs of LEP students. His proposal would also make schools and districts more accountable for helping children with LEP master their academic subjects and learn English. The President's FY 2001 budget increases funding for these programs by an additional \$832 million.

HELPING ALL CHILDREN ACHIEVE HIGH STANDARDS

More High-Quality Teachers with Smaller Class Sizes. Research proves that children learn more in smaller classes - particularly in the early years. Small classes allow children to receive more individual attention from teachers; acquire a solid foundation for future learning; and learn to read independently by the end of third grade. The Clinton-Gore Administration won a second installment of \$1.3 billion for the President's plan to hire an additional 100,000 well-prepared teachers to reduce class size in the early grades, when children learn to read and master the basic skills. This year's budget provides \$1.75 billion, a \$450 million increase -- enough to fund nearly 49,000 teachers. Nearly 30,000 teachers have already been hired through the Class Size Reduction Initiative.

Expanding Choice and Accountability in Public Schools. The Clinton-Gore Administration has worked to expand public school choice and support the growth of public charter schools, which have increased from one public charter school in the nation when the President was first elected to more than 1,700 today. More than 250,000 students nationwide are now enrolled in charter schools in 30 states and the District of Columbia. The President won \$145 million in FY 2000 -- and has proposed \$175 million in his FY01 budget -- to continue working toward his goal of establishing 3,000 quality charter schools by 2002.

Teaching Every Child to Read by the 3rd Grade. The President challenged Americans to unite to be sure that every child can read well and independently by the third grade. In response to his America Reads challenge, more than 1,400 colleges have committed more than 26,000 Work Study students to tutor children in reading, and more than two million children have been taught, tutored or mentored by national service programs like AmeriCorps, VISTA, and Foster Grandparents. In addition, colleges and universities that participate in the Federal work-study program must include at least one tutoring or family literacy project as part of its community service activities, giving priority to the employment of work-study students as reading tutors in schools participating in reading reform efforts. Grants are awarded through the Reading Excellence Act to high-poverty schools to improve the teaching and learning of reading.

Helping Students Master Mathematics by the Eighth Grade. President Clinton issued a Presidential Directive to the Department of Education and the National Science Foundation to work together to devise an action strategy for helping students to improve in mathematics. This joint effort led to the creation of America Counts, an initiative to ensure that all students master challenging mathematics, including the foundations of algebra and geometry, by the end of the 8th grade.

Striving for Excellence with National Education Standards. President Clinton has challenged every state to adopt high standards, and to test every 4th grade student in reading and 8th grade student in math so that parents, students, and teacher can tell if students are meeting high standards. Fifteen of the nation's largest urban school districts, as well as six states and the Department of Defense schools have joined the President's effort. The National Assessment Governing Board is developing voluntary national tests for the 4th and 8th grades, and the National Academy of Sciences is conducting studies on these tests.

Setting High Standards with Goals 2000. The National Standards and Testing effort builds upon the success of Goals 2000, President Clinton's education reform initiative enacted in 1994, which helps States establish standards of excellence for all children, and plan and implement steps to raise educational achievement. Communities in virtually every state receive Goals 2000 funds and are using these funds to upgrade the curriculum, improve teaching, increase parental involvement in schools, and make better use of computers in the classroom.

Supporting Local Education Reform Efforts. In April 1999, the President signed into law the Education Flexibility Partnership Act of 1999 (Ed-Flex) to give all states the ability to use federal resources in ways that best complement local efforts and innovation.

OPENING THE DOORS OF COLLEGE TO ALL AMERICANS

Enacted Hope Scholarships and Lifetime Learning Tax Credits. President Clinton proposed and passed the HOPE Scholarships and Lifetime Learning tax credits, which in 1999 were claimed by an estimated 10 million American families struggling to pay for college. The Hope Scholarship helps make the first two years of college

universally available by providing a tax credit of up to \$1,500 for tuition and fees for the first two years of college. The Lifetime Learning tax credit provides a 20 percent tax credit on the first \$5,000 of tuition and fees for students beyond the first two years of college, or taking classes part-time (in 2003, this increases to \$10,000 of tuition and fees). In his FY 2001 budget, the President has proposed expanding the Lifetime Learning tax credit with a College Opportunity tax cut, which will give families the option of taking a tax deduction or claiming a 28 percent credit for the first \$5,000 of college tuition and fees through 2002, and \$10,000 thereafter.

Expanding Work Study and Pell Grants. One million students will be able to work their way through college because of the President's expansion of the Work Study Program, and nearly four million students will receive a Pell Grant of up to \$3,300, the largest maximum award ever. The maximum award has increased 43 percent under the Clinton-Gore Administration. This year President Clinton proposed a \$77 million increase in Work Study to continue to support one million awards, and a \$200 increase in the Pell Grant maximum award, to raise it to \$3,500.

More Affordable Student Loans. This Administration has introduced lower fees and interest rates that have saved the average borrower over \$500; more flexible repayment terms, including the option to repay as a share of income; and a restored tax deduction for student loan interest. The new Direct Student Loan program-established in 1994-bypasses federally guaranteed lenders to deliver loans to students more quickly, simply, and cheaply. Together, students and taxpayers have already saved \$15 billion through student loan reforms.

Paying for College through Community Service. In just five years, AmeriCorps has allowed 150,000 young people to serve in their communities while earning money for college or skills training. In 1999, nearly 50,000 young people had the opportunity to serve and earn an award of up to \$4,725 to pay for college or repay student loans.

Reaching Out to Disadvantaged Students. The TRIO programs are designed to motivate and support students from disadvantaged backgrounds. TRIO includes five distinct outreach programs targeted to serve and assist students as they progress from middle school to post-secondary education. TRIO funding has increased by two-thirds over the past seven years, to \$645 million. The President's FY 2001 budget provides \$725 million for TRIO, an increase of \$80 million to help provide assistance to over 760,000 students, 37,000 more than in 2000.

Established the GEAR-UP Mentoring Program for Middle School Children. President Clinton and Vice President Gore created and expanded GEAR-UP, a nationwide mentoring initiative, to help over 750,000 low-income middle school children finish school and prepare for college. GEAR-UP expands mentoring efforts by states and provides new grants to partnerships of middle schools, institutions of higher education, and community organizations, to provide intensive early intervention services to help prepare over 750,000 students at high-poverty middle schools for college. The President's FY 2001 budget would expand services to 1.4 million students with a 63 percent increase.

Increased Funding and Grants for Historically Black Colleges and Universities. The Clinton-Gore Administration increased funding for Historically Black Colleges and Universities by over \$260 million between FY 1992 and FY 2000. Today, America's 105 HBCUs are educating almost 300,000 African Americans.

Enacted a Hispanic Education Action Plan. The Clinton-Gore Administration is reaching out to Hispanic youth, encouraging them to stay in school, do well academically and graduate from high school, and go on to college so that they can compete successfully for good jobs. The Administration proposed and won funding increases for a Hispanic Education Action Plan in the FY 1999 budget. As part of this plan, the President and Vice President proposed significant increases in a number of programs that enhance educational opportunity for Hispanic Americans. The final FY 2000 budget agreement included \$436 million in increases for programs that help to improve the educational outcomes of Latinos and limited English proficient students, including Title I grants to LEAs, Adult Education, Bilingual Education, and TRIO.

Dual Degree Programs for Minority-Serving Institutions. The Clinton-Gore Administration has proposed a new program to increase opportunities for students at four-year minority-serving institutions. Students would receive two degrees within five years: one from a minority-serving institution, and one from a partner institution in a field in which minorities are underrepresented. This new \$40 million program will serve an estimated 3,000 students.

Helping Students Finish College. This year the President has proposed new College Completion Challenge Grants to help reduce the college drop-out rate. Although college enrollment rates have risen, 37 percent of students that go on to post-secondary school drop out before they get a certificate or a degree. The problem is especially acute for minorities: 29 percent of African Americans and 31 percent of Hispanics drop out of college after less than one year, compared to 18 percent of whites. The CCCG program is designed to address this problem with a comprehensive approach including pre-freshman summer programs, support services and increased grant aid to students. This \$35 million initiative will improve the chances of success for nearly 18,000 students.

ENSURING OUR SCHOOLS ARE SAFE PLACES TO LEARN

Coordinating the Federal Government's Response to Youth Violence. President Clinton created the White House Council on Youth Violence to coordinate youth violence research and programs throughout the federal government, and to make information derived from the federal government's efforts more accessible to the public. Members of the Council include the Attorney General and the Secretaries of Health and Human Services, Education, and Labor, as well as the Director of the Office of Management and Budget.

Preventing Violence With the Safe Schools/Healthy Students Initiative. Evidence shows that a comprehensive, integrated community-wide approach is an effective way to promote healthy childhood and youth development and address the problems of school violence and alcohol and other drug abuse. In 1998, President Clinton signed into law the Safe Schools/Healthy Students Initiative (SS/HS), an unprecedented joint effort involving the Departments of Education,

an unprecedented joint effort involving the Departments of Education, Justice, and Health and Human Services to help communities design and implement comprehensive educational, mental health, social service, law enforcement services for youth. SS/HS has provided \$146 million to 77 local education authorities who have established formal partnerships with local mental health and law enforcement agencies. This year, the President has called for a \$100 million expansion of the Safe Schools/Healthy Students Initiative.

More Police Officers in Schools. President Clinton and Vice President Gore's community policing grants have been used to fund over 2,000 police officers to work in schools. These officers have been targeted to work in the 10 percent of America's schools with serious crime problems.

Keeping Schools Safe and Drug Free. President Clinton and Vice President Gore have increased funding for the Safe and Drug Free Schools program, which provides grants aimed at eliminating violence to schools serving 40 million children. They have also enacted reforms that make sure that federal resources go to schools with the most serious problems. Now the President and Vice President are seeking to require schools receiving funds to adopt comprehensive school safety plans, use proven anti-drug and gang programs, intervene with troubled youth, establish security procedures for schools, and give parents annual school safety reports of drug and violence incidents at their children's school.

Zero Tolerance for Guns and Weapons in Schools. President Clinton and Vice President Gore fought for passage for the Gun Free Schools Act, which requires the expulsion of students caught bringing weapons to schools. In the act's first two years, over 9,000 students were expelled for weapons violations.

Engaging the Private Sector in Youth Violence Prevention: National Campaign Against Youth Violence. In August 1999, President Clinton announced the formation of an independent, national campaign to engage the private sector in addressing the problem of youth violence. The Campaign has developed anti-violence activities including a major media campaign, concerts, town hall meetings, and in-school and after-school programs. The Campaign also highlights effective youth violence initiatives in cities across the country.

Updated July 2000

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Before It's Too Late

*A Report to the Nation from The National Commission
on Mathematics and Science Teaching
for the 21st Century*



EMBARGOED UNTIL
9/27/2000 10:00am EDT

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Before It's Too Late

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Before It's Too Late



*A Report to the Nation from the National Commission
on Mathematics and Science Teaching for the 21st Century*

Letter of Transmittal

September 27, 2000

Richard W. Riley
Secretary of Education
U.S. Department of Education
Washington, DC 20202

Dear Secretary Riley:

On July 20, 1999—the 30th anniversary of the first landing on the moon—you announced the appointment of the 25-member National Commission on Mathematics and Science Teaching for the 21st Century. In your charge to the Commission and its eight ex officio members, you asked us to investigate and report on the quality of mathematics and science teaching in the nation, directing us to consider ways of improving recruitment, preparation, retention, and professional growth for mathematics and science teachers in K–12 classrooms nationwide. You reminded us that, three decades after a historic achievement, “we need to set the stage for advancement in mathematics and science for the next thirty years.”

It has been my privilege to chair the Commission, and I am pleased to report to you, on behalf of its members, that we have completed our work. With this letter, we transmit to you our report, *Before It's Too Late*, which summarizes our findings. It presents to both the Department of Education and the American people a set of ambitious goals for improving mathematics and science teaching and specific action strategies for achieving each of them.

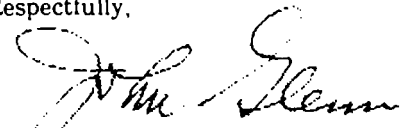
We trust that we have been faithful to your charge. As we have listened to the presentations of scholars, deliberated over the studies of outstanding researchers, and attended to the experience of dedicated administrators and teachers, we have learned much. Our assumptions have been called into question. Our individual views have been tempered by the perspectives of colleagues whose judgment we have come to respect, even in disagreement. As we have sought to understand today's problems in mathematics and science education, we have also worked to uphold a constant vision of high-quality teaching as the irreducible minimum for creating tomorrow's solutions.

We believe that the issues and concerns raised in our report can be understood, addressed by, and potentially unite policymakers, teachers, the business community, parents, students, and private citizens alike. The goals and action strategies we suggest may be seen by some as too great a reach, by some as not bold enough. We are convinced, however, that if they are ignored, our children and our nation will soon pay the high price that always accompanies apathy.

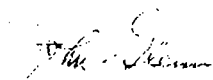
Each member of the Commission, through this letter, expresses appreciation for your leadership in having brought this diverse group together to examine an issue that has pivotal significance for our country as we embark on a new century and millennium. It is our collective and earnest hope that you will continue that leadership by encouraging widespread discussion of our views and suggestions, and by urging appropriate action based on our findings and recommendations.

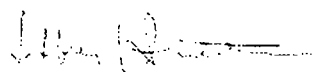
Finally, we offer our profound thanks for having provided us with this opportunity to serve our country—and our children—as members of this Commission.

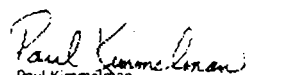
Respectfully,

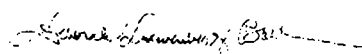


John Glenn, Commission Chairman


John Glenn
Commission Chairman

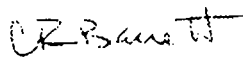

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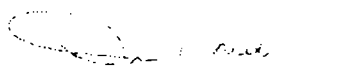

Paul Kimmelman
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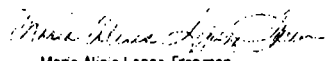

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Arthur F. Thurnau Professor of Mathematics Education
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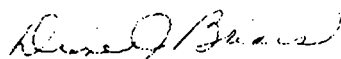

Rush Holt
U.S. Representative, New Jersey

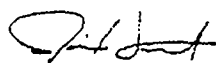

William E. Kirwan
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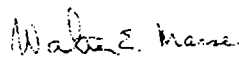

Craig R. Barrett
President and CEO, Intel Corporation

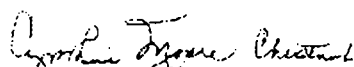

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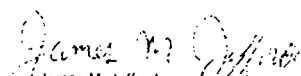

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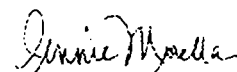

Diane J. Briars
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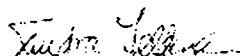

James B. Hunt Jr.
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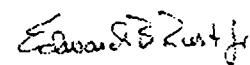

Cynthia Moore Chestnut
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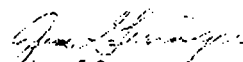

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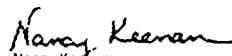

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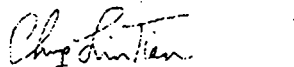

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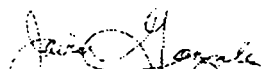

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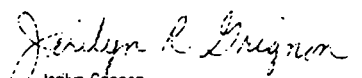

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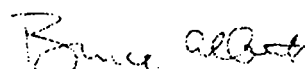

Edward M. Kennedy
U.S. Senator, Massachusetts


Dennis Van Roekel
Secretary-Treasurer, National Education Association

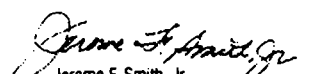

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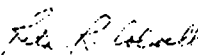
Ex Officio

Richard W. Riley, U.S. Secretary of Education


Bruce Alberts
President, National Academy of Sciences


Neal Lane
Assistant to the President for Science and Technology Policy,
Office of Science and Technology Policy


Jerome F. Smith, Jr.
Chancellor for Education and Professional Development,
U.S. Department of Defense


Rita R. Colwell
Director, National Science Foundation


Bill Richardson
U.S. Secretary of Energy


Daniel S. Goldin
Administrator, National Aeronautics and Space Administration


Rodney E. Slater
U.S. Secretary of Transportation

Commission Members

Foreword



This report makes only a few straightforward points, but it makes them urgently and insistently.

First, at the daybreak of this new century and millennium, the Commission is convinced that the future well-being of our nation and people depends not just on how well we educate our children generally, but on how well we educate them in mathematics and science specifically.

From mathematics and the sciences will come the products, services, standard of living, and economic and military security that will sustain us at home and around the world. From them will come the technological creativity American companies need to compete effectively in the global marketplace. "Globalization" has occurred. Economic theories of a few years ago are now a reality. Goods, services, ideas, communication, businesses, industries, finance, investment, and jobs—the good jobs—are increasingly the competitive currency of the international marketplace.

Among the first things Americans watch every morning on TV is the global marketplace at work. The quotes not only from Wall Street itself, but also from the Nikkei, Hang Seng, and Hong Kong exchanges, followed in turn by those of Frankfurt, Zurich, and London—along with reports on the status of the yen, peso, and Eurodollar—all reflect investment flows of hundreds of billions in

assets around the world. Times have changed. In an integrated, global economy, whose key components are increasingly knit together in an interdependent system of relationships, will our children be able to compete?

Beyond the world of global finance, mathematics and science will also supply the core forms of knowledge that the next generation of innovators, producers, and workers in every country will need if they are to solve the unforeseen problems and dream the dreams that will define America's future.

Second, it is abundantly clear from the evidence already at hand that we are not doing the job that we should do—or can do—in teaching our children to understand and use ideas from these fields. Our children are falling behind; they are simply not "world-class learners" when it comes to mathematics and science.

The Third International Mathematics and Science Study (TIMSS) tested the students of 41 nations. Children in the United States were among the leaders in the fourth-grade assessment, but by high school graduation they were *almost* last. Here at home, the National Assessment of Educational Progress basically substantiates our students' poor performance.

In short, our children are losing the ability to respond not just to the challenges already presented by the 21st century but to its potential as well. We are failing to capture the interest of our youth for scientific and mathematical ideas. We are not instructing them to the level of

competence they will need to live their lives and work at their jobs productively. Perhaps worst of all, we are not challenging their imaginations deeply enough.

Third, after an extensive, in-depth review of what is happening in our classrooms, the Commission has concluded that the most powerful instrument for change, and therefore the place to begin, lies at the very core of education—with *teaching itself*.

The teaching pool in mathematics and science is inadequate to meet our current needs; many classes in these subjects are taught by unqualified and underqualified teachers. Our inability to attract and keep good teachers grows. As a result, newer, technologically oriented industries are having trouble finding enough qualified employees from among those teachers' students. Worse, creativity atrophies and innovation suffers.

We are of one mind in our belief that the way to interest children in mathematics and science is through teachers who are not only enthusiastic about their subjects, but who are also steeped in their disciplines and who have the professional training—as *teachers*—to teach those subjects well. Nor is this teacher training simply a matter of preparation; it depends just as much—or even more—on sustained, high-quality professional development.

Fourth, we believe that committing ourselves to reach three specific goals can go far in bringing about the basic changes we need. These goals go directly to issues of quality, quantity, and an enabling work environment for teachers of mathematics and science. For each goal, we offer

specific action strategies for achieving that particular goal, ideas on who should implement them, and how. Specifically, we offer suggestions on how to:

- *Establish an ongoing system to improve the quality of mathematics and science teaching in grades K-12;*
- *Increase significantly the number of mathematics and science teachers and improve the quality of their preparation; and*
- *Improve the working environment and make the teaching profession more attractive for K-12 mathematics and science teachers.*

structure

number

environment

The goals we set before the American people in this report will not be easily attained, nor will the action strategies we offer be readily implemented. Most other nations have a national education system that can change direction more rapidly than our K-12 system, which is operated by nearly 16,000 independent school boards. Even when the majority of board members are firmly dedicated to good education, it is still a difficult job to change direction when needed.



The task to which we call the American people is therefore not an easy one. Nor will our goals be met at bargain-basement rates. But we believe we have a well-focused view of the needs facing our country and its youth, and that we have identified the right starting points for preparing them to meet their future. We are just as strongly convinced that the downstream cost of not turning this problem around will be exponentially higher than the cost of beginning to solve it now.

But rising to great challenges is a part of our national character—not only in such arduous deeds as breaking the bonds of the planet itself, but in the daily work of equipping each new generation to meet new responsibilities. The last time we turned a century, our schools rose to the challenge of educating the nation's youth to meet the demands of an industrializing economy. We succeeded in the equally formidable task of integrating millions of immigrants from around the world into a dynamic culture without precedent in history.



Now history presents us with a yet more pressing demand. We are being called upon to capitalize on the changes wrought by two great revolutions: rapid economic globalization on the one hand and the expansion of information-based technologies on the other. In this light, we can take heart from American history's most profound lesson: Our ability, as a people, to uncover the liberating opportunities concealed within daunting tasks is what defines the American genius.

In the end, then, the message of this report is a simple one. The time has come to move from the information and analysis we have gathered to the resolution we need. We are summoned to answer a stark question. As our children move toward the day when *their* decisions will be the ones shaping a new America, will they be equipped with the mathematical and scientific tools needed to meet those challenges and capitalize on those opportunities?

These are our children, and the choice is ours. We know what we have to do; the time is now—*before it's too late*.

* * * * *

The Commission sincerely appreciates the confidence that Secretary Richard W. Riley placed in us, and hopes that our report is a worthy and useful product in guiding our nation's students to world-class performance.

Special thanks are due to our Executive Director, Linda P. Rosen, whose lifelong experience in mathematics education was vital to our work, and whose direction of the labors of the Commission through long hours on a day-in, day-out, yearlong basis was exemplary and crucial to our work.

Executive Summary

In an age now driven by the relentless necessity of scientific and technological advance,

the current preparation that students in the United States receive in mathematics and science is, in a word, unacceptable.

Recent reports of the performance of our country's students from both the Third International Mathematics and Science Study (TIMSS) and the National Assessment of Educational Progress (NAEP) echo a dismal message of lackluster performance, now three decades old; it's time the nation heeded it—*before it's too late.*

Four important and enduring reasons underscore the need for our children to achieve competency in mathematics and science: (1) the rapid pace of change in both the increasingly interdependent global economy and in the American workplace demands widespread mathematics- and science-related knowledge and abilities; (2) our citizens need both mathematics and science for their everyday decision-making; (3) mathematics and science are inextricably linked to the nation's security interests; and (4) the deeper, intrinsic value of mathematical and scientific knowledge shape and define our common life, history, and culture. Mathematics and science are primary sources of lifelong learning and the progress of our civilization.

Beyond the disturbing news that our young people are not performing well enough in mathematics and science to take firm command of their own futures, five major factors have begun to coalesce that

make this a particularly opportune time to focus on strengthening mathematics and science education. (1) reform efforts have sharply focused the attention of the American people on education as a public issue; (2) the nation now has a surplus of resources to invest in education; (3) a coming demographic shift in the teaching force—two thirds of which will be retiring in the next decade—offers an unparalleled chance to plan for and make changes at the core of education itself; (4) our schools can now put to work what educators have learned in the past generation about curriculum, high standards, effective teaching, assessment, and how children learn; and (5) the rising generation of college graduates is once again showing an interest in teaching as a profession. The nation must capitalize on the convergence of these factors to improve mathematics and science teaching in the United States. We need to act now, *before it's too late.*

The primary message of this report holds that America's students must improve their performance in mathematics and science if they are to succeed in today's world and if the United States is to stay competitive in an integrated global economy. The Report's second message points in the direction of a solution: the most direct route to improving mathematics and science achievement for all students is better mathematics and science teaching.

Evidence of the positive effect of better teaching is unequivocal; indeed, the most



*Predictors
of Success*

consistent and powerful predictors of student achievement in mathematics and science are full teaching certification and a college major in the field being taught.

Better mathematics and science teaching is therefore grounded, first of all, in improving the quality of teacher preparation and in making continuing professional education available for all teachers. A closer look at the teaching that goes on in mathematics and science



classrooms today puts the performance of U.S. students on national and international assessments in sharper focus. The basic teaching style in too many mathematics and science classes today remains essentially what it was two generations ago. By contrast, teaching innovation and higher student performance are well documented in other countries, where students' improvements are anchored to an insistence on strong professional development for teachers.

What *could* be happening in U.S. mathematics and science classrooms is markedly different. The report names an extensive set of characteristics of "high-quality teaching." When they are focused through the lens of exemplary teacher preparation and an integrated system of

professional development, an enormous potential for empowering teachers and improving instruction is apparent.

The pressing national need for *high-quality teaching* described in this report, therefore, demands a vigorous, national response that unifies the efforts of all stakeholders in mathematics and science education. To that end, three wide-ranging, intertwined goals focus the report's call for action at local, state, and federal levels. As an aid to implementation, each goal is accompanied by a coordinated set of well-funded action strategies that identify key stakeholders who should take the lead in implementing each strategy. The estimated annual cost to achieve these action strategies is over \$5 billion. These funds and other resources will come from a diversified set of sources, including all levels of government, higher education, business and industry, professional education associations and teachers' unions, community groups, and the citizenry. The goals and action strategies set forth in the report are as follows:

Goal 1: *Establish an ongoing system to improve the quality of mathematics and science teaching in grades K-12.*

Seven interdependent action strategies are offered to implement this system: (1) each state, must immediately undertake a full *needs assessment* to determine what teachers require, both in their schools and their professional lives, if they are to routinely deliver high-quality teaching; (2) *Summer Institutes* must be established to address the professional development

needs identified, (3) building- and district-level *Inquiry Groups* can provide venues for teachers to engage in common study to enrich their subject knowledge and teaching skills; (4) *Leadership Training* is needed to prepare facilitators for the Summer Institutes and Inquiry Groups; (5) a dedicated *Internet Portal* must be available to teachers so they can make use of and contribute to an ever-expanding knowledge base about mathematics and science teaching; (6) a nongovernmental *Coordinating Council* is needed to bring together the above initiatives and those that follow to assess accomplishments; and (7) all states and local districts should initiate *reward and incentive programs*, both to support exemplary professional development that results in higher student achievement and to increase the attractiveness of teaching as a profession.

Goal 2: *Increase significantly the number of mathematics and science teachers and improve the quality of their preparation.*

Three action strategies are offered for this goal: (1) a direct strategy that identifies *exemplary models of teacher preparation* whose success can be widely replicated; (2) an overarching strategy of finding ways to *attract additional qualified candidates into teaching* from among high school and college students, recent college graduates, and people at mid-career; and (3) creating 15 competitively selected *Mathematics and Science Teaching Academies* to annually train 3,000 Academy Fellows, who will be nationally recruited for a one-year, intensive course on effective teaching methods in mathematics or science.

Goal 3: *Improve the working environment and make the teaching profession more attractive for K-12 mathematics and science teachers.* Four action strategies address this goal: (1) focused *induction* programs are required to help acclimate beginning mathematics and science teachers to the profession, create formal mentoring relationships, and introduce teachers to Inquiry Groups; (2) *district/business partnerships* are needed to provide support for a broad range of efforts that can help create professional working environments for teachers. These efforts can enhance teaching by providing materials, facilities, equipment, and mentor stipends; (3) *incentives*—whether in the form of cash awards, salary increases, support for further education, or community-wide recognition—are needed to encourage deserving mathematics and science teachers to remain in teaching and improve their skills; and (4) *salaries* of all teachers must be made more competitive, but especially for mathematics and science teachers, whose combined preparation and skills command high wages in the private sector.

The report concludes by challenging all Americans directly to take personal responsibility for expressing their views on mathematics and science education to policy- and decision-makers, and to take the initiative to implement the report's action strategies in their own communities.

The Problem

Our Students' Performance in Mathematics and Science is Unacceptable



*Eleven Septembers ago,
with the heady horizon
of a new millennium
within sight,*

the nation's governors gathered in Charlottesville, Virginia, to set ambitious goals for our schools. Among the challenges the governors issued was this one:

"By the Year 2000, United States students will be first in the world in mathematics and science achievement."

A goal like that might be tough, Americans thought, but it was reachable.

But our effort since has not matched our rhetoric. Results from the Third International Mathematics and Science Study (TIMSS) show U.S. students devastatingly far from this goal by the time they finish high school.

In an age now driven by the relentless necessity of scientific and technological advance, the preparation our students receive in mathematics and science is, in a word, unacceptable. Despite our good intentions, their learning is too often superficial. Students' grasp of science as a process of discovery, and of mathematics as the language of scientific reasoning, is often formulaic, fragile, or absent altogether. And perhaps most alarming of all, as recent assessments seem to show, the longer our children study these crucial disciplines, the less favorably they compare with their peers in other countries.

The Recycled Message of TIMSS and NAEP:

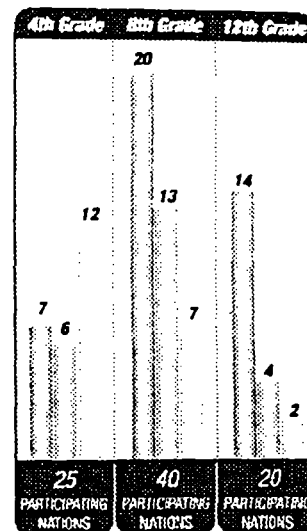
Our Students Are Losing Ground

America has heard news like this before. In 1957, the sudden appearance of Sputnik galvanized a massive national effort to win the space race and improve mathematics and science education. We knew we had to "catch up with the Russians." With a burst of single-minded intensity, we more than caught up: in 12 years we achieved the moon. But we did not duplicate or sustain that intensity, a lesson we have heard three times over from international assessments of science and mathematics achievement conducted since the 1960s. The unmistakable message is that our students' performance relative to their peers in other countries—our competitors all—is disappointingly unchanged. Their students have consistently scored higher than U.S. students.² Indicators from those three assessments and those conducted here at home corroborate the point.

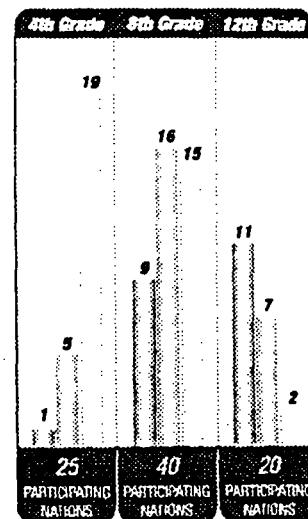
TIMSS Results: The Third International Mathematics and Science Study assessed the performance of students from 41 countries in 1995. U.S. fourth-graders scored above the international average in mathematics and science; eighth-graders scored slightly above the international average in science and slightly below the international average in mathematics. However, among 20 nations assessed in advanced mathematics and physics (students were not assessed from all

TIMSS Results*

MATHEMATICS



SCIENCE



1 Nations with average scores HIGHER than the U.S.

2 Nations with average scores EQUIVALENT to the U.S.

Nations with average scores LOWER than the U.S.

*When participation of the United States is included, the total number of participating countries is 26, 41, 21 at the 4th grade, 8th grade, and the 12th grade respectively

countries for all grades), *none* scored significantly lower than the United States in advanced mathematics, and only *one* scored lower in physics.¹ In a phrase, our mathematics and science students are not "world class."

NAEP Results: The National Assessment of Educational Progress (NAEP, the "Nation's Report Card") periodically reports student achievement in science and mathematics using four categories: "Below Basic," "Basic," "Proficient," and "Advanced." On the 1996 NAEP, *less than one-third* of all U.S. students in grades 4, 8, and 12 performed at or above the "Proficient" achievement level in mathematics and science, where "Proficient" represents solid academic performance for each grade assessed. Perhaps even more alarming, *more than one-third* of U.S. students scored below the "Basic" level in these subjects, which means they lack mastery of the prerequisite knowledge and skills needed for "Proficient" at each grade. While U.S. students do, indeed, learn more each year they are in school, they are performing less well in twelfth grade than in the fourth and eighth grades, *compared to the standards of proficiency* for those grade levels. Despite some improvements in NAEP mathematics scores since the 1970s, our students' performance in science and mathematics has remained at disappointing levels for nearly 30 years.²

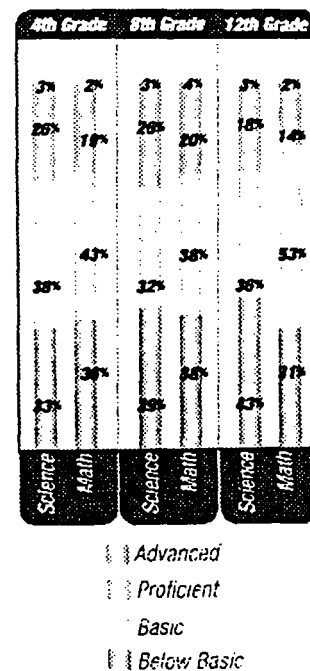
In sum, whether we look at comparisons of our young people to those of other nations or look simply at the progress our students are making at home,³ the nation keeps getting the same dismal message about mathematics and science achievement: our students are losing ground. It's time we heeded it.

But heeding the bad news has to involve something other than wringing our hands and raising a polite rallying cry for improvement. The issues raised by TIMSS, NAEP, and state performance data are deeply entrenched. They cannot be papered over. Only a well-conceived strategy, grounded in data and sustained over time, can possibly overcome the status quo. The majority of states report assessment data for both mathematics and science; but proficiency levels in both subjects are often too incomplete to paint a useful portrait for determining accountability. This is especially true in science, where only 16 states report proficiency levels. Thus, a crucial first step in creating greater accountability is for state education agencies to supply to the public complete, user-friendly, reporting on student performance, *school-by-school*.⁴ As it stands, only 12 state education agencies provide parent information on their Web site guides to student assessment; that is 38 states too few.

Why Does It Matter?

Four important and enduring reasons underscore the need for our children to achieve competency in mathematics and science: (1) the demands of our changing

NAEP Performance Results



Science Results Reported in "What Do Students Know?": Results for 4th, 8th & 12th Grade Students. National Center for Educational Statistics. www.nagb.org/pubs/students/nation.html

NAEP 1996 Mathematics: Report Card for The Nation and the States. Washington D.C.: National Center for Educational Statistics. February 1997. p. 59

economy and workplace, (2) our democracy's continuing need for a highly educated citizenry, (3) the vital links of mathematics and science to the nation's national security interests, and (4) the deeper value of mathematical and scientific knowledge.

The demands of our changing economy and workplace

A Changing Economy: Science and mathematics exert the most visible influence on the economy through their most rapidly changing offspring—new technologies.

- New technologies are the relentless drivers behind the nation's standard of living. Since 1996, national productivity (i.e., output per worker hour) has increased, on average, by 2.6% per year, a rate that doubles the standard of living roughly every 25 years.⁷ Such productivity gains are unsustainable without a workforce sufficiently educated in the sciences and mathematics.
- The technology-driven economy of the 21st century will add about 20 million jobs to the American economy by 2008—if we can only educate our young people to fill them.⁸
- Jobs in both the health sciences and computer industries requiring science and mathematics skills will increase by 5.6 million by 2008. The Department of Labor estimates that postsecondary institutions will have to produce nearly

four times as many graduates in computer science as they do now to meet the demand.⁹

- Bureau of Labor Statistics projections for 1998-2008 revealed that more than two-thirds of the 30 occupational categories expected to have the fastest growth—most of them high-tech—already had hourly earnings above the national median; 11 of those job categories were in the top earnings quartile of \$16.25/hour and up.¹⁰
- Finance, trade, industrial production, communications, and asset ownership are becoming increasingly integrated on a global basis. So are capabilities in science and technology. Singapore, for example, reputedly has the most technologically intensive workforce in the world. Israel now produces more technology-based startups than anywhere outside Silicon Valley; its high-tech exports account for a quarter of its global sales, and the country boasts 135 engineers per 10,000 citizens—twice the U.S. ratio. Drawing on a young, skilled, and well-educated workforce, Ireland now produces 60% of all PC business-application software sold in Europe. The common denominator of these advances abroad is education—a “raw material” far easier to acquire than lumber or iron ore.¹¹
- Ironically, the U.S. higher education system itself contributes mightily to the rapid advances by equipping the

workforces of our competitors. The Department of Education has reported that, for 1995-96, nonresident aliens received 34.6% of all bachelor's and 44% of all master's degrees in engineering, mathematics, and information science. These students are out-competing young Americans for university spots and are returning to their native lands to expand technical capacity there.¹²

A Changing Workplace: New scientific discoveries not only add to basic knowledge, they also transform jobs, the lives of families, and the shape of public issues. The mathematical and scientific preparation of each new generation—beginning with the one now in school—has become the precondition not just to progress but to the future itself, as the links among economy, technologies, and education tighten in a rapidly changing workplace.

■ “Knowledge work” is replacing low-end, low-wage jobs. In 1950, 80% of jobs were classified as “unskilled”; now, an estimated 85% of all jobs are classified as “skilled.”¹³ A telling example is found in machine tooling. The operators of today’s computer-numerically-controlled (CNC) manufacturing technology now need sophisticated skills, commonly including computer programming and knowledge of calculus.¹⁴

■ Many American companies now have to import the computing talent they

need to stay competitive. Two years ago the Congress had to pass special legislation to permit the entry of computer workers, in rapidly escalating numbers, from abroad. The so-called “H-1B Visa Bills” progressively raised the ceiling to permit the entry of some 300,000 temporary, non-immigrant, skilled computer workers between 1998 and 2002.

■ *Training Magazine* reports that approximately \$62.5 billion was spent by businesses on training in 1999.¹⁵ Much of these funds are spent on upgrading basic employee skills, many of which should have been acquired at school. In too many contexts, the nation is paying twice to equip its workforce.

■ Among the scarier statistics recently reported by a Midwest think tank is this one: 60% of all new jobs in the early 21st century will require skills that are possessed by only 20% of the current workforce.¹⁶



Our democracy's need for an educated citizenry

It is not just the role that mathematics, science, and technology play in the changing economy and workplace that matters. Mathematics and science have become so pervasive in daily life that we tend to overlook them. Literacy in these areas affects the ability to understand weather and stock reports, develop a personal financial plan, or understand a doctor's advice. Taking advantage of mathematical and scientific information does not generally require an expert's grasp of those disciplines. But it does require a distinctive approach to analyzing information. We *all* have to be able to make accurate observations, develop conjectures, and test hypotheses—in short, we have to be familiar with a scientific approach.

Examples of science-related issues with far-reaching implications for public and private life that require the understanding of an informed citizenry are present everywhere:

- ❖ **In biology:** Cloning of organisms, the selective genetic manipulation of human reproduction, and the use of DNA as courtroom evidence;
- ❖ **In health:** The development of new drugs, chemical and biological terrorism, the effect of agricultural herbicides and pesticides on the food chain, whether to take nutritional supplements, or even calculating the nutritional value of a week's groceries;
- ❖ **In computer science:** Issues of data encryption, maintaining computer privacy, the conduct of e-commerce; and

- ❖ **In meteorology and earth science:** Global warming, the ozone layer, and hurricane and earthquake research.

The list is endless, but the point is a simple one. No citizen of America can participate intelligently in his or her community or, indeed, conduct many mundane tasks, without being familiar with how science affects his daily life and how mathematics shapes her world.

The vital links of mathematics and science to our national security interests

The warp of our nation's security interests and the woof of mathematics and science are closely woven. It was the pure science of nuclear physics that first gave rise to, then continued to support, the nation's nuclear deterrent throughout the last half century. Nuclear science—put to sea in nuclear submarines—has also formed the second pillar of our strategic defense system. Long-range bombers, the third pillar, became possible only with advances in aeronautical science.

Mathematics and science today supply the architecture that gives structure and strength to the development of new weapons, from long-range missiles to the B-2 ("Stealth") bomber. Science and mathematics continuously enhance our armed forces' ability to protect the nation, whether in the form of vaccinations against chemical and biological agents, or night-vision goggles for combat troops, or the Global Positioning Satellite system (GPS) that can pinpoint the location of virtually any object on the planet. An invisible web of sophisticated satellite communications technology connects our military forces in the global defense arena.

where U.S. troops must respond quickly and operate for indefinite periods. On the ground, the modern equipment and weaponry that our troops are now called on to use in battle require mathematical and scientific skills, particularly computer-based learning. Finally, the sophisticated mathematics of encryption supports and protects our diplomatic and military communications around the world, as well as those of American corporations.

The deeper value of mathematical and scientific knowledge

The wealth of knowledge that mathematics and science impart for understanding the world has such breadth that it is easy to overlook the dimension of depth. But teaching our children these subjects is important at a more profound level than that of their practical benefits. Above all, mathematics and science impart three qualities that define our human world and enable us to meet its challenges.

❖ First, mathematics and the sciences bring order, harmony, and balance to our lives. They have great explanatory power. They teach us that our world is not capricious but predictable, i.e., that it contains pattern and logic, which can be used in the service of humankind. The analytical tools of mathematics and the investigative skills of a scientific approach are also foundational skills for lifelong learning, in other words, for creating progress itself.

❖ Second, science and mathematics continually shape and reshape our history and culture, giving rise to new

ideas and inventions. It was early astronomy that formed the knowledge base of ancient Near Eastern civilizations. The physics of Newton made the Industrial Revolution possible. In our own time, the pure science of information theory has yielded not only computers but also an incredibly useful global communications system.

❖ Third, as science and mathematics provide human beings with powerful tools for understanding and continually reshaping the physical world itself, they teach us again and again that Nature's secrets can be unlocked—in short, that the new is possible.

Not the Last Word

Despite the pervasiveness of mathematics and science in our lives, the sad reality is that our nation continues to renege on its "*By the Year 2000...*" promise. Our schools are not producing graduates with the kinds of skills our economy needs to remain on the competitive cutting edge. In consequence, we are bequeathing failure to our children. As they try to meet the challenge with the longest-range implications of all—securing their own and America's place in the world—they need to command the disciplines that they are only indifferently mastering today.

If this were all that could be said, then the future would be bleak indeed. But it is not. Some important factors have begun to coalesce, each adding to the others' momentum.

The Time to Act is Now



An ancient Chinese proverb says, "The best time to plant a tree is twenty years ago; the second best time is today."

We believe that wisdom applies to the task of strengthening and improving the quality of mathematics and science teaching and learning in America. Fortunately, an unusual confluence of factors has created an unprecedented—perhaps once-in-a-lifetime—opportunity for making progress. Five things seem to be happening at once.

❖ First, two decades of experience in education reform demonstrate that tinkering around the edges will not suffice. Happily, education reform now has the focused attention of the American people. Not long ago, when asked to name the top problems facing the nation, Americans ranked education well down on the list. Today, in poll after poll, it is number one. That kind of concern, focused through the lens of a well-crafted agenda, offers an opportunity to generate real energy. But that opportunity will not last forever.

❖ Second, America now has the abundance of resources it needs to address the issue of mathematics and science education powerfully. We are still in the midst of the longest economic expansion in our history. Thanks in part to a half-century of investment in science and technology,

there may be a trillion-plus-dollar surplus at hand to invest in our people.

❖ Third, the U.S. teaching force is about to go through a massive reshuffling. Over the next decade, our schools will replace two-thirds of their teachers, whether by retirement, attrition, or job changes. This immense demographic shift in our schools presents us with an unparalleled chance to plan—to inject new energy into mathematics and science teaching in the form of new recruitment, training, and supportive structures that can strengthen teaching at all grade levels. This we *must* do, before we are forced to play yet another game of educational catch-up.

❖ Fourth, we have learned much in the past generation about what works in mathematics and science education—about rigorous curriculum, high standards,¹⁷ effective teaching methods, challenging assessments, and how young people learn.¹⁸ In several states, school districts, and schools, innovative approaches are being attempted. Many are promising. We need to build on these approaches and extend them with new research. We now have the chance to bring this knowledge together in a mathematics and science education effort that will serve as a powerful tool for change. Ignored research is worthless; unused tools can only rust.

high 4+

Finally, many more able college students are expressing an interest in teaching. The success of such programs as *Teach for America* and *AmeriCorps*, and the national resurgence in volunteerism, demonstrate that the long dormant idealism of a former generation has been reawakened. According to a recent poll, 10% of young Americans say they want to teach in our schools—double the number who said so in 1982.¹⁹

rialization and the needs of a growing population. At the beginning of the 21st century we look to an even greater challenge. Our schools, and the teachers who imbue them with life, must find ways to produce higher levels of proficiency in mathematics and science in *all* their students. The American people must do this because our world and our times require it. If we do not plant this tree today, we will surely have to do so tomorrow, next month, or next year—at a higher price.

Now, The Glimpse of a Greater Challenge

At the beginning of the 20th century, schools in our country underwent profound changes as they adapted teaching and curricula to the demands of indust-



Toward a Solution

We Must Place Better Teaching at the Center of Mathematics and Science



The two core premises of this report are simply stated and they undergird every change we recommend:

(1) *Now, more than ever, America's students must improve their performance in mathematics and science.* That is the burden of the case presented thus far.

(2) The second premise points in the direction of a solution: *The most direct route to improving mathematics and science achievement for all students is better mathematics and science teaching.* In other words, better teaching is the lever for change.

To call for higher student achievement and high-quality teaching as the most direct route to change seems obvious on the surface, but recent educational reform recommendations have not been sufficiently guided by this clear linkage. Now, before it's too late, is the time to make it.

The evidence for the effect of better teaching is unequivocal.²⁰ The most consistent and most powerful predictors of higher student achievement in mathematics and science are: (a) full certification of the teacher and (b) a college major in the field being taught.²¹ Conversely, the strongest predictors of lower student achievement are new teachers who are uncertified, or who hold less than a minor in their teaching field.

The difference better teaching makes is often dramatic. The National Commission on Teaching and America's Future reported in 1996, for example, that licensing examination scores and teaching experience accounted for 43% of the gains in mathematics test scores in the early grades.²²

The difference better teaching makes for students is paralleled by what can also happen for teachers. A focused *professional development* experience led by qualified teachers, mentors, and colleagues is the indispensable foundation for competence and high-quality teaching.

As school gets under way in the fall of 2000, many underprepared and out-of-field teachers will take charge of mathematics and science classrooms. They, as well as their better-prepared and more knowledgeable colleagues, must have access to ways to continually improve their teaching. Only a tailored system of professional development provides that access.

Thus, if we are to create the kind of mathematics and science education America needs, we have to start rebuilding at education's very foundation—*teaching itself*.²³ For this reason, the three goals in this report—and the action strategies that accompany them—point in a new direction.

But before turning to specific remedies, we need to know more about what is happening now in America's mathematics and science classrooms—and what should take its place.

WHO IS A MATH OR SCIENCE TEACHER?

All teachers, grades K–12, who provide instruction in mathematics or science for some part of the school day are math or science teachers. The elementary school generalist, the high school teacher specializing in physics, as well as the drama teacher who may be assigned to a single geometry class, are all persons whose teaching quality is of interest—and of consequence—to the nation.

WHAT IS PROFESSIONAL DEVELOPMENT?

When this report uses the term "professional development," it means a planned, collaborative, educational process of continuous improvement for teachers that helps them do five things: (1) deepen their knowledge of the subject(s) they are teaching; (2) sharpen their teaching skills in the classroom; (3) keep up with developments in their fields, and in education generally; (4) generate and contribute new knowledge to the profession; and (5) increase their ability to monitor students' work, so they can provide constructive feedback to students and appropriately redirect their own teaching.

The Need for Professional Development

To say that improving the quality of teaching yields better student performance in science and mathematics makes sense, and some states have taken this wisdom to heart.²⁴ But in many more places, nearly the reverse is true. There, the knowledge base and arsenal of teachers' skills must be replenished:

- ❖ More than one in four high school mathematics teachers and nearly one in five high school science teachers lack even a minor in their main teaching field.²⁵
- ❖ More than 12% of all new hires enter the classroom without any formal training; another 14% start work without meeting the teaching standards of their states.²⁶
- ❖ About 56% of high school students taking physical science are taught by out-of-field teachers, as are 27% of those taking mathematics. These percentages are much greater in high-poverty areas. Among schools with the highest minority enrollments, for example, students have less than a 50% chance of getting a science or mathematics teacher who holds both a license and a degree in the field being taught.²⁷

Thus, when the dismissal bell rings each day, untold thousands of American students depart for home having been taught by mathematics and science teachers ill-equipped for the job. Far too many are inexperienced beginners, with

little or no training, and little or no mentoring by qualified colleagues.

Astonishingly, in no other profession is so much of such ultimate worth entrusted to people with such uneven qualifications.



SHORT-TERM SOLUTION CREATES LONG-TERM PROBLEM

The most common solution to the shortage of qualified mathematics and science teachers is to assign those classes to out-of-field teachers. But merely being able to keep one chapter ahead of the students in an algebra or environmental science text does not a mathematics or science teacher make.

Predictably, underqualified teachers are most prevalent in urban schools. A recent survey taken among 40 large urban schools, for instance, showed that more than 90% of them had an immediate need for a certified mathematics or science teacher.²⁸

What Happens in Most Classes



Despite the dramatic transformations throughout our society over the last half-century,

teaching methods in mathematics and science classes have remained virtually unchanged. Classroom practice has still hardly begun to capitalize on the many dimensions of the learning process.

A videotape study of eighth-grade mathematics classes in the United States reveals that the basic teaching style in American mathematics classrooms remains essentially what it was two generations ago. The approach used for the lessons was numbingly predictable: (1) a review of previous material and homework, (2) a problem illustration by the teacher, (3) drill on low-level procedures that imitate those demonstrated by the teacher, (4) supervised seat work by students, often in isolation, (5) checking of seatwork problems, and (6) assignment of homework. In not one of 81 videotaped U.S. classes did students construct a mathematical proof.²⁹

In Japan, by contrast, closely supervised, collaborative work among students is the norm. Teachers begin by presenting students with a mathematics problem employing principles they have not yet learned. They then work alone or in small groups to devise a solution. After a few minutes, students are called on to present their answers; the whole class works through the problems and solutions,

uncovering the related mathematical concepts and reasoning. The students learn through reasoned discovery, not lecture alone.

Not incidentally, this approach is a natural outgrowth of the teaching culture in Japan, which accords teachers not only abundant time for preparation, but also for collaborative lesson planning. Fully 99% of all elementary teachers and 50% of all middle school teachers participate in lesson study groups that meet for two to five hours per week. The debilitating professional isolation of U.S. teachers stands in stark contrast to this pattern. A core conclusion from the videotape research: "The key to long-term improvement [in teaching] is to figure out how to generate, accumulate, and share professional knowledge."³⁰

Instructional patterns in the United States do not yield much better results when it comes to the sciences. Tests of scientific knowledge and classroom observation indicate that most science students spend much of their time learning definitions, or the labels that apply to natural phenomena and scientific processes. In other words, much science instruction in our schools parallels what happens in a badly taught history unit on the Civil War, in which students learn nothing but the names of the generals and the dates of the battles. Seldom are students asked to master the "big" concepts that make science so powerful and fascinating.³¹

If the core of mathematics and science is about inquiry, then too many of today's mathematics and science classrooms come up short. Students are crippled by content limited to the "What?" They get only a little bit about the "How?" (or "How else?") and not nearly enough about the "Why?" Missing almost entirely is "Why should I care?" It is hard to imagine that students in these classes are gaining the conceptual and problem-solving skills they need to function effectively as workers and citizens in today's world—a world that increasingly depends on mathematics and science.



What Could Happen

We Need To Capture A Vision Of High-Quality Teaching



What kind of instruction in mathematics and science can justifiably be called "high-quality teaching?"

- A core premise of high-quality teaching is that the ability to teach, contrary to myth, is not "something you're born with"; it can be learned and refined over time. Specific teaching skills—for example, the ability to distinguish between what is most important for students to learn and what is hardest for them to understand—can only be acquired through training, mentoring, collaboration with peers, and practice.
- High-quality teaching requires that teachers have a deep knowledge of subject matter. For this there is no substitute.
- In high-quality teaching, the process of *inquiry*, not merely "giving instruction," is the very heart of what teachers do. Inquiry not only tests what students know, it presses students to put what they know to the test. It uses "hands on" approaches to learning, in which students participate in activities, exercises, and real-life situations to both learn and apply lesson content. It teaches students not only what to learn but how to learn.
- High-quality teaching not only encourages students to learn, it *insists* they learn.
- High-quality teaching, especially in the sciences, focuses on the skills of observation, information gathering, sorting, classifying, predicting, and testing. A good science or mathematics teacher encourages students to try new possibilities, to venture possible explanations, and to follow them to their logical conclusions.
- High-quality teaching fosters healthy skepticism. It encourages students to submit their work to questioning by others, to pull things apart and put them back together, and to reflect on how conclusions were reached.
- High-quality teaching allows for, recognizes, and builds on differences in the learning styles and abilities of students. It has the deepest respect for students as persons; it corrects without squelching; it builds on strengths rather than trying to stamp out weaknesses.
- High-quality teaching is grounded in a careful and thorough alignment of curriculum, assessment, and high standards for student learning.
- To keep its edge, high-quality teaching must be continually reshaped by the institutional structures that support it, i.e., by professional development, continuing education, the effective use of technology, and recognition and rewards.
- Finally, the effectiveness of high-quality teaching can be evaluated by the performance and achievement of the students who receive it.

Three Goals



The pressing national need for high-quality teaching described in this report demands a vigorous,

national response that unifies the efforts of all stakeholders in mathematics and science education. To that end, three wide-ranging but intertwined goals focus our call for action at the local, state, and federal levels. Achieving these goals will involve the sustained efforts of legislators and other decision-makers, the business community, higher education, school boards and administrators, teachers, and parents. An intense, serious commitment to achieve these goals, through a coordinated set of well-funded action strategies, is needed immediately.

All together, the action strategies for achieving these goals nationally will cost more than \$5 billion annually. Strategy by strategy, the financial responsibility must be shouldered by the governments and institutions best equipped to do so, whether at the federal, state, or local levels, by business and industry, or by higher education. The agenda laid out here details concrete steps that all Americans can take. The most important point to keep in focus is that the funds invested in mathematics and science education today can purchase a lifetime of leverage on the future of American school children and the nation as a whole.

Clearly, the cost of achieving these goals

will create a noticeable line item in education budgets at every level. (An estimate of the costs associated with the first year of implementation of the goals concludes this report.) At the same time, however, the nation's balance sheet now shows a considerable surplus and the cost of delay is higher still. Those funds must therefore be put to work now, when and where they can most usefully equip our young people, and through them the nation itself, for the new century's challenges.

GOAL 1: Establish an ongoing system to improve the quality of mathematics and science teaching in grades K-12.

If high-quality teaching is the leverage point for improving mathematics and science education, and if professional development is a prerequisite for a well-qualified and effective teaching force, then teachers need a focused support system and enough time to grow as professionals.

Sadly and short-sightedly, however, professional development is too often treated not as a necessity but as a luxury item on the school budget. Many people erroneously believe that teachers are not working unless they are standing in front of a classroom. In fact, preparation time, individual study time, as well as time for peer contact and joint lesson planning, are vital sources of both competence and nourishment for all teachers.

But teachers are granted precious little time for any of these activities. Equally rare are extended periods of time set aside

SCALING UP

Several states and school districts already provide excellent instruction in mathematics and science. Their students' test scores provide evidence of high-quality teaching. But occasional oases of excellence are not enough to meet the nation's needs. That means scaling up our efforts to match our aspirations. Our perspective must be nationwide and we must intensify our efforts immediately: not next week, or next year, but now. Our aim can be no less than equipping every K-12 student in every school with an excellent education in mathematics and science. The three strategic goals of this report are therefore just as urgent as they are visionary.

The estimated costs that accompany the Action Strategies proposed here remind us that we will get only what we are willing to pay for.

WHAT IS A PROFESSIONAL?

A professional "professes" the values associated with a particular occupation, and has acquired the special core of knowledge and skills needed to serve others effectively through that occupation. If professionals do not maintain and expand their knowledge and skills, they will atrophy.

We have the resources and insights to build an even stronger base of professional knowledge about mathematics and science teaching. Where that is not available, it has to be developed.

Why isn't high-quality teaching universal?

For teachers to deliver high-quality teaching, they must be empowered to do so. Generating this kind of teaching means that school boards, administrators, parents, and policymakers must be willing to stand up for teachers as the primary drivers of student achievement. Teachers must be given the time they need within the school day to keep up with new developments in their fields, teaching aids, materials, and technology. Teachers must be encouraged to contribute knowledge back to their disciplines. They need the time and feedback necessary to reflect on their teaching, so they can get better at it.



Teacher empowerment also means according teachers the respect they deserve for their judgments about learning, rewarding their professionalism, and yes, paying them what they are worth. These concerns are addressed by the goals that follow.



for teachers to have challenging educational experiences of their own. In consequence, much-needed study and preparation time is routinely sacrificed to in-service events that are no more substantive than a broad-brush overview of this semester's teaching fad. High-quality professional development ought to be the lifeblood of American teaching; instead, it is used only to provide the occasional, anemic transfusion.

Everyone connected with and touched by the U.S. education system is responsible for changing the character of professional development and its impact. *Teachers* need to take responsibility for their own professionalism as they practice mathematics and science teaching and work to improve their knowledge and teaching skills. *Principals, superintendents and school boards* must make sure teachers have the time and resources they need to prepare and collaborate. *Teacher preparation institutions, state departments of education, and the federal government* all have a substantive policy role in enabling teachers, schools, and districts to realize improved teaching via professional development. The support of businesses, which stand squarely to benefit from improvements made in the quality of mathematics and science teaching, is also crucial to enriching the quality of professional development. *Professional associations and their members* can make their own important contributions through workshops, clinics, and new curricular initiatives.

The place to begin improving mathematics and science teaching is with a *system* that promotes high-quality professional development opportunities for all teachers. Such opportunities should build upon one another and reinforce accountability. The system must be rooted, first of all, in a clear determination of the professional development needs of teachers in every school and school district. That determination must be followed by an immediate response to the most pressing needs; a sustained response with the necessary leadership, resources, tools and time; and a continuing system that recognizes and rewards schools that demonstrate improved student achievement.

Despite progress in some states and districts, there remains an urgent need for wide-scale self-examination, strategic planning, and rapid implementation of a system of professional development tailored to the needs of those who provide instruction in science and mathematics, K-12. Action strategies for implementing such a system are outlined below; each is accompanied by concrete suggestions on how the work can be done and who can do it.

Action Strategies: What Needs to Happen
Needs Assessment: Each state must quickly undertake a full assessment of the professional development needs, district by district, of its mathematics and science teachers, K-12. As many stakeholders as possible must be involved in this self-

NEEDS ASSESSMENT

Who Will Make Them Happen and How?

- Some selected states will begin their needs assessments immediately. States should first establish criteria and protocols for conducting their needs assessment, then go on to identify and analyze state certification and recertification requirements. Once procedures and systems have been established and tested in these initial states, what is learned can be widely disseminated to all states.
- Governors, state legislatures, and state boards of education in each of the remaining states (thence districts) must work together quickly to allocate the federal, state, and local funds and staff needed to develop and oversee a similar assessment of the professional development needs of mathematics and science teachers.
- Two- and four-year colleges and universities, using their mathematics, science, and education faculties, can assist school districts and others in planning and implementing needs assessments.

SUMMER INSTITUTES

Who Will Make Them Happen and How?

- As with the needs assessments, selected states will establish protocols and evaluation criteria for Summer Institutes, working in concert with state boards of education. The lessons learned from these experiences will be widely disseminated to other states to inform their efforts.
- Governors, state legislatures, state boards of education, and districts in each of the remaining states must work together quickly, allocating funds and staff, to develop and oversee a series of Summer Institutes addressing the most pressing professional development needs of mathematics and science teachers.
- Federal, state, and local professional development funds must be allocated to this coordinated purpose—rather than in the diffuse way that is currently all too common. Teachers should be compensated for their participation in the Summer Institutes.
- Institutions of higher education and professional associations are well positioned to assist in planning, hosting, conducting, and evaluating Summer Institutes.

evaluation—teachers, administrators, parents, school boards, businesses, two- and four-year institutions of higher education, professional associations, and others. In addition to seeking to upgrade content knowledge and teaching skills, statewide needs assessments must also determine:

- (1) whether schools offer a full complement of mathematics and science courses;
- (2) whether the quality of curricula, texts, and assessments strongly supports high-quality teaching and learning;
- (3) whether the necessary materials and resources (e.g., laboratories and equipment) are readily available;
- (4) whether teachers are adept in using technology; and
- (5) whether teacher certification and recertification guidelines are sufficiently ambitious.

As a result, school districts will have a complete snapshot of the status of their science and mathematics teaching corps, enabling the ready identification of professional development tasks that must be targeted first.



Based on what is learned from these needs assessments, each state, with district input, must move immediately to implement a *system* of professional development, designed to address the short- and long-term needs of its mathematics and science teachers. To put this in perspective, collectively the states must plan to quickly reach the *1.7 million teachers nationwide* who provide instruction in science and mathematics.

Summer Institutes: In the near term, two-week Summer Institutes will address the most pressing problems, such as providing opportunities for upgrading content knowledge for out-of-field teachers, conducting subject-based workshops for all science and mathematics teachers, integrating technology into the teaching of mathematics and science, introducing new teaching methods, and improving skills for teaching specific subject matter by grade. Over the long term, states are urged to tailor their Institutes to teachers' identified needs and to make regular Institute attendance a critical component of teacher recertification, with the purpose of continually increasing teachers' science and mathematics knowledge base. In many locations, the powerful technology of distance learning can open Summer Institutes to a statewide teacher audience.

Inquiry Groups: However well they may have been prepared to teach, and whatever knowledge they may have gained in Summer Institutes, *all* teachers need continuing, collegial contact, peer

reinforcement and input from experts to sharpen their skills and deepen their subject knowledge. Building- and district-level Inquiry Groups are envisioned as communities of learning. They will provide a specific venue for teachers to share ideas, gain the benefit of one another's teaching experience, engage in common study to enrich their subject knowledge, learn more about technology, and design ways to incorporate local, state, and national educational developments (e.g., subject-matter learning standards) into their teaching. While critically important during the school year, Inquiry Groups must also continue through the summer, enabling teachers to explore some issues without the pressing responsibility of daily student contact. For districts moving to 11-month salary schedules, full participation in an Inquiry Group ought to be an integral part of every teacher's responsibilities when school is not in session.

Time for in-depth study through regular work with peer Inquiry Groups is a teacher's most valuable professional resource. *It must be considered sacrosanct.*

Perhaps most important, these groups can be a rich source of new knowledge about teaching itself, generated from the field. Such groups can readily take advantage of local resources (e.g., businesses, museums, laboratories), other Inquiry Groups from neighboring districts, and faculty from nearby two- and four-year higher education institutions. Inquiry Groups could also be networked

electronically, via distance learning technology, for wider sharing of information, instruction, and resources.

Leadership Training: Summer Institutes and Inquiry Groups must be facilitated by teachers who are current with the most effective teaching methods in their disciplines, who have shown demonstrable results of higher student achievement in mathematics and science, and who are adept in the use of technology for teaching and learning. Although there are many such teachers, the demand far outpaces the supply. To remedy this, many more potential leaders must be identified and trained.

Internet Portal: High-quality mathematics and science teaching requires not only access to technology (especially the Internet) but also regular training in how to use it effectively. An Internet Portal, i.e., an interactive, conversational Web resource dedicated to science and mathematics instruction, would provide links to an ever-expanding knowledge base that would be invaluable in supporting high-quality professional development.

The Portal, functioning as a "virtual resource center" and updated frequently, would provide hyper-links to form a "one-stop-shopping" learning network. It would also codify what is already available on the Web elsewhere, while providing a framework for new entries over time. Among the activities and resources envisioned for the Portal are:

INQUIRY GROUPS

Who Will Make Them Happen and How?

- Districts must establish conditions that promote and support continuing learning communities among science and mathematics teachers in each school, focusing on teaching quality. Doing so will demand a reallocation of teacher time and professional development funds to focus on discipline-based efforts.
- Policies must be enacted by school boards, and rigorously enforced by school administrators, to ensure that this reallocation occurs.
- Access to a variety of Web-based resources—through an Internet Portal dedicated to mathematics and science teaching—must be readily available to all Inquiry Group participants.
- Parent organizations have a watchdog and advocacy role to play in ensuring that Inquiry Groups have the means and opportunity to succeed.

LEADERSHIP TRAINING

Who Will Make it Happen and How?

- Appropriate agencies within the federal government must provide the funding needed to train cadres of facilitators and help them, thereafter, to keep abreast of new insights and research in science and mathematics teaching
- These trained leaders should work in their respective districts and states to organize and facilitate Summer Institutes and Inquiry Groups. They should also be proactive in helping colleagues develop their Internet and research skills

THE INTERNET PORTAL

Who Will Make It Happen and How?

- Appropriate federal agencies, especially the National Science Foundation, must scale up current efforts to create a digital library that will serve as the foundation for an Internet Portal.
 - States must provide search engines keyed to their respective state standards and curriculum frameworks for more tailored use of the information in the Portal.
 - Businesses, particularly those in information management, have a crucial role to play in contributing to and sustaining the Internet Portal.
 - Curriculum and software developers, publishers, and academics should collaborate with teachers in generating the resources and tools offered via the Portal.
 - Local school boards must make it a matter of policy that mathematics and science teachers have access to, and training in how to use, the Internet Portal.
- An online professional journal that encourages mathematics and science teachers to engage in publishable research and to share new teaching strategies with colleagues, both nationwide and internationally;
 - User-friendly access to the growing number of Web sites with real-time data and experiences to support high-quality teaching and learning;
 - A dedicated database for mathematics and science teachers, containing teaching ideas, lesson plans, student work, and other resources;
 - An interactive, online resource for conversations, meetings, and idea sharing;
 - An outlet to distance-learning courses in science and math for K-12 students and their teachers; and
 - Interactive video, both for observing good teachers and critiquing teachers' own teaching, for mentoring, and for online instruction.



Coordinating Council for Mathematics and Science Teaching:

Implementing and sustaining the initiatives described above, as well as several of those that follow in subsequent goals, require special attention from a *nongovernmental* organization. A Coordinating Council for Mathematics and Science Teaching will serve primarily as a collaborative body. It will function as a broker and matchmaker, bringing together groups that have a stake in mathematics and science education. The Council will also monitor state and local progress on needs assessments, Summer Institutes, Leadership Training, and other initiatives, and make such information widely available. In addition, the Council will take a special interest in creating opportunities for states and localities to collaborate in implementing the goals and strategies offered in this report, particularly those related to the professional development needs of mathematics and science teachers. Key activities for the Council in this arena include:

- Encouraging state needs assessments and collecting and publishing data on mathematics and science teaching that emerge from the assessments;
- Helping schools and school districts consider ways to align their professional development system with state curricula, teaching guidelines, performance standards, and assessment frameworks;

- ❖ Disseminating models for restructuring the school day and teachers' responsibilities to provide sufficient time to support a system of ongoing professional development;
- ❖ Collecting and disseminating research on improving mathematics and science teaching; developing databases relevant to teaching; identifying and promoting "best practices" in mathematics and science teaching; and facilitating nationwide communication among teachers; and
- ❖ Measuring progress and making the results of implementing these action strategies widely known to the public.

Rewards Programs: Just as we do our children a profound disservice when we fail to reward their effort, or worse, promote them beyond their merit, so do we cheat their teachers when we fail to recognize their success, or worse, reward them for mediocre performance. To increase the attractiveness of the professional development system, and to make clear that continual improvement in teaching methods is highly valued, all states and local districts must institute a program of recognition and rewards to deserving schools and teachers. Schools with exemplary professional development systems, and those that, *most importantly*, show improvement on rigorous assessments of student achievement in mathematics and science, must be recognized with monetary rewards for their teachers and other staff, and through well-publicized, showcase events. Such programs must speak directly to the

bedrock issue of the accountability of our schools—and especially of teachers—for the performance of students.

GOAL 2: Increase significantly the number of mathematics and science teachers and improve the quality of their preparation.

The demand for teachers generally, and for certified and fully qualified mathematics and science teachers specifically, is far outpacing the supply. The most recent data available (1993-94) on nationwide vacancies indicate that 20% of the slots—about 6,500 individuals—were filled by uncertified teachers. A more recent survey indicates that the problem is not diminishing. The National Science Teachers Association has reported that 48% of all middle schools and 61% of all high schools responding reported difficulty in finding qualified science teachers.⁴² In urban areas the problem intensifies: 95% of urban districts report an immediate need for high school science and mathematics teachers, while 80% report a need for middle school science and mathematics teachers.⁴³ These estimated shortages are likely to grow with the impending retirement of almost two-thirds of the current teaching force. The quality of instruction in mathematics and science will be compromised unless the pipeline of qualified teachers expands significantly.

An estimated 240,000 middle and high school mathematics and science teachers will be needed over the next 10 years.⁴⁴ Of this total, nearly 70% will be newcomers to the profession. The negative

COORDINATING COUNCIL

Who Will Make It Happen and How?

- Financial support for the Council must come from a diversified funding stream, including the federal and state governments, businesses, and foundations.
- Where appropriate, the Council will partner with existing groups to provide the necessary services and motivation to states and districts.
- Institutions of higher education will support the Council's mission by providing the training venues and the human resources needed to enact Council-brokered activities.

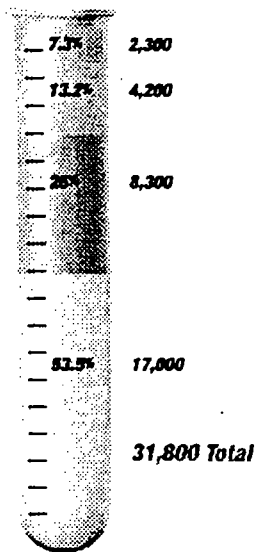
REWARDS PROGRAMS

Who Will Make Them Happen and How?

- U.S. corporations and businesses, which have a stake in improving mathematics and science education, should provide significant funds, over several years, to support rewards and recognition programs in those states and districts that have implemented a system of high-quality professional development and assessment.
- It makes sense to gradually move rewards and recognition programs under the umbrella of state and local education agencies, although a strong business presence is needed to keep school-business relationships viable and to impart to the public the importance of the business stake in mathematics and science education.

The Right Measurements

Middle and High School Mathematics and Science positions filled during the 1993-94 school year.



- Non-Certified New Teachers
- Non-Certified Returning and Transferring Teachers
- New Certified Teachers
- Certified Returning and Transferring Teachers

EXEMPLARY MODELS

Who Will Make Them Happen and How?

- An appropriate federal agency, working with an array of highly respected professionals, will move quickly to set the criteria and process for identifying exemplary programs.
- This agency will also move, in a very timely fashion, to facilitate the identification process for new and redesignated models.
- Federal funds should be made available to the identified institutions for their use in supporting promising students to study science and mathematics teaching.

already done

impact of the teacher shortage is compounded by the diffuse and therefore uneven quality of the education delivered by teacher preparation institutions. The sad fact is that many teacher preparation programs do not build an adequate knowledge base in their graduates. An aggressive recruitment program, therefore, must be accompanied by an equally aggressive, and simultaneous, effort to improve teacher preparation.³⁵

To deal with these issues, two fundamental tasks must be accomplished:

(1) identify exemplary models of teacher preparation that can be widely replicated, and (2) find ways to attract large numbers of qualified candidates into teaching (e.g., persons in mid-career seeking new challenges). We must train these individuals to high standards and provide them with the resources they need, throughout their careers, to meet the certification requirements and demands of high-quality teaching. Once employed, these new teachers can both contribute to and learn from Inquiry Groups that are part of a well-conceived professional development strategy in their respective schools.

The first step in such a strategy, however, must be a preparation program that imparts a deep understanding of content, teaches prospective teachers many ways to motivate young minds, especially with the appropriate use of technology, and instills a knowledge of—and basic skills in using—effective teaching methods in the discipline.

NAPTES

Action Strategies: What Needs to Happen
Exemplary Models. Identifying exemplary programs of teacher preparation around the country, and finding ways to encourage others to multiply their success, are basic to reaching Goal 2. To identify successful approaches and expand the pool of exemplary institutions and well-prepared new teachers, rigorous criteria are needed beyond those already used by credentialing and accrediting bodies. (Better-targeted performance criteria are indicated for teacher preparation institutions if for no other reason than the less-than-successful teaching generated by many of their graduates.) Designation as an exemplary program must be highly selective, a mark of prestige; nonetheless, there should be no artificial limit on the number of institutions accorded that status.

Each group of exemplary programs will keep its status for five years, at which time they will undergo a new review. Once identified, faculty at institutions with exemplary programs will need to collaborate with colleagues at other higher education institutions to increase the number of programs that can meet the exemplary criteria in subsequent years. In addition, designation as "Exemplary" should be required to qualify two- and four-year institutions to receive the federal funds needed to support full-tuition four-year scholarships. These new scholarships can entice high school students to become mathematics and science teachers and increase the number of undergraduates who can benefit from high-quality teacher preparation. When fully operational, more

than 1,500 scholarships will be available yearly to high-achieving students who are attracted and committed to math and science teaching as a career.

Teacher Recruitment: Once we can identify the kinds of teacher preparation programs that are most effective, and have a mechanism in place to increase the number of such programs, we can give full attention to an ambitious program to recruit students to enter the corps of mathematics and science teachers. Incentive-based strategies offer the most promise for attracting individuals capable of high-quality teaching, drawing from at least three groups of potential candidates

- To address the pressing needs created by teacher shortages in mathematics and science, *recent college graduates and persons at mid-career* with baccalaureate (or higher) degrees in mathematics or science will be invited to compete for 3,000 prestigious, one-year, paid fellowships that lead to certification as mathematics and science teachers.* At the end of their training, Fellows will agree to be employed for five years, to teach in districts with math and science teacher shortages.¹⁷

- To attract *college students*, a federally funded loan program, based on financial need, is required to target those considering mathematics and science teaching as a career. These loans will be forgiven, contingent upon the students' agreement to teach for

five years in districts with shortages of mathematics and science teachers.

The number of available loans can be adjusted annually to reflect the demand; 6,000 loans are appropriate for current shortages of qualified teachers.

- Although *high school seniors* typically explore various career options, many are open to the idea of teaching. To attract this group, 1,500 scholars will be competitively chosen to attend one of the exemplary preparation institutions on a full-tuition scholarship. In return, these students must agree to teach for five years in areas with teacher shortages.

Mathematics and Science Teaching

Academies: An entirely new kind of research- and school-based preparation program must be created to provide a year of teacher education for those with scientific and mathematical content knowledge. Specifically, 15 Mathematics and Science Teaching Academies must be competitively selected, one in each of the 10 federal regions, with 5 more strategically located. No new brick-and-mortar infrastructure is envisioned. Rather, each Academy will build on existing institutions and bring them together into a new kind of relationship. Each Academy will ideally comprise an administrative consortium of at least one institution of higher education (including two-year colleges), neighboring school districts, business partners, members of

RECRUITMENT

Who Will Make It Happen and How?

- The federal government must support an aggressive, national outreach, media campaign to attract young people to teaching careers in mathematics and science.
- Those in frequent and close contact with the academic progress of such students—parents, school counselors, principals, teachers, professors—must build on the campaign with encouragement and guidance for these prospective teachers. The Coordinating Council will disseminate materials and information in support of the campaign and stimulate recruitment strategies for mid-career and recent college graduates.
- Through appropriate federal agencies, funds will be available to support the different scholarship and loan programs.
- Appropriate federal agencies will administer the financial aid aspects of the programs.

MATHEMATICS and SCIENCE

TEACHING ACADEMIES

Who Will Make Them Happen and How?

- Academies must be established through a competitive grant process administered by appropriate federal agencies and supported by federal funding.
- Higher education institutions will take the lead in the administration of the Academies. Members of the faculty from science, mathematics, and education departments will have substantive roles.
- Nearby school districts must provide internships for Fellows during their year of training, and districts with a demonstrated shortage will hire Fellows upon their completion of the Academy's program.
- Districts must also develop and implement induction programs for new mathematics and science teachers, including involvement in their Inquiry Groups.

the Eisenhower Math and Science Consortia, and perhaps others. The permanent staff at each Academy will be kept small, supplemented with visiting scholars on sabbatical.

Three thousand competitively selected Academy Fellows with degrees in mathematics and science will be identified from among recent college graduates and persons at mid-career who are seeking a new challenge in life. Fellows will be appointed annually to receive a one-year, intensive course in effective teaching methods in mathematics or science; each will receive a \$30,000 stipend for the year. Training for all Fellows must include school-based internships that involve supervised teaching.

After an intense high-quality preparation program, these individuals will be ideal job candidates for school districts suffering from mathematics and science teacher shortages in middle and high schools. Federal funds, up to \$10,000 per Fellow, will be available to the districts that hire Fellows at the conclusion of their course of study, with two provisos: that the funds be locally matched, and that a *district-wide* induction program be created for as many new mathematics and science teachers as possible. It is worth pointing out that districts that already have established Inquiry Groups will benefit greatly from the newly minted knowledge that Fellows bring to their posts, just as Fellows will benefit from sharing experiences with seasoned veterans.

Once established, all the Academies

will work collaboratively to share knowledge and experience. Similarly, the Academies and exemplary undergraduate teacher preparation programs will work collaboratively to share lessons learned in their quest for high-quality preparation for teaching.

GOAL 3: Improve the working environment and make the teaching profession more attractive for K-12 mathematics and science teachers.

Our society frequently refuses to recognize the professional status of teachers, ranking them below doctors, lawyers, and clergy. Many Americans think "anyone can be a teacher" and that little expertise is required. And because teachers are not fully appreciated for the special knowledge and skills required to do their jobs, they are vulnerable to public attack.³⁸ This widespread attitude is simply wrongheaded.

The low esteem teachers experience is only one source of the disappointment they feel, however. The lack of positive regard for teachers is compounded when efforts to recruit new members to the teaching profession fail to solve the staffing problems of schools. Turnover in the nation's teaching force is high—about 14% overall in 1994-95, with somewhat higher rates among mathematics and science teachers.³⁹ The top reason mathematics and science teachers leave teaching is "dissatisfaction" with their working environment, a factor cited far more often among mathematics and science teachers

than others (40% vs. 29%).” The specific causes given for their unhappiness make a long list, but chief among them are these professional issues: lack of leadership and respect from principals, lack of classroom autonomy, lack of respect from students, poor support from administrators, overly large classes, and poorly equipped classrooms and laboratories.” But by far, the number one reason for dissatisfaction among mathematics and science teachers is “poor salary”—cited by 66% of those who leave their jobs.” This issue is examined separately at the conclusion of the report.

The professional environment of too many mathematics and science teachers contains too many of these negative factors. Their effect is to drive more and more teachers out of the profession, which leads to stop-gap strategies such as out-of-field teaching and temporary certification, which in turn deprofessionalize teaching even more—a vicious circle.

Energetic and sustained steps are needed to break out of this downward spiral. State education agencies, school districts, and schools must move immediately and aggressively to make mathematics and science teaching more attractive.” And, they must have the widespread support of local businesses and the public.

Not all these “dissatisfactions” can be remedied at once, but it is possible to launch a turnaround that will foster better teaching. Three action strategies are suggested here. First, beginning teachers, especially, need help in acclimating to the challenges and opportunities of teaching. Second, some business/school district

partnerships have already proven themselves uniquely capable of the kind of collaboration that fosters high-quality teaching and makes the profession more attractive. More of these vital partnerships are needed. Third, veteran teachers who demonstrate improvement and who regularly seek new challenges should be encouraged to stay in the classroom and rewarded for their efforts. The following action strategies are accompanied by concrete suggestions on how the work can be done and who can do it.

Action Strategies: What Needs to Happen

Induction Programs: A first step is to set up special “induction” programs for new teachers, especially in districts that may not be able to hire Academy Fellows. This kind of program is routine throughout the business world as a means of easing new people into the workplace, imparting the “company culture,” fostering employee loyalty, and acknowledging leadership and excellence in seasoned veterans. Such programs can also create formal mentoring relationships, including participation in Inquiry Groups, that focus on transmitting not only content matter but also vital knowledge and skills related to teaching itself. Other induction strategies include:

- Frequent, formal interaction with master teachers, including class observations and teaching critiques. Several states and districts have already launched such programs.
- Policies that ensure that new teachers do not inherit the most demanding teaching schedules and most challenging students;

INDUCTION PROGRAMS

Who Will Make Them Happen and How?

- State leaders, school board members, local superintendents, and principals must act with determination, realign priorities, and take the policy initiatives needed to develop the induction programs that can foster professionalism across the continuum of teaching experience.
- Professional associations have a powerful role to play in creating and offering model professional development and induction programs, as well as model mentoring programs.
- The Coordinating Council must provide a forum for sharing information about existing and new model induction programs and reporting on the effectiveness of such programs, especially regarding issues of retention and teaching quality.
- The American Federation of Teachers and the National Education Association have an enormous stake in professionalizing teaching. Superintendents and principals need to be able to count on union members to support efforts to develop induction programs aimed at improving the quality of mathematics and science education in grades K–12.

BUSINESS/SCHOOL DISTRICT PARTNERSHIPS

Who Will Make Them Happen and How?

- Business/district partnerships must focus on mechanisms for sharing knowledge, expertise, and resources. Together, they must define the best match between the needs and capabilities of the two partners.
- The Coordinating Council, working with groups such as the National Alliance of Business and the Business Coalition for Education Reform, must provide models of existing partnerships and encourage the development of new ones.
- Both businesses and school districts must assign a high-level staff person as a liaison with responsibility for maintaining and improving the partnership, coordinating the assignment of business personnel to the schools and vice versa, and developing appropriate activities.

- ✧ Policies aimed at focusing a new teacher's time and energy on *teaching*, e.g., by excluding or limiting extracurricular duties; and
- ✧ Policies that ensure instruction in the use of technology in general, including participation in the existing high-quality programs designed for this purpose, and in the use of the mathematics and science teaching Portal in particular.

Business/District Partnerships: Many

businesses already serve their local communities in extraordinary ways. These enlightened companies are needed as models for others who can expand, rejuvenate, or establish new partnerships that will help strengthen professionalism in mathematics and science teaching. Acting with states, districts, and other stakeholders, business/district partnerships can take several steps to encourage teachers to stay in the classroom, continually sharpen their skills, optimize working conditions, and encourage widespread public support for mathematics and science education. Some of these steps—but not all—involve commitments of funds; all of them do involve business commitments of time and talent. Among the specific roles business/district partnerships can play are the following:

- ✧ Business/district partnerships can collaborate to provide facilities, materials, equipment, scholarship support, and other resources to enhance the learning environment in K-12 mathematics and science

classrooms, and to support students preparing to become mathematics and science teachers. For example, a local business could stock a science laboratory or train teachers in the use of the Internet Portal;

- ✧ Partnerships can provide or help to generate community grants and incentives to schools that restructure time and personnel responsibilities for mathematics and science teachers, thereby enabling them to focus their energies on collaboration and high-quality teaching.
- ✧ Partnerships can help schools and school districts sustain induction programs for all teachers of mathematics and science, K-12. They might, for example, help raise funds to pay annual stipends to mentors. Local businesses might also offer new teachers and mentors opportunities for field-based learning experiences that can enhance teaching;
- ✧ Such partnerships can establish and run paid summer internship programs within companies for interested teachers, both as a means of expanding their skills and of enhancing their incomes;
- ✧ Business/district partnerships can develop "release time" programs that make employees available to act as mentors or to assist mathematics and science teachers in other ways—without loss of seniority or benefits. Similarly, business partners can work with colleges and universities to

significantly reduce the number of out-of-field mathematics and science teachers by helping to retrain unqualified teachers, or by releasing qualified employees to work in schools; and

- Business/district partnerships can serve as advocates for additional teachers to go through the advanced certification process of the National Board for Professional Teaching Standards and support the costs of participation.

But a caveat is in order here. As vitally important as the participation of the business community is in improving mathematics and science education, the long-term responsibility for public education remains with the public. The proper role of American business and business/district partnerships lies in helping to “jump-start” initiatives called for here, not in financing them indefinitely. Equally important is the pragmatic realization that some districts do not have a business base nearby. The needs of business-poor districts in rural and inner-city areas are just as urgent as those where businesses are prominent; therefore, states, school organization advocacy groups (e.g., PTAs and PTOs), and other voluntary associations must step into the breach to ensure that differences between districts are not deepened.

Career-long Incentives: All groups with a stake in mathematics and science education must provide incentives for deserving mathematics and science

teachers to remain in teaching and improve their skills. These incentives must be directly tied to accountability measures for teachers that take student performance seriously as a criterion of high-quality teaching and teachers’ professional competence.

Mathematics and science teachers, like other professionals, ought to be fully able to advance through a series of career stages that reflect both their intellectual and professional growth; teachers who demonstrate improvement in their teaching must be appropriately acknowledged.”

Often, the only opportunity for teachers to advance is to leave the classroom and take a position in school administration. In fact, achieving the goal of high-quality teaching demands that good teachers be able to flourish in the classroom. That can only happen when teachers have an open-ended opportunity to improve their teaching and be recognized for their accomplishments. Today, almost all teachers are paid on the basis of years of

CAREER-LONG INCENTIVES

Who Will Make Them Happen and How?

- All members of the local education community (principals, administrators, school boards, parents, civic leaders, etc.) must provide recognition to teachers whose students show higher achievement on high-quality measures.
- To encourage excellent teachers to remain in the classroom, school districts must create new salary structures that recognize added responsibilities and achievements.



experience and number of education units and degrees earned. More progressive salary structures—tied to increased levels of teacher responsibility and to job-performance criteria—are needed.

Teachers also need to know that they are valued. When appropriate, civic organizations ought to demonstrate the community's appreciation to hard-working, highly accomplished teachers.

Teacher Pay: The Litmus Test

Teachers in this country are scandalously underpaid, a fact that invariably affects the quality of teaching in our nation's classrooms. The fact is, many teachers experience their jobs as exercises in irony: they are expected to have high-quality qualifications and skills, but they are neither accorded professional status nor rewarded with a professional's salary. Creating high-quality teaching in mathematics and science education demands both.

What Teachers Earn: The National Center for Education Statistics reports that, on average, teachers earn 29% less than other workers with a baccalaureate degree (\$35,048 per year compared to \$49,362 per year in 1997), a differential that has nearly quadrupled during the economic expansion of the 1990s. The demands of the economy and workplace are widening this gap. Given that the national average starting salary for teachers is \$25,735,⁴⁵ the teaching profession is nowhere near being a financially competitive option for most young people who leave college with backgrounds in mathematics and science.

In fact, baccalaureate degree earners in these fields can earn twice as much in private industry as in teaching.⁴⁶ Making sure that teaching mathematics and science has appeal as a career option is directly linked to the potential for meaningful salary growth. It is hard to escape the conclusion that without better pay for mathematics and science teachers, the high-quality teaching needed in these fields will be very difficult to sustain.

One powerful litmus test of how serious we are about providing high-quality mathematics and science teaching is what we are willing to pay good mathematics and science teachers. That is not really so much a financial test as it is a policy one, not so much a matter of the pocketbook as one of political will. And that statement, in the end, leads to this final point.

Taking Personal Responsibility

This report has laid out a coordinated set of tasks for the key stakeholders in mathematics and science education. But the story is not yet complete. *We therefore put this challenge directly to the American people: if you have found our case persuasive, it is up to you to take responsibility for achieving these goals.*

Realistically, neither paying mathematics and science teachers what they are worth, nor any other issue raised in this report, is a problem that will be solved by "someone else." It is this nation's citizens and taxpayers whose priorities and principles should be honored in public policy, including—and in this context especially—in decisions about what teachers are paid.

THE VITAL ROLE OF LOCAL SCHOOL BOARDS

Local school boards, because they are the decision-making body closest to the classroom, play a central role in setting a new course. It is they who have the ultimate responsibility to bring high-quality teaching in mathematics and science to our schools. It is their job (within some state-imposed guidelines) to set local instructional priorities and policy, to determine budgets, and to set salary scales.

Perhaps most important of all, it is school boards that are accountable—to citizens, parents, and taxpayers alike—for the education our children receive. Whether elected or appointed, school board members serve at the sufferance of the public.

But to be accountable, school boards must be held accountable. They must be called on to interpret their actions and justify their decisions. And in America, making them responsive is the people's job.

So we put this agenda squarely before you:

- ✱ If you don't know how well children in your local schools are performing in mathematics and science on challenging state and district assessments, find out. How do their scores stack up against those of children in neighboring schools? Then decide if they are learning what they need to know to "hit the future running."
- ✱ If you are unaware of what mathematics and science teachers are paid where your children attend school, find out. Then decide what steps you will take to bring teacher salaries up to the professional level that reflects the value you, as parents and as taxpayers, put on their work and their performance.
- ✱ If you believe that out-of-field teaching, temporary certificates, and high turnover among mathematics and science teachers are unacceptable outcomes of current policies, and if you believe that high-quality teaching is the right direction to take, then declare yourself. It is up to you to put an end the former and ensure the latter.
- ✱ If you want your voice to be heard, call your child's principal, your school board representative, your local school superintendent. Call and write your representatives in state government. Contact the local chapters of the professional teachers' organizations whose members teach your children

subjects such as arithmetic, biology, and algebra. Ask them: "What is being done here to attract more teachers into mathematics and science teaching?" "How many teachers *here* are teaching out-of-field?" "What are mathematics and science teachers paid here and why?" "What is the status of professional development in math and science instruction here?" "What do you need?" "How can I help?"

High-quality teaching in mathematics and science cannot be bought on the cheap. But it comes back—ten-, twenty-, a hundredfold—to the nation, the community, and especially to our own children, in the form of a better prepared workforce, a more productive economy, and a more creative people.

The time to find out what you can do and to whom you should speak is now. Go to the meetings; get involved. Only when those who sit in the seat of power understand the public's priorities can they act in the citizens' interest. And only you can declare that interest.

This Commission has done what it can do. It has studied the problem and it here offers the American people three goals. We believe they can be achieved, and we have offered ideas on how. Whether they *are* achieved is still to be decided. We know that it is not enough to call for change. In a democracy, the people create real change, not commissions.

As the Chinese proverb says, the time to plant the tree is now—*before it's too late*.

What Can You Do?



Every American has a stake in mathematics and science teaching for the 21st Century. Parents, teachers, administrators, school board members, higher education institutions, state political leaders, and business leaders have particularly critical roles to play in ensuring success. To improve student achievement in mathematics and science, everyone involved must first ask themselves several hard questions and then must take action.

The Commission targeted the seven stakeholder groups below. For each group, several questions are posed to direct attention to critical issues. A checklist of important steps is then provided to define a comprehensive plan for raising K-12 mathematics and science student achievement in states, districts and schools.

School Board and Superintendent Team

- ❖ Do your district's mathematics and science achievement levels compare favorably to achievement levels in neighboring districts, states and other countries?
- ❖ How many individuals assigned to teach mathematics and science in your district have a major or minor in these fields?
- ❖ Does your district teacher salary schedule compare favorably to that of neighboring districts?

If your answers to any of these questions are at all disquieting, the following checklist can inform efforts to promote higher student achievement:

- | | |
|---|--|
| ☐ Develop a common vision, with input from the community, for promoting a high level of student achievement in mathematics and science. | ☐ Provide competitive salaries to attract and retain the best-qualified mathematics and science teachers. |
| ☐ Use accurate data to develop policies that will improve mathematics and science teaching. | ☐ Establish induction programs to ensure that new mathematics and science teachers receive the support necessary to be effective. |
| ☐ Commit funding to ensure that all mathematics and science teachers have ongoing collaborative opportunities to improve their skills and knowledge. | ☐ Develop mathematics and science teacher leaders who facilitate the continuous learning of their colleagues. |
| ☐ Set a target date for hiring only fully certified teachers of mathematics and science and put in place the policies and programs necessary to meet the target. | ☐ Provide administrators and teachers with electronic and other forms of access to an ever-expanding knowledge base about mathematics and science teaching. |
| ☐ Aggressively recruit high-quality mathematics and science teachers from a nationwide pool, including those certified through alternative pathways (e.g., by offering signing bonuses or giving salary credit for all previous experience). | |

Principals

- ✱ Are you satisfied that the science and mathematics preparation that your students receive is adequate preparation for the next level of schooling?
- ✱ Are the new teachers that you hire adequately prepared?
- ✱ Are your teachers provided with sufficient time to work together to improve teaching and student learning?

If your answers to any of these questions are at all disquieting, the following checklist can inform efforts to promote higher student achievement:

- | | |
|--|--|
| ☐ Provide your teachers with significant professional development opportunities to improve their teaching year-round including in-depth study through Inquiry Groups with peers, mentors and outside experts and through Summer Institutes. | ☐ Should you have no option but to assign an out-of-field teacher, be certain that a mentor and other ongoing support is available. |
| ☐ Ensure that teachers and other school staff have electronic and other forms of access to the ever-expanding knowledge base about mathematics and science teaching. | ☐ Ensure that opportunities to pursue careers in mathematics and science teaching are emphasized for students in your school. |
| ☐ Ensure that new mathematics and science teachers have frequent interaction with mentor teachers, participate in Inquiry Groups, and have reasonable teaching loads. | |

Teachers

- ✱ Are your student's mathematics and science achievement levels on state and classroom assessments at an acceptably high level?
- ✱ Are you actively seeking to deepen your content knowledge?
- ✱ Are you actively seeking to learn new teaching methods for diverse student learners?

If your answers to any of these questions are at all disquieting, the following checklist can inform efforts to promote higher student achievement:

- | | |
|--|--|
| ☐ Actively seek new knowledge about teaching in your discipline, work with your peers on a continuing basis to improve your skills, and take full advantage of the professional development opportunities offered by your district and state. | ☐ Regularly work with colleagues to compare the achievement level of your students against the standards in your district and state, identify areas for improvement, set goals, and make plans for achieving these goals. |
| ☐ Actively work to improve your knowledge and skills to incorporate educational technology into your learning and teaching. | ☐ Actively share your knowledge and experience with new teachers. |
| ☐ Communicate to parents the specific standards that students are to meet at each grade level and update parents on their child's progress in meeting these standards. | |

Parents

- ❖ Do your district's mathematics and science achievement levels compare favorably to achievement levels in neighboring districts, states and other countries?
- ❖ Do your child's teachers have the necessary background to teach the courses to which they are assigned?
- ❖ How does the teacher salary schedule in your school district compare to that of neighboring districts?

If your answers to any of these questions are at all disquieting, the following checklist can inform efforts to promote higher student achievement:

- ☐ Learn about the mathematics and science standards that children are required to meet in your state and get a clear picture of how well your child's school is doing in meeting these standards.
- ☐ Support increased funding for programs that support quality mathematics and science teaching.
- ☐ Support the principal's efforts at your child's school to hire well-qualified teachers and to provide them with opportunities to continually improve their skills.

State Leadership

- ❖ Do your district's mathematics and science achievement levels compare favorably to achievement levels in neighboring districts, states and other countries?
- ❖ How many out-of-field teachers are assigned to teach mathematics and science across your state?
- ❖ How do certification requirements for K-12 mathematics and science teachers in your state compare to those of neighboring states and national standards?

If your answers to any of these questions are at all disquieting, the following checklist can inform efforts to promote higher student achievement:

- ☐ Identify the critical professional development needs of the individuals teaching mathematics and science through a district-by-district assessment.
- ☐ Establish and enforce high standards for mathematics and science teachers for initial and continuing certification.
- ☐ Develop policies and dedicate funding, based on identified needs, to upgrade content knowledge and improve the skills for all those teaching mathematics and science, K-12.
- ☐ Develop career-long incentives and rewards for effective mathematics and science teachers that encourage them to remain in teaching and to continually upgrade their skills.
- ☐ Establish and implement a professional development model that addresses the specific needs of mathematics and science teachers and their students through Summer Institutes and Inquiry Groups.
- ☐ Establish alternative pathways to teacher certification that encourage recent college graduates and people with degrees in mathematics and science to pursue teaching.

Higher Education Institutions

- ❖ How do your graduates perform as mathematics and science teachers after graduation? How does their performance compare to those from other programs?
- ❖ What portion of your mathematics and science education graduates teach and for how long?
- ❖ Do your graduates report that your program prepared them for successful teaching? Are schools that hire your graduates satisfied with the quality of their instruction?

If your answers to any of these questions are at all disquieting, the following checklist can inform efforts to promote higher student achievement:

- | | |
|---|---|
| ☐ Work closely with area schools to identify existing and future needs for highly qualified K-12 mathematics and science teachers. | ☐ Emphasize recruitment strategies and provide incentives for eligible students to become science and mathematics teachers. |
| ☐ Ensure that your program meets criteria for exemplary math and science teacher preparation and actively contribute to the knowledge base in support of these criteria. | ☐ Evaluate and track teacher performance following graduation and use this information to improve your mathematics and science teacher preparation programs. |
| ☐ Collaborate with area school districts to ensure a quality induction process for new mathematics and science teachers. | |

Business

- ❖ Does your business encourage its employees to work as advocates in the schools, with the goal of achieving high-quality mathematics and science education?
- ❖ Do your corporate philanthropic priorities help students and educators meet higher standards in mathematics and science?

If your answers to any of these questions are at all disquieting, the following checklist can inform efforts to promote higher student achievement:

- | | |
|--|--|
| ☐ Work to increase the supply and quality of incoming mathematics and science teachers by advocating for policies, programs and investments that will make the teaching profession a more attractive career option. | ☐ Provide support for National Board for Professional Teaching Standards certification. |
| ☐ "Lend" qualified employees to act as part- or full-time teachers in local schools, without incurring loss of pay or benefits. | ☐ Make regular contributions of time, materials and resources to enhance instruction in mathematics and science education in local schools. |
| ☐ Actively participate in reward and incentive programs that recognize excellence in mathematics and science teaching in local schools as measured by improved student achievement. | |

What Can You Do?

Estimate of Costs in First Year

Prepared by the U.S. Department of Education Budget Office

	Action Strategy	Federal	State/Local ¹	Business	Public/Private
Goal 1	Needs Assessment ^{2,3}	\$15,340,000	\$7,660,000		
	Summer Institutes ^{2,5}	\$1,214,000,000	\$606,060,000		
	Inquiry Groups ^{2,6}	\$1,574,950,000	\$786,300,000		
	Leadership Training ⁴	\$112,000,000			
	Internet Portal	\$50,000,000			
	Coordinating Council				\$4,000,000
	Rewards Program			\$500,000,000	
Goal 2	Scholarships (Exemplary Models) ⁷	\$18,000,000			
	Loan Forgiveness ⁸	\$36,000,000			
	Academics/Fellows ^{9,10}	\$120,000,000			
Goal 3	Induction/Partnerships/Incentives/Salaries	<i>To be determined locally</i>			
	Sub Total:	\$3,140,290,000	\$1,400,020,000	\$500,000,000	\$4,000,000
				Total:	\$5,044,310,000

¹ There are 56 units nationwide -- states, territories and Washington, D.C.

² Current authorizing legislation for the Eisenhower Professional Development State Grants (ESEA, IIB) requires that each participating Local Education Agency match every two dollars of federal funding with one dollar of its own resources. Such local resources can come from other federal programs or from non-federal sources. The same ratio is used here for those Strategies in which it is most appropriate.

³ First year, one time cost.

⁴ First year, one time cost for 15,000 leaders.

⁵ One-fifth of the math/science teaching force (340,000 per year)

⁶ All K-12 math/science teachers (1.7 million)

⁷ Scholarships offered (1,500/year)

⁸ Loans offered (6,000/year)

⁹ Stipends and operating expenses (3,000 Fellow/year)

¹⁰ Beginning in second year, an additional \$30,000,000 needed for induction programs

September 2000

¹Report of the National Education Goals Panel, Washington, D.C.: U.S. Department of Education, 1989.

²T. Husen, *International Study of Student Achievement in Mathematics*, New York: Wiley, 1967, and C. C. McKnight, et al., *The Underachieving Curriculum: Assessing U.S. School Mathematics from an International Perspective*, Champaign, Ill.: Stipes, 1987, as cited in James W. Stigler and James Hiebert, *The Teaching Gap*, New York: The Free Press, 1999, p. 5.

³David Kearns and James Harvey, *A Legacy of Learning*, Washington, D.C.: Brookings Institution Press, 2000, pp. 29-30. In general science, American fourth-grade students ranked third among 26 nations; by eighth grade they were seventeenth among 41 nations; and by twelfth grade they were tied for eighteenth among 20 nations. In general, the mathematics pattern is similar. American students were twelfth among 26 nations in fourth grade, twenty-eighth among 41 nations in eighth grade; and twelfth-graders were tied for eighteenth among 20 nations. (Students were not assessed from the same number of nations in all grades.) See also the U.S. Department of Education, *National Digest of Education Statistics*, 1999, Washington, D.C.: National Center for Education Statistics, 1999.

⁴Kearns and Harvey, *op. cit.*, p. 27.

⁵Although recent news about the rise in the average mathematics score on the SAT and the corresponding broadening of the student population taking the test is welcome, U.S. students remain behind the average performance level in mathematics attained more than 30 years ago. See *The Washington Post*, August 31, 2000, p. 1.

⁶Under Title I legislation that becomes effective in the spring of 2001, States are required to annually disseminate information, school by school, on student performance in reading and math. Anticipating the requirement, all but two States are currently posting at least some mathematics assessment data on the State Education Agency's (SEA) Web site; 35 States provide assessment data by specific grade levels and 32 states report mathematics proficiency levels. In science, reporting is spottier. Thirty-one states report assessment data; 21 states provide science assessment data by specific grade levels; but only 16 states report science proficiency levels. For parents, SEA Web addresses can be readily obtained with a phone call to their local school district. Information on state assessment data provided by Westat, Inc., unpublished tabulations compiled from state education agencies' Web sites, Rockville, Md., Sept. 8, 2000.

⁷*The Wall Street Journal*, "Technology Spurs Economic Expansion," January 31, 2000.

⁸U.S. Department of Labor, "20 Million Jobs: January 1993-November 1999," A Report by the Council of Economic Advisors and the Chief Economist, U.S. Department of Labor, December 3, 1999, downloaded from <http://www.dol.gov/sec/public/media/reports/20mill/main.htm>, March 13, 2000, as cited in Milton Goldberg and Susan L. Traiman, "Why Business Backs Education Standards," in Diane Ravitch, ed., *Brookings Papers on Education Policy*, Washington, D.C.: Brookings Institution, 2000 (forthcoming).

⁹*Ibid.*

¹⁰*Ibid.*

¹¹*Workforce Economics*, National Alliance of Business, Occasional Report, Vol. 6, No. 1 (Spring, 2000), pp. 9-11.

¹²*Ibid.*, p. 10.

¹³Philip R. Day and Robert H. McCabe, "Remedial Education: A Social and Economic Imperative," AACC Issue Paper, Washington, D.C.: American Association of Community Colleges, 1997.

¹⁴Interview with Robert Gardner, Director of Public Relations, Association for Manufacturing Technology, June 20, 2000, as cited in Goldberg and Traiman, *loc. cit.*

¹⁵*Training Magazine*, Annual Report, Minneapolis: Bil Communications, Vol. 36, No. 10 (1999), downloaded from <http://www.trainingsupersite.com>.

¹⁶Interview with Richard W. Judy, Hudson Institute, Indianapolis, April 19, 2000, as cited in Goldberg and Traiman, *loc. cit.*

¹⁷The vision of high-quality teaching in K-12 mathematics and science is expanded on and operationally defined in three reports that are currently guiding standards-based science and mathematics education: (1) American Association for the Advancement of Science, *Benchmarks for Science Literacy*, New York: Oxford University Press, 1993; (2) National Council of Teachers of Mathematics, *Principles and Standards for School Mathematics*, Reston, Va: NCTM, 2000; and (3) National Research Council, *National Science Education Standards*, Washington, D.C.: National Academy Press, 1996.

¹⁸National Research Council, *How Young People Learn*, Washington, D.C.: National Academy Press, 1999.

¹⁹Higher Education Research Institute, *The American Freshman: National Norms for Fall, 1998*, Los Angeles: University of California at Los Angeles, 1999.

²⁰Linda Darling-Hammond, *What Matters Most: Teaching for America's Future*, New York: National Commission on Teaching and America's Future, 1996, Executive Summary.

²¹Linda Darling-Hammond, "Teacher Quality and Student Achievement: A Review of State Policy Evidence," Teaching Quality Policy Briefs, Number 2 (December, 1999), Washington, D.C.: Center for the Study of Teaching, downloaded from <http://www.depts.washington.edu/ctpmail>.

²²Linda Darling-Hammond, *Supply, Demand, and Quality in Mathematics and Science Teaching*. Briefing for the National Commission on Mathematics and Science Education for the 21st Century, Washington, D.C., September, 1999.

²³National Research Council, *Educating Teachers of Science, Mathematics, and Technology: New Practices for the New Millennium*, Washington, D.C.: National Academy Press, 2000.

²⁴Examples of two states that have produced impressive results by focusing on better teaching are Texas and North Carolina. In Texas, a study of grades 1-11 found that teachers' subject-matter expertise accounted for 40% of the difference on achievement tests. Disparities between white and minority students were almost entirely accounted for by the qualifications of their teachers. In North Carolina, students entered the 1990s near the bottom of the NAEP rankings in mathematics. After the State boosted minimum salaries, used scholarship programs to recruit more able students to teaching, invested in better teacher education curricula, created professional development academies, instituted mentoring programs for entering teachers, and created incentives for teachers to be certified by the National Board of Professional Teaching Standards, North Carolina students now score well above the NAEP averages. See "Who Should Teach?" *Education Week*, January 13, 2000.

²⁵Linda Darling-Hammond, "Supply, Demand, and Quality in Mathematics and Science Teaching."

²⁶*Ibid.*

²⁷*Ibid.*

²⁸Richard M. Ingersoll, "Turnover Among Mathematics and Science Teachers in the U.S.," Study Paper prepared for the National Commission on Mathematics and Science Teaching for the 21st Century, Washington, D.C., September, 1999, and Urban Teacher Collaborative, *The Urban Teacher Challenge: Teacher Demand and Supply in the Great City Schools*, Washington, D.C.: Council of Great City Schools, January, 2000.

²⁹Steve Olson, "Candid Camera," *TEACHER MAGAZINE on the WEB*, May/June, 1999. Videotape, "Eighth-Grade Mathematics Lessons: United States, Japan, and Germany," Washington, D.C.: U.S. Department of Education, 1999, produced by Nanette Seago.

³⁰James W. Stigler, Briefing for the National Commission on Mathematics and Science Teaching for the 21st Century, Washington, D.C., September, 1999, pp. 23 and 19 of the transcript.

³¹Division of Research, Evaluation, and Communication, Directorate for Education and Human Resources, *Indicators of Science and Mathematics Education, 1995*, Arlington, Va.: National Science Foundation, 1996.

³²*National Science Teachers Association Reports*, "Survey Indicates High Teacher Turnover, Job Dissatisfaction," Arlington, Va.: National Science Teachers Association, 2000, downloaded from <http://www.nsta.org/reports/00jun2.asp>.

³³*The Urban Teacher Challenge: Teacher Demand in the Great City Schools*, 2000, Washington, D.C.: Council of Great City Schools, 2000, pp. 9-11.

³⁴Estimates based on projected fall 1999 counts of teachers and proportions from the U.S. Department of Education, National Center for Education Statistics, Schools and Staffing Survey, 1993-94; and Fast Response Survey, "Teacher Survey on Professional Development and Training."

³⁵National Research Council, *op. cit.*

²⁸Emily C. Feistritz and David T. Chester. *Alternative Teacher Certification: A State-by-State Analysis 1998-99*. Washington, D.C.: National Center for Education Information, p. 6, downloaded from <http://www.ncei.com/Alt-Teacher-Cert.htm>. Alternative routes for preparing and licensing science and mathematics teachers provide ways to attract large numbers of highly educated and life-experienced adults who have the talent and enthusiasm to teach.

²⁹Susan Sclafani, "Comparisons of Alternative Certification Program, Teach for America, and Certified Teachers in the Houston Independent School District," Briefing for the National Commission on Mathematics and Science Teaching for the 21st Century, Washington, D.C., May, 2000. The Houston Independent School district has found that the students of teachers certified through the Alternative Certification Program performed just as well as, or better than, students of teachers trained through traditional teacher preparation programs. Also, the retention rate of the alternatively certified teachers five years later was significantly higher.

³⁰James W. Stigler and James Hiebert, *The Teaching Gap*, New York: The Free Press, 1999, pp. 170-71

³¹Richard M. Ingersoll, *loc. cit.*, p.5.

³²*Ibid.*, Figure 4, p.7.

³³*Ibid.*, Table 1, p.6.

³⁴*Ibid.*

³⁵The Commission recognizes that the action steps recommended here could—and should—be made for all teachers, not just teachers of mathematics and science. But the need for improving the professional environment of mathematics and science teachers is particularly acute because of their shortage, and because of the salaries degree holders in these fields can command in the private sector.

³⁶Adam Urbanski and Roger Erskine, "School Reform, TURN, and Teacher Compensation," *Phi Delta Kappan*, January, 2000, pp. 367-70. The Teacher Union Reform Network (TURN), composed of local school districts and the local affiliates of the AFT and the NEA, is a labor/management collaboration that rewards teachers who obtain certification by the National Board of Professional Teaching Standards (NBPTS). Participating teachers receive support for NBPTS fees or are granted special standing as mentors or lead teachers. Nine TURN locals provide bonuses, salary supplements for certification, or additional pay for teachers who act as mentors. In addition, the Consortium for Policy Research in Education has identified 15 States and 20 districts that offer financial rewards to teachers who obtain NBPTS certification. Teachers are generally provided with one-time rewards ranging from \$2,000 to \$10,000, and annual salary supplements ranging from \$500 to \$10,000 per year or from 1% to 12% of their base salary per year (see <http://www.wcer.wisc.edu/cpre/teachercomp/reform/nbtpspay.thm>).

³⁷Steven Greenhouse, "Teachers' Pay: Adding Up the Impact of Raising Salaries," *The New York Times*, August 9, 1999.

³⁸Ann Bradley, "High Tech Fields Luring Teachers from Education," *Education Week*, January 19, 2000. Indeed, the average annual teacher salary is only "a fraction of the annual bonus received by many thirty-somethings on Wall Street." Greenhouse, *loc. cit.*

Charter

AUTHORITY

The National Commission on Mathematics and Science Teaching for the 21st Century, (Commission) is established by the Secretary of Education and is governed by the provisions of the Federal Advisory Committee Act (FACA) (P. L. 92-463, as amended; 5 U.S.C.A. Appendix 2).

PURPOSE AND FUNCTIONS

The Office of the Under Secretary serves as the principal advisor to the Secretary by directing, coordinating, and recommending Department policy. Therefore, the Commission has been established in this office for the purpose of: (1) reviewing the current state of American K-12 mathematics and science education with a focus on the challenges of teacher recruitment, preparation, retention, and professional growth and (2) articulating the steps needed to strengthen the classroom practice of math and science teachers. The Commission would produce a report describing specific action steps that federal, state, and local policymakers can take to address math and science teacher supply and quality issues.

STRUCTURE

The Commission will be composed of not more than twenty-five members. Members shall be appointed from, but not limited to, the following groups: current or recent members of Congress, Governors, Mayors, State Legislators, Chief State School Officers, Nobel laureates, CEOs, teachers, University presidents, principals, parents, students, public representatives, and other distinguished leaders in the fields of mathematics and science. Ex officio, non-voting members, of the Commission, include the Secretary of Education or his designee, the Secretary of Defense, the Secretary of Energy, the Secretary of Transportation, the NASA Administrator, the Director of the Office of Science and Technology Policy, the Director of the National Science Foundation, and the President of the National Academy of Sciences.

Members shall be appointed by the Secretary for the duration of the Commission. Any vacancy in the Commission shall not affect its powers, but shall be filled in the same manner as the original appointment. The Secretary shall designate a member of the Commission to serve as the chairperson.

The Under Secretary names the Designated Federal Official (DFO) to the Commission.

MEETINGS

The Commission shall meet at the call of the Chairperson, with the concurrence of the Designated Federal Official or designee who is present at all meetings. The Commission shall meet at least four times, or more frequently, as may be necessary to carry out the Commission's responsibilities. Meetings are open to the public except as may be determined otherwise by the Under Secretary in accordance with Section 10(d) of the FACA. Adequate public notification will be given in advance of each meeting. Meetings will be conducted and records of the proceedings kept, as required by applicable laws.

A quorum of the Commission consists of a majority of the authorized members.

ESTIMATED ANNUAL COST

Members will serve without compensation. However, members may each receive reimbursement for travel expenses incident to attending Commission meetings, including per diem in lieu of subsistence, as authorized by the Federal travel regulations. Funds will be provided by the Department of Education to administer the Commission. The estimated annual person-years of staff support is: two (2) FTE. An estimated budget of \$800,000 over two fiscal years has been allotted for this Commission.

REPORTS

Not later than September 30, 2000, the Commission shall submit a report to the Secretary that contains a detailed statement of the findings and conclusions resulting from the study, together with the Commission's recommendations. The Secretary will then submit the report to the President and Congress together with the recommendations of the Commission.

TERMINATION

The Commission shall terminate 90 days after the date on which the Commission submits its report to the Secretary.

The Commission is hereby chartered in accordance with Section 14(b) of FACA. This charter expires two years from the date of filing.

APPROVED:

August 12, 1999

Richard W. Riley, Secretary of Education

Establishment date: March 23, 1999

Filing date: April 6, 1999

The Commission wishes to express its deep gratitude to the many individuals and organizations without whose work our own labors would have been far more difficult and far less productive.

We owe, first, an enduring debt to the Commission staff. Under the able leadership of Executive Director Linda P. Rosen, they worked long hours to organize and manage our several meetings, keep the flow of communication moving, prepare extensive and invaluable briefing books, handle travel and logistical arrangements, and attend faithfully to the myriad details that are never noticed because they are never left undone. Beyond all these very necessary tasks, however, the staff ably contributed in substantive ways to our discussions and our final report. Thanks are due to John M. Luczak, Nancy Hawthorne Mumaw, Jamila A. Rattler, Jan Solomon, Rebekah Song, and Emmett L. Wright for their excellent work.

Bruce O. Boston of Wordsmith, Inc., served as the eloquent writer/editor of *Before It's Too Late*, building on earlier substantive work by Steve Olson and Amy Kaslow.

RCW Communications Design, Inc., created the report's layout and design and ably guided it through the production process.

A number of individuals provided support to the members and ex officio members of the Commission, attending meetings in their stead when necessary and contributing to the Commission's discussions. Our thanks are due them for helping to keep lines of communication open. They were: V.J. Ajarwal, Arthur Bienenstock, Brian Branton, Laura Chow, Kelley S. Coyner, Kate Dickens, Carlene Ellis, Peter Faletra, Karen Garr, Alice Gill, Ken Griffin, Susan Hattan, Kathy Havens, Jay Labov, Frank Owens, Danica Petroschius, Joan Rothenberg, Richard Stoddard, Lisa Towne, and Judith Sunley. Also deserving thanks is Edward T. Esty and Judy Wurtzel, whose advice and counsel were of great assistance. And, the extra hands offered by Anthony Ashton, Seth Fenton, and Wendy Goldstein were invaluable in expediting the work.

The Commission's deliberations were greatly informed by the wisdom of many experts. These stimulating views were shared with us through commissioned papers and presentations. Commissioned paper authors included Richard Ingersoll; Edward Britton, Senta Raizen, Lynn Paine, and Mary Ann Huntley; Beatriz Chu Clewell and Laurie B. Forcier; as well as Brian Lord and Barbara Miller. Presenters included Dennis Bartels, Barnett Berry, Barbara Blumenthal, Barbara Cervone, Cindy Chapman, Susan Collins, Linda Darling-Hammond, Richard Elmore, William Firestone, Thomas Gillett, Gary Hart, Janice Jackson, Carolyn Kelley, Michael Lach, Donald Langenberg, Michal Lomask, Susan Loucks-Horsley, Iris Metts, Tom Payzant, Susan Sclafani, Nanette Seago, Gail Shroyer, Elliot Solloway, James W. Stigler, Uri Treisman, John Vaille, and Suzanne Wilson.

Finally, our thanks are due to Battelle, the Disney Learning Partnership, and Texas Instruments, who provided considerable support to the Commission's work; to Jennifer House and Lillian Israel of the Association for Computing Machinery for organizing an engaging and informative demonstration of learning technology for us.

Acknowledgments

September 2000

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This document contains examples of programs created by public and private organizations. They are provided for the reader's information and their inclusion is not intended as an endorsement by the U.S. Department of Education.

Preparing Students for College Early

- In 1998, President Clinton and Vice President Gore created GEAR-UP to encourage students to begin planning for college as early as sixth grade. Research shows that students taking challenging courses in middle school are much more likely to succeed in high school and go on to college. The program will benefit more than 750,000 students. [Dept. of Education, GEAR-UP FY2001 Funding Information, www.ed.gov/gearup]
- The Administration has also expanded the TRIO programs, a network of eight initiatives designed to help low-income, first-generation college, and disabled individuals achieve academic success beginning in middle school, throughout college, and into graduate school. Since 1993, funding for the programs has increased from \$388 million to \$645 million, and TRIO programs now offer services to 730,000 students. [Dept of Education, Challenging the Status Quo]
- The number of students taking Advanced Placement exams increased to 704,000 in 1999. In 1995 only 476,000 took AP tests. [The College Board, 8/31/99; 8/22/96] The Administration's Advanced Placement Initiative provides help to pay fees and provide classroom materials that has encouraged 92,000 low-income students to take AP exams since 1998 and will assist 80,000 more this year. [Dept. of Education, Challenging the Status Quo]

Standards and Accountability

President Clinton and Vice President Gore have led the movement for higher standards and accountability for all students. They have helped states set high education standards and are working for the right type of accountability that demands results and rewards progress.

High Standards For All Students

- In 1994, President Clinton and Vice President Gore fought for and won passage of Goals 2000 and the Improving America's Schools Act. The implementation of these acts has been crucial in helping states develop challenging curricula and set high performance standards. Today, 49 states require students to meet tough standards in core subjects, and 48 states test reading and mathematics skills in elementary, middle and high school to ensure students are meeting those standards. [1999 National Education Summit].
 - According to Republican Gov. Tommy Thompson, Goals 2000 "*changed the face of education as we know it.*" [letter to Michael Cohen, senior advisor to Secretary Riley, 9/18/95]
 - A comprehensive General Accounting Office survey found that, "Almost all state and local officials said Goals 2000 funds provided valuable assistance to education reform efforts at both the state and local levels and that, without this funding, some reform efforts either would not have been accomplished or would not have been accomplished as quickly." [GAO, Goals 2000 Flexible Funding Supports State and Local Education Reform, November 1998]
- The Clinton-Gore Administration also passed significant education reforms that require states receiving Title I funds to ensure that all students are held to the same high standards, ending the practice of relegating poor children to a watered-down curriculum and remedial classes. [1994 ESEA Reauthorization]. Today, 11 million low-income students in 13,000 school districts benefit from higher expectations and a challenging curriculum geared to higher standards. [Dept. of Education, Challenging the Status Quo 1993-2000, 5/00, p. 4]
- Ending social promotion and providing students with the knowledge and skills necessary to perform in college and the workforce will ensure that all students receive a world class education. In 1996, President Clinton challenged all states to end social promotion the right way, by giving all children the support they need to meet high standards. To further this effect, the Administration has proposed the Education Accountability Act, which would require all states to end social promotion, and the FY2001 Budget proposal would provide the tools necessary to make sure all students have the chance to meet high standards by significantly expanding after-school and summer school opportunities, investing in high quality teaching, reducing class sizes and increasing access to early childhood education. [Educational Accountability Act of 1999, FY 2001 Budget p.61]

Fixing Failing Schools

- President Clinton and Vice President Gore dedicated \$134 million in Title I money to an Accountability Fund that is giving districts the resources to improve low performing schools through a variety of approaches, including providing professional development and implementing research based curricula. The Administration has requested \$250 million for the fund next year. [Dept. of Education, Challenging the Status Quo 1993-2000, 5/00, p. 4; OMB, FY2001 Budget, p.42]
- The Clinton-Gore administration is now fighting for legislation that will require states and districts to identify schools with the lowest achievement results and turn them around. If the district fails to achieve results, the school could be shut down and reopened under new leadership or students could be transferred to charter schools.
 - *After having been identified as performing below expectations on state assessments, Audubon Elementary School in Owensboro, Kentucky today ranks 18th statewide in student performance among elementary schools. Since 1994, even with two-thirds of its students in poverty,*

Audubon has boosted the percentage of students scoring at a level of "proficient" and "distinguished" on state assessments from 12 percent to 57 percent in writing; 5 percent to 70 percent in reading; and 0 percent to 64 percent in science.

How Standards and Accountability Transformed Head Start

- When President Clinton and Vice President Gore took office, Head Start served too few children, and programs were not required to meet quality or performance standards. Bipartisan legislation signed by President Clinton in 1994 not only expanded Head Start, but reformed it to guarantee that providers meet standards for facilities, teachers, class size and learning. Those programs that couldn't meet the standards would lose their funding. Since 1993, 150 grantees have been closed while more than 200 identified as seriously deficient have turned their programs around. Meanwhile, the Clinton-Gore Administration has dedicated \$800 million for quality improvements to make sure that Head Start programs meet basic standards. And the Head Start curriculum now stresses reading and math skill development. [HHS, Improving Head Start: A Success Story, 6/16/2000]

Investing in Proven Initiatives

President Clinton and Vice President Gore have not only doubled federal resources for education and training, but they have focused federal resources on proven initiatives that work.

Smaller Classes and Quality Teachers: Research proves that smaller class size leads to significant lasting gains in academic achievement. The Administration's initiative to hire 100,000 high quality teachers in the early grades has added 29,000 teachers, providing smaller classes for 1.7 million children. Class size in grades 1-3 has dropped from 23 to 18 students in schools taking advantage of grants. This year the administration is requesting..... [Dept. of Education, Local Success Stories, Reducing Class Size, 11/99].

- *We have had practically no discipline problems. The children are more like a team and they expect the best from each other. This saves a great amount of our instructional time. ...I had only one child (from my class of 19) fail reading for the first six-week grading period. This alone is proof that the children are receiving more individualized instruction and they are greatly benefiting from class size reduction.* –Teacher in Mississippi

Public School Choice: Public school choice increases parental involvement and accountability, and encourages innovation. Charter schools increase a parents choice by offering alternative schools in the area. The number of charter schools in the country has increased from one to 1,700 during the Clinton-Gore Administration, with the federal government providing nearly \$400 million in total support. Today, more than 250,000 students are enrolled in charter schools in 39 states. [U.S. Dept. of Education, The State of Charter Schools, 2000]. The Administration has also expanded the Magnet schools program from 2,400 to 5,200 schools serving 1.5 million students, expanding access to high-quality programs in math, science, technology and arts. [Dept. of Education, Challenging the Status Quo 1993-2000, 5/00, p. 21]

After-School and Summer School: Extended learning time is an essential strategy to improve reading and math scores and provide children a safe and productive environment in the after school hours, when most incidences of crime, alcohol and drug abuse occur. The 21st Century Community Learning Center initiative, launched by President Clinton and Vice President Gore in 1997, today provides after-school and summer school opportunities for 850,000 students. The Administration would expand this program to 10,000 schools and 2.5 million students, which would reduce the number of latch key kids by 25 percent. [Dept. of Education, Challenging the Status Quo 1993-2000, 5/00, pp. 12, 32; FY2001 Budget, p.61]

- *Esmeralda, a student in the low-income school district of La Quinta, California, improved her reading level from 2.75 to 5.80 through the Computer Curriculum Corporation program that provides reading software. She spent two hours a day, four days a week, in her school's computer lab, which was funded by a 21st Century Community Learning Center grant.*

Technology in the Classroom: Today 78 percent of teachers receive training in using technology in the classroom, up from 51 percent in 1994. Internet access has grown from 4 percent of classrooms in 1994 to 65 percent in 1999, with 100 percent of schools expected to be wired by the end of 2000. And the Vice-President's E-rate program has provided internet access for 1 million classrooms and libraries.

School Construction: needs data

- High School reform: small schools/schools to work
- School construction
- Gear up

Expanding and Improving Head Start: Thirty-five years of study and experience with Head Start has demonstrated that low-income children who participated were less likely to be held back in school or to be placed in special education classes and more likely to succeed in school and to graduate. [Council of Economic Advisers, *Educating America: An Investment in our Future*, 9/95] The Clinton-Gore Administration has enacted the largest expansion of Head Start ever, including expanding participation by over 200,000 children, extending Head Start to an all-day, full-year preschool program, and creating Early Head Start to support children under three and pregnant women.

Q177 @ Calls Goals 2000

Technology
Reading
SPED
Bilingual?
Hispanic?
Success
Series

Standards and Accountability

President Clinton and Vice President Gore have led the movement for higher standards and accountability for all students. They have helped states set high education standards and are working for the right type of accountability that demands results and rewards progress.

Crucial Leadership Set High Standards

- In 1994, President Clinton and Vice President Gore fought for and won passage of Goals 2000 and the Improving America's Schools Act. These two successful have been crucial in helping states develop challenging curriculums and set high performance standards. Today, 49 states require students to meet tough standards in core subjects, and 48 states test reading and mathematics skills in elementary, middle and high school. [1999 National Education Summit].
 - According to Republican Gov. Tommy Thompson, Goals 2000 "changed the face of education as we know it." [letter to Michael Cohen, senior advisor to Secretary Riley, 9/18/95]
 - A comprehensive General Accounting Office survey found that, "Almost all state and local officials said Goals 2000 funds provided valuable assistance to education reform efforts at both the state and local levels and that, without this funding, some reform efforts either would not have been accomplished or would not have been accomplished as quickly." [GAO, Goals 2000 Flexible Funding Supports State and Local Education Reform, November 1998]

High Standards for All Students

- The Clinton-Gore Administration also passed significant education reforms that require states receiving Title I funds to ensure that all students are held to the same high standards, ending the practice of relegating poor children to a watered-down curriculum and remedial classes. [1994 ESEA Reauthorization]. Today, 11 million low-income students in 13,000 school districts benefit from higher expectations and a challenging curriculum geared to higher standards. [Dept. of Education, Challenging the Status Quo 1993-2000, 5/00, p. 4]

Fixing Failing Schools

Holding Schools Accountable for Results

- President Clinton and Vice President Gore dedicated \$134 million in Title I funds to an Accountability fund that is giving low-performing schools the tools to improve performance. The Administration has requested \$250 million for the fund next year. [Dept. of Education, Challenging the Status Quo 1993-2000, 5/00, p. 4; OMB, FY2001 Budget, p.42]
- The Clinton-Gore administration is now fighting for legislation that will require states and districts to identify schools with the lowest achievement results and turn them around. If the districts fail to achieve results, the responsible school staff can be fired or the school could be shut down and students transferred to other public schools in the district. [Educational Excellence for All Children Act] Currently, only 19 states have systems to identify low-performing schools and just 16 have systems to hold schools accountable. [1999 National Education Summit].

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endings social promotion.

use list
to pull
1 page

look at each school
on
funding
schools
around?

See
practices
in the field

Student Achievement

President Clinton and Vice President Gore introduced a strategy of high standards for all student, accountability for results and investment in what works that is beginning to pay off. Reading and math scores are up at all levels, college entrance scores are up and more students are heading to college.

Higher Reading and Math Scores at All Levels

- Average reading scores increased for students in grades 4, 8, and 12 between 1994-98. For eighth graders, the national average score ~~was~~ ^{add math} higher in 1998 than in 1994 and 1992. [NAEP 1998 Reading Report Card]
- Students' scores on the NAEP mathematics scale have also increased for all three grades measured. Scores were higher in 1996 than in 1992 for all three grades, and higher in 1992 than in 1990. The national average scaled score for fourth graders in 1996 was 224, an increase of 11 points over the national average for 1990. The average for eighth graders in 1996 was 272, an increase of 9 points over 1990; and the average score for twelfth graders was 304, an increase of 10 points over 1990. [NAEP 1996 Mathematics Report Card]
- Reading scores of 9-year-olds in the highest-poverty schools, where over 75% of students qualify for free or reduced-price lunch, rose by nearly one grade level on the National Assessment of Educational Progress (NAEP) between 1992 and 1996.
- Math scores of 9-year-olds in the highest-poverty schools rose by one grade level between 1992 and 1996.

Students Are Taking Tougher Classes And Aiming Higher

- In 1998, 55 percent of graduating high school seniors took a core curriculum (4 years of English, 3 years each of social studies, science and math). In 1990, just 38 percent did. [NCES High School Transcript Study, 1999]
- The number of students taking AP exams increased to 704,000 in 1999. In 1995 only 476,000 took AP tests. [The College Board, 8/31/99; 8/22/96] The Administration's Advanced Placement Initiative provides help to pay fees and provide classroom materials that has encouraged 92,000 low-income students to take AP exams since 1998 and will assist 80,000 more this year. [Dept. of Education, Challenging the Status Quo]

College Entrance Scores Are Up

- 1998 SAT math scores were the highest in 27 years. Verbal scores were the highest in 10 years, and have increased 5 points since 1992. Combined SAT scores have increased by 15 points since '92. [The College Board, 9/1/98; 8/31/99]. Need new numbers
- Average ACT scores have also increased over the past seven years after remaining virtually flat between 1980-92. [ACT, 8/17/99].
- Over the last 10 years, SAT test scores for college-bound African American students have increased by a total of 13 points. [The College Board, 8/31/99] The gaps in test scores between African American and white elementary and secondary students have also closed slightly in Math, Science and Reading. [NCES, The Condition of Education 1999, p.2]

Fewer Dropouts

- The percentage of students who drop out of high school fell from 5.3 percent in 1994 to 4.6 percent in 1997. The largest improvements came among African American and lower-income students. [NCES, The Condition of Education: 1999, p. 110].
- The percentage of young adults who have completed high school is the highest level ever reported. Today, 88.1 percent of 25-29 year olds graduated from high school. The number has increased from 86.3 percent in 1992. [NCES, The Condition of Education: 1998]

More Students Are Going To College

- Between 1992-97, the percentage of high school graduates going to college increased from 61.9 percent to 67.0 percent. The percentage of African American graduates going to college has increased by 12 points since 1992 and is now at its highest point ever. Low-income students are also much more likely to attend college. Today 50.6 percent of low-income graduates go on to college. In 1992, just 43.6 percent did. [NCES, The Condition of Education: 1999, p. 128]

Dollars to Classrooms

President Clinton and Vice President Gore have taken successful steps to improve efficiency in the Department of Education. Today 99 percent of funds for major education programs are distributed to states, the Department is doing more with fewer personnel and thousands of pages of paperwork and regulations have been eliminated.

Over 90 Percent of Federal Dollars to Local Districts

- A 1999 GAO study found that 99 percent of appropriations for 10 major education programs are distributed to states. And 94 percent of these funds are distributed to local agencies. [GAO, Federal Education Funding, Allocation to State and Local Agencies for 10 Programs, 9/99]

Doing More With Less

- Despite the fact that President Clinton and Vice President Gore have doubled the federal government's investment in education, there are fewer Department of Education staff this year than there were in 1992. [Dept. of Education FY2001 Budget Summary]

Eliminating Regulations and Unnecessary Programs

- Since President Clinton and Vice President Gore took office, 65 programs totaling \$625 million have been eliminated or consolidated. The U.S. Department of Education has eliminated 39 percent of departmental regulations – totaling 923 pages. [Testimony of Under Secretary Marshall Smith, 4/9/97]

Reforms Saving Billions of Dollars

- In 1990, the student loan default rate was 22.4 percent. Under the Clinton-Gore administration, the default rate has been cut every year, and is now a record low 8.8 percent. [5-year Report Card on American Education, February 2000]
- Collection of defaulted student loans have tripled under the Clinton-Gore Administration, to \$3.0 billion in FY1999. [Dept of Education, FY2001 Budget Request, www.ed.gov]
- The Direct Student Loan Program has saved taxpayers an estimated \$4 billion since 1993. [Dept of Education, Challenging the Status Quo, p.41]
- Federal subsidies for banks and guaranty agencies have been pared down, saving taxpayers an additional \$1.6 billion. [Dept of Education, Challenging the Status Quo, p.41]

Easing the Paperwork Burden

- In 1994, President Clinton signed the ESEA Reauthorization Act, which eliminated two-thirds of regulations governing federal elementary and secondary education programs. As part of these reforms, states are allowed to submit a single form. This has resulted in elimination of 85 percent of the paperwork requirements. [Statement of Deputy Secretary Marshall Smith, 12/6/99]

More State Flexibility than Ever Before

- Since 1993, the Department has approved 478 waivers of regulations for states. [Waiver Fact Sheet, 5/2000, www.ed.gov] In 1999, President Clinton signed the Education Flexibility Partnership Act, which allows all states with strong accountability safeguards the opportunity to waive many federal requirements in order to achieve results of local improvement plans. [Ed-Flex Fact Sheet, 6/28/00, www.ed.gov]

Discipline and School Violence

From day one, President Clinton and Vice President Gore have taken a tough stance against youth violence. They have adopted a zero tolerance policy against weapons in schools, and challenged states to adopt policies to improve order and safety in classrooms, including adopting school uniforms, enforcing truancy laws and imposing curfews. Although serious problems still exist across the country, crime in schools has dropped by more than one-third under The Clinton-Gore Administration.

School Violence Rates Drop

- School crime has decreased by more than one-third under President Clinton and Vice President Gore. In 1993, there were 155 school-related crimes per 1000 students. The rate had dropped to 102 per 1000 in 1997. [U.S. Dept of Justice, 1999 Annual Report on School Safety]
 - The number of students carrying a weapon to school and students getting in fights at school has also dropped significantly since 1993. Serious crime dropped for the seventh year in a row, the longest continuous decline in nearly 40 years. [U.S. Dept of Justice, 1999 Annual Report on School Safety]
 - Reversing the previous upward trend, drug use had been stopped and drug use among teenage students has decreased or remained flat for three straight years. [Monitoring the Future Survey 1992-1999]
- Need new numbers

Zero Tolerance for Guns and Weapons

- President Clinton and Vice President Gore fought for passage of the Gun Free Schools Act, which requires the expulsion of students caught bringing weapons to schools.
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- President Clinton and Vice President Gore have encouraged schools to adopt school uniform and dress code policies and urged communities to enforce truancy laws and impose curfews.

More Police Officers in Schools

- President Clinton and Vice President Gore have designated \$250 million in community policing grants to fund over 2,250 police officers to work in schools. [Dept. of Justice, Community Oriented Policing Services, www.usdoj.gov/cops/]

After-School and Summer-School Opportunities Reduce Crime

- President Clinton and Vice President Gore have provided funding for 7,700 after school and summer programs that serve 2.5 million students. Not only do these programs give students a safe place to improve skills necessary to meet tough academic standards, but they also have lowered crime rates in some areas where after-school programs have been implemented. [Dept of Education, Challenging the Status Quo, p.32]

Proposals for Project SERV and School Councilors:

Student Achievement

Education Achievement

change title?

President Clinton and Vice President Gore introduced a strategy of higher standards and accountability that is beginning to pay off. Reading and math scores are up at all levels, college entrance scores are up and more students are heading to college. African-Americans and women have made particularly impressive gains over the past eight years.

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Efficiency
21% less
87% to hire teachers
3% administrative costs

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• proposal for joint SERV & School Counselors.

Quality Teachers in Every Classroom

President Clinton and Vice President Gore are helping communities hire 100,000 quality teachers in school districts across the country. They have drastically increased federal efforts to attract quality teachers to high-need schools and are improving teacher training, pay and working to increase the respect for the teaching profession. They are also working to expand professional development for teachers, expanding the number of board certified teachers and have proposed requiring more secondary school teachers to have degrees in the subjects they teach.

Largest teacher training and recruitment effort ever

- President Clinton and Vice President Gore have launched the largest investment in teacher hiring and training ever. In 1998, the administration won funding to start hiring 100,000 new quality teachers over six years. Since then President Clinton and Vice President Gore have secured a total of \$2.5 billion toward their goal and expect to hire 49,000 teachers by the end of FY2000. [Dept of Education, Challenging the Status Quo, p.32; Dept. of Education, FY2001 Budget Summary, www.ed.gov]]
- President Clinton and Vice President Gore have nearly doubled funding for teacher quality and recruitment programs. In 1993, the federal government spent just \$435 million to train and recruit quality teachers. In 1999, President Clinton fought for and secured \$793 million. The administration's 2001 budget proposal would increase this to \$1 billion annually. [FY2001 Budget, p.45]
- The Clinton-Gore Administration is working to enact laws that would reduce the number of teachers who teach outside their area of expertise. Today, 88 percent of science and 82 percent of math teachers in secondary schools had a major or minor in the area they taught. In 1993, 18 percent of science teachers and 23 percent of math teachers were teaching outside of their field of expertise. [NCES, Teacher Quality: A Report on the Preparations and Qualifications of Public School Teachers, 1/1999].

Professional Development and Board Certification

- President Clinton and Vice President Gore have encouraged professional board certification and licensing of teachers and launched state grants to encourage a rigorous process. [Higher Education Amendments of 1998]. There are currently 4,804 teachers certified by the National Board for Professional Teaching Standards. Thirty-eight states and 169 local school districts offer a variety of incentives, including fee support for candidates and salary increases for certified teachers. [NBPTS Release, 6/1/2000, www.nbpts.org].
- In order to educate students for the digital economy, teachers need to be computer literate and trained to integrate technology into the classroom. President Clinton and Vice President Gore have launched grants that are training 400,000 teachers to use technology in the classroom. [OMB, FY2001 Budget, p.46]
- The Clinton-Gore Administration implemented the Troops to Teachers program to encourage former military personnel to become teachers. So far 3,600 teachers in schools in all 50 states and almost 2,000 school districts. [DANTES, Troops to Teachers Program Status Report, 3/30/2000] President Clinton and Vice President Gore have requested \$25 million in funding for 2001 to substantially increase this proven pool of teaching talent and expand the successful concept to other mid-career professionals. [OMB, FY2001 Budget, p.45]

Standards and Accountability in Teacher Training

- The 1998 Higher Education Act signed by President Clinton holds states and teacher education programs accountable for preparing skilled teachers, and encouraging alternate ways for qualified professionals to enter the teaching profession. President Clinton and Vice President Gore have also

introduced annual report cards on teacher training, licensing and certification in each state. [Dept. of Education, Improving Teacher Quality, Recruitment, and Preparation, www.ed.gov/offices/OPE/heatqp/tqp.sum.html]

Hiring Quality Teachers Where They Are Needed Most

- The Clinton-Gore Administration's Class Size Reduction Initiative targets funds to high poverty communities, where the need for high quality teachers is the greatest, by distributing 80 percent of its funds on the basis of the number of poor children in each district. [Dept. of Education, Local Success Stories: Reducing Class Size, 11/99]
- President Clinton and Vice President Gore have launched the American Indian Teacher Corps to attract 1,000 new, high quality teachers to American Indian and Alaska native schools. They have nearly doubled funding for bilingual and English as a Second Language education and have requested funds to train 8,000 tutors to help students with limited English skills excel academically. [OMB, FY 2001 Budget, pp. 43, 236]

Expanding College Opportunity

Recognizing that a college education is more important to success in today's economy than ever before. President Clinton and Vice President Gore have enacted the largest expansion of college opportunity since the GI Bill was passed in 1944. They have drastically increased the federal investment in student aid, resulting in an increase in the number of students receiving aid, enrolling in college, and the number of students preparing for college.

Opening the Doors of College to All Americans

- President Clinton and Vice President Gore have enacted the largest expansion of college opportunity for Americans since the GI Bill. The Clinton-Gore Administration proposed and initiated the HOPE Scholarship and Lifetime Learning Tax Credits. These two programs provide tax credits worth a total of \$6.8 billion to 10 million families. The Administration has expanded participation in the work study program, so that 1 million students can work their way through school. They also created AmeriCorps, which has helped 150,000 students earn money for college through community service. [OMB, FY2001 Budget]
- The Clinton-Gore Administration created the Direct Lending program, which has made borrowing money for college cheaper and easier, saving students and their families over \$8 billion and saving taxpayers more than \$5 billion since 1993. Direct lending has reduced paperwork and fees for students and costs to the federal government. The Administration has also cut student loan interest rates and origination fees for all students, saving students more than \$8 billion. And Clinton-Gore economic policies have kept interest rates low, reducing college costs for students taking out loans by and estimated \$200 per year. [Dept of Education, Challenging the Status Quo; White House Fact Sheet, 1/27/00]
- President Clinton and Vice President Gore have increased the maximum Pell Grant award by \$1,000, and proposed an additional \$200 increase next year. Between 1993 and 1999, the maximum Pell Grant award has increased slightly faster than the rate of college tuition and fees. During the previous administration, college tuition and fees increased much quicker than the maximum Pell Grant. [Dept. of Education, Pell Grant Year-End Report, 1998-99; OMB, FY 2001 Budget; Dept. of Education, Digest of Education Statistics, Table 317]
- This Administration has greatly expanded the availability of student aid. More than 2.5 million more students receive some sort of federal grant, loan or work-study assistance today than in 1992, and this number does not include the 10 million families taking advantage of HOPE Scholarships and Lifetime Learning Tax Credits. [OMB, FY2001 Budget Appendix, p. 369; FY1994 Budget Appendix]

More Students Going to College

- As a result of President Clinton and Vice President Gore's efforts, more high school graduates are going directly to college today than ever before. In 1998, 66 percent of high school graduates went directly to college. This translates into an estimated 1.6 million students, or more than 200,000 more than went directly to college in 1992. [Condition of Education 2000 Table 32-1]
- Particularly impressive gains have been made among low-income students and African-Americans. The percentage of high school graduates going directly to college has increased from 44 percent in 1992 to more than 50 percent in 1997 among low-income families and from 50 percent in 1992 to 62 percent in 1998 among African American students. [Condition of Education 2000 Tables 32-1, 32-3]