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Subseries: Administration Files

OA/ID Number: 62025
Folder ID Number: 62025-007

Folder Title:
Administration Awards - Science and Math [1990-92]

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THE WHITE HOUSE
WASHINGTON

September 7, 1990

SCHEDULE PROPOSAL

TO: JOSEPH W. HAGIN, II
DEPUTY ASSISTANT TO THE PRESIDENT FOR
APPOINTMENTS AND SCHEDULING

FROM: D. ALLAN BROMLEY *Alan*
SPECIAL ASSISTANT TO THE PRESIDENT FOR
SCIENCE AND TECHNOLOGY

REQUEST: Receive and address secondary teachers in an East Room Ceremony for the Presidential Secondary Awards for Excellence in Science and Mathematics Teaching with brief remarks on the Administration's strong support of education.

PURPOSE: To demonstrate the Administration's strong commitment to education by recognizing those teachers of science and mathematics whose dedication and accomplishments are truly outstanding. This is consistent with the Administration's commitment to improving the education system in this Nation and the work by the Administration on the math and science education goal. A high level appearance will applaud the efforts these teachers have made to improve the skills of this Nation's young people, and assist in highlighting the anniversary of the Education Summit.

BACKGROUND: The awards are given annually to outstanding secondary teachers, two from each state, the District of Columbia, Puerto Rico, U.S. Territories, and the DoD Dependent Schools. They are nominated by their peers with final recommendation by a distinguished panel of educators chosen by the National Science Foundation. The Assistant to the President for Science and Technology reviews and approves the finalists and forwards them to the President for final decision.

PREVIOUS

PARTICIPATION: The President addressed the 1989 recipients of the Presidential Awards for Excellence in Science and Mathematics Teaching (secondary) on October 24, 1989.

DATE: October 16, 1990

LOCATION: East Room (1 hour)

TIME: Between 10 A.M and 12 Noon

PARTICIPANTS: The President, The Vice President, The First Lady, Barbara Bush, Secretary Cavazos, Dr. D. Allan Bromley, The head of the National Science Foundation, award winners, and family.

**OUTLINE OF
EVENT:**

The President opens the ceremony with a few remarks, then departs, leaving the Assistant to the President for Science and Technology and the Director of the National Science Foundation to carry on with the presentation of awards.

MEDIA

COVERAGE: Open

REMARKS

REQUIRED: Brief congratulatory remarks and brief remarks on the importance of the teacher's contributions to the education of our Nation's youth. (10 minutes)

RECOMMENDED

BY: D. Allan Bromley, OSTP
Jackeline J. Clawson, Project Officer, OSTP (x2870)

THE WHITE HOUSE
WASHINGTON

September 4, 1990

MEMORANDUM TO JOSEPH W. HAGIN II

FROM: D. ALLAN BROMLEY 
SUBJECT: NATIONAL SCIENCE TEACHERS ASSOCIATION

This is just a brief note to reinforce my memorandum of last November in which I urged you to consider the possibility of having President Bush accept the invitation of the National Science Teachers Association to be the keynote speaker at their national convention scheduled for March 27-30, 1991.

The Association anticipates between 17,000 and 20,000 people in attendance in Houston in 1990 and last spring had some 15,000 at their convention in Atlanta.

Given the President's joint interests in science education and science and technology as an investment in the future, this, in my opinion, would represent an excellent opportunity and audience for him and an opportunity for a major talk on these topics.

THE WHITE HOUSE
WASHINGTON
SCHEDULE PROPOSAL

3/19/1

TO: Kathy Super
Deputy Assistant to the President for
Appointments and Scheduling

FROM: D. Allan Bromley, Assistant to the President for Science and Technology *Allan*

REQUEST: To address the National Summit on Mathematics Assessment

PURPOSE: To address 600 leaders representing the public policy sector, the mathematics education community, and the testing industry, demonstrating that your commitment to make American math and science education world-class is unwavering

BACKGROUND: The National Summit on Mathematics Assessment will be the first major event hosted by the National Academy of Sciences in assisting the Nation in pursuit of the goals that the President and the Governors have set for mathematics and science education

PREVIOUS PARTICIPATION: None

DATE AND TIME: April 24 *(1:30 - 2:00)*
Between 9:00 - 11:00 a.m.

LOCATION: National Academy of Sciences

PARTICIPANTS: The Honorable Lamar Alexander, Secretary of Education
Dr. Frank Press, President of the National Academy of Sciences
600 Summit Attendees

REMARKS REQUIRED: To be provided by speechwriters.

MEDIA COVERAGE:

RECOMMENDED BY: D. Allan Bromley

OPPOSED BY:

NATIONAL ACADEMY OF SCIENCES

2101 CONSTITUTION AVENUE, NW WASHINGTON, D. C. 20418

OFFICE OF THE PRESIDENT

March 7, 1991

The President
The White House
1600 Pennsylvania Avenue, N.W.
Washington, D.C. 20500

Dear Mr. President:

The National Academy of Sciences has mobilized to assist the nation in pursuit of the goals you and the Governors have set for mathematics and science education. Our first major event in this endeavor is a National Summit on Mathematics Assessment to be held at the National Academy on April 23-24, 1991. I invite you to speak to a select group of 600 leaders from every state representing the public policy sector, the mathematics education community, and the testing industry who will convene those days to answer the questions:

- What does it mean to be first in the world in mathematics achievement by the year 2000?
- How do we measure progress in pursuit of that goal?

Lamar Alexander has chaired the Steering Committee for the National Summit on Mathematics Assessment which has included many of the leaders who are also members of your Education Policy Advisory Committee. Governor Alexander, who will no doubt be Secretary Alexander by the date of the Summit, will chair the convocation.

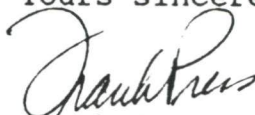
We would like to schedule your address between 9:00 - 11:00 a.m. on April 24, 1991. If another time during the April 23-24 meeting is better for you, we will arrange our event to accommodate your schedule.

The President
March 7, 1991
Page Two

Your participation in this event can be a powerful message to the 600 leaders, as well as to the nation as a whole, that your commitment to make American mathematics and science education world class is unwavering. I commend you for making mathematics and science education a national priority, and sincerely hope you will view the Summit as an opportunity for you to move the nation closer to the goal of being first in the world in mathematics and science achievement by the year 2000.

Best wishes as your administration leads the nation in reforming mathematics and science education. With Lamar Alexander, Allan Bromley, and Walter Massey on your team, the mathematics and science communities are confident that great progress can be made.

Yours sincerely,


Frank Press
Chairman

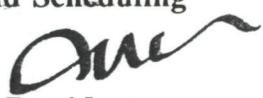
THE WHITE HOUSE

WASHINGTON

January 13, 1992

SCHEDULE PROPOSAL

TO: Kathy Super
Deputy Assistant to the President
for Appointments and Scheduling

FROM: D. Allan Bromley 
The Assistant to the President
for Science and Technology

REQUEST: Receive and address secondary teachers in a ceremony for recipients of the Presidential Secondary Awards for Excellence in Science and Mathematics Teaching.

PURPOSE: To demonstrate the Administration's strong commitment to education by recognizing those teachers of science and mathematics whose dedication and accomplishments are truly outstanding. This is consistent with the Administration's commitment to improving the education system in our Nation and the work by the Administration on the America 2000 math and science education goal.

BACKGROUND: The awards are given annually to outstanding secondary teachers, two from each state, the District of Columbia, Puerto Rico, U.S. Territories, and the D.O.D. Dependent Schools. They are nominated by their peers for their significant contributions to improvements in the skills of our Nation's young people, with final recommendations made by a distinguished panel of educators chosen by the National Science Foundation. The Assistant to the President for Science and Technology reviews and approves the finalists and forwards them to the President for final decision.

PREVIOUS PARTICIPATION: President Bush addressed the 1991 recipients of the Presidential Awards for Excellence in Science and Mathematics Teaching (elementary) on October 4, 1991. The President also addressed the 1989 recipients (secondary) on October 24, 1989, and the recipients of the elementary awards on October 2, 1990.

DATE AND TIME:	In order of preference: March 13, 1992 (anytime) March 12, 1992 (afternoon)
DURATION:	approximately 15 minutes (set-up additional)
LOCATION:	East Room
PARTICIPANTS:	President Bush, Vice President Quayle, the First Lady, Education Secretary Alexander, Dr. D. Allan Bromley, Dr. Walter Massey (Director of the National Science Foundation), award winners and their family.
OUTLINE OF EVENT:	The President greets the teachers and their families, makes brief remarks, and departs.
REMARKS REQUIRED:	To be provided by speechwriters.
MEDIA COVERAGE:	Open
RECOMMENDED BY:	D. Allan Bromley
OPPOSED BY:	No one.

THE WHITE HOUSE

WASHINGTON

☐ APPOINTMENT

☐ SCHEDULE

☐ HONORARY POSITION

RESPONSE DUE DATE:

January 17, 1992

REQUEST FOR SCHEDULING RECOMMENDATION

MEMORANDUM FOR:

____ SAM SKINNER
____ ANDREW CARD, JR
____ ROGER PORTER
____ SIG ROGICH
____ SUSAN PORTER ROSE
____ EDE HOLIDAY
____ CONSTANCE HORNER
____ GREGG PETERSMEYER
____ DORRANCE SMITH

____ PHILLIP BRADY
____ DAVID DEMAREST
____ MARLIN FITZWATER
____ FREDERICK MCCLURE
____ CAM FINDLAY
____ BRENT SCOWCROFT
____ C. BOYDEN GRAY
____ *X Dr. Brumley*

FROM:

KATHY L. SUPER

PRESIDENTIAL APPOINTMENTS AND SCHEDULING

Please provide your recommendation the following scheduling request:

EVENT: Participate in a forum sponsored by the American Association for the Advancement of Science (AAAS)

DATE: February 6-11, 1992

LOCATION: Chicago, Illinois

Additional information concerning this event is attached.

YOUR RECOMMENDATION:

Accept _____

Regret X

Surrogate

Priority _____

Routine _____

Message

Video _____

Satellite _____

Teleconference _____

Written _____

1/13/92

If your commendation is to accept, please cite reasons below

Recommend rejection strongly! The President has nothing to gain from this and should maintain the high ground that he currently holds.

PLEASE RETURN TO PATRICIA COX, ROOM 182 OEOB, BY THE RESPONSE DUE DATE ABOVE SO THAT YOUR COMMENTS MAY BE CONSIDERED AS WE PROCEED WITH IS REQUEST.

THANK YOU

*DAB.
(former president of AAAS!)*

American
Association
for the Advancement of
Science

Scheduling
2/6/92

297087

RSVP 1-24-92

1333 H Street, NW, Washington, DC 20005
(202) 326-6640; FAX (202) 371-9526
Cable Address: ADVANCESCI

EXECUTIVE OFFICE

January 6, 1992

President George H.W. Bush
The White House
Washington, DC 20500

Dear Mr. President:

The 135,000 member American Association for the Advancement of Science (AAAS) is meeting in Chicago on February 6-11, 1992. We are interested in learning if you would be willing to participate in a forum for Presidential candidates on science, technology, and education policy to be held during this meeting.

The session would be held at 9:30 p.m. on Thursday, February 6, in the Hyatt Regency Chicago. The format would be one in which each candidate gives a 5 - 10 minute statement on science, technology, and education policy, followed by questions and discussion. Each candidate would have the opportunity to respond to the remarks of the others. The AAAS meeting typically attracts 5,000 to 7,000 participants, plus several hundred science writers and other media representatives. A large share of these people would no doubt be interested in attending the forum.

If you are interested in participating, we would be pleased to assist your staff in making the necessary preparations. Attached is a brief description of the Association and its meeting.

In order to do the necessary planning, we need to know by January 24 whether you would be able to attend this forum. Please ask the appropriate person from your staff to contact Dr. Albert H. Teich, director of science and policy programs at AAAS at 202-326-6600 by this date regarding your availability.

Sincerely,

Leon M. Lederman

Leon M. Lederman
President

LML/aht

Attachment

THE AMERICAN ASSOCIATION FOR THE ADVANCEMENT OF SCIENCE

Founded in 1848, the American Association for the Advancement of Science is the world's largest federation of scientific and engineering societies, with nearly 300 affiliates. In addition, AAAS counts nearly 135,000 scientists, engineers, science educators, policymakers, and interested citizens among its individual members, making it the largest general scientific organization in the world.

AAAS is dedicated to the following objectives:

- To further the work of scientists;
- To facilitate cooperation among them;
- To foster scientific freedom and responsibility;
- To improve the effectiveness of science in the promotion of human welfare;
- To advance education in science;
- To increase public understanding and appreciation of the importance and promise of the methods of science in human progress.

The Association's board of directors consists of the chairman, president, president-elect, and eight others elected by the general membership. Two other officials -- the executive officer and the treasurer -- also sit on the 13-member board. In addition, members elect an 83 person council, which meets annually to establish general policies regarding AAAS programs.

A central staff of about 230 people work in the Association's headquarters in Washington, D.C. Among their activities are the editing and publishing of the prestigious weekly journal *Science*; the planning and support of annual meetings and symposia; and a range of special programs in science education, international cooperation, science and public policy, equal opportunity in science, and science communication to the general public.

Each year the AAAS annual meeting offers its several thousand participants a stimulating, multidisciplinary look at the year's advances in science and technology and at social, political, and economic dimensions of these advances. Widely covered by the national and local media, the annual meeting takes place in a different city each year.

June 14

THE WHITE HOUSE
WASHINGTON

May 2, 1990

Dear Mr. Boehlert:

Thank you for your letter regarding the federal scholarships provisions of the Kennedy math and science education bill (S. 2114). Your letter reflects a genuine commitment to improving mathematics and science education in this country.

I agree that it is critically important that we attract top quality mathematics, science, and engineering students into teaching careers. A federal scholarship program for students majoring in mathematics, science, and engineering who agree to teach at the pre-college level seems an excellent way to do this. I have asked the interagency group referred to in your letter to give your letter special attention.

I welcome the opportunity to meet with you to discuss these issues and others. I have asked my appointments secretary to call your office to set up such a meeting.

Sincerely,

225-3665



D. Allan Bromley
Assistant to the President
for Science and Technology

The Honorable Sherwood Boehlert
Ranking Republican Member
Subcommittee on Science, Research
and Technology
United States House of Representatives
Washington, D.C. 20515

EXECUTIVE OFFICE OF THE PRESIDENT
OFFICE OF SCIENCE AND TECHNOLOGY POLICY
WASHINGTON, D.C. 20506

May 15, 1990

MEMORANDUM FOR D. ALLAN BROMLEY

THROUGH: J. THOMAS RATCHFORD 
FROM: KATHERINE L. YURACKO 
SUBJECT: YOUR MEETING WITH LAURO CAVAZOS AND STEPHEN DANZANSKY, ON TUESDAY MAY 15, 1990 AT 1:00, AT THE DEPARTMENT OF EDUCATION, 400 MARYLAND AVE. S.W.

The goal for this meeting is a decision on the process for taking mathematics and science education issues from the FCCSET through the DPC.

The Kennedy bill (S. 2114, The Excellence in Mathematics, Science, and Engineering Education Act of 1990) is the case at hand. We suggest exposing the Kennedy bill simultaneously to the DPC S&T working group which your chair, and the education working group chaired by Cavazos. Your meeting should focus on the process for taking mathematics and science education issues from FCCSET to the DPC, rather than the specifics of the Kennedy bill.

Participants

Lauro F. Cavazos
Stephen I. Danzansky
J. Thomas Ratchford

Background

Dr. Ratchford has convened four interagency meetings on mathematics and science education legislation, on March 21, and April 4, 16, and 30. The list of participants is attached.

At the first interagency meeting the group agreed that the FCCSET Education and Human Resources Committee should develop a coordinated interagency plan for mathematics and science education. It is generally agreed that not until the FCCSET Committee has completed its analysis will we have a really good understanding of what might be useful legislation to accomplish the work we want to get done.

However, recognizing the immediate need to respond to the Kennedy bill and other pending legislation (you will be asked to testify at a hearing on the bill sometime in June), the group has gone forward with developing a response to the Kennedy bill. Accordingly, the working group has evaluated the bill from the perspectives of DOEd, NSF, and DOE, and has compiled a list of acceptable aspects of the bill and areas where additional legislative authorities are needed. The interagency group has jointly drafted testimony for you on the Kennedy bill (attached).

Attachments

- **Participants in the interagency meetings on mathematics and science education legislation**
- **Draft OSTP testimony on S. 2114, The Excellence in Mathematics, Science, and Engineering Education Act of 1990**
- **Summary of S. 2114**
- **NSF analysis of S. 2114**
- **Draft DOE analysis of needed legislative authorities**
- **Report on April 19, 1990 hearing on S. 2114**

**cc: Mary Harley Kruter
Charles Dickens**

**INTERAGENCY MEETING ON
MATH AND SCIENCE EDUCATION LEGISLATION**

Monday April 30 at 10:00

Room 5026, New Executive Office Building

PARTICIPANTS:

Dr. Thomas Ratchford

**Associate Director for Policy and International Affairs
Office of Science and Technology Policy**

Dr. Luther Williams

**Senior Science Advisor
National Science Foundation**

Dr. Raymond Bye

**Director, Office of Legislative and Public Affairs
National Science Foundation**

Mr. Christopher Cross

**Assistant Secretary for Educational Research and Improvement
Department of Education**

Ms. Nancy Kennedy

**Assistant Secretary for Legislation
Department of Education**

Mr. David Florio

**Director of Policy Studies and Collaborative Initiatives
Department of Education**

Mr. Joseph Hezir

**Deputy Associate Director
Energy and Science Division
Office of Management and Budget**

Mr. Bernard Martin

**Deputy Associate Director
Labor, Veterans & Education Division
Office of Management and Budget**

Dr. Norine Noonan
Chief, Science and Space Programs Branch
Office of Management and Budget

Ms. Peggy Dufour
Special Assistant to the Secretary
Department of Energy

Ms. Doreen Torgerson
Policy Analyst
Office of Policy Development

Mr. John Schall
Deputy Executive Secretary
Domestic Policy Council

Dr. Mary Harley Kruter
Senior Policy Analyst
Office of Science and Technology Policy

Dr. Katherine L. Yuracko
AAAS Fellow
Office of Science and Technology Policy

April 25, 1990 - "DRAFT" OSTP Testimony/Statement for Dr. Bromley
 IN RE "Excellence in Mathematics, Science, and Engineering
 Education Act of 1990" (S.2114)

I want to thank the Committee for this opportunity to present the Administration's views on critical education issues in science, mathematics, and engineering. Science and mathematics learning among our children, youth, and college-age adults is in crisis. Audiences across the country have heard me say that unless we make fundamental changes in our education system, the United States is in danger of becoming the first fully industrialized third world country.

The problems are well documented. Major studies paint a strikingly similar picture for school-based science and mathematics learning. The good news is that student test scores in factual science knowledge and arithmetic computation have increased over the past decade. The overall science and mathematics achievement decline since the early 1970's has bottomed out. And minority students have begun to close the learning gap with their majority peers.

The bad news is that gains are concentrated in simple skills and facts and that minority students are still several years behind their majority counterparts. Worse, students have little opportunity to learn more advanced science and mathematics. Even when students get the opportunity to learn, their work at all levels is dominated by lectures, class recitation, and textbook reading.

Being a scientist demands more than learning from lectures and textbooks, it also requires being creative, inquisitive, exploring, and having fun with the hands-on work of the laboratory. For the most part science instruction is devoid of the most interesting and challenging aspects of authentic science -- experiments, on-site observation, writing up experiments, interpreting data, and forming hypotheses. Only a third of 7th graders and about half of 11th graders are asked to form hypotheses or interpret data during a typical week according to our most recent National Assessment of Educational Progress (NAEP) science report.

What is most discouraging is that we are turning off the excitement and natural curiosity that students bring to school. The level of enjoyment students have in taking science and mathematics declines with their years in school. Over two thirds of 3rd graders like science when they have it, and they find it interesting and useful. These perceptions decline as they stay in school. That decline has continued over the past decade.

Only about a third of 11th graders believe that science will be important to their lives.

According to the NAEP, science achievement among high school students in the United States has not even returned to the levels of the early 1970's. Less than 8% of the 11th graders in the recent National Assessment of Educational Progress have the prerequisite knowledge and skill needed for college level work. Less than half of these 17-year-olds have attained the knowledge and skill to hold technical jobs or even to benefit from special on-the-job technical training. For black and Hispanic students, the gap between expected and actual performance increases with years in school.

The case in mathematics is nearly identical. Average achievement for elementary and high school students has increased. However, nearly all of the increase is in the learning of basic facts and rudimentary skills. Most high school students do not have the prerequisite understanding and skill to study advanced secondary school mathematics.

Instruction is dominated by lectures, blackboard demonstrations, textbook and workbook problems. Students have few opportunities to work on problems in groups, make reports on mathematics projects, or do mathematics laboratory activities. Moreover, according to the Education Testing Service (ETS), only about half of the high school students who demonstrate the greatest mathematics talents--the top 10% among those taking the SAT test--actually pursue courses of study in college science, mathematics, or engineering. Worse yet, about 25 percent of these high-achieving high school students do not even go on to college.

As an additional complication, there will be an absolute decline in the 18 to 22 year-old population through the mid-1990's. Within that declining cohort, the proportion of minority students is growing substantially. While minorities have begun to close the gap, black and Hispanic students remain about four years behind whites students in science learning. The rate at which these groups enter and complete college, let alone the numbers who pursue advanced work in science and mathematics, is appallingly low.

Success requires far-reaching changes at all levels of education--elementary, secondary, and post secondary--and among the essential components and structures of education at each level. By this, I mean that schools and colleges, in concert, must fundamentally reform school and college curricular content, time spent on learning, the roles and careers of teachers, the way students spend their time, the type and use of equipment and facilities and the way students and faculty are rewarded.

CLEAR GOALS AND OBJECTIVES

The President and this Administration are fully aware of the problems we face and we have made significant strides in addressing science and mathematics education needs--through...

oo THE NATIONAL EDUCATION SUMMIT.
 oo AGREEMENT ON NATIONAL EDUCATION GOALS, AND IN
 oo THE 1991 BUDGET.

Last fall the President convened the Nation's Governors for the National Education Summit to address critical problems and issues. As a result of that Summit, the President and Governors have agreed upon National Education Goals and objectives to be reached by the turn of the century. Science and mathematics are central to those National goals, which include the following.

By the year 2000, American students will leave grades four, eight and twelve having demonstrated competency in challenging subject matter including English, mathematics, science, history, and geography; and every school in American will ensure that all students learn to use their minds well, so they may be prepared for responsible citizenship, further learning, and productive employment in our modern economy.

By the year 2000, U.S. students will be first in the world in science and mathematics achievement.

These goals form the national framework for Federal policy and strategic investments in science, mathematics, technological, and engineering education.

Strategic Federal Initiatives to Achieve National Goals

Congressional and Administration actions have set in place a number of programs and agency roles that--when well-designed and implemented in a coordinated manner--will provide critical resources and positive leverage for those who are ultimately responsible for reaching our goals--in states, local education agencies, in schools and higher education institutions. The Department of Education and the National Science Foundation have programmatic responsibility, and critical roles are also played by the Departments of Energy, Health and Human Services/National Institutes of Health, National Aeronautics and Space Administration, and Department of Defense.

Through the 1991 Budget we have placed high priority on programs and funding for science and mathematics education. Our funding priorities are focused on support for state, local, and institutional efforts to implement fundamental, systemic reforms in mathematics, science, and technological education. These

programs are designed to advance general scientific literacy and mathematical numeracy and to prepare the next generation of scientists, engineers, and members of the technical workforce.

Elementary and Secondary Education

The Department of Education Fiscal Year 1991 Budget proposes a 60 percent increase in funding for programs directly focused on science and mathematics education. The budget includes a 70% increase in Eisenhower Act funds. The Act is devoted to science and mathematics programs for teacher education and professional development at the state and local levels, and for national demonstration and innovation initiatives. In addition, there is a \$500 million increase called for in Chapter 1 funding for the disadvantaged--a significant portion of which may be used by schools for remedial mathematics.

The Department also supports R&D work on science and mathematics education in 10 of its research centers, three of which are specifically focused on science, mathematics, and technology. Dissemination efforts have been initiated with the National Science Foundation and Department using clearinghouses, regional laboratories, and the National Diffusion Network to provide states and localities with timely knowledge about exemplary materials and practices.

The National Science Foundation's 1991 budget has a 30 percent increase in its budget for education and human resources. This includes a \$47 million increase over the 1990 budget for the Science and Engineering Education Directorate (SEE). SEE's current funding for FY 1990 is \$204 million. For FY 1991, the total NSF budget proposes \$94 million, an increase of about 50%, for programs that support education for underrepresented groups--minorities, women, and the disabled.

Most of the Science and Engineering Education Directorate funds are devoted to elementary and secondary teacher preparation and enhancement, instructional materials development, the applications of advanced educational technologies, and informal science and mathematics education. The Foundation has initiated support for comprehensive reforms which encompass all levels of education and each of the major education components--curriculum content, teaching and teachers, testing and instructional materials, and organizational arrangements. The Foundation has recently announced a major statewide, systemic reform initiative in science, mathematics, and engineering education to increase the general level of science and technical literacy and to provide an increased pool of talented scientists and engineers.

NSF continues to increase the number of comprehensive, regional Career Access Science and Technology Centers for minorities, women, and the disabled. These Centers focus on learning from

grade school through graduate school. And the Foundation is expanding the scientist/educator/publisher "triad" projects to improve curriculum materials from elementary science to middle school mathematics. These partnerships are specifically designed to make sure that materials are tested in realistic situations and that their potential for adoption is increased.

The Department of Energy budget contains a 50 percent increase in education funds--a total of \$25 million. Admiral Watkins has issued a directive that each national laboratory establish a program--with the private sector--to support teacher training in the surrounding region. He has specifically encouraged partnerships with urban and rural school systems.

We have also increased the education budget of the National Aeronautics and Space Administration by 21 percent. The \$51 million in education resources will be invested in informal science education and presentations to schools and for teacher workshops and internships.

Undergraduate and Graduate Studies

We have proposed a new National Science Scholars program at the Department of Education to encourage students to pursue post-secondary study in the natural sciences, mathematics, and engineering. The priorities for the Department's Graduate Assistance in Areas of National Need are all in the physical sciences, mathematics, and engineering. And the Department and NSF are working together on a special Upward Bound initiative to provide minority high school students with opportunities provided by the NSF Regional Career Access Centers.

NSF's 1991 budget contains a 50 percent increase in support of undergraduate science, mathematics, and engineering education programs across the Foundation. This includes doubling resources for undergraduate course and curriculum reform; a 31 percent increase in instructional laboratory and instrumentation projects; significant investment in Engineering Education Coalitions; and an additional 100 graduate fellowships. In addition, the Foundation offers postgraduate, graduate, and undergraduate research opportunities through cross-discipline research programs, such as, the Global Change Research Education and training program and Research Training Group Awards. A substantial cadre of graduate students are also supported through research assistantships funded via NSF research grants.

The Department of Energy supports over 6,000 undergraduates, graduate students, and college and university faculty through fellowships to work at DOE laboratories and other facilities. The National Institutes of Health provide nearly \$300 million in training grants for 12,000 graduate trainees in research laboratories. That is over and above the thousands of graduate

and post-graduate research opportunities offered students through NIH research grants. NASA also supports graduate and undergraduate research grants.

Interagency Coordination

These department and agency programs represent, collectively, the Administration's efforts to achieve the National Goals. However, individually they will have marginal effect unless they are coordinated, and work in concert with reforms among the states, local school districts and schools, colleges, universities. I have committed my office to maintain a well-coordinated Federal policy and programmatic presence in support of school and college opportunities and reforms.

Education and human resources is a top priority for the Office of Science and Technology Policy. I have established an Education and Human Resources Committee under the Federal Coordinating Council for Science, Engineering, and Technology (FCCSET). This Committee--chaired by Secretary of Energy Watkins, with the Under Secretary of Education and the Senior Science Advisor of NSF serving as vice chairs--will encourage and coordinate programs and policies related to science, mathematics, engineering, and technological education, training, and human resource development. We will avoid needless duplication, complement program priorities, and where appropriate encourage joint funding initiatives.

The Department of Education and the National Science Foundation have already reached beyond coordination to the development of cooperative initiatives and relationships. On March 1, 1990, OSTP presented its report, "Coordination of U.S. Department of Education and National Science Foundation Programs in Mathematics and Science Education," to the Congress. Each agency has appointed individuals to a working group to assure cooperation among program staff. And the Department of Education has an agency-wide task force to identify alternative ways to increase the impact of all science and mathematics education programs. In addition to all of the Department's offices, NSF and members of my staff, Department of Energy, NASA, and other agency staff meet with the task force. Specifically, NSF and Department of Education collaboration is fostered in the following areas:

- Jointly funded studies include national and international assessments of student learning and the respective opportunities to learn. Informal science education television projects, such as, the Voyage of Mimi, 3-2-1 Contact, and Square One TV have been co-sponsored. This year, the Department will join NSF in support of the American Association for the Advancement of Science "2061" phase II curriculum development projects. These projects are designed to develop alternative curricular strategies to

achieve the learning goals described in the AAAS/Project 2061 report "Science for All Americans." NSF and the Department have supported various planning and experimentation projects to fundamentally alter the scope and sequence of secondary school science.

- NSF is developing appropriate "protocols" to make sure that materials and exemplary teacher professional development projects are shared through the Department's dissemination networks, such as the National Diffusion Network, regional laboratories, and technical assistance centers associated with large categorical programs.
- The Department's Eisenhower science and mathematics programs at the state and local levels support teacher participation in NSF teacher enhancement projects.
- State and local education agencies making application to NSF for support under the aforementioned state and local systemic reform program are specifically encouraged in the program announcement to use Eisenhower Act, Chapters 1 and 2, and Vocational Education funds to strengthen science and mathematics learning initiatives.

Pending Legislation -- S.2114

The introduction of the bill provides an important opportunity for a productive discussion of our national needs in mathematics, science, and engineering. That discussion must focus on strategic efforts to achieve the National Education Goals are consistent with those expressed in the bill. However, the bill in its present form would not accomplish even its stated aims. It is with this in mind that I would like to provide you with the Administration's views on the bill.

The bill contains separate authority for no less than 25 different programs in math and science education at a total authorized level of \$125 million in the next fiscal year. Most of the funds authorized would support programs to be administered by the National Science Foundation. The balance of the funds would be authorized for programs to be managed by the Department of Education, the Department of Labor, and the Smithsonian Institution. This particular approach of distributing pieces of program authority among a number of agencies dilutes and fragments the efforts we should be making in this important area, unless it is carried out in the context an integrated program strongly supported by the President, Congress, and the agency heads.

Rather, we should support broadly-based systemic changes. This will require effectively-coordinated strategies of support for states and localities making fundamental reforms. We need to continue to reinforce local and state initiatives to make

fundamental, system-wide changes. If we at the Federal level are to be a significant force for good in the efforts to reform learning for students, teachers, and faculty we must work together to make sure that our policies and programs:

- support and reward those individuals and agencies willing to take risks and make comprehensive improvements in curriculum, teaching, testing and assessment practices, school organization, and learning opportunities;
- avoid fragmentation of Federal education programs;
- encourage inter-agency collaboration at the Federal, state, local, and school/college institutional levels;
- combine the strengths of new and existing Education, NSF, Energy, NASA, Defense, NIH, and related programs;
- reinforce merit review efforts to make sure that funded programs are of high quality; and
- support the 1991 Budget priorities in science, mathematics, technical, and engineering education.

Two new initiatives within the 1991 NSF budget request help illustrate this point. The State Systemic Initiative--described above--and the Alliances for Minority Participation--involving public and private sector and academic partnerships--programs represent new, comprehensive approaches designed to stimulate wholesale reforms in particularly critical but substantially different aspects of mathematics and science education. If we approach the issues in this comprehensive manner for all the levels of mathematics and science education, we will be able to produce a meaningful, long range, and coordinated implementation plan that would help meet our national goals.

The key to success is implementation, and implementation is difficult work. The only meaningful implementation is reform of education at the level of learning. At the Federal level we cannot directly achieve learning goals. However, we can play an important role in support of and monitoring progress toward those goals.

As currently drafted S.2114 represents a fragmented collection of scattered ideas and strategies. Its construction is antithetical to broad systemic reforms in K-12 or undergraduate education. In some instances it violates the sound practice of merit review for grant awards. It would confuse existing authorities and encourage turf battles by redesignating agency functions. This is particularly problematic given emerging efforts at interagency collaboration.

Most importantly, it would force education systems and institutions to select from a scattered array of discrete programs administered by at least three different Federal agencies. The substantial duplication of effort would discourage many of our education systems most in need of support and technical assistance.

My final comment concerns the varying levels of prescription and general bureaucracy that appear throughout the bill. We firmly believe that the current set of NSF initiatives in mathematics and science education are effective in part because of the flexibility that is part of the management structure. This should be recognized and encouraged by the Congress for all agencies. The Department programs for the disadvantaged and other special populations are important to the overall education role of the Federal government. As noted in the OSTP report to Congress on coordination, NSF and the Department are already exploring these issues.

We need to make sure we have examined existing policies, program authorities, and collaborative initiatives to determine:

- what is currently authorized and working well;
- any barriers or obstacles which can be removed within existing legislative authorities;
- areas which are inadequately addressed by legislative or programmatic authority; and
- barriers and incentives for inter-agency and inter-governmental cooperation and coordination.

As we proceed, we must make sure that our most striking needs are addressed by:

- greatly increasing participation of women, minorities, and the disabled in science and engineering, and in the teaching of science and mathematics;
- increased collaboration among the various levels of education --between elementary and secondary schools and between schools and colleges;
- making sure that elementary teachers have the preparation and continuing professional development experiences to enable them to design and implement active learning programs for our younger children.

A careful analysis of critical needs indicates a number of targets of opportunity for emphasis. The President's 1991 Budget--described above--provides the important direction. The President is working to forge strong, cooperative relationships among Federal agencies. He has also proposed important

initiatives and legislative and budget priorities in science, mathematics, and engineering education.

- Undergraduate Scholarships. The President has proposed a National Science Scholars program in the Department of Education to encourage students with outstanding academic records to pursue studies in life, physical, and computer science, engineering, and mathematics.
- Opportunities for System-Wide Reform. Incentives for local school systems to engage in systemic reforms in curriculum content, teaching, professional careers, governance and decision-making, and learning programs at the school site are being proposed through National Science Foundation programs and Eisenhower Act programs with other Education Department program funds under the discretion of states or localities.
- Research, data, and assessment. The President has requested increased funds for research, data collection, and analysis to follow-up the Education Summit and through the Department of Education's National Center for Education Statistics and Office of Research in the Office of Educational Research and Improvement (OERI).
- The preparation, recruitment, retention, and professional development of well qualified science and mathematics teachers and faculty are supported--or included in the President's legislative initiatives--by NSF Teacher Preparation and Enhancement Programs and Department of Education national and state the Eisenhower Act Programs, Alternative Certification, Research and Dissemination, and Fund for the Improvement of Postsecondary Education (FIPSE).
- Opportunities for teachers, students, and faculty to learn from and work with practicing scientists and engineers. In addition to involvement of scientists and engineers in programs funded by the Department of Education and NSF, the Department of Energy laboratories, NASA, and NIH offer opportunities for teacher professional development. The NSF Young Scholars program also provides promising high school students opportunities to work directly with scientists and engineers.

In closing, I want to thank you for this opportunity to present our views and comments. We urge the Congress to support the President's proposals, which we believe represent a major step forward in achieving the national goals of excellence in education. We are continuing to try to identify measures that will advance these goals. We look forward to continuing a dialogue with you in this area.

Source: House Science Committee

**S. 2114 EXCELLENCE IN MATH, SCIENCE AND ENGINEERING
EDUCATION ACT OF 1990
(Kennedy/Hatfield)**

Cosponsors: Mitchell, Byrd, Pell, Glenn, Rockefeller, Adams, Bingaman, Gore, Inouye, Kerrey, Mikulski, Simon and Stevens

Title I National Goals and Policy (\$5 million)

Declares National objectives: (1) U.S. students rank # 1 in science literacy by 2000, (2) increase supply of scientists, engineers and technologists, (3) increase participation of women and minorities, and (4) upgrade U.S. education and training systems to achieve preceding goals

Authorizes \$5 million for NSF to gather and analyze education data to track progress toward above goals

**Title II Science and Technical Literacy of the General Public
(\$46 million)**

- (1) **Establish National Institute for Technology and Learning within the Smithsonian Institution (\$3 million)**
- (2) **Establish National Clearinghouse for Science, Mathematics, and Technology Education under grant from the Smithsonian (\$3 million)**
- (3) **Establish regional science, math, and technology education consortia for enhancing elementary and secondary education (new curricular materials, teaching tools and training teachers in use of new materials). \$15 million authorized for Department of Education**
- (4) **Roving master teachers in math and science for elementary schools. Grants to states from Department of Education (\$7 million)**
- (5) **Regional mathematics, science and technology academies, grades 7-12. Planning grants from Department of Education (\$2 million) to educational entities (state and local) for establishing residential academies**
- (6) **Informal math, science, and technology education programs within NSF. Creates Division of Informal Math, Science, and Technology Education in SEE Directorate**
 - (a) **Grants for fellowships to train informal science education professionals, to fund informal science education projects in economically disadvantaged population centers, and grants for innovative activities or programs to serve as models for replication (\$7 million)**
 - (b) **Grants to science museums to develop and disseminate new**

programs and activities, and grants to entities involved in public television programs in science and technology (\$7 million)

- (7) Develop formal and informal educational materials for grades 1-12 based on space exploration and awards to students for exceptional science and space exploration projects. Grants from NSF (\$2 million)

Title III Scientists and Engineers Education Act (\$34 million)

Creates Division Undergraduate Math, Science and Engineering within SEE Directorate

- (1) Grants to establish partnerships between 2-year and 4-year institutions to increase numbers of 2-year students transferring to 4-year schools; university department bootstrap grants to upgrade undergraduate instruction; and Presidential Awards for Excellence in College Teaching (\$12 million to NSF)
- (2) National Mathematics - Science Teacher Corps (\$2 million from NSF). 2-year undergraduate scholarships (Boehlert portion) from H.R. 996
- (3) Additional \$20 million authorized for NSF Graduate Fellowship Program with intention to double number of fellowships in FY 1991 relative to FY 1987 and increase number of awards to women and minorities

Title IV Technology Education and Training Act (\$15 million)

- (1) Establish a High School Technology Curricular Development Program for innovative courses to motivate students to pursue careers as engineers or technologists (\$5 million to NSF)
- (2) Establish partnerships between companies and 2-year and 4-year colleges to develop relevant training programs, including student work/study programs at the companies, development of relevant curricular materials, and other education collaboration. (\$5 million to NSF)
- (3) Grants to companies to establish industry-wide training consortia for technologists in technologies relevant to particular industries (\$5 million to Department of Labor)

Title V Women and Minorities in Math, Science, and Engineering (\$25 million)

- (1) Exemplary visiting professionals fellowships (for grades 7-12) and distinguished visiting professors to stimulate interest of women and minority students in science and math. (\$10 million to NSF)
- (2) Undergraduate scholarships for women and minorities (\$10 million to NSF)

- (3) *Establish partnerships between minority colleges and research universities to provide enrichment programs for minority students (\$5 million to NSF)*

Title VI

- (1) *Requires Department of Education, NSF and Department of Labor to evaluate and report on programs in this Act for which they are responsible*
- (2) *Contains authorizations for each program for FY 1991 and "such sums" through FY 2000*

NATIONAL SCIENCE FOUNDATION
1800 G STREET, N.W.
WASHINGTON, D.C. 20550

MEMORANDUM

DATE: April 27, 1990
TO: FCCSET COMMITTEE ON EDUCATION AND HUMAN RESOURCES
FROM: DR. LUTHER WILLIAMS *W*
SENIOR SCIENCE ADVISOR, NSF
SUBJECT: NSF ANALYSIS OF S. 2114

We have reviewed the portions of S. 2114 that would impact upon the Foundation from an organizational--as well as a programmatic--perspective for the purpose of determining which provisions are acceptable, areas where additional legislative authority is needed, and areas where additional legislative authority is not needed.

DESIREABLE PROVISIONS

Within S. 2114, a very desirable and necessary provision is Section 320(b) which for the most part, amends the NSF Organic Act to make lawfully admitted permanent resident aliens eligible to compete for NSF Graduate Fellowships. This change in the fellowship program had been recommended by an NSF task force that reviewed the fellowship program and in response to a letter from Senator Kennedy in December 1989 concerning such a change, the NSF Director replied that such a change in individual eligibility for the program was strongly supported. A copy of the correspondence is attached.

ANALYSIS OF AUTHORITIES WITHIN THE BILL

NSF's Organic Act provides the Foundation with very broad authority for carrying out programs in both research and education areas. Section 3(a) of that Act says, in part:

The Foundation is authorized and directed...to initiate and support...science education programs at all levels...and programs to strengthen...engineering education programs at all levels[,]...to award...scholarships and graduate fellowships for study and research in the sciences and engineering...[and] to ...support the development and use of computer and other scientific and engineering methods and technologies, primarily for research and education in the sciences and engineering.

It is my view that NSF has sufficient authority under its Organic Act to request funds for and initiate any of the NSF programs

currently within S. 2114, and therefore, as currently drafted, the bill adds no new authority to the Foundation.

EXCESSIVE PRESCRIPTION AND INAPPROPRIATE ORGANIZATIONAL CHANGES

What the bill would do however, assuming it is enacted in its current form, is authorize the establishment of a substantial number of individual programs, all modestly funded, many with substantial amounts of overly prescriptive provisions that would hinder the flexibility NSF historically has had in the operation and management of its programs. A specific example where the prescription is consider excessive is in Section 313, the undergraduate scholarship program, that would require an extensive effort on the part of NSF to track and recoup scholarship support should the recipient not teach math or science at the precollege level for the requisite number of years.

The bill would also mandate a number of organizational changes in the Foundation's structure. It is unclear how these changes would contribute to improving the quality and impact of the relevant programs. The Foundation objects to these mandated organizational changes.

STRATEGIC APPROACH

The relevant question to consider is: If it is true that the bill technically provides no additional authority to NSF, and there is going to be a bill, then how could the bill be improved so that it serves a more useful purpose? I would suggest that we need to take a strategic approach. Where do we want to be by 2000? What do we want to accomplish by the year 2000? What measureable objectives do we want to achieve? etc.

Once we know where we want to be, we should look at the current set of programs to see how they contribute to those goals and objectives. Once the objectives are correlated with existing programs, we are in a much better position to know what additional efforts or programs are needed to meet agreed upon objectives that are not currently addressed through existing efforts.

I believe we are better served by approaching the legislation in a substantially different way. Some of the programs may be appropriate and some may contribute little to overall objectives that current efforts are presently addressing. What we should do is recognize that to deal with this issue and the bill, we are really suggesting a substantial reorganization/rewriting of the bill. The purpose is to turn the bill into a broad strategic approach with specific objectives that NSF, ED, DOE, and other agencies can use to in order to assess current programs and propose and new efforts should that be appropriate.

Attachment

EDWARD M. KENNEDY, MASSACHUSETTS, CHAIRMAN

CLAYBORN PELL, RHODE ISLAND
HOWARD M. METZENBAUM, OHIO
SPARK M. MATSUNAGA, HAWAII
CHRISTOPHER J. DODD, CONNECTICUT
PAUL SIMON, ILLINOIS
TOM HARKIN, IOWA
BRUCE ADAMS, WASHINGTON
BARBARA A. MIKULSKI, MARYLANDORRIN G. HATCH, UTAH
NANCY LONDON KASSEBAUM, KANSAS
JIM JEFFORDS, VERMONT
DAN COATS, INDIANA
STROM THURMOND, SOUTH CAROLINA
DAVE DURENBERGER, MINNESOTA
THAD COCHRAN, MISSISSIPPINICK LITTLEFIELD, STAFF DIRECTOR AND CHIEF COUNSEL
ARISTINE A. IVERSON, MINORITY STAFF DIRECTOR

United States Senate

COMMITTEE ON LABOR AND
HUMAN RESOURCES

WASHINGTON, DC 20510-6300

December 27, 1989

Mr. Erich Bloch
 Director
 National Science Foundation
 1800 G Street, NW
 Washington, DC 20550

Dear Mr. Bloch:

As you know, the Committee is currently examining various initiatives in the area of science, mathematics and engineering education. The Committee's focus covers the elementary area right up through the post graduate level of education. One of the Committee's concerns in this area is how can we attract and retain more of our students into science and engineering.

From among a variety of options, the Committee is considering legislation to double the number of NSF graduate fellowship awards and to make eligible resident aliens for the NSF Graduate Fellowship Program. This change would make eligibility for this program consistent with other Foundation Programs.

The Committee would like your views on such a change in the eligibility of the graduate fellowship program. What impact would this have on attracting and retaining students into science and engineering and would you support such an amendment?

I would appreciate your thoughts on this issue at your earliest convenience.

Sincerely,

Edward M. Kennedy
 Edward M. Kennedy

NATIONAL SCIENCE FOUNDATION
WASHINGTON, D.C. 20550

March 19, 1990

OFFICE OF THE
DIRECTOR

The Honorable Edward M. Kennedy
Chairman
Committee on Labor and Human Resources
United States Senate
Washington, DC 20510-6300

Dear Mr. Chairman:

Thank you for your letter of December 27, 1989, asking for our views with respect to amending of the National Science Foundation Act of 1950 to authorize award of NSF Fellowships to permanent residents. I strongly believe that permanent residents should be able to compete for NSF graduate fellowships.

Permanent-resident aliens, often referred to as "green card holders," have taken the first step toward United States citizenship. They have made America their home: paying taxes, incurring eligibility for military service, and raising their families here. These individuals are already eligible for most Federal educational stipends. For example, permanent residents can receive "Pell Grants" (20 U.S.C. 1091(a)(5)). There is no reason to bar them from receiving NSF Fellowships.

The addition of permanent residents will increase the total pool of potential Fellowship applicants by less than seven percent and would coincide with an increase in the number of active Fellows from 1,500 per year to more than 3,000.

The Office of Management and Budget has advised that there is no objection from the standpoint of the President's program to enactment of such an amendment to the NSF Act.

Thank you for the opportunity to express our views.

Sincerely,

A handwritten signature in dark ink, appearing to read "Erich Bloch".
Erich Bloch
Director

DRAFT

Department of Energy
Amendments to S.2114

Page 71, between lines 2 and 3, insert the following new title:

TITLE VI -- FEDERAL AGENCY PROGRAMS

Sec. 601. STATEMENT OF PURPOSE.

It is the purpose of this title to assure that the fullest possible use is made of the vast resources and expertise of Federal agencies to achieve the objectives and goals established in this Act.

Sec. 602. DEFINITION.

As used in this title, "Federal agency" means an executive agency as defined in section 105 of title 5 of the United States Code and the military departments as defined in section 102 of that title.

Sec. 603. PROGRAM ESTABLISHED

Every Federal agency that directly or through its contractors

(1) conducts activities including the fields of mathematics, science, or engineering, or

(2) employs personnel in the fields of mathematics, science, engineering or allied occupations as determined by the Director of the Office of Personnel Management,

shall identify education as a fundamental part of its mission and shall carry out a mathematics, science and engineering education outreach program. The education outreach program shall include as a minimum the following facets:

(a) providing access to its facilities, equipment, and personnel by students and teachers in communities surrounding the agency's facilities;

DRAFT

- (b) broadening existing programs or initiating new ones to
 - (1) reach students in kindergarten through grade 12,
 - (2) reach "average" students as well as those who are advanced or need remediation, and
 - (3) increase minority and female student participation;
- (c) collaborating to develop or expand education programs with
 - (1) eligible entities, as defined in section 220(b)(1) of this Act,
 - (2) eligible partnerships, as defined in section 403(c) of this Act,
 - (3) consortiums, as defined in section 710 of this Act, or
 - (4) any other entity or person the head of the Federal agency considers appropriate; and
- (d) encouraging its mathematicians, scientists, engineers, technicians and other experts to perform volunteer work in their communities with students or teachers, or both.

A Federal agency may approve up to eight hours per month administrative for personnel who volunteer under this section. The costs attributed to this section of a contractor operating a government-owned facility are considered allowable costs under the contract. To the extent funds are appropriated for that purpose, a Federal agency may award grants, contracts, or cooperative agreements to carry out the program established by this section.

Sec. 604. EXCEPTION

A Federal agency establishing a program under another title of this Act is not required to establish a program under this title.

DRAFT

- Page 71, line 3, strike "VI" and insert "VII"
- Page 71, line 14, strike "602" and insert "702"
- Page 71, line 20, strike "603" and insert "703"
- Page 72, line 4, strike "610" and insert "710"
- Page 74, line 20, strike "620" and insert "720"
- Page 78, line 13, strike "621" and insert "721"

Source: NSF

**S2114--MATH AND SCIENCE EDUCATION:
PREPARING FOR OUR ENVIRONMENTAL AND TECHNOLOGICAL FUTURE
SENATE LABOR AND HUMAN RESOURCES COMMITTEE HEARING**

The first in a series of hearings on math and science education, was held on April 19, 1990 by the Senate Labor and Human Resources Committee. In his opening remarks, committee chairman, Senator Kennedy, referred to statistics on teaching and teachers to show that elementary and secondary schools fail to provide stimulating and sufficient curricula in math and science. Senator Orrin Hatch (R-UT) followed the chairman's opening remarks with a statement encouraging a thorough evaluation of current educational efforts. Sen. Hatch said that American policy makers should refrain from a "staple gun" approach to educational programming. He elaborated on his metaphor by saying that the issue was not simply a question of tacking on new educational programs to existing programs, but also a question of how to review existing programs for effectiveness and terminating those that are not effective.

Three panels of witnesses discussed the benefits and shortcomings the omnibus legislation, S2114, Excellence in Math, Science and Engineering, and the general state of this country's education.

The first witness was Senator John Rockefeller (D-W.VA), who spoke about the nation's failure to address the problems of workforce illiteracy--in reading, math, science and technology--and the predicted shortage of scientists and engineers by the end of the century. He said that S.2114 addresses both these problems. He also encouraged that the National Science Foundation be charged to come to Congress with a strategic plan to make America number one in math and science. In particular, he highlighted his proposal to establish a National Science Teacher Corps, which targets math and science students in their junior and senior years as undergraduates and grants them scholarships if they will agree to serve for a minimal period as pre-college teachers.

Witnesses on Panel II were:

- o Dr. Charles D. Hollister, Vice President and Senior Scientist, Woods Hole Oceanographic Institution, (MA).
- o Dr. Rodger Bybee, Associate Director, Biological Sciences Curriculum Studies, (CO)

Dr. Hollister gave a pep-talk for science and scientists. He noted the poor public image scientists enjoy and spoke of the need to improve it. Science is a contact sport, he said, and its rewards not immediately socially recognized. He deplored society's, and even the science community's, acceptance of math illiteracy. Without improving math skills in everyone, the opportunities in science for women and minorities will continue to be limited. He expressed fear that this and the next two

generations of young people are fairly lazy, and this laziness, combined with the hard work of science, could contribute to a continued decline in math and science in this country.

Dr. Bybee strongly advocated a formal, strategic public education plan. He stated that improvements in math and science education would be incremental and take time. He recommended ways be found to keep the importance of math and science education improvements at the forefront.

While questioning Panel II, Senator Kennedy raised the issue of excessive legislative prescription and was told by Dr. Hollister that the legislation was a good start. But, Hollister added, in his opinion, it was a band aid: the dollar amounts were too small; and the bill failed to consider continuing education or return to education by middle-aged adults. Dr. Bybee concurred that the bill was to some degree prescriptive. All agreed that there needed to be more emphasis along the human resource pipeline.

Sen. Mikulski asked Bybee whether he was familiar with the OTA report, Educating Scientists and Engineers: From Grade School to Grad School, that recommended NSF restructure its decentralized educational programs--specifically remove them from the research directorates. Dr. Bybee said that there should be better coordination, and was strongly supported by Dr. Hollister who expressed concern at the thought of divorcing research from education.

Panel III consisted of:

- o Dr. Hans Anderson, President, National Academy of Teachers Association
- o Dr. Shirley Malcom, America Association for the Advancement of Science
- o Dr. Richard Atkinson, Chancellor, University of California, San Diego.

Dr. Anderson spoke very personally about the benefits of federal support for math and science education. He vigorously opposed early casting of students into different educational tracks, which he said helped eliminate minority and women students from pursuing careers in math and science by removing them from tracks that study math and science. He also said that undergraduate education needed more attention. He spoke on behalf of Project 2061, a curriculum development effort involving AAAS.

Dr. Malcom stated that many barriers needed to be removed before the bill could be implemented to meet current problems. Concurring with Drs. Bybee and Hollister, she supported cumulative, individual efforts and decisions. The bill has too many underfunded programs, too few satisfactorily leveraged

programs, and the regional consortia should be better leveraged and connected to the states and the Eisenhower funding. She supported comprehensive efforts that would attract, retain and transfer science and math students from undergraduate through graduate school. Dr. Malcolm indicated that stake holders need to be better linked throughout the system and cost-sharing should be used to reinforce different parts of the system; otherwise money is not being maximized. She felt that weeding and cultivating old programs to increase scale is necessary in addition to adding new programs. She concluded that S.2114 is a good strategic start, but will not succeed without surveying the current education efforts.

Dr. Atkinson focussed his remarks on the production of S&E PhDs and cited figures that indicate the U.S is facing a serious shortfall in PhD production. S.2114, he said, seems to improve variety but was a modest effort--it provides a framework to look at issues like PhD production. He praised the computer training many K-12 students are receiving, but urged that the U.S do more to improve teacher training. Atkinson endorsed the use of fellowships and traineeships to better improve the institutional development.

THE WHITE HOUSE
WASHINGTON

November 14, 1990

John,

Attached is the memorandum you requested. I'll be back in town Wednesday and hope to discuss the matter further with you then.

Allan

THE WHITE HOUSE
WASHINGTON

November 13, 1990

MEMORANDUM FOR GOVERNOR SUNUNU

FROM: D. ALLAN BROMLEY 
SUBJECT: MATHEMATICS AND SCIENCE EDUCATION INFRASTRUCTURE
INITIATIVE

A proposal for an Administration initiative is outlined below which is aimed at preserving U.S. leadership in graduate science and engineering education and research, and in using this strong base to upgrade undergraduate mathematics and science education in order to address some very high priorities in K-12 mathematics and science education. Among its aims is the reassertion of Presidential leadership in this crucial area at a time of increasingly aggressive Congressional attention.

Background

Technological progress plays a central role in economic growth. This progress, in turn, depends on a supply of educated professionals in mathematics, science and engineering, and a scientifically and mathematically literate work force. Two recent Bush Administration reports, the February 1990 Economic Report of the President and the September 1990 U.S. Technology Policy emphasize these points. The February 1989 Administration document, Building a Better America, also focuses on the importance of these investments in America's future.

In the United States, our graduate education system in mathematics, science and engineering is, without doubt, the best in the world. It attracts the best students and researchers from all over the world. We must preserve this leadership.

The quality of our undergraduate education in these areas is much more variable than that found in most other countries. We have peaks of excellence and valleys of mediocrity, but on average we are competitive, however, we do need to improve the weaker institutions.

Precollege education in the United States - especially in mathematics and science - is scandalous. International comparisons of educational achievement in these subjects place American students near the bottom compared to other industrialized nations. This must be improved.

The challenge to the nation and the Bush Administration is to fix that part of our educational system that is broken and preserve excellence where it exists.

Precollege education is predominantly a non-Federal government responsibility. The Administration has done an excellent job of developing broad policy and shaping a climate for reform of our K-12 system. The President and the Governors have enunciated National Education Goals, and White House leadership has taken us well along the path toward educational reform that will be necessary for their attainment.

We have also made significant progress in developing a coherent federal approach to mathematics and science education. A committee of the Federal Coordinating Council on Science, Engineering and Technology (FCCSET), chaired by Admiral James Watkins, was asked to review all existing Federal agency-supported programs in the area of mathematics and science education, with the intent of providing greater coordination and efficiency among disparate Federal programs. In the process of doing this interagency cross-cutting evaluation, the Committee has taken the President's and Governors' goals and developed a National Education Priority Framework for the Federal government, with specific strategic objectives and implementation priorities. The highest priorities relate to teacher competence and curriculum and organizational reforms. These priorities have provided a template for an 11-agency Federal program for FY 1992. Admiral Watkins and I - together with agency officials - presented this cross-cutting evaluation to OMB for review during a two-hour hearing on November 1.

Colleges and universities have a clear and apparent role in graduate and undergraduate education. They also influence K-12 education in crucial ways.

The question is how should we position federal support in order to best preserve our lead in graduate education, improve our undergraduate instruction, and assist in fixing our K-12 problems.

OUTLINE OF INITIATIVE

Since the end of the Second World War, the United States has perpetrated a myth that the Federal government supports research in universities but not education at the graduate level. In reality, generations of graduate students in all fields have been supported as research assistants on federal grants and contracts throughout their graduate education program. The initiative that we suggest herein moves us away from that myth ever so slightly. It also provides an opportunity to require from the universities a plan, in return for the support provided by the initiative, outline steps they would take to bring university costs under control as well as to stabilize or reduce tuition costs at the undergraduate and graduate levels.

This initiative complements other efforts of the Administration towards achievement of the National Education Goals. It should be emphasized that the K-12 problem is predominantly a state and local responsibility. At the Federal level, the mathematics and science aspects of the K-12 problem are being addressed by Adm. Watkins' interagency committee, and the interagency FY 1992 initiative is now being reviewed by OMB and the EOP. That initiative would be on a parallel track with this one. Taken together, the two initiatives would constitute a comprehensive Administration mathematics, science and engineering educational and facilities initiative.

GOALS OF INITIATIVE

Graduate Education. We are number one in the world in graduate education in mathematics, science and engineering. Our support structure is fundamentally sound, although we face many tough decisions on individual programs and projects. However, the research universities have deferred building and renovating facilities for a decade. According to a new NSF study, we have accumulated a facilities backlog of approximately \$12 billion.

- o **Goal: retain our position of world leadership in graduate education in science, mathematics and engineering.**

Excellence in graduate education in mathematics and science is not enough if our nation is to be a world leader in the 21st century. For example, about half of our doctorates in engineering and physics are now granted to foreign citizens. Clearly, there are failures in our undergraduate and K-12 education programs.

Undergraduate Education. Almost 50% of American freshman enter a college or university within 50 miles of their homes. Thus, to provide a quality education, there is a need for excellent undergraduate institutions in all parts of the country. In science and engineering this means providing modest research support, such as that found in the highly successful EPSCoR (Experimental Program to Stimulate Competitive Research) Program. Without at least a modest base of high-quality research, teaching falters. At the same time, it should be emphasized that there is no reason whatever to support less than excellent research anywhere -- such research neither contributes to teaching nor to regional economic development.

Education at the undergraduate and graduate levels is becoming increasingly expensive. Concern has been expressed about the accessibility of college and university education. This initiative could address the cost issue by making receipt of program funds conditional on bringing overhead and tuition costs under control. This could also be structured to be consistent with the Administration's developing Empowerment policies.

- o **Goal: Make quality undergraduate education in mathematics, science and engineering available to students in all parts of the country.**

K-12 Education. A necessary condition for attaining the National Education Goals as they relate to mathematics and science is a talented teacher corps, well-prepared in the subject matter of their disciplines. Admiral Watkins' committee has placed its highest priority on teacher education and improvement. This is particularly important at the high school level.

Adequate training and retraining of our mathematics and science teachers is no small task. For it to be effective, reforms are needed in our teacher education, involving broader participation by senior professors in our universities and a normal preparatory path for teachers that includes undergraduate majors in subjects other than education. There is an opportunity for the federal government to catalyze this reform.

- o **Goal: Reorient college and university curricula and teaching so as to provide the best education possible for mathematics and science teachers, especially at the high school level.**

Major elements of the Initiative:

- o Upgrade university and college research facilities; studies indicate that the total accumulated shortfall may be as high as \$12 billion for both renovation and new construction. Our emphasis should be on renovation, to make available modern research facilities that are competitive with those in industry and in our leading competitor foreign nations. An emphasis on renovation (as contrasted to new construction) is especially important in this period of limited resources because it provides improved quality for the research environment of existing researchers without demanding their numbers increase.
- o Strengthen college and university teaching and related research in order to provide high-quality undergraduate opportunities for mathematics, science and engineering students in all parts of the country.
- o Support college and university efforts to reform K-12 teacher education and retraining. This implies upgraded teacher education programs, greater participation by senior professors, and substantial increases in the number of subject matter majors in mathematics and science.
- o Require universities to develop a management plan in the long run to evolve economic self-sufficiency to control costs, and stabilize or reduce tuition costs.

Characteristics:

- o 5-year program; no extension contemplated since once completed universities and colleges should be expected to manage their activities so that use and amortization fees paid as part of federal overhead payments would enable them to maintain their infrastructure at an acceptable quality level for the indefinite future.

- o \$1 - 1.4 billion/year Federal funding (average);
 - \$750M - \$1B/year for facilities
 - \$200 - 300M/year for targeted research in support of educational and economic development objectives
 - \$50 - 100M/year for teacher education reform
- o At least 50-50 non-federal matching for facilities to help insure high-quality activities.
- o Begin in FY 1992.

Interagency effort:

- o Policy and goals enunciated by the President.
- o Strategy and priorities developed by the technical agencies.
- o Interagency funding, management and coordination.

Budget Offsets:

- o End specific earmarkings of research and development funds by Congress (Congressional directed, "pork" projects); this would require agreement by Congressional leadership, including Appropriations Committees. These total a few hundred million dollars per year (a careful inventory is being prepared by OSTP) and could be directed to this initiative.
- o Shift in schedules/timing for some large projects in science. Specifics could be developed during the FY 1992 budget review.
- o Optimize the balance in current R&D programs between research, education and facilities funding. The overall effects on funding of research by individual investigators and small groups should be positive or, at worst, zero.

Homework to be Done:

- o Identify and characterize present congressional earmarks.
- o Identify and characterize current programs that support excellence in college and university mathematics and science teaching and related research; this would include EPSCoR and similar programs.
- o Review recommended and actual reforms under way in K-12 teacher education and retraining, and identify ways to leverage desirable reforms through modest federal support. Sources would include PCAST, NRC Biology Education Report and Carnegie Commission education effort.

Details of facilities program:

A 5-year program to support merit reviewed renovation and, where appropriate, construction projects as a component of the Federal support of U.S. research universities and colleges. Among the requirements of the program would be the following:

- a. 50/50 non-federal matching.**
- b. a university commitment that user fees for buildings and amortization fees for equipment be sequestered for use exclusively in infrastructure and equipment purchase areas rather than as, at present, being added to general fund accounts.**
- c. a Federal change in the building and equipment amortization schedules from 50 and 15 years to 20 and 5 years respectively to provide an adequate cash flow so that, following the catch-up enabled by this initiative, they could and should be expected to be self-sustaining with respect to infrastructure.**
- d. a requirement that universities in applying to this initiative pledge to forego acquisition of facilities funding through pork channels.**
- e. a commitment by universities and colleges that they manage their bureaucracies such that their overhead rates on federal grants and contracts be returned to, and stabilized at their 1985 levels.**
- f. a commitment by universities and colleges that they take measures to stabilize, and where possible, reduce tuition costs to, or below, their 1990 levels.**

OPTIONS

Three elements of a mathematics and science education infrastructure initiative are outlined above. They are:

- a. 5-year facilities renovation and construction program.**
- b. Program to strengthen university and college teaching and related research on a widely distributed geographic basis.**
- c. Program to support college and university efforts to reform K-12 teacher education and training in mathematics and science.**

Although there is a certain amount of positive interaction between the three elements of the initiative as presented, they could be supported selectively, that is one element only or any two elements taken together. Thus, options include:

1. 5-year facilities program only
\$800 - \$1B/year
2. 10-year facilities program only
\$400 - \$500B/year
3. Program to strengthen university and college teaching and related research
\$200 - \$300M/year
4. Program for college and university efforts to reform K-12 teacher education
\$50 - 100M/year
5. 1 + 3 + 4 above
\$1 - 1.4B/year
6. 2 + 3 + 4 above
\$650 - 900M/year
7. 2 + 3 above
\$250 - 400M/year

IMPLEMENTATION

If this initiative, in any of its variants meets with approval, the State of the Union message would be a very effective vehicle for its announcement.

WHITE HOUSE STAFFING MEMORANDUM

DATE: June 20, 1992

ACTION/CONCURRENCE/COMMENT DUE BY: ---

PRESIDENTIAL REMARKS: SCIENCE AND TECHNOLOGY MEDALS PRESENTATION
TUESDAY, JUNE 23, 1992

SUBJECT:

ROSE GARDEN

	ACTION	FYI		ACTION	FYI
VICE PRESIDENT	☐	☒	HORNER	☐	☐
SKINNER	☐	☒	MCBRIDE	☐	☐
SCOWCROFT	☐	☒	MOORE	☐	☒
DARMAN	☐	☒	PETERSMEYER	☐	☐
BRADY	☐	☒	PORTER	☐	☒
BROMLEY	☐	☒	SMITH	☐	☒
CALIO	☐	☒	YEUTTER	☐	☒
DEMAREST	☐	☒	FINDLAY	☐	☒
FITZWATER	☐	☒	MCGROARTY	☐	☒
GRAY	☐	☒	KAUFMAN	☐	☒
HOLIDAY	☐	☒	FIRESTONE	☐	☒
			BOSKIN		☒

REMARKS:

The attached has been forwarded to the President.

RESPONSE:

PHILLIP D. BRADY
 Assistant to the President
 and Staff Secretary
 Ext. 2702

THE WHITE HOUSE

WASHINGTON

2 JUN 19 P5:18

June 19, 1992

MEMORANDUM FOR THE PRESIDENT

THROUGH:

DAVID DEMAREST

DMcH for W.D.

FROM:

BETH HINCHLIFFE

On Tuesday, June 23, you will address approximately ³200 people in the Rose Garden on the occasion of the presentation of the National Medals of Science and Technology.

Your remarks (7 minutes, cards) specifically honor the recipients for their contributions, and call for America's continuing commitment to science and technology. They also address the Administration's support for R&D and job creation.

(Hinchliffe/Gershowitz)
June 19, 1992 5 p.m.
MEDAL Draft Two

**PRESIDENTIAL REMARKS: SCIENCE AND TECHNOLOGY MEDALS PRESENTATION
TUESDAY, JUNE 23, 1992 1:30 P.M.
ROSE GARDEN**

[ACKNOWLEDGEMENTS] As I look out at the men and women we honor today, I'm reminded of something Albert Einstein once said to his fellow scientists: "Concern for man himself and his fate must always form the chief interest of all technical endeavors ... in order that the creations of our mind shall be a blessing and not a curse to mankind." Today we honor men and women whose lifework answers Einstein's challenge. They bless mankind not only with the brilliance of their minds -- but with the integrity of their hearts.

I'm proud to present the National Medals of Science and Technology to our 16 recipients -- to these men and women of persistent and, at times, clairvoyant determination. They have expanded the frontiers of science on canvases as infinitesimal as a single human cell -- and as infinite as space itself.

We honor them for their accomplishments -- but we honor them also for having the courage to undertake the journey. There's a church in Sussex, England which has a wonderful inscription I'd like to see serve as the epitaph for these recipients' pioneer spirit of innovation and invention. The inscription says: "A vision without a task is but a dream; a task without a vision is drudgery; [but] a vision with a task is the hope of the world."

The hope of our world lies in individuals who asked why -- and then followed wherever that question led. Scientists like

Nobel Prize laureate Howard Temin, a truly seminal thinker in the history of biology who reshaped our thoughts about RNA and DNA. Entrepreneurs like Bill Gates, co-founded Microsoft and led a revolution in the information industry. Visionaries like Eugene Shoemaker, who helped to transform our world not only through the astounding breadth of his contributions to space exploration, but also through the infectious enthusiasm of his imagination. And inventors like Norman Joseph Woodland, who developed a simple device of our daily lives -- bar coding. You've seen first-hand how impressed I am by how bar coding works.

You all prove that America's greatest resource is the genius of our people. We must encourage and support it: that's why Congress must double the budget of the National Science Foundation by 1994; and keep funding on track in 1993 for the Super Conducting Super Collider. That's why I'm committed to increases in R&D funding: to let our most talented people push the limits of their imaginations, to understand the universe, and use the results to create jobs and futures for others. I've also established a National Technology Initiative to bring government officials together with private businesses to share technology -- to move new discoveries out of federal labs and into the marketplace.

And I believe we need to stimulate private sector investment -- the engine of any entrepreneurial economy. That's why I'm fighting so hard to get Congress to slash the capital gains tax; and make the research and experimentation tax credit permanent.

The world economy of the 21st century will demand a new age

of American competitiveness in a fiercely challenging global marketplace. In order to compete we must make immediate, drastic changes: beginning with the need for well-educated workers.

Many of you are teachers, influencing one dream at a time. You know that education is the basis of our future. You know the terrible fact that in some math and science studies we rank almost last among the industrialized nations. Rest assured: we will turn that around. Technical competence is so vital that one of our six national education goals is to be first in the world in math and science by the year 2000. In order to reach that goal, my budget invests \$768 million in precollege math and science education: an increase of 18% over last year, and 123% over 1990.

Our nation can remain strong only by investing its resources and talents in science, technology and education. I want to recognize a group of special people who are dedicating their lives to that quest -- our first class of Presidential Faculty Fellows, 30 young faculty members named for their excellence and promise in research and teaching. These scientists and engineers represent the best investment we can make in our future. But I'd like to remind them of something. As you look at the Medalists we honor today, remember that whatever work you do -- you will be standing on the shoulders of giants.

A few months ago in New Hampshire I discovered something quite unusual -- the "maize craze" competition. I'm not sure exactly how to describe it -- kids have to make a robot to fetch tennis balls out of a box filled with corn. Well, some of the

best ideas sound pretty strange at first -- and let me tell you, this is a terrific idea. I was enormously impressed by how it teams high-school students with high-powered engineering teams from major universities and corporations: a great example of the private-public partnership that will lead us to excellence in the next century. "Maize craze" is part of US FIRST, a national alliance of business, education and government working to reverse declining student interest and performance in science and math. I invited Dean Kamen to bring his winners here: sponsors Xerox and NYPRO, and teams from Wilson Magnet and Clinton High Schools.

We are honoring today a spectrum of achievers that goes from high school to the pinnacle of research. In turn, we need to nurture each step of the educational ladder, for each step depends on the soundness of the preceding one. Congratulations to all of you here today -- especially our distinguished Medalists, who show us the triumph of the human mind and the unfolding drama of the human imagination. May God bless you all.

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