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NATIONAL SCIENCE EDUCATION ACT

JULY 11, 2001.—Committed to the Committee of the Whole House on the State of the Union and ordered to be printed

Mr. BOEHLERT, from the Committee on Science, submitted the following

R E P O R T

[To accompany H.R. 100]

[Including cost estimate of the Congressional Budget Office]

The Committee on Science, to whom was referred the bill (H.R. 100) to establish and expand programs relating to science, mathematics, engineering, and technology education, and for other purposes, having considered the same, report favorably thereon with an amendment and recommend that the bill as amended do pass.

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The amendment is as follows:

Strike all after the enacting clause and insert the following:

89–006

SECTION 1. SHORT TITLE.

This Act may be cited as the "National Science Education Act".

SEC. 2. FINDINGS.

Congress finds the following:

(1) As concluded in the report of the Committee on Science of the House of Representatives, "Unlocking Our Future Toward a New National Science Policy", the United States must maintain and improve its preeminent position in science and technology in order to advance human understanding of the universe and all it contains, and to improve the lives, health, and freedoms of all people.

(2) It is estimated that more than half of the economic growth of the United States today results directly from research and development in science and technology. The most fundamental research is responsible for investigating our perceived universe, to extend our observations to the outer limits of what our minds and methods can achieve, and to seek answers to questions that have never been asked before. Applied research continues the process by applying the answers from basic science to the problems faced by individuals, organizations, and governments in the everyday activities that make our lives more livable. The scientific-technological sector of our economy, which has driven our recent economic boom and led the United States to the longest period of prosperity in history, is fueled by the work and discoveries of the scientific community.

(3) The effectiveness of the United States in maintaining this economic growth will be largely determined by the intellectual capital of the United States. Education is critical to developing this resource.

(4) The education program of the United States needs to provide for 3 different kinds of intellectual capital. First, it needs scientists, mathematicians, and engineers to continue the research and development that are central to the economic growth of the United States. Second, it needs technologically proficient workers who are comfortable and capable dealing with the demands of a science-based, high-technology workplace. Last, it needs scientifically literate voters and consumers to make intelligent decisions about public policy.

(5) Student performance on the recent Third International Mathematics and Science Study highlights the shortcomings of current K–12 science and mathematics education in the United States, particularly when compared to other countries. We must expect more from our Nation's educators and students if we are to build on the accomplishments of previous generations. New methods of teaching science, mathematics, engineering, and technology are required, as well as better curricula and improved training of teachers.

(6) Science is more than a collection of facts, theories, and results. It is a process of inquiry built upon observations and data that leads to a way of knowing and explaining in logically derived concepts and theories. Mathematics is more than procedures to be memorized. It is a field that requires reasoning, understanding, and making connections in order to solve problems. Engineering is more than just designing and building. It is the process of making compromises to optimize design and assessing risks so that designs and products best solve a given problem. Technology is more than using computer applications, the Internet, and programming. Technology is the innovation, change, or modification of the natural environment, based on scientific, mathematical, and engineering principles.

(7) Students should learn science primarily by doing science. Science education ought to reflect the scientific process and be object-oriented, experiment-centered, and concept-based. Students should learn mathematics with understanding that numeric systems have intrinsic properties that can represent objects and systems in real life, and can be applied in solving problems. Engineering education should reflect the realities of real world design, and should involve hands-on projects and require students to make trade-offs based upon evidence. Students should learn technology as both a tool to solve other problems and as a process by which people adapt the natural world to suit their own purposes. Computers represent a particularly useful form of technology, enabling students and teachers to acquire data, model systems, visualize phenomena, communicate and organize information, and collaborate with others in powerful new ways. A background in the basics of information technology is essential for success in the modern workplace and the modern world.

(8) Children are naturally curious and inquisitive. To successfully tap into these innate qualities, education in science, mathematics, engineering, and technology must begin at an early age and continue throughout the entire school experience.

(9) Teachers provide the essential connection between students and the content they are learning. Prospective teachers need to be identified and recruited by presenting to them a career that is respected by their peers, is financially and intellectually rewarding, contains sufficient opportunities for advancement, and has continuing access to professional development.

(10) Teachers need to have incentives to remain in the classroom and improve their practice, and training of teachers is essential if the results are to be good. Teachers need to be knowledgeable of their content area, of their curriculum, of up-to-date research in teaching and learning, and of techniques that can be used to connect that information to their students in their classroom.

SEC. 3. MASTER TEACHER GRANT PROGRAM.

(a) DEFINITIONS.—In this section—

(1) The term "sponsoring school" means an elementary or secondary school that employs a teacher who is participating in a program funded in accordance with this section.

(2) The term "nonclassroom time" means time during regular school hours that is not utilized by a master teacher for instructing elementary or secondary school children in the classroom.

(3) The term "master teacher" means a mathematics or science teacher who works to improve the instruction of mathematics or science in kindergarten through 9th grade through—

(A) participating in the development or revision of science, mathematics, engineering, or technology curricula;

(B) serving as a mentor to mathematics or science teachers at the sponsoring school or other schools;

(C) coordinating and assisting teachers in the use of hands-on inquiry materials, equipment, and supplies, and when appropriate, supervising acquisition and repair of such materials;

(D) providing in-classroom teaching assistance to mathematics or science teachers; and

(E) providing professional development, including for the purposes of training other master teachers, to mathematics and science teachers.

(4) The term "mathematics or science teacher" means a teacher of mathematics, science, engineering, or technology in an elementary or secondary school.

(b) PROGRAM AUTHORIZED.—(1) The Director of the National Science Foundation shall establish a program to award competitive, merit-reviewed grants to institutions of higher education (or consortia thereof) to train master teachers and assist elementary and secondary schools to design and implement master teacher programs.

(2) Institutions of higher education receiving grants under this section shall offer programs to train master teachers. As part of such programs, a grantee shall—

(A) recruit and select teachers to receive training;

(B) ensure that training covers both content and pedagogy;

(C) ensure that participating teachers have mentors; and

(D) assist participating teachers with the development and implementation of master teacher programs at their sponsoring schools.

(3) Grants awarded under this section may be used to—

(A) develop and implement professional development programs to train elementary or secondary school teachers to become master teachers and to train existing master teachers;

(B) provide stipends and reimbursement for travel to allow teachers to participate in professional development programs in the summer and throughout the year;

(C) provide guidance to sponsoring schools to enable them to develop and implement a plan for the use of master teachers;

(D) support participating teachers during the summer in research programs conducted at institutions of higher education, private entities, or government facilities;

(E) provide educational materials and equipment to master teachers;

(F) provide computer equipment and network connectivity necessary to enable master teachers to collaborate with other master teachers, to access educational materials available online, and to communicate with scientists or other mentors at remote locations; and

(G) fund any other activities the Director determines will accomplish the goals of this section.

(c) SELECTION PROCESS.—(1) An institution of higher education seeking funding under this section shall submit an application at such time, in such manner, and

containing such information as the Director may require. The application shall include, at a minimum—

(A) a description of which classroom subjects and grade levels the training will address;

(B) a description of the activities to be carried out, including—

(i) how such activities will be aligned with State and local standards and with other activities that promote student achievement in mathematics and science; and

(ii) how such activities will be based on a review of relevant research and why such activities are expected to strengthen the quality of mathematics and science instruction;

(C) a description of how the applicant will ensure the active participation of its mathematics, science, or engineering departments in the development and implementation of the program;

(D) an explanation of how the program will ensure that teachers are given instruction in both content and pedagogy;

(E) a description of how the applicant will recruit teachers to participate in the program and the criteria that will be used to select the participants;

(F) a description of the type and amount of any financial assistance that will be provided to teachers to enable them to participate; and

(G) a description of how the applicant will work with schools to ensure the success of the participating teachers.

(2) In evaluating the applications submitted under this subsection, the Director shall consider, at a minimum—

(A) the ability of the applicant to effectively carry out the proposed program;

(B) the experience the applicant has in developing and implementing high-quality professional development programs for mathematics or science teachers; and

(C) the extent to which the applicant is committed to making the program a central organizational focus.

(3) In evaluating the applications submitted under this subsection, the Director shall give priority to those applications that demonstrate the greatest participation of mathematics, science, or engineering departments.

(d) TEACHER ELIGIBILITY.—(1) To be eligible to participate in a program funded under this section, a mathematics or science teacher shall submit to the Director, at such time and in such manner as the Director may require, an assurance executed by the sponsoring school, that, after completing the program funded by this section, the participating teacher will be provided sufficient non-classroom time to serve as a master teacher. A copy of this assurance must be submitted to the institution of higher education as part of the teacher's application to participate in the master teacher program.

(2) No funds authorized by this section may be used to train any teacher who has not complied with paragraph (1).

(e) ACCOUNTABILITY AND DISSEMINATION.—(1) The Director shall evaluate the activities carried out under this section. At a minimum such evaluations shall use a common set of benchmarks and assessment tools to identify best practices and materials developed and demonstrated with funds provided under this section.

(2) The results of the evaluations required under this subsection shall be made available to the public, including through the National Science, Mathematics, Engineering, and Technology Education Digital Library, and shall be provided to the Committee on Science of the House of Representatives and the Committee on Health, Education, Labor, and Pensions of the Senate.

(3) Materials developed under the program established under this section that are demonstrated to be effective shall be made available through the National Science, Mathematics, Engineering, and Technology Education Digital Library.–

(f) AUTHORIZATION OF APPROPRIATIONS.—There are authorized to be appropriated to the National Science Foundation to carry out this section $50,000,000 for each of fiscal years 2002 through 2004.

SEC. 4. DISSEMINATION OF INFORMATION ON REQUIRED COURSE OF STUDY FOR CAREERS IN SCIENCE, MATHEMATICS, ENGINEERING, AND TECHNOLOGY EDUCATION.

(a) IN GENERAL.—The Director of the National Science Foundation shall, jointly with the Secretary of Education, compile and disseminate information (including through outreach, school counselor education, and visiting speakers) regarding—

(1) typical standard prerequisites for middle school and high school students who seek to enter a course of study at an institution of higher education in science, mathematics, engineering, or technology education for purposes of teaching in an elementary or secondary school; and

(2) the licensing requirements in each State for science, mathematics, engineering, or technology elementary or secondary school teachers.

(b) AUTHORIZATION OF APPROPRIATIONS.—There are authorized to be appropriated to the National Science Foundation to carry out this section $5,000,000 for each of fiscal years 2002 through 2004.

SEC. 5. REQUIREMENT TO CONDUCT STUDY EVALUATION.

(a) STUDY REQUIRED.—The Director of the National Science Foundation shall enter into an agreement with the National Academies of Sciences and Engineering under which the Academies shall review existing studies on the effectiveness of technology in the classroom on learning and student performance, using various measures of learning and teaching outcome including standardized tests of student achievement, and explore the feasibility of one or more methodological frameworks to be used in evaluations of technologies that have different purposes and are used by schools and school systems with diverse educational goals. The study evaluation shall include, to the extent available, information on the type of technology used in each classroom, the reason that such technology works, and the teacher training that is conducted in conjunction with the technology.

(b) DEADLINE FOR COMPLETION.—The study evaluation required by subsection (a) shall be completed not later than one year after the date of the enactment of this Act.

(c) DEFINITION OF TECHNOLOGY.—In this section, the term "technology" has the meaning given that term in section 3113(11) of the Elementary and Secondary Education Act of 1965 (20 U.S.C. 6813(11)).

(d) AUTHORIZATION OF APPROPRIATIONS.—There are authorized to be appropriated to the National Science Foundation for the purpose of conducting the study evaluation required by subsection (a), $600,000.

SEC. 6. SCIENCE, MATHEMATICS, ENGINEERING, AND TECHNOLOGY BUSINESS EDUCATION CONFERENCE.

(a) IN GENERAL.—Not later than 180 days after the date of the enactment of this Act, the Director of the National Science Foundation shall convene the first of an annual 3- to 5-day conference for kindergarten through 12th grade science, mathematics, engineering, and technology education stakeholders, including—

(1) representatives from Federal, State, and local governments, private industries, private businesses, and professional organizations;

(2) educators;

(3) science, mathematics, engineering, and technology educational resource providers;

(4) students; and

(5) any other stakeholders the Director determines would provide useful participation in the conference.

(b) PURPOSES.—The purposes of the conference convened under subsection (a) shall be to—

(1) identify and gather information on existing science, mathematics, engineering, and technology education programs and resource providers, including information on distribution, partners, cost assessment, and derivation;

(2) determine the extent of any existing coordination between providers of curricular activities, initiatives, and units; and

(3) identify the common goals and differences among the participants at the conference.

(c) REPORT AND PUBLICATION.—At the conclusion of the conference the Director shall—

(1) transmit to the Committee on Science of the House of Representatives and to the Committee on Commerce, Science, and Transportation of the Senate a report on the outcome and conclusions of the conference, including an inventory of curricular activities, initiatives, and units, the content of the conference, and strategies developed that will support partnerships and leverage resources; and

(2) ensure that a similar report is published and distributed as widely as possible to stakeholders in science, mathematics, engineering, and technology education.

(d) AUTHORIZATION OF APPROPRIATIONS.—There are authorized to be appropriated to the National Science Foundation to carry out this section—

(1) $300,000 for fiscal year 2002; and

(2) $200,000 for each of fiscal years 2003 and 2004.

SEC. 7. DISTANCE LEARNING GRANTS.

(a) IN GENERAL.—The Director of the National Science Foundation shall establish a program to award competitive, merit-based grants to institutions of higher education to provide distance learning opportunities in mathematics or science to elementary or secondary school students.

(b) USE OF FUNDS.—Grants awarded under this section shall be used by institutions of higher education to establish programs under which elementary or secondary school students can participate in research activities in mathematics or science occurring at the grantees' institution via the Internet.

(c) SELECTION PROCESS.—(1) An institution of higher education seeking funding under this section shall submit an application at such time, in such manner, and containing such information as the Director may require. The application shall include, at a minimum—

(A) a description of the research opportunities that will be offered;

(B) a description of how the applicant will publicize these research opportunities to schools and teachers;

(C) a description of how the applicant will involve teachers of participating students in the program;

(D) a description of how students will be selected to participate;

(E) a description of how the institution of higher education will ensure that the research is enhancing the participants' education and will make it more likely that the participants will continue their studies in mathematics or science; and

(F) a description of how the funds will be spent.

(2) In evaluating the applications submitted under this subsection, the Director shall consider—

(A) the ability of the applicant to effectively carry out the proposed program;

(B) the extent to which the proposed program will enhance the participants' education and encourage them to continue the study of mathematics or science; and

(C) the extent to which the proposed program will provide opportunities that would not otherwise be available to students.

(3) The Director shall ensure, to the extent practicable, that the program established under this section serves students in a wide range of geographic areas and in rural, suburban, and urban schools.

(d) AUTHORIZATION OF APPROPRIATIONS.—There are authorized to be appropriated to the National Science Foundation to carry out this section $5,000,000 for each of the fiscal years 2002 through 2004.

SEC. 8. DEFINITIONS.

In this Act:

(1) The term "elementary school" has the meaning given that term by section 14101(14) of the Elementary and Secondary Education Act of 1965 (20 U.S.C. 8801(14)).

(2) The term "secondary school" has the meaning given that term by section 14101(25) of the Elementary and Secondary Education Act of 1965 (20 U.S.C. 8801(25)).

(3) The term "institution of higher education" has the meaning given that term by section 101 of the Higher Education Act of 1965 (20 U.S.C. 1001).

II. PURPOSE OF THE BILL

The purpose of H.R. 100 is to authorize appropriations for science, mathematics, engineering and technology (SMET) education programs at the National Science Foundation (NSF) and other purposes. The bill authorizes appropriations of $60.9 million for Fiscal Year 2002 and $60.2 million for Fiscal Years 2003 and 2004.

III. BACKGROUND AND NEED FOR THE LEGISLATION

In 1945 when Dr. Vannevar Bush transmitted his landmark report, "Science—the Endless Frontier", he paraphrased Harvard President John Conant in making the case for the importance of a targeted investment in mathematics and science education as part of a National research policy:

> In every section of the entire area where the word science may properly be applied, the limiting factor is a human one. We shall have rapid or slow advance in this direction or in that depending on the number of really

> first-class scientists who are engaged in the work in question. . . . So in the last analysis, the future of science in this country will be determined by our basic educational policy.

This analysis is as true today as it was fifty years ago. Recent studies have shown that the most important factor in successful educational improvement efforts, especially those in science, math, engineering and technology, is the skill of enthusiastic and well-prepared teachers. When integrating the needs of learners into the context of the emerging needs of the American workplace and society, the truth of the observation "teaching is the essential profession, the one that makes all other professions possible" is obvious. Teachers provide the essential connection between students and the content they are learning. A gifted and well-trained teacher can instill the excitement of scientific inquiry while anchoring the material in the context of everyday life.

Thus, high quality teachers must be identified, recruited, and retained in every school district throughout the Nation. K–12 science, mathematics, engineering, or technology teachers should be respected by their peers, rewarded financially and intellectually, and have sufficient opportunities for advancement. In exchange, we must expect that all teachers have mastered their content area, curricula, up-to-date research in teaching and learning, and techniques that can be used to connect information to the students in their classrooms.

The National Commission on Mathematics and Science Teaching for the 21st Century concluded that the most efficient way to disseminate information about best practices and to improve the quality of professional development was to train a cadre of master teachers. These teachers, who must be well versed in the most effective teaching methods, have demonstrated the ability to obtain high student achievement, and be able to effectively use technology for teaching and learning, can assume responsibility for reviewing and modifying curriculum and developing and implementing professional development and mentoring programs for their peers. H.R. 100, the National Science Education Act (NSEA) responds to these recommendations and authorizes the Director of the National Science Foundation to establish a program to provide grants to universities to train master teachers and for other purposes designed to improve the instruction of elementary and secondary mathematics and science education.

IV. SUMMARY OF HEARINGS

On Wednesday, March 7, 2001, the House Committee on Science held a hearing to gather teachers' perspectives on how the federal government can help improve K–12th grade science and math education. Testifying before the committee were four teachers representing elementary, middle, and secondary math and science educators, three of whom were recipients of the prestigious Presidential Award for Excellence in Science and Mathematics Teaching. These witnesses spoke to the importance of improving the quality and availability of professional development, developing better student assessment tools, increasing the prestige of mathematics and science teachers, reducing the professional isolation ex-

perienced in the classroom, and building stronger partnerships between schools and universities.

On Wednesday, May 2, 2001, the House Science Committee's Subcommittee on Research held a hearing on ways the National Science Foundation could most effectively stimulate K–12 math and science education reform. The witnesses addressed the central role that higher education, business, and school district partnerships can play in stimulating science and mathematics education reform. The witnesses emphasized the importance of high quality professional development programs, the important role that the prestige of business partners can play in encouraging broader acceptance of reform activities, the need to recruit better prepared teachers, the important mentoring role that can be played by master teachers, and the importance of long-term rather than short-term programs.

On May 10, 2001, the House Service Committee's subcommittee on Research held a hearing to examine the gap that currently exists between what is known about how people learn and the methods and materials educators use to teach. The witnesses gave testimony to the critical importance of establishing a long-term research agenda designed to bridge the gap between cognitive science and education research and to finding better ways to ensure that the results of this research are incorporated into teacher education, professional development, and classroom activities.

V. COMMITTEE ACTIONS

On January 3, 2001, Dr. Vernon J. Ehlers (MI) joined by seven other co-sponsors, introduced H.R. 100, the National Science Education Act, a bill to authorize appropriations for science, mathematics, engineering and technology education for Fiscal Years 2002 through 2004. The Subcommittee on Research met to consider H.R. 100 on June 7, 2001, and entertained the following amendment—

Amendment 1. Mr. Boehlert (NY) offered an amendment in the nature of a substitute: (1) to revise Section 4, the master teacher program, by authorizing grants to institutions of higher education for the purpose of training master teachers; (2) to revise Section 9, the distance learning grant program, by providing grants to higher education institutions for the implementation of K–12 distance learning programs; and (3) to strike Section 3—Assurance of Continued Local Control, Section 7—Teacher Technology Professional Development, Section 10—Scholarships to Participate in Certain Research Activities, and Section 11—Interagency Coordination of Science Education Programs. The amendment was adopted by voice vote.

With a quorum present, Ms. Johnson moved that the Subcommittee favorably report the bill, H.R. 100, as amended, to the Full Committee on Science with the recommendation that it be in order for the amendment, in the nature of a substitute adopted by the Subcommittee, to be considered as an original bill for the purpose of amendment under the five minute rule at Full Committee, and that the staff be instructed to make technical and conforming changes to the bill as amended. The motion was agreed to by a voice vote.

On June 13, 2001, the Full Committee met to consider the bill, H.R. 100, as adopted by the Subcommittee on Research. With a

quorum present, Mr. Gordon moved that the Committee favorably report the bill, H.R. 100, as amended, to the House with the recommendation that the bill as amended do pass, and that the staff be instructed to make technical and conforming changes to the bill as amended and prepare the legislative report, and that the Chairman take all necessary steps to bring the bill before the House for consideration. The motion was agreed to by a voice vote.

VI. SUMMARY OF MAJOR PROVISIONS OF THE BILL

The National Science Education Act, H.R. 100, focuses on improving elementary and secondary science, mathematics, engineering and technology education. H.R. 100 would authorize appropriations of $60.9 million for fiscal year 2002 and $60.2 million for fiscal years 2003 and 2004. More specifically, the bill—

• Authorizes the Director of NSF to award grants to institutions of higher education (or consortia thereof) to develop and implement programs to train master mathematics and science teachers. In order to participate in the program, teachers must obtain a written assurance from their school or school district that they will be provided with sufficient release time to fulfill the responsibilities of a master teacher. The program is authorized at $50 million for each of fiscal years 2002–2004.

• Authorizes the Director of NSF to compile and disseminate to students information regarding the typical prerequisites for middle school and high school students seeking to pursue post-secondary degrees in mathematics, science or engineering in order to become teachers. The program is authorized at $5 million for each fiscal years 2002–2004.

• Authorizes the Director of NSF to enter into an agreement with the National Academy of Sciences to review studies on the effectiveness of technology in the classroom. The study is authorized at $600,000.

• Authorizes the Director of NSF to convene an annual business conference on science, mathematics, engineering, and technology education. The purpose of the conference is to identify and disseminate model programs developed or implemented by business for the reform of mathematics and science education. The conference is authorized at $300,000 for fiscal year 2002 and $200,000 for fiscal years 2003 and 2004.

• Authorizes the Director of NSF to award grants to institutions of higher education to provide elementary and secondary school students an opportunity to participate over the Internet in research projects conducted in laboratories at institutions of higher education. The program is authorized at $5 million in each of fiscal years 2002–2004.

Table 1 provides a detailed summary of the authorizations in H.R. 100.

TABLE 1.—THE NATIONAL SCIENCE EDUCATION ACT

[By fiscal year; in millions of dollars]

Activity	FY 2002 authorization	FY 2003 authorization	FY 2004 authorization	Total authorization
NSF:				
Total Grants	55.0	55.0	55.0	165.0
Total Other	5.9	5.2	5.2	16.3

TABLE 1.—THE NATIONAL SCIENCE EDUCATION ACT—Continued

[By fiscal year; in millions of dollars]

Activity	FY 2002 authorization	FY 2003 authorization	FY 2004 authorization	Total authorization
Grants:				
Master Teacher Grants	50.0	50.0	50.0	150.0
Distance Learning Grants	5.0	5.0	5.0	15.0
Other:				
Course Dissemination	5.0	5.0	5.0	15.0
Study Evaluation	.6			
Business Conference	.3	.2	.2	.7
Total	60.9	60.2	60.2	181.3

VII. SECTION-BY-SECTION ANALYSIS

Section 1. Short title

Cites the Act as the "National Science Education Act."

Section 2. Findings

The Committee finds that: (1) the United States must maintain its preeminent position in science and technology to advance human understanding and to improve the lives of all people; (2) the growth of the economy depends upon continued scientific and technological research; (3) economic growth is possible only through intellectual capital and education is instrumental to developing this resource; (4) educational institutions must provide for three kinds of intellectual capital: that needed by scientists, mathematicians and engineers, that needed by other workers to succeed in a high-technology workplace, and that needed by the general citizenry to enable them to make informed and educated decisions as voters and consumers; (5) student performance on recent assessments indicates that American students are being outperformed by their international peers. We must expect more from American educators and students, and new methods, better curricula and improved training of teachers is needed; (6) science, mathematics, engineering and technology are more than subjects that contain facts to memorized—each is the foundation of principles that must be applied throughout a lifetime; (7) science, mathematics, engineering and technology must be learned by doing; (8) children are naturally curious and learning of science, mathematics, engineering and technology must begin early and continue from kindergarten through high school; (9) teachers are the most essential component of a successful learning experience and teachers must be offered a career that is respected by their peers, is financially and intellectually rewarding, provides continuing access to professional development and offers opportunity for advancement; and (10) teachers must have incentives to remain in the profession and improve their practice and they must be knowledgeable about their content area, the curriculum, and effective pedagogical techniques.

Section 3. Master Teacher grant program

Establishes within NSF a master teacher program, which awards funds to institutions of higher education for the purpose of training science or math teachers to lead instruction and manage hands-on resources in grades K–9. Grantees must recruit and select teachers

to participate, provide training in both content and pedagogy, provide teachers with mentors, and assist teachers in the implementation of master teacher programs in their schools. Authorizes $50 million for each of FY2002–FY2004.

Section 4. Dissemination of information on required course of study for careers in science, mathematics, engineering, and technology education

Requires NSF and the Department of Education to disseminate to high schools information explaining the high school courses typically prerequisite to pursuing a college teaching degree in science and math. Authorizes $5 million for each of FY2002–FY2004.

Section 5. Requirement to conduct study evaluation

Authorizes an evaluation of studies on the effectiveness of technology in the classroom for learning. Authorizes $600,000 to be obligated within one year of enactment of this Act.

Section 6. Science, mathematics, engineering, and technology business education conference

Authorizes NSF to convene a conference to bring together private sector participants in education. Authorizes $300,000 for FY2002, $200,000 for FY2003 and FY2004.

Section 7. Grants for distance learning

Authorizes NSF to make grants to institutions of higher education to provide research opportunities to elementary and secondary school students via the Internet. Authorizes $5 million for each of FY2002–FY2004.

Section 8. Definitions

Defines: (1) "elementary school" and "secondary school" as defined in the Elementary and Secondary Education Act of 1965; and (2) "institution of higher education" as defined in the Higher Education Act of 1965.

VIII. COMMITTEE VIEWS

Sec. 3—Master Teacher grant program

The Committee has authorized the Director of the National Science Foundation to award grants to institutions of higher education (or consortia thereof) to recruit and train master teachers. The Committee believes that it is absolutely essential that master teachers be provided with sufficient release time from the classroom to allow them to fulfill the responsibilities of a master teacher (including, developing and providing professional development for other teachers, leading curriculum review activities, management of laboratory materials and equipment). In order to ensure that sufficient release time is provided, the Director of NSF is required to secure a written assurance from the school or local educational agency that employs a teacher participating in the master teacher program. The written assurance shall guarantee that the school or local educational agency shall provide the master teacher with paid release time to fulfill the responsibilities of a master teacher upon completion of the program.

Sec. 4—Dissemination of information on required course of study for careers in science, mathematics, engineering, and technology education

Recent surveys conducted by the National Science Foundation have revealed that many students fail to understand the importance of taking mathematics and science courses throughout their middle and secondary school years. These same surveys reveal that an alarming number of students who wish to pursue careers in engineering, medicine, mathematics and science fail to take the required mathematics and science courses. Inadequate mathematics and science preparation during a student's middle school and high school years can have a profound negative impact on the number and kind of higher education and professional opportunities available to a student. The Committee authorizes the Director of NSF to coordinate with the Secretary of Education in developing a program to ensure that students and their parents better understand the importance and consequences of decisions to pursue or not pursue additional coursework in mathematics and science.

The Committee believes that hands-on science instruction will motivate students to pursue careers in math and sciences and that dissemination of information regarding prerequisite secondary school courses will be a helpful tool for students considering careers in teaching. However, none of the funds authorized to be appropriated in this bill may be used for the purpose of requiring any individual student to pursue any particular career.

IX. COST ESTIMATE

Rule XIII, clause 3(d)(2) of the House of Representatives requires each committee report accompanying each bill or joint resolution of a public character to contain: (1) an estimate, made by such committee, of the costs which would be incurred in carrying out such bill or joint resolution in the fiscal year in which it is reported and in each of the five fiscal years following such fiscal year (or for the authorized duration of any program authorized by such bill or joint resolution, if less than five years); (2) a comparison of the estimate of costs described in subparagraph (1) of this paragraph made by such committee with an estimate of such costs made by any Government agency and submitted to such committee; and (3) when practicable, a comparison of the total estimated funding level for the relevant program (or programs) with the appropriate levels under current law. However, House Rule XII, clause 3(d)(3)(B) provides that this requirement does not apply when a cost estimate and comparison prepared by the Director of the Congressional Budget Office under section 402 of the Congressional Budget Act of 1974 has been timely submitted prior to the filing of the report and included in the report pursuant to House Rule XIII, clause 3(c)(3). A cost estimate and comparison prepared by the Director of the Congressional Budget Office under section 402 of the Congressional Budget Act of 1974 has been timely submitted to the Committee on Science prior to the filing of this report and is included in Section X of this report pursuant to House Rule XIII, clause 3(c)(3).

Rule XIII, clause 3(c)(2) of the House of Representatives requires each committee report that accompanies a measure providing new

budget authority (other than continuing appropriations), new spending authority, or new credit authority, or changes in revenues or tax expenditures to contain a cost estimate, as required by section 308(a)(1) of the Congressional Budget Act of 1974 and, when practicable with respect to estimates of new budget authority, a comparison of the total estimated funding level for the relevant program (or programs) to the appropriate levels under current law. H.R. 100 does not contain any new budget authority, credit authority, or changes in revenue or tax expenditures. Assuming that the sums authorized under the bill are appropriated, H.R. 100 does authorize additional discretionary spending, as described in the Congressional Budget Officer report on the bill, which is contained in Section X of this report.

X. CONGRESSIONAL BUDGET OFFICE COST ESTIMATE

U.S. CONGRESS,
CONGRESSIONAL BUDGET OFFICE,
Washington, DC, June 21, 2001.

Hon. SHERWOOD L. BOEHLERT,
Chairman, Committee on Science,
House of Representatives, Washington, DC.

DEAR MR. CHAIRMAN: The Congressional Budget Office has prepared the enclosed cost estimate for H.R. 100, the National Science Education Act.

If you wish further details on this estimate, we will be pleased to provide them. The CBO staff contacts are Melissa Zimmerman and Kathleen Gramp.

Sincerely,

BARRY B. ANDERSON
(For Dan L. Crippen, Director).

Enclosure.

H.R. 100—National Science Education Act

Summary: H.R. 100 would authorize several new programs at the National Science Foundation to promote science and technology in elementary and secondary education. The bill would authorize approximately $60 million for a year for fiscal years 2002 through 2004 for these initiatives. Assuming appropriation of the authorized amounts, CBO estimates that implementing H.R. 100 would cost $167 million over the 2002–2006 period. The bill would not affect direct spending or receipts; therefore, pay-as-you-go procedures would not apply.

H.R. 100 contains no intergovernmental or private-sector mandates as defined in the Unfunded Mandates Reform Act (UMRA). This bill would benefit state and local governments, including local school districts and public universities. However, any costs incurred to participate in the program would be voluntary.

Estimated cost to the Federal Government: The estimated budgetary impact of H.R. 100 is shown in the following table. The cost of the legislation falls within budget function 250 (general science, space, and technology):

	By fiscal year, in millions of dollars—					
	2001	2002	2003	2004	2005	2006
CHANGES IN SPENDING SUBJECT TO APPROPRIATION						
Authorized Level	0	61	60	60	0	0
Estimated Outlays	0	9	36	52	48	22

Basis of estimate: For this estimate, CBO assumes that the authorized amounts will be appropriated for each year, beginning in 2002. We assume outlays will follow historical spending patterns for similar programs. Over the 2002–2004 period, the bill would authorized $50 million a year for grants to colleges and universities to support master teacher programs; $5 million a year for initiatives related to distance learning; and $5 million a year for the creation and distribution of teaching-career information to students. In addition, H.R. 100 would authorize $300,000 for fiscal year 2002 and $200,000 a year for fiscal years 2003 and 2004 for annual education conferences and $600,000 for the National Academies of Sciences and Engineering to evaluate the effectiveness of technology in the classroom.

Pay-as-you-go considerations: None.

Intergovernmental and private-sector impact: H.R. 100 contains no intergovernmental or private-sector mandates as defined in UMRA. The bill would benefit state and local governments, including local school districts and public universities, by authorizing appropriations to the National Science Foundation for grant programs designed to improve science education. Any costs incurred by intergovernmental entities to participate in grant programs would be voluntary.

Estimate prepared by: Federal costs: Melissa Zimmerman and Kathleen Gramp; impact on State, local, and tribal governments: Elyse Goldman; impact on the private sector: Lauren Marks.

Estimate approved by: Peter H. Fontaine, Deputy Assistant Director for Budget Analysis.

XI. COMPLIANCE WITH PUBLIC LAW 104–4

H.R. 100 contains no unfunded mandates.

XII. COMMITTEE OVERSIGHT FINDINGS AND RECOMMENDATIONS

Rule XIII, clause 3(c)(1) of the House of Representatives requires each committee report to include oversight findings and recommendations required pursuant to clause 2(b)(1) of rule X. The Committee on Science's oversight findings and recommendations are reflected in the body of this report.

XIII. CONSTITUTIONAL AUTHORITY STATEMENT

Rule XIII, clause 3(d)(1) of the House of Representatives requires each report of a committee on a bill or joint resolution of a public character to include a statement citing the specific powers granted to the Congress in the Constitution to enact the law proposed by the bill or joint resolution. Article I, section 8 of the Constitution of the United States grants Congress the authority to enact H.R. 100.

XIV. FEDERAL ADVISORY COMMITTEE STATEMENT

H.R. 100 does not establish nor authorize the establishment of any advisory committee.

XV. CONGRESSIONAL ACCOUNTABILITY ACT

The Committee finds that H.R. 100 does not relate to the terms and conditions of employment or access to public services or accommodations within the meaning of section 102(b)(3) of the Congressional Accountability Act (Public Law 104–1).

XVI. STATEMENT ON PREEMPTION OF STATE, LOCAL, OR TRIBAL LAW

This bill is not intended to preempt any state, local, or tribal law.

XVII. CHANGES IN EXISTING LAW MADE BY THIS BILL, AS REPORTED

This legislation does not amend any existing Federal statute.

XVIII. COMMITTEE RECOMMENDATIONS

On June 13, 2001, a quorum being present, the Committee on Science favorably reported the National Science Education Act, by a voice vote, and recommends its enactment.

XIX. STATEMENT ON GENERAL PERFORMANCE GOALS AND OBJECTIVES

Pursuant to clause (3)(c) of House rule XIII, the goals of H.R. 100 are to improve student mathematics and science achievement in elementary and secondary schools through the education and training of master teachers, encourage middle school and high school students to take additional mathematics and science courses and encourage greater collaboration between businesses and other education stakeholders.

Section 3 of the Act authorizes the Director of NSF to provide grants to institutions of higher education to recruit and train master teachers. It is the performance objective of this program to improve elementary and secondary school student achievement by increasing the number and quality of master teachers that are available to reform curricula, implement professional development programs, and serve as mentors to other teachers.

Section 4 of the Act authorizes the Director of NSF to compile and disseminate information (through outreach, school counselor education, and visiting speakers, etc.) about the courses middle and high school students must take to pursue science, mathematics, engineering and technology education at institutions of higher education to become elementary or secondary school teachers. The general performance goal of this program is to encourage middle and high school students who are considering careers in teaching to take additional science and mathematics courses.

Section 6 of the Act authorizes the Director of NSF to convene an annual conference for kindergarten through 12th grade science, mathematics, engineering, and technology stakeholders. The general performance goals of the conference are to share information about business initiated education reform programs and to improve collaboration among stakeholders.

Section 7 of the Act authorizes the Director of NSF to establish a program to provide distance learning opportunities in mathe-

matics or science to elementary or secondary school students. The general performance objective of the program is to increase student achievement by using distance learning technologies to provide students with opportunities to participate in research projects conducted at institutions of higher education.

XX. EXCHANGE OF COMMITTEE CORRESPONDENCE

HOUSE OF REPRESENTATIVES,
COMMITTEE ON SCIENCE,
Washington, DC, June 25, 2001.

Hon. JOHN BOEHNER,
Chairman, House Committee on Education and the Workforce,
Rayburn House Office Building, Washington, DC.

DEAR CHAIRMAN BOEHNER: Thank you for your letter of June 26, 2001 regarding H.R. 100, the National Science Education Act.

I appreciate your waiving your Committee's right to a referral on this bill so that it can move expeditiously to the floor. I recognize your Committee's jurisdiction in this area and will support any request you may make to have conferees on H.R. 100 or similar legislation.

The exchange of letters between our two committees will be included in the Committee report on H.R. 100 and will be made part of the floor record.

Sincerely,

SHERWOOD L. BOEHLERT, *Chairman.*

HOUSE OF REPRESENTATIVES,
COMMITTEE ON EDUCATION AND THE WORKFORCE,
Washington, DC, June 26, 2001.

Hon. SHERWOOD L. BOEHLERT,
Chairman, Committee on Science,
Washington, DC.

DEAR CHAIRMAN BOEHLERT: Thank you for working with me regarding H.R. 100, the "National Science Education Act", which was introduced by Rep. Vern Ehlers, referred to the Committee on Science and in addition the Committee on Education and the Workforce, and ordered favorably reported by your Committee on June 13, 2001. I understand your desire to have this legislation considered expeditiously by the House; hence, I do not intend to hold a hearing or markup on this legislation.

In agreeing to waive consideration by our Committee, I would expect you to agree that this procedural route should not be construed to prejudice the Committee on Education and the Workforce's jurisdictional interest and prerogatives on this or any similar legislation and will not be considered as precedent for consideration of matters of jurisdictional interest to my Committee in the future. I would also expect your support in my request to the Speaker for the appointment of conferees from my Committee with respect to matters within the jurisdiction of my Committee should a conference with the Senate be convened on this or similar legislation.

I would appreciate your including our exchange of letters in your Committee's report to accompany H.R. 100. Again, I thank you for

working with me in developing this legislation and I look forward to working with you on these issues in the future.

Sincerely,

JOHN BOEHNER, *Chairman.*

XXI. PROCEEDINGS OF SUBCOMMITTEE MARKUP

H.R. 100, NATIONAL SCIENCE EDUCATION ACT

JUNE 7, 2001

HOUSE OF REPRESENTATIVES,
SUBCOMMITTEE ON RESEARCH,
COMMITTEE ON SCIENCE,
Washington, DC.

Chairman SMITH. To move forward now with the consideration of Mr. Ehlers' bill, H.R. 100, we will now consider that bill to establish and expand programs relating to science, mathematics, engineering, and technology education and for other purposes. I would now recognize the gentleman from Michigan, Mr. Ehlers, the author of the bill for five minutes.

Mr. EHLERS. Thank you, Mr. Chairman. First of all, I have a prepared statement but in the interest of time I ask that you have it entered.

Chairman SMITH. Without objection the statement will be included in the record.

Mr. EHLERS. Thank you.

[Statement of Mr. Ehlers follows:]

OPENING STATEMENT OF HON. VERNON J. EHLERS

Today we are marking up H.R. 100, the National Science Education Act, the first of three bills aimed at improving science, math, engineering, and technology education—known as "SMET ed." H.R. 100 is a similar version to H.R. 4271, which passed this Committee by a unanimous vote during the 106th Congress. I want to thank Chairman Boehlert and Chairman Smith for their leadership on this issue.

Our K–12 education system serves three main purposes: it is responsible for preparing future scientists and engineers for further study in college and graduate school; it provides all future workers the basic technical skills they will need in a 21st century workforce, where nearly every job will have a technical component; and it provides scientific and technical understanding so that citizens may make informed decisions as consumers and voters. Unfortunately, recent international assessments of student performance in science and math showed that our twelfth grade students were well behind their international peers.

As most of you know, during the 106th Congress, this Committee conducted a series of hearings to further examine the state of the nation's math and science education, and to suggest improvements. While there are many factors that impact student achievement, a common theme that arose from our discussions is that there is no substitute for a knowledgeable and well-prepared teacher in the classroom.

Teachers, particularly at the elementary and middle school level, often lack time and school resources to implement an inquiry-based, hands on science curriculum. H.R. 100 authorizes a competitive grant program for higher education institutions to train teachers with strong backgrounds in math, science, engineering and technology to become master teachers. Master teachers would be trained to provide ongoing professional development, in-classroom assistance, and oversight of hands-on science materials to a group of elementary and middle school SMET teachers. This is the type of support our teachers deserve and should be receiving.

In addition, this bill requires NSF and the National Academies to evaluate existing studies on the effectiveness of technology in the classroom on learning and student performance. Federal, state, and local governments have done a good job providing funds for technology acquisition, but it is unclear what technologies and how technology enhance student learning.

This bill also creates a program for higher education institutions to provide distance learning opportunities for elementary and secondary students. Distance learning invites exciting possibilities for student learning, particularly for student scientific research.

I look forward to having my colleagues' input today and to consideration by the full Committee and full House in the future. With this effort, our nation's teachers and students will be one step closer to receiving the support they so much deserve.

I would like to close by thanking Chairman Boehlert and Chairman Smith for working with me to bring this bill forward today.

Mr. EHLERS. I deeply appreciate the interest in science education on the part of the Full Committee Chairman, Mr. Boehlert, and the Subcommittee Chairman, Mr. Smith. I think it has been a number of years since we had a combination like that, and I especially appreciate Mr. Boehlert's deep interest in promoting science and insuring that our students have a good opportunity to learn science when they are in elementary schools and that we will have an adequate number of trained citizens in the future.

I also appreciate that we now have a President who has made education a high priority and naturally, science education is part of that.

We all recognize, I believe, as the Subcommittee Chairman mentioned during his comments that today's economic boom is largely related to the work that we have done in science and technology and the discoveries that we have made there.

What most people in this nation do not recognize, however, is the role of improved education in providing the workforce for that economic boom and also the continuing research to keep it going. And that is the purpose of this bill and the previous bill.

Expressing it in three specific purposes, number one, we want to make sure we have an adequate supply of well-trained scientists and engineers. Number two, we want to insure that we have enough technically-trained workers for the many technically-oriented positions that are going to be in the workplace of the future, and thirdly, we want to make sure that we have an insured electorate and an insured group of consumers in this country.

If you ask the question, how can you best impact science and math education in the K–12 system, the obvious answer is through better-trained teachers. I have worked in this field for over 30 years now, and I am pleased to say that the problem is not that the teachers don't want to teach science or that they are incapable of teaching science. It is that they really do sincerely want to do a good job of teaching science and mathematics. The difficulty is they have not been properly trained in their college or university experiences, and so I believe our first goal has to be to adequately train the teachers who are already in the classrooms who have not received sufficient training when they were in the higher educational system.

A subsidiary to that which we will address later on in other bills is how do we train teachers currently in the higher educational system in a better way to teach math and science.

So the emphasis of H.R. 100 is twofold. First of all, making certain that we do a good job of training existing teachers, and secondly, to provide a master teacher system, what I call the go-to teacher. In my personal experience in working with the schools the single biggest factor in whether or not a teacher succeeded in the classroom in teaching math and science when they had not had a

large amount of training in it, the single biggest factor was whether they had a go-to person in the school that they could go to for help and advice when the guppies died or the plants failed or the equipment broke. And if they did not have that go-to person, generally the science program did not succeed because the average teacher does not have the expertise or the time to take care of problems like that.

It does take extra time and effort to teach science properly, particularly with the hands-on approach. And the—at the university level we have no extra time for faculty to teach science through the laboratory system. We do not do that in the K–8 system, and we need people around who are trained in the field who can serve as a resource for the classroom teacher and particularly who can take care of the equipment, make certain that it is up to snuff and repair it when it is not.

The purpose of the H.R. 100 bill, the primary purpose is to train a core of master teachers who will have the knowledge and expertise to help other teachers in their particular school building do an adequate job of teaching math and science but who will also serve as a resource person in terms of the equipment and materials needed.

I deeply appreciate the willingness of the Chair of the Subcommittee and the Chair of the Full Committee. They have been very, very helpful in reviewing this bill. As most of you know this bill went to the floor last year. It passed this Committee unanimously. It was defeated on suspensions last year for another reason which we incidentally have corrected in this bill but it still received a majority of the votes last year. There is a lot of support for it. I appreciate the help I have had from the Committee and the Subcommittee, both the Chairs and the staff in revising the bill to take account of some of the objections raised last year.

I believe it is in great shape, and I ask for your support. I thank you, Mr. Chairman.

Chairman SMITH. We would thank the gentleman for—from Michigan for his leadership in this area. I would like to note for the record that this Subcommittee has held two hearings in this area of improving math and science education, and it was interesting that two of the witnesses suggested that the initial interest and excitement and motivation to move ahead and take up math and science started in the kindergarten through the third grade. And also that parents are so vital in lighting that initial fire that tends to keep burning as far as pursuing the interest and the knowledge in this area.

So it is my hope that we also can look at that kind of example, that kind of success that has been exhibited in some areas of kindling that initial fire of interest and then continuing with the quality kind of education.

I ask unanimous consent that the bill be considered as read and open to amendment at any point, and without objection it is so ordered.

I move the first reading of the bill be dispensed with if that is in accord with the wishes of the Subcommittee. Without objection it is so ordered.

We will move to the first amendment on the roster, which is the amendment in the nature of a substitute offered by Chairman Boehlert, and the clerk will report the amendment.

Madam CLERK. Amendment in the nature of a substitute to H.R. 100 offered by Mr. Boehlert.

Chairman SMITH. I would ask unanimous consent to dispense with the reading. Without objection it is so ordered. Mr. Boehlert is recognized for five minutes. Mr. Chairman.

Chairman BOEHLERT. Thank you, Mr. Chairman. I am pleased to offer this amendment in the nature of a substitute on behalf of Dr. Ehlers who will explain ifs contents momentarily. Just let me say once again this is a bipartisan amendment that insures that all the goals of H.R. 100 will be met. And as we all know very well the most important ingredient in a child's education is not a fancy new physical plant, although we want our youngsters to have good facilities, not the brightest and best-illustrated textbooks, although they are very important. The most important ingredient in a child's education is the teacher. And we are focusing on the teacher, and let me congratulate Dr. Ehlers for his leadership in this area. And Mr. Chairman, let me congratulate you also, the dynamic duo from Michigan I guess.

But it just bothers me as it should bother all Americans that depending on whose figures you believe a disproportionately high share of our youngsters K through 12 education are taking their science courses from people who are not trained to teach science course. Dedicated educators, they may have majored in French or history or something. They are in the classroom teaching science because that is their assignment.

We want to help them, and we want to get the best qualified science disciplined major teachers in the classroom, and we want to get them the best instruction they have, and Dr. Ehlers' suggestion on the development of master teacher core is just outstanding.

So with that I would hope that the Committee will move forward, and I look forward to Dr. Ehlers' more comprehensive explanation of the amendment.

Chairman SMITH. The Chair would recognize for five minutes the Ranking Member, the gentle lady from Texas, Representative Johnson.

Ms. JOHNSON. Thank you very much, Mr. Chairman. I am prepared to support the substitute amendment. It addresses the main concern I had with the underlying bill by recasting the master teacher provision in such a way as to provide for the professional development and training of master teachers.

The provision as now constituted is consistent with the approach taken by the master teacher language in H.R. 1693, the Hall Science Education Bill. I would like to add that the master teacher language in the bill follows the approach that Congressman Etheridge recommended.

During the Committee's consideration of the Ehlers' Science Education Bill last year the other provisions in the amendment are consistent with what was approved in a bipartisan manner by the Committee last year, and I recommend passage of this substitute amendment. Thank you.

Chairman SMITH. Chair would recognize the gentleman from Michigan, Mr. Ehlers, for a brief explanation of the amendment.

Mr. EHLERS. Thank you, Mr. Chairman, and I believe I was can do it in less than five minutes because I have already referred to parts of it. I appreciate the support evidenced, and this shows that the legislator process does work because the—everyone on this Committee has participated in some way in revising the bill from last year and I think has improved it.

The H.R. 100 as introduced provided grants to schools to hire master teachers, and that was a subject of some contention last year when it reached the floor. This amendment changes this program by providing grants to institutions of higher education for the purpose of training master teachers but when they do that, there will have to be a commitment from the school that the teacher is employed by that they will use the newly-trained talents of the master teachers to maximum advantage so we are not just putting money into training. We are insuring that the schools make a commitment to use that training in a beneficial way.

This amendment also changes a provision in the bill we had last year which provided for distance learning. It—rather than providing grants directly to schools for distance learning activities as we had last year, the substitute amendment before us would provide the grants to higher education institutions or implementation of K–12 distance learning programs, primarily intended so that the universities can develop distance learning experiments so that students in elementary and secondary schools can actually be involved in ongoing university experiments, doing it all through distance learning through the internet.

This amendment also strikes Section 710 and 11, which were—which we have determined to be duplicative of other legislative proposals that are currently moving through the House in the President's Education Bill.

So it is a streamlined bill compared to last year's but it gets at the essence, and I think it improves the essence that we had last year.

I appreciate the assistance everyone has given, and I urge adoption of the amendment.

Chairman SMITH. Any other discussions? If not, the vote occurs on the amendment. All in favor will say aye. Aye. Those opposed no. The ayes have it, and the amendment is agreed to.

Are there any further amendments? Hearing none the question is on the passage of the bill H.R. 100 as amended. All those in favor will say aye. Aye. Those opposed say no. In the opinion of the Chair the ayes have it.

The Ranking Member for a motion.

Ms. JOHNSON. Thank you, Mr. Chairman. I move that the substitute—the Subcommittee favorably report the bill H.R. 100 is amended to the Full Committee with the recommendation that it be an order for the amendment in the nature of a substitute adopted by the Subcommittee, be considered as an original bill for the purpose of amendment under the five-minute rule of the Full Committee.

Further, I ask unanimous consent that the staff be instructed to make all necessary technical and conforming changes to the bill as amended in accordance with the recommendations of the Subcommittee.

Chairman SMITH. The Committee has heard the motion. Those in favor will say aye. Aye. Those opposed say no. The ayes have it, and the motion is agreed to.

[H.R. 100 follows:]

I

107TH CONGRESS
1ST SESSION

H. R. 100

To establish and expand programs relating to science, mathematics, engineering, and technology education, and for other purposes.

IN THE HOUSE OF REPRESENTATIVES

JANUARY 3, 2001

Mr. EHLERS (for himself, Mr. KOLBE, Mr. HORN, Mr. BACA, Mr. SANDLIN, Mr. CAMP, Mr. FILNER, and Mr. GIBBONS) introduced the following bill; which was referred to the Committee on Science, and in addition to the Committee on Education and the Workforce, for a period to be subsequently determined by the Speaker, in each case for consideration of such provisions as fall within the jurisdiction of the committee concerned

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A BILL

To establish and expand programs relating to science, mathematics, engineering, and technology education, and for other purposes.

Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled,

SECTION 1. SHORT TITLE.

This Act may be cited as the "National Science Education Act".

SEC. 2. FINDINGS.

Congress finds the following:

(1) As concluded in the report of the Committee on Science of the House of Representatives, "Unlocking Our Future Toward a New National Science Policy", which was adopted by the House of Representatives, the United States must maintain and improve its preeminent position in science and technology in order to advance human understanding of the universe and all it contains, and to improve the lives, health, and freedoms of all people.

(2) It is estimated that more than half of the economic growth of the United States today results directly from research and development in science and technology. The most fundamental research is responsible for investigating our perceived universe, to extend our observations to the outer limits of what our minds and methods can achieve, and to seek answers to questions that have never been asked before. Applied research continues the process by applying the answers from basic science to the problems faced by individuals, organizations, and governments in the everyday activities that make our lives more livable. The scientific-technological sector of our economy, which has driven our recent economic boom and led the United States to the longest

1 period of prosperity in history, is fueled by the work
2 and discoveries of the scientific community.
3 (3) The effectiveness of the United States in
4 maintaining this economic growth will be largely de-
5 termined by the intellectual capital of the United
6 States. Education is critical to developing this re-
7 source.
8 (4) The education program of the United States
9 needs to provide for 3 different kinds of intellectual
10 capital. First, it needs scientists, mathematicians,
11 and engineers to continue the research and develop-
12 ment that are central to the economic growth of the
13 United States. Second, it needs technologically pro-
14 ficient workers who are comfortable and capable
15 dealing with the demands of a science-based, high-
16 technology workplace. Last, it needs scientifically lit-
17 erate voters and consumers to make intelligent deci-
18 sions about public policy.
19 (5) Student performance on the recent Third
20 International Mathematics and Science Study high-
21 lights the shortcomings of current K–12 science and
22 mathematics education in the United States, par-
23 ticularly when compared to other countries. We must
24 expect more from our Nation's educators and stu-
25 dents if we are to build on the accomplishments of

previous generations. New methods of teaching science, mathematics, engineering, and technology are required, as well as better curricula and improved training of teachers.

(6) Science is more than a collection of facts, theories, and results. It is a process of inquiry built upon observations and data that leads to a way of knowing and explaining in logically derived concepts and theories. Mathematics is more than procedures to be memorized. It is a field that requires reasoning, understanding, and making connections in order to solve problems. Engineering is more than just designing and building. It is the process of making compromises to optimize design and assessing risks so that designs and products best solve a given problem. Technology is more than using computer applications, the Internet, and programming. Technology is the innovation, change, or modification of the natural environment, based on scientific, mathematical, and engineering principles.

(7) Students should learn science primarily by doing science. Science education ought to reflect the scientific process and be object-oriented, experiment-centered, and concept-based. Students should learn mathematics with understanding that numeric sys-

tems have intrinsic properties that can represent objects and systems in real life, and can be applied in solving problems. Engineering education should reflect the realities of real world design, and should involve hands-on projects and require students to make trade-offs based upon evidence. Students should learn technology as both a tool to solve other problems and as a process by which people adapt the natural world to suit their own purposes. Computers represent a particularly useful form of technology, enabling students and teachers to acquire data, model systems, visualize phenomena, communicate and organize information, and collaborate with others in powerful new ways. A background in the basics of information technology is essential for success in the modern workplace and the modern world.

(8) Children are naturally curious and inquisitive. To successfully tap into these innate qualities, education in science, mathematics, engineering, and technology must begin at an early age and continue throughout the entire school experience.

(9) Teachers provide the essential connection between students and the content they are learning. Prospective teachers need to be identified and recruited by presenting to them a career that is re-

1 spected by their peers, is financially and intellectu-
2 ally rewarding, contains sufficient opportunities for
3 advancement, and has continuing access to profes-
4 sional development.

5 (10) Teachers need to have incentives to remain
6 in the classroom and improve their practice, and
7 training of teachers is essential if the results are to
8 be good. Teachers need to be knowledgeable of their
9 content area, of their curriculum, of up-to-date re-
10 search in teaching and learning, and of techniques
11 that can be used to connect that information to their
12 students in their classroom.

13 **SEC. 3. ASSURANCE OF CONTINUED LOCAL CONTROL.**

14 Nothing in this Act may be construed to authorize
15 any department, agency, officer, or employee of the United
16 States to exercise any direction, supervision, or control
17 over the curriculum, program of instruction, administra-
18 tion, or personnel of any educational institution or school
19 system.

20 **SEC. 4. MASTER TEACHER GRANT PROGRAM.**

21 (a) PROGRAM AUTHORIZED.—The Director of the
22 National Science Foundation shall conduct a grant pro-
23 gram to make grants to a State or local educational agen-
24 cy, a private elementary or middle school, or a consortium

1 of any combination of those entities, for the purpose of
2 hiring a master teacher.
3 (b) ELIGIBILITY.—In order to be eligible to receive
4 a grant under this subsection, a State or local educational
5 agency, private elementary or middle school, or consortium
6 described in subsection (a) shall submit to the Director
7 a description of the relationship the master teacher will
8 have vis-a-vis other administrative and managerial staff
9 and the State and local educational agency, the ratio of
10 master teachers to other teachers, and the requirements
11 for a master teacher of the State or local educational agen-
12 cy or school, including certification requirements and job
13 responsibilities of the master teacher. The description of
14 job responsibilities must include a discussion of any re-
15 sponsibility the master teacher will have for—
16 (1) development or implementation of science,
17 mathematics, engineering, or technology curricula;
18 (2) in-classroom assistance;
19 (3) authority over hands-on inquiry materials,
20 equipment, and supplies;
21 (4) mentoring other teachers or fulfilling any
22 leadership role; and
23 (5) professional development, including training
24 other master teachers or other teachers, or devel-

1 oping or implementing professional development pro-
2 grams.
3 (c) ASSESSMENT OF EFFECTIVENESS.—The Director
4 shall assess the effectiveness of activities carried out under
5 this section.
6 (d) FUNDS.—
7 (1) SOURCE.—Grants shall be made under this
8 section out of funds available for the National
9 Science Foundation for education and human re-
10 sources activities.
11 (2) AUTHORIZATION.—There are authorized to
12 be appropriated to the National Science Foundation
13 to carry out this section $50,000,000 for each of fis-
14 cal years 2002 through 2004.

15 **SEC. 5. DISSEMINATION OF INFORMATION ON REQUIRED**
16 **COURSE OF STUDY FOR CAREERS IN**
17 **SCIENCE, MATHEMATICS, ENGINEERING, AND**
18 **TECHNOLOGY EDUCATION.**

19 (a) IN GENERAL.—The Director of the National
20 Science Foundation shall, jointly with the Secretary of
21 Education, compile and disseminate information (includ-
22 ing through outreach, school counselor education, and vis-
23 iting speakers) regarding—
24 (1) typical standard prerequisites for middle
25 school and high school students who seek to enter a

course of study at an institution of higher education in science, mathematics, engineering, or technology education for purposes of teaching in an elementary or secondary school; and

(2) the licensing requirements in each State for science, mathematics, engineering, or technology elementary or secondary school teachers.

(b) AUTHORIZATION OF APPROPRIATIONS.—There are authorized to be appropriated for the National Science Foundation to carry out this section $5,000,000 for each of fiscal years 2002 through 2004.

SEC. 6. REQUIREMENT TO CONDUCT STUDY EVALUATION.

(a) STUDY REQUIRED.—The Director of the National Science Foundation shall enter into an agreement with the National Academies of Sciences and Engineering under which the Academies shall review existing studies on the effectiveness of technology in the classroom on learning and student performance, using various measures of learning and teaching outcome including standardized tests of student achievement, and explore the feasibility of one or more methodological frameworks to be used in evaluations of technologies that have different purposes and are used by schools and school systems with diverse educational goals. The study evaluation shall include, to the extent available, information on the type of technology used in

1 each classroom, the reason that such technology works,
2 and the teacher training that is conducted in conjunction
3 with the technology.

4 (b) DEADLINE FOR COMPLETION.—The study eval-
5 uation required by subsection (a) shall be completed not
6 later than one year after the date of the enactment of this
7 Act.

8 (c) DEFINITION OF TECHNOLOGY.—In this section,
9 the term "technology" has the meaning given that term
10 in section 3113(11) of the Elementary and Secondary
11 Education Act of 1965 (20 U.S.C. 6813(11)).

12 (d) AUTHORIZATION OF APPROPRIATIONS.—There
13 are authorized to be appropriated to the National Science
14 Foundation for the purpose of conducting the study eval-
15 uation required by subsection (a), $600,000.

16 **SEC. 7. TEACHER TECHNOLOGY PROFESSIONAL DEVELOP-**
17 **MENT.**

18 (a) IN GENERAL.—The Director of the National
19 Science Foundation shall establish a grant program under
20 which grants may be made to a State or local educational
21 agency, a private elementary or middle school, or a consor-
22 tium consisting of any combination of those entities for
23 instruction of teachers for grades kindergarten through
24 the 12th grade on the use of information technology in

1 the classroom. Grants awarded under this section shall be
2 used for training teachers to use—
3 (1) classroom technology, including hardware,
4 software, communications technologies, and labora-
5 tory equipment; or
6 (2) specific technology for science, mathematics,
7 engineering or technology instruction, including data
8 acquisition, modeling, visualization, simulation, and
9 numerical analysis.
10 (b) AUTHORIZATION OF APPROPRIATIONS.—There
11 are authorized to be appropriated for the National Science
12 Foundation to carry out this section $10,000,000 for each
13 of fiscal years 2002 through 2004.

14 **SEC. 8. SCIENCE, MATHEMATICS, ENGINEERING, AND**
15 **TECHNOLOGY BUSINESS EDUCATION CON-**
16 **FERENCE.**

17 (a) IN GENERAL.—Not later than 180 days after the
18 date of the enactment of this Act, the Director of the Na-
19 tional Science Foundation shall convene the first of an an-
20 nual 3- to 5-day conference for kindergarten through the
21 12th grade science, mathematics, engineering, and tech-
22 nology education stakeholders, including—
23 (1) representatives from Federal, State, and
24 local governments, private industries, private busi-
25 nesses, and professional organizations;

1 (2) educators;
2 (3) science, mathematics, engineering, and tech-
3 nology educational resource providers;
4 (4) students; and
5 (5) any other stakeholders the Director deter-
6 mines would provide useful participation in the con-
7 ference.
8 (b) PURPOSES.—The purposes of the conference con-
9 vened under subsection (a) shall be to—
10 (1) identify and gather information on existing
11 science, mathematics, engineering, and technology
12 education programs and resource providers, includ-
13 ing information on distribution, partners, cost as-
14 sessment, and derivation;
15 (2) determine the extent of any existing coordi-
16 nation between providers of curricular activities, ini-
17 tiatives, and units; and
18 (3) identify the common goals and differences
19 among the participants at the conference.
20 (c) REPORT AND PUBLICATION.—At the conclusion
21 of the conference the Director of the National Science
22 Foundation shall—
23 (1) transmit to the Committee on Science of the
24 House of Representatives and to the Committee on
25 Commerce, Science, and Transportation of the Sen-

1 ate a report on the outcome and conclusions of the
2 conference, including an inventory of curricular ac-
3 tivities, initiatives, and units, the content of the con-
4 ference, and strategies developed that will support
5 partnerships and leverage resources; and
6 (2) ensure that a similar report is published
7 and distributed as widely as possible to stakeholders
8 in science, mathematics, engineering, and technology
9 education.
10 (d) AUTHORIZATION OF APPROPRIATIONS.—There
11 are authorized to be appropriated for the National Science
12 Foundation to carry out this section—
13 (1) $300,000 for fiscal year 2002; and
14 (2) $200,000 for each of fiscal years 2003 and
15 2004.
16 **SEC. 9. GRANTS FOR DISTANCE LEARNING.**
17 (a) IN GENERAL.—The Director of the National
18 Science Foundation may make competitive, merit-based
19 awards to develop partnerships for distance learning of
20 science, mathematics, engineering, and technology edu-
21 cation to a State or local educational agency or to a pri-
22 vate elementary, middle, or secondary school, under any
23 grant program administered by the Director using funds
24 appropriated to the National Science Foundation for ac-
25 tivities in which distance learning is integrated into the

education process in grades kindergarten through the 12th grade.

(b) AUTHORIZATION OF APPROPRIATIONS.—There are authorized to be appropriated for the National Science Foundation to carry out this section $5,000,000 for each of fiscal years 2002 through 2004.

SEC. 10. SCHOLARSHIPS TO PARTICIPATE IN CERTAIN RESEARCH ACTIVITIES.

(a) IN GENERAL.—The President, acting through the National Science Foundation, shall provide scholarships to teachers at public and private schools in grades kindergarten through the 12th grade in order that such teachers may participate in research programs conducted at private entities or Federal or State government agencies. The purpose of such scholarships shall be to provide teachers with an opportunity to expand their knowledge of science, mathematics, engineering, technology, and research techniques.

(b) REQUIREMENTS.—In order to be eligible to receive a scholarship under this section, a teacher described in subsection (a) shall be required to develop, in conjunction with the private entity or government agency at which the teacher will be participating in a research program, a proposal to be submitted to the President describing the types of research activities involved.

1 (c) PERIOD OF PROGRAM.—Participation in a re-
2 search program in accordance with this section may be
3 for a period of one academic year or two sequential sum-
4 mers.

5 (d) USE OF FUNDS.—The Director may only use
6 funds for purposes of this section for salaries of scholar-
7 ship recipients, administrative expenses (including infor-
8 mation dissemination, direct mailing, advertising, and di-
9 rect staff costs for coordination and accounting services),
10 expenses for conducting an orientation program, reloca-
11 tion expenses, and the expenses of conducting final selec-
12 tion interviews.

13 (e) AUTHORIZATION OF APPROPRIATIONS.—There
14 are authorized to be appropriated for the National Science
15 Foundation to carry out this section $5,000,000 for each
16 of fiscal years 2002 through 2004.

17 **SEC. 11. INTERAGENCY COORDINATION OF SCIENCE EDU-**
18 **CATION PROGRAMS.**

19 (a) INTERAGENCY COORDINATION COMMITTEE.—

20 (1) ESTABLISHMENT.—The Director of the Of-
21 fice of Science and Technology Policy shall establish
22 an interagency committee to coordinate Federal pro-
23 grams in support of science and mathematics edu-
24 cation at the elementary and secondary level.

1 (2) MEMBERSHIP.—The membership of the
2 committee shall consist of the heads, or designees, of
3 the National Science Foundation, the Department of
4 Energy, the National Aeronautics and Space Admin-
5 istration, the Department of Education, and other
6 Federal departments and agencies that have pro-
7 grams directed toward support of elementary and
8 secondary science and mathematics education.
9 (3) FUNCTIONS.—The committee shall—
10 (A) prepare a catalog of Federal research,
11 development, demonstration and other pro-
12 grams designed to improve elementary and sec-
13 ondary science or mathematics education, in-
14 cluding for each program a summary of its
15 goals and the kinds of activities supported, a
16 summary of accomplishments (including evi-
17 dence of effectiveness in improving student
18 learning), the funding level, and, for grant pro-
19 grams, the eligibility requirements and the se-
20 lection process for awards;
21 (B) review the programs identified under
22 subparagraph (A) in order to—
23 (i) determine the relative funding lev-
24 els among support for—

1 (I) teacher professional develop-
2 ment;
3 (II) curricular materials;
4 (III) improved classroom teach-
5 ing practices;
6 (IV) applications of computers
7 and related information technologies;
8 and
9 (V) other major categories of ac-
10 tivities;
11 (ii) assess whether the balance among
12 kinds of activities as determined under
13 clause (i) is appropriate and whether un-
14 necessary duplication or overlap among
15 programs exists;
16 (iii) assess the degree to which the
17 programs assist the efforts of State and
18 local school systems to implement stand-
19 ards-based reform of science and mathe-
20 matics education, and group the programs
21 in the categories of high, moderate, and
22 low relevance for assisting standards-based
23 reform;
24 (iv) for grant programs, identify ways
25 to simplify the application procedures and

requirements and to achieve greater conformity among the procedures and requirements of the agencies; and

(v) evaluate the adequacy of the assessment procedures used by the departments and agencies to determine whether the goals and objectives of programs are being achieved, and identify the best practices identified from the evaluation for assessment of program effectiveness; and

(C) monitor the implementation of the plan developed under subsection (c) and provide to the Director of the Office of Science and Technology Policy its findings and recommendations for modifications to that plan.

(b) EXTERNAL REVIEW.—The Director of the National Science Foundation shall enter into an agreement with the National Research Council to conduct an independent review of programs as described in subsection (a)(3)(B) and to develop findings and recommendations. The findings and recommendations from the National Research Council review of programs shall be reported to the Director of the Office of Science and Technology Policy and to the Congress.

(c) EDUCATION PLAN.—

1 (1) PLAN CONTENTS.—On the basis of the find-
2 ings of the review carried out in accordance with
3 subsection (a)(3)(B) and taking into consideration
4 the findings and recommendations of the National
5 Research Council in accordance with subsection (b),
6 the Director of the Office of Science and Technology
7 Policy shall prepare a plan for Federal elementary
8 and secondary science and mathematics education
9 programs which shall include—
10 (A) a strategy to increase the effectiveness
11 of Federal programs to assist the efforts of
12 State and local school systems to implement
13 standards-based reform of elementary and sec-
14 ondary science and mathematics education;
15 (B) a coordinated approach for identifying
16 best practices for the use of computers and re-
17 lated information technologies in classroom in-
18 struction;
19 (C) the recommended balance for Federal
20 resource allocation among the major types of
21 activities supported, including projected funding
22 allocations for each major activity broken out
23 by department and agency;
24 (D) identification of effective Federal pro-
25 grams that have made measurable contributions

to achieving standards-based science and mathematics education reform;

(E) recommendations to the departments and agencies for actions needed to increase uniformity across the Federal Government for application procedures and requirements for grant awards for support of elementary and secondary science and mathematics education; and

(F) dissemination procedures for replicating results from effective programs, particularly best practices for classroom instruction.

(2) CONSULTATION.—The Director shall consult with academic, State, industry, and other appropriate entities engaged in efforts to reform science and mathematics education as necessary and appropriate for preparing the plan under paragraph (1).

(d) REPORTS.—

(1) INITIAL REPORT.—The Director of the Office of Science and Technology Policy shall submit to the Congress, not later than 1 year after the date of the enactment of this Act, a report which—

(A) includes the plan described in subsection (c)(1);

(B) in accordance with subsection (c)(1)(C), describes, for each department and

1 agency represented on the committee estab-
2 lished under subsection (a)(1), appropriate lev-
3 els of Federal funding;
4 (C) includes the catalog prepared under
5 subsection (a)(3)(A);
6 (D) includes the findings from the review
7 required under subsection (a)(3)(B)(iii);
8 (E) includes the findings and recommenda-
9 tions of the National Research Council devel-
10 oped under subsection (b); and
11 (F) describes the procedures used by each
12 department and agency represented on the com-
13 mittee to assess the effectiveness of its edu-
14 cation programs.
15 (2) ANNUAL UPDATES.—The Director of the
16 Office of Science and Technology Policy shall submit
17 to the Congress an annual update, at the time of the
18 President's annual budget request, of the report sub-
19 mitted under paragraph (1), which shall include, for
20 each department and agency represented on the
21 committee, appropriate levels of Federal funding for
22 the fiscal year during which the report is submitted
23 and the levels proposed for the fiscal year with re-
24 spect to which the budget submission applies.

1 **SEC. 12. DEFINITIONS.**

2 In this Act:

3 (1) The terms ''local educational agency'' and
4 ''State educational agency'' have the meanings given
5 such terms in section 14101 of the Elementary and
6 Secondary Education Act of 1965 (20 U.S.C. 8801).

7 (2) The term ''institution of higher education''
8 has the meaning given that term by section 101 of
9 the Higher Education Act of 1965 (20 U.S.C.
10 1001).

○

COMMITTEE ON SCIENCE

SUBCOMMITTEE ON RESEARCH

Thursday, June 7, 2001

AMENDMENT ROSTER

H.R. 100, National Science Education Act

No.	Sponsor	Description	Results
1	Mr. Boehlert	Amendment in the Nature of a Substitute to H.R. 100	

SECTION-BY-SECTION DESCRIPTION OF AMENDMENT IN THE NATURE OF A SUBSTITUTE TO H.R. 100
(Offered by Mr. Boehlert, on behalf of Mr. Ehlers)

SEC. 1. SHORT TITLE (from bill as introduced)

"National Science Education Act"

SEC. 2. FINDINGS (from bill as introduced)

Discuss the importance of science and technology to the nation's economic future, problems with student performance in these fields, the nature of science education, and the importance of teachers.

SEC. 3. MASTER TEACHER GRANT PROGRAM
(totally new version of Section 4 in the bill as introduced)

Establishes a competitive, merit-reviewed grant program at the National Science Foundation (NSF) to provide funds to institutions of higher education to train master teachers who will work in K-9 classrooms. Grantees must recruit and select teachers to participate, provide training in both content and pedagogy, provide teachers with mentors, and assist teachers implement master teacher programs in their schools. Grantees will provide teachers with a stipend during the training and can provide room and board. For a teacher to participate in the program, a teacher's school must certify that the teacher will be given time to perform the duties of a master teacher (which requires time outside the teacher's own classroom to help train and assist other teachers). The program is authorized at $50 million a year in FY 2002-2004.

SEC. 4. DISSEMINATION OF INFORMATION ON REQUIRED COURSE OF STUDY FOR CAREERS IN SCIENCE, MATHEMATICS, ENGINEERING AND TECHNOLOGY EDUCATION. (Section 5 of the bill as introduced)

NSF and the Department of Education should distribute information to high schools about the course of study in college necessary to become a science, math, engineering or technology teacher. The program is authorized at $5 million a year in FY 2002-2004.

SEC. 5. REQUIREMENT OT CONDUCT STUDY EVALUATION
(Section 6 of the bill as introduced)

The National Academies of Science and Engineering shall conduct a review (paid for by NSF) of existing studies on the effectiveness of technology in the classroom within one year of enactment. The study is authorized at $600,000.

SEC. 6. SCIENCE, MATHEMATICS, ENGINEERING, AND TECHNOLOGY BUSINESS EDUCATION CONFERENCE. (Section 8 of the bill as introduced)

NSF shall convene annual conferences to improve education and the coordination of education programs. Participants will include federal, state and local governments, business, professional organizations, teachers, students and other stakeholders. NSF will submit a report on conference results to the Congress. The conference is authorized at $300,000 for FY 2002 and $200,000 a year for FY 2003-2004.

SEC. 7. DISTANCE LEARNING GRANTS.
(Totally new version of Section 9 of the bill as introduced)

Establishes a competitive, merit-reviewed grant program at NSF to award funds to institutions of higher education to provide research opportunities to elementary and secondary school students via the Internet. The program is authorized at $5 million a year for FY 2002-2004.

SEC. 8. DEFINITIONS. (Section 12 of the bill as introduced)

Provides the standard references to define "local education agency" and "institution of higher education."

(The substitute drops entirely Sections 3, 7, 10 and 11 of the bill as introduced.)

COMMITTEE ON SCIENCE
U.S. House of Representatives
Washington, D.C. 20515

Section by Section of H.R. 100

H.R. 100- To establish and expand programs relating to science, mathematics, engineering, and technology education, and for other purposes.

Sec. 1. SHORT TITLE.

This Act may be cited as the "National Science Education Act".

Sec. 2. FINDINGS.

Congress finds the following:
(1) The U.S. must maintain its preeminent position in science and technology.
(2) More than half of the economic growth in the U.S today results directly from research and development in science and technology.
(3) Education is critical for intellectual capital development and maintaining economic growth.
(4) The U.S. needs an educational program that builds intellectual capital in the science, mathematics, engineering, and technology fields.
(5) Student performance on the recent Third International Mathematics and Science Study highlights the shortcomings of the current U.S. system of K-12 science and mathematics education, particularly when compared to other countries.
(6) Science is a process of inquiry that leads to logically derived concepts and theories. Mathematics is a field that requires reasoning, understanding, and making connections in order to solve problems. Engineering is the process of making compromises to optimize design and assessing risks to best solve a given problem. Technology is the adaptation of the natural environment based on scientific, mathematical, and engineering principles.
(7) Students should learn science, mathematics, engineering and technology primarily through hands on activities. In addition, students should learn the real world applications and the interdisciplinary nature of each subject. Computers represent a particularly useful form of technology. A basic knowledge of information technology is essential for success in the modern world.
(8) To successfully tap the inquisitive nature of children, science, mathematics, engineering, and technology education must begin at an early age.
(9) Teaching must be a career that is respected, and it must contain opportunities for further development and advancement.
(10) Educators need to possess current knowledge of their content area, curriculum, and effective teaching methods.

Sec. 3. ASSURANCE OF CONTINUED LOCAL CONTROL.

Nothing in this Act may be construed to authorize any U.S. department, agency, officer, or employee to exercise any direction, supervision, or control over the curriculum, program of instruction, administration, or personnel of any educational institution or school system.

Sec. 4. MASTER TEACHER GRANT PROGRAM.

(a) PROGRAM AUTHORIZED- The Director of the National Science Foundation (NSF) shall make grants to State or local educational agencies or private elementary or middle schools to hire master teachers.
(b) ELIGIBILITY- In order to be eligible, the schools or school districts described in subsection (a) shall submit a description of the relationship the master teacher will have with school and school district staff and the State or local educational agency, the ratio of master teachers to other teachers, and a description the school or state's requirements for a master teacher (including certification and job responsibilities).
(c) ASSESSMENT OF EFFECTIVENESS- The Director shall assess the effectiveness of activities carried out under this section.

(d) FUNDS-
(1) SOURCE- Grants shall be made out of funds available for the NSF for education and human resources activities.
(2) AUTHORIZATION- This section authorizes $50,000,000 for each of Fiscal Years (FY) 2002 through 2004.

Sec. 5. DISSEMINATION OF INFORMATION ON REQUIRED COURSE OF STUDY FOR CAREERS IN SCIENCE, MATHEMATICS, ENGINEERING, AND TECHNOLOGY EDUCATION.

(a) IN GENERAL- The Director of NSF and the Secretary of Education shall disseminate information regarding the-
(1) Typical college prerequisites for middle and high school students seeking a career in science, mathematics, engineering, and technology education.
(2) State licensing requirements for teacher.
(b) AUTHORIZATION OF APPROPRIATIONS- $5,000,000 is authorized to carry out this section for each of FY 2002 through 2004

Sec. 6. REQUIREMENT TO CONDUCT STUDY EVALUATION.

(a) STUDY REQUIRED- The Director of NSF shall contract with the National Academies of Sciences and Engineering to review existing studies on the effectiveness of technology in the classroom on learning.
(b) DEADLINE FOR COMPLETION- The study shall be completed within one year of enactment.

(c) DEFINITION OF TECHNOLOGY- The term "technology" is defined as in Section 3113 (11) of the Elementary and Secondary Education Act of 1965.
(d) AUTHORIZATION OF APPROPRIATIONS- $600,000 is authorized for the study.

Sec. 7. TEACHER TECHNOLOGY PROFESSIONAL DEVELOPMENT.

(a) IN GENERAL-The Director of NSF shall make grants to State or local educational agencies or private elementary or middle schools for teacher instruction on the use of information technology in the classroom. The grants shall be used to train teachers to use classroom technology including hardware, software and lab equipment.

(c) AUTHORIZATION OF APPROPRIATIONS- $10,000,000 is authorized for each of FY 2002 through 2004

Sec. 8. SCIENCE, MATHEMATICS, ENGINEERING, AND TECHNOLOGY BUSINESS EDUCATION CONFERENCE.

(a) IN GENERAL- The Director of NSF shall, within 180 days of enactment, convene the first of an annual 3 to 5 day conference for K-12 science, mathematics, engineering, and technology education stakeholders including Federal, State, and local governments, private industry, and organizations, educators, educational resource providers.

(b) PURPOSES- The purpose of the conference shall be to gather information on existing science, mathematics, engineering, and technology education programs and resources, to determine the extent of existing coordination between providers, and to identify the common objectives of the participants.

(c) REPORT AND PUBLICATION- At the end of the conference the Director of NSF shall transmit to the Committee on Science of the House of Representatives and to the Committee on Commerce, Science, and Transportation of the Senate a report on the results of the conference. The report shall also be made available to the public.

(d) AUTHORIZATION OF APPROPRIATIONS- The Director of NSF is authorized to expend $300,000 for FY 2002; and $200,000 for each of fiscal years 2003 and 2004 for this purpose.

Sec. 9. GRANTS FOR DISTANCE LEARNING.

IN GENERAL- The Director of NSF may make competitive awards to to State or local educational agencies or to private elementary, middle, or secondary schools for the purpose of developing partnerships for integrating distance learning techniques into the instruction of science, mathematics, engineering, and technology education.

AUTHORIZATION OF APPROPRIATIONS- $5,000,000 is authorized to carry out this section for each of FY2002 through 2004.

Sec. 10. SCHOLARSHIPS TO PARTICIPATE IN CERTAIN RESEARCH ACTIVITIES.

(a) IN GENERAL- The President, through NSF, shall provide research scholarships to K-12 teachers at public and private schools to enable them to participate in research projects conducted at universities, Federal or State Government agencies.

(b) REQUIREMENTS- The teacher must submit a proposal, in conjunction with the participating agency or private entity, describing the research activities that will be undertaken.

(c) PERIOD OF PROGRAM- Participation in the program is limited to one academic year or two sequential summers.

(d) USE OF FUNDS- The Director of NSF may use funds only for salaries of scholarship recipients, and expenses related to orientation, relocation, and final interviews.

(e) AUTHORIZATION OF APPROPRIATIONS- $5,000,000 is authorized for each of fiscal years 2002 through 2004.

Sec. 11. INTERAGENCY COORDINATION OF SCIENCE EDUCATION PROGRAMS.

(a) Interagency Coordination Committee--The Director of the Office of Science and Technology Policy (OSTP) is directed to establish an interagency committee to coordinate Federal programs in support of science and mathematics education at the elementary and secondary level. The committee shall consist of the heads (or designees) of the National Science Foundation, the Department of Energy, the National Aeronautics and Space Administration, the Department of Education and any other agencies that have programs directed toward support of K-12 science and mathematics education. The Committee will catalogue Federal education programs, assess the balance among activities and programs, identify unnecessary duplication, identify ways to standardize the application process, and assess the degree to which the programs assist state and local reform efforts.

(b) External Review--- The Director of NSF shall enter into an agreement with the National Research Council to conduct the independent review the of Federal education programs described in subsection (a).

(c) Education Plan--- The Director of OSTP shall annually prepare a coordinated plan for Federal elementary and secondary science and mathematics education programs.

(d) Reports--- The Director of OSTP shall submit to Congress a report that includes the education plan and describes the appropriate level of mathematics and science education funding for each department and agency.

Sec. 12. DEFINITIONS.

The terms "local educational agency" and "State educational agency" are defined in section 14101 of the Elementary and Secondary Education Act of 1965 (20 U.S.C. 1001).

The term "institution of higher education" has the meaning given that term by section 101 of the Higher Education Act of 1965 (20 U.S.C. 1001).

AMENDMENT IN THE NATURE OF A SUBSTITUTE TO H.R. 100 OFFERED BY MR. BOEHLERT

Strike all after the enacting clause and insert the following:

1 **SECTION 1. SHORT TITLE.**

2 This Act may be cited as the "National Science Edu-
3 cation Act .

4 **SEC. 2. FINDINGS.**

5 Congress finds the following:

6 (1) As concluded in the report of the Com-
7 mittee on Science of the House of Representatives,
8 "Unlocking Our Future Toward a New National
9 Science Policy , which was adopted by the House of
10 Representatives, the United States must maintain
11 and improve its preeminent position in science and
12 technology in order to advance human under-
13 standing of the universe and all it contains, and to
14 improve the lives, health, and freedoms of all people.

15 (2) It is estimated that more than half of the
16 economic growth of the United States today results
17 directly from research and development in science
18 and technology. The most fundamental research is
19 responsible for investigating our perceived universe,
20 to extend our observations to the outer limits of

1 what our minds and methods can achieve, and to
2 seek answers to questions that have never been
3 asked before. Applied research continues the process
4 by applying the answers from basic science to the
5 problems faced by individuals, organizations, and
6 governments in the everyday activities that make our
7 lives more livable. The scientific-technological sector
8 of our economy, which has driven our recent eco-
9 nomic boom and led the United States to the longest
10 period of prosperity in history, is fueled by the work
11 and discoveries of the scientific community.
12 (3) The effectiveness of the United States in
13 maintaining this economic growth will be largely de-
14 termined by the intellectual capital of the United
15 States. Education is critical to developing this re-
16 source.
17 (4) The education program of the United States
18 needs to provide for 3 different kinds of intellectual
19 capital. First, it needs scientists, mathematicians,
20 and engineers to continue the research and develop-
21 ment that are central to the economic growth of the
22 United States. Second, it needs technologically pro-
23 ficient workers who are comfortable and capable
24 dealing with the demands of a science-based, high-
25 technology workplace. Last, it needs scientifically lit-

erate voters and consumers to make intelligent decisions about public policy.

(5) Student performance on the recent Third International Mathematics and Science Study highlights the shortcomings of current K 12 science and mathematics education in the United States, particularly when compared to other countries. We must expect more from our Nation s educators and students if we are to build on the accomplishments of previous generations. New methods of teaching science, mathematics, engineering, and technology are required, as well as better curricula and improved training of teachers.

(6) Science is more than a collection of facts, theories, and results. It is a process of inquiry built upon observations and data that leads to a way of knowing and explaining in logically derived concepts and theories. Mathematics is more than procedures to be memorized. It is a field that requires reasoning, understanding, and making connections in order to solve problems. Engineering is more than just designing and building. It is the process of making compromises to optimize design and assessing risks so that designs and products best solve a given problem. Technology is more than using computer

1 applications, the Internet, and programming. Tech-
2 nology is the innovation, change, or modification of
3 the natural environment, based on scientific, mathe-
4 matical, and engineering principles.

5 (7) Students should learn science primarily by
6 doing science. Science education ought to reflect the
7 scientific process and be object-oriented, experiment-
8 centered, and concept-based. Students should learn
9 mathematics with understanding that numeric sys-
10 tems have intrinsic properties that can represent ob-
11 jects and systems in real life, and can be applied in
12 solving problems. Engineering education should re-
13 flect the realities of real world design, and should in-
14 volve hands-on projects and require students to
15 make trade-offs based upon evidence. Students
16 should learn technology as both a tool to solve other
17 problems and as a process by which people adapt the
18 natural world to suit their own purposes. Computers
19 represent a particularly useful form of technology,
20 enabling students and teachers to acquire data,
21 model systems, visualize phenomena, communicate
22 and organize information, and collaborate with oth-
23 ers in powerful new ways. A background in the ba-
24 sics of information technology is essential for success
25 in the modern workplace and the modern world.

1 (8) Children are naturally curious and inquisi-
2 tive. To successfully tap into these innate qualities,
3 education in science, mathematics, engineering, and
4 technology must begin at an early age and continue
5 throughout the entire school experience.
6 (9) Teachers provide the essential connection
7 between students and the content they are learning.
8 Prospective teachers need to be identified and re-
9 cruited by presenting to them a career that is re-
10 spected by their peers, is financially and intellectu-
11 ally rewarding, contains sufficient opportunities for
12 advancement, and has continuing access to profes-
13 sional development.
14 (10) Teachers need to have incentives to remain
15 in the classroom and improve their practice, and
16 training of teachers is essential if the results are to
17 be good. Teachers need to be knowledgeable of their
18 content area, of their curriculum, of up-to-date re-
19 search in teaching and learning, and of techniques
20 that can be used to connect that information to their
21 students in their classroom.
22 **SEC. 3. MASTER TEACHER GRANT PROGRAM.**
23 (a) DEFINITIONS. In this section
24 (1) The term "sponsoring school means an ele-
25 mentary or secondary school that employs a master

1 teacher who is participating in a program funded in
2 accordance with this section.
3 (2) The term "nonclassroom time means time
4 during regular school hours that is not utilized by a
5 master teacher for instructing elementary or sec-
6 ondary school children in the classroom.
7 (3) The term "master teacher means a mathe-
8 matics or science teacher who works to improve the
9 instruction of mathematics or science in kinder-
10 garten through 9th grade through
11 (A) participating in the development or re-
12 vision of science, mathematics, engineering or
13 technology curricula;
14 (B) serving as a mentor to mathematics or
15 science teachers at the sponsoring school or
16 other schools;
17 (C) coordinating and assisting teachers in
18 the use of hands-on inquiry materials, equip-
19 ment, and supplies, and when appropriate, su-
20 pervising acquisition and repair of such mate-
21 rials;
22 (D) providing in-classroom teaching assist-
23 ance to mathematics or science teachers; and
24 (E) providing professional development, in-
25 cluding for the purposes of training other mas-

1 ter teachers, to mathematics and science teach-
2 ers.
3 (6) The term "mathematics or science teacher
4 means a teacher of mathematics, science, engineer-
5 ing, or technology in an elementary or secondary
6 school.
7 (b) PROGRAM AUTHORIZED. (1) The Director of the
8 National Science Foundation shall establish a program to
9 award competitive, merit-reviewed grants to institutions of
10 higher education (or consortia thereof) to train master
11 teachers and assist elementary and secondary schools to
12 design and implement master teacher programs.
13 (2) Institutions of higher education receiving grants
14 under this section shall offer programs to train master
15 teachers. As part of such programs, a grantee shall
16 (A) recruit and select teachers to receive train-
17 ing;
18 (B) ensure that training covers both content
19 and pedagogy;
20 (C) ensure that participating teachers have
21 mentors; and
22 (D) assist participating teachers with the devel-
23 opment and implementation of master teacher pro-
24 grams at their sponsoring schools.

1 (3) Grants awarded under this section may be used
2 to
3 (A) develop and implement professional develop-
4 ment programs to train elementary or secondary
5 school teachers to become master teachers;
6 (B) provide stipends and reimbursement for
7 travel to allow teachers to participate in professional
8 development programs in the summer and through-
9 out the year;
10 (C) provide guidance to sponsoring schools to
11 enable them to develop and implement a plan for the
12 use of master teachers;
13 (D) support participating teachers during the
14 summer in research programs conducted at institu-
15 tions of higher education, private entities or govern-
16 ment facilities;
17 (E) provide educational materials and equip-
18 ment to master teachers;
19 (F) provide computer equipment and network
20 connectivity necessary to enable master teachers to
21 collaborate with other master teachers, to access
22 educational materials available online, and to com-
23 municate with scientists or other mentors at remote
24 locations; and

1 (G) fund any other activities the Director deter-
2 mines will accomplish the goals of this section.
3 (c) SELECTION PROCESS. (1) An institution of
4 higher education seeking funding under this section shall
5 submit an application at such time, in such manner, and
6 containing such information as the Director may require.
7 The application shall include, at a minimum
8 (A) a description of which classroom subjects
9 and grade levels the training will address;
10 (B) a description of the activities to be carried
11 out, including
12 (i) how such activities will be aligned with
13 State and local standards and with other activi-
14 ties that promote student achievement in math-
15 ematics and science; and
16 (ii) how such activities will be based on a
17 review of relevant research and why such activi-
18 ties are expected to strengthen the quality of
19 mathematics and science instruction;
20 (C) a description of how the applicant will en-
21 sure the active participation of its mathematics,
22 science, or engineering departments in the develop-
23 ment and implementation of the program;

1 (D) an explanation of how the program will en-
2 sure that teachers are given instruction in both con-
3 tent and pedagogy;
4 (E) a description of how the applicant will re-
5 cruit teachers to participate in the program and the
6 criteria that will be used to select the participants;
7 (F) a description of the type and amount of any
8 financial assistance that will be provided to teachers
9 to enable them to participate; and
10 (G) a description of how the applicant will work
11 with schools to ensure the success of the partici-
12 pating teachers.
13 (2) In evaluating the applications submitted under
14 this subsection, the Director shall consider, at a
15 minimum
16 (A) the ability of the applicant to effectively
17 carry out the proposed program;
18 (B) the experience the applicant has in devel-
19 oping and implementing high quality professional de-
20 velopment programs for mathematics or science
21 teachers; and
22 (C) the extent to which the applicant is com-
23 mitted to making the program a central organiza-
24 tional focus.

1 (3) In evaluating the applications submitted under
2 this subsection, the Director shall give priority to those
3 applications that demonstrate the greatest participation of
4 mathematics, science, or engineering departments.

5 (d) TEACHER ELIGIBILITY. (1) To be eligible to
6 participate in a program funded under this section, a
7 mathematics or science teacher shall submit to the Direc-
8 tor, at such time and in such manner, as the Director may
9 require, an assurance executed by the sponsoring school,
10 that, after completing the program funded by this section,
11 the participating teacher will be provided sufficient non-
12 classroom time to serve as a master teacher. A copy of
13 this assurance must be submitted to the institution of
14 higher education as part of the teacher s application to
15 participate in the master teacher program.

16 (2) No funds authorized by this section may be used
17 to train any teacher who has not complied with paragraph
18 (1).

19 (e) ACCOUNTABILITY AND DISSEMINATION. (1) The
20 Director shall evaluate the activities carried out under this
21 section. At a minimum such evaluations shall use a com-
22 mon set of benchmarks and assessment tools to identify
23 best practices and materials developed and demonstrated
24 with funds provided under this section.

1 (2) The results of the evaluations required under this
2 subsection shall be made available to the public, including
3 through the National Science, Mathematics, Engineering,
4 and Technology Education Digital Library, and shall be
5 provided to the Committee on Science of the House of
6 Representatives and the Committee on Health, Education,
7 Labor, and Pensions of the Senate.

8 (3) Materials developed under the program estab-
9 lished under this section that are demonstrated to be effec-
10 tive shall be made available through the National Science,
11 Mathematics, Engineering, and Technology Education
12 Digital Library.

13 (f) AUTHORIZATION OF APPROPRIATIONS. There
14 are authorized to be appropriated to the National Science
15 Foundation to carry out this section $50,000,000 for each
16 of fiscal years 2002 through 2004.

17 **SEC. 4. DISSEMINATION OF INFORMATION ON REQUIRED**
18 **COURSE OF STUDY FOR CAREERS IN**
19 **SCIENCE, MATHEMATICS, ENGINEERING, AND**
20 **TECHNOLOGY EDUCATION.**

21 (a) IN GENERAL. The Director of the National
22 Science Foundation shall, jointly with the Secretary of
23 Education, compile and disseminate information (includ-
24 ing through outreach, school counselor education, and vis-
25 iting speakers) regarding

1 (1) typical standard prerequisites for middle
2 school and high school students who seek to enter a
3 course of study at an institution of higher education
4 in science, mathematics, engineering, or technology
5 education for purposes of teaching in an elementary
6 or secondary school; and
7 (2) the licensing requirements in each State for
8 science, mathematics, engineering, or technology ele-
9 mentary or secondary school teachers.
10 (b) AUTHORIZATION OF APPROPRIATIONS. There
11 are authorized to be appropriated to the National Science
12 Foundation to carry out this section $5,000,000 for each
13 of fiscal years 2002 through 2004.
14 **SEC. 5. REQUIREMENT TO CONDUCT STUDY EVALUATION.**
15 (a) STUDY REQUIRED. The Director of the National
16 Science Foundation shall enter into an agreement with the
17 National Academies of Sciences and Engineering under
18 which the Academies shall review existing studies on the
19 effectiveness of technology in the classroom on learning
20 and student performance, using various measures of learn-
21 ing and teaching outcome including standardized tests of
22 student achievement, and explore the feasibility of one or
23 more methodological frameworks to be used in evaluations
24 of technologies that have different purposes and are used
25 by schools and school systems with diverse educational

1 goals. The study evaluation shall include, to the extent
2 available, information on the type of technology used in
3 each classroom, the reason that such technology works,
4 and the teacher training that is conducted in conjunction
5 with the technology.

6 (b) DEADLINE FOR COMPLETION. The study eval-
7 uation required by subsection (a) shall be completed not
8 later than one year after the date of the enactment of this
9 Act.

10 (c) DEFINITION OF TECHNOLOGY. In this section,
11 the term "technology has the meaning given that term
12 in section 3113(11) of the Elementary and Secondary
13 Education Act of 1965 (20 U.S.C. 6813(11)).

14 (d) AUTHORIZATION OF APPROPRIATIONS. There
15 are authorized to be appropriated to the National Science
16 Foundation for the purpose of conducting the study eval-
17 uation required by subsection (a), $600,000.

18 **SEC. 6. SCIENCE, MATHEMATICS, ENGINEERING, AND**
19 **TECHNOLOGY BUSINESS EDUCATION CON-**
20 **FERENCE.**

21 (a) IN GENERAL. Not later than 180 days after the
22 date of the enactment of this Act, the Director of the Na-
23 tional Science Foundation shall convene the first of an an-
24 nual 3- to 5-day conference for kindergarten through the

1 12th grade science, mathematics, engineering, and tech-
2 nology education stakeholders, including
3 (1) representatives from Federal, State, and
4 local governments, private industries, private busi-
5 nesses, and professional organizations;
6 (2) educators;
7 (3) science, mathematics, engineering, and tech-
8 nology educational resource providers;
9 (4) students; and
10 (5) any other stakeholders the Director deter-
11 mines would provide useful participation in the con-
12 ference.
13 (b) PURPOSES. The purposes of the conference con-
14 vened under subsection (a) shall be to
15 (1) identify and gather information on existing
16 science, mathematics, engineering, and technology
17 education programs and resource providers, includ-
18 ing information on distribution, partners, cost as-
19 sessment, and derivation;
20 (2) determine the extent of any existing coordi-
21 nation between providers of curricular activities, ini-
22 tiatives, and units; and
23 (3) identify the common goals and differences
24 among the participants at the conference.

1 (c) REPORT AND PUBLICATION. At the conclusion
2 of the conference the Director shall
3 (1) transmit to the Committee on Science of the
4 House of Representatives and to the Committee on
5 Commerce, Science, and Transportation of the Sen-
6 ate a report on the outcome and conclusions of the
7 conference, including an inventory of curricular ac-
8 tivities, initiatives, and units, the content of the con-
9 ference, and strategies developed that will support
10 partnerships and leverage resources; and
11 (2) ensure that a similar report is published
12 and distributed as widely as possible to stakeholders
13 in science, mathematics, engineering, and technology
14 education.
15 (d) AUTHORIZATION OF APPROPRIATIONS. There
16 are authorized to be appropriated to the National Science
17 Foundation to carry out this section
18 (1) $300,000 for fiscal year 2002; and
19 (2) $200,000 for each of fiscal years 2003 and
20 2004.
21 **SEC. 7. DISTANCE LEARNING GRANTS.**
22 (a) IN GENERAL. The Director of the National
23 Science Foundation shall establish a program to award
24 competitive, merit-based grants to institutions of higher
25 education to provide distance learning opportunities in

1 mathematics or science to elementary or secondary school
2 students.
3 (b) USE OF FUNDS. Grants awarded under this sec-
4 tion shall be used by institutions of higher education to
5 establish programs under which elementary or secondary
6 school students can participate in research activities in
7 mathematics or science occurring at the grantees institu-
8 tion via the Internet.
9 (c) SELECTION PROCESS. (1) An institution of
10 higher education seeking funding under this section shall
11 submit an application at such time, in such manner, and
12 containing such information as the Director may require.
13 The application shall include, at a minimum
14 (A) a description of the research opportunities
15 that will be offered;
16 (B) a description of how the applicant will pub-
17 licize these research opportunities to schools and
18 teachers;
19 (C) a description of how the applicant will in-
20 volve teachers of participating students in the pro-
21 gram;
22 (D) a description of how students will be se-
23 lected to participate;
24 (E) a description of how the institution of high-
25 er education will ensure that the research is enhanc-

1 ing the participants education and will make it
2 more likely that the participants will continue their
3 studies in mathematics or science; and
4 (F) a description of how the funds will be
5 spent.
6 (2) In evaluating the applications submitted under
7 this subsection, the Director shall consider
8 (A) the ability of the applicant to effectively
9 carry out the proposed program;
10 (B) the extent to which the proposed program
11 will enhance the participants education and encour-
12 age them to continue the study of mathematics or
13 science; and
14 (C) the extent to which the proposed program
15 will provide opportunities that would not otherwise
16 be available to students.
17 (3) The Director shall ensure, to the extent prac-
18 ticable, that the program established under this section
19 serves students in a wide range of geographic areas and
20 in rural, suburban, and urban schools.
21 (d) AUTHORIZATION OF APPROPRIATIONS. There
22 are authorized to be appropriated to the National Science
23 Foundation to carry out this section $5,000,000 for each
24 of the fiscal years 2002 through 2004.

1 **SEC. 8. DEFINITIONS.**

2 In this Act:

3 (1) The term "elementary school has the
4 meaning given that term by section 14101(14) of
5 the Elementary and Secondary Education Act of
6 1965 (20 U.S.C. 8801(14)).

7 (2) The term "secondary school has the mean-
8 ing given that term by section 14101(25) of the Ele-
9 mentary and Secondary Education Act of 1965 (20
10 U.S.C. 8801(25)).

11 (3) The term "institution of higher education
12 has the meaning given that term by section 101 of
13 the Higher Education Act of 1965 (20 U.S.C.
14 1001).

Chairman SMITH. Without objection the motion to reconsider is laid on the table, and the Chair notes the presence of a quorum. I would like to thank all of the members of the Committee and good work, and with that I applaud everybody that has been working on this. And the Subcommittee is adjourned.

[Whereupon, at 10:40 a.m., the Subcommittee was adjourned.]

XXII. PROCEEDINGS OF FULL COMMITTEE MARKUP

H.R. 100, NATIONAL SCIENCE EDUCATION ACT

JUNE 13, 2001

HOUSE OF REPRESENTATIVES,
COMMITTEE ON SCIENCE,
Washington, DC.

Chairman BOEHLERT. We will now consider H.R. 100, National Science Education Act. And I think in view of the action on the floor, we probably should suspend our deliberations for now. Go to the floor, cast our ballots and come right back. And we should be able to dispense of another very important bill in short order.

Mr. SMITH. Mr. Chairman?

Chairman BOEHLERT. Yes.

[Statement of Nick Smith follows:]

HOUSE OF REPRESENTATIVES,
COMMITTEE ON SCIENCE,
Washington, DC, June 7, 2001.

To: Sherwood L. Boehlert, Chairman.
From: Nick Smith, Chairman Subcommittee on Research.
Re: Subcommittee Mark-up of H.R. 1858.

On June 7, 2001, the Subcommittee on Research held a mark-up of H.R. 1858, National Mathematics and Science Partnerships Act. A Manager's Amendment was offered by Mr. Smith and Ms. Johnson and was adopted by a voice vote.

Attached for your information is a section by section analysis and a copy of the measure.

H.R. 1858, AS REPORTED BY THE SUBCOMMITTEE ON RESEARCH ON JUNE 7, 2001

SEC. 1. SHORT TITLE

"National Mathematics and Science Partnerships Act".

SEC. 2. FINDINGS

Discuss the goal set by the nation's Governors to establish the U.S. as the world's leaders in math and science achievement by the year 2000, the failure to reach that goal, and the need to redouble efforts to provide all of the country's students with a world-class education in math, science, engineering, and technology.

SEC. 3. DEFINITIONS

Provides the standard references to define "institution of higher education", "local educational agency", "state educational agency", "Director", and defines "eligible nonprofit organization".

SEC. 4. AUTHORIZATIONS OF APPROPRIATIONS

Any authorization of appropriations in the bill is in addition to amounts otherwise authorized or appropriated for the National Science Foundation (NSF).

SEC. 5. MATCHING REQUIREMENTS

Allows the Director of NSF to establish matching fund requirements for any of the programs authorized by the bill, with the exception of the Noyce Scholarship program described in Title IV.

TITLE I. MATHEMATICS AND SCIENCE EDUCATION PARTNERSHIPS

Subtitle A. Mathematics and science education partnerships

Establishes a competitive, merit-based program to award grants to institutions of higher education or eligible nonprofit organizations to establish math and science partnership programs. Requires institutions of higher education to partner with one or more local educational agencies to be eligible to receive a partnership grant. Partnerships may also include a state educational agency and/or one or more businesses. Requires that the higher education institution include a mathematics, science or engineering department in the programs carried out through the partnership. At least 50% of the partnerships must include businesses.

Lists allowable activities for partnership programs that include teacher recruitment, training, and professional development—including training in educational technologies—distance learning programs, development of curricular materials and assessment tools, and others, including any other activities the NSF Director determines will accomplish the goals of the program. Specifies that the allowable activities for partnerships shall include programs to encourage the ongoing interest of girls in science, mathematics, engineering and technology and prepare them to pursue college and graduate-level study in these fields. Requires NSF Director to ensure, to the extent practicable, that partnership grants be awarded in a geographically diverse fashion, and that the partnerships include a diverse array of rural, urban and suburban school districts.

Authorization of $200 million for each of fiscal years 2002 through 2006.

Subtitle B. Teacher research scholarship program

Establishes a competitive, merit-based grant program for institutions of higher education or eligible nonprofit organizations to provide research opportunities in mathematics, science, and engineering for math and science teachers. Businesses or State laboratories may be included as partners in the program. Grant recipients recruit and select teachers, give them opportunities to conduct research, and provide them with mentors and programming support. Grant recipients must provide a stipend to participating teachers and may provide room and board. Requires NSF Director to ensure, to the extent practicable, that partnership grants be awarded in a geographically diverse fashion, including rural, urban and suburban areas.

Authorization of $15 million for each of fiscal years 2002 through 2006.

TITLE II. NATIONAL SCIENCE, MATHEMATICS, ENGINEERING, AND TECHNOLOGY EDUCATION DIGITAL LIBRARY

Directs the NSF Director to expand the National Science, Mathematics, Engineering, and Technology Education Digital Library program by providing grants, on a competitive, peer-reviewed basis, to institutions of higher education or other qualified entities to provide timely and continuous dissemination of K–12 science, math, engineering, and technology educational resources, materials, practices, and policies through the Internet and other digital technologies. Allows grant recipients to use funds to provide assistance to schools for the selection and adaptation of curricular materials, practices, and teaching methods that are made available through the Digital Library. Allows the Director to contract out operation of the Digital Library.

Authorization of $20 million for each of fiscal years 2002 through 2006.

TITLE III. STRATEGIC EDUCATION RESEARCH PROGRAM

Subtitle A. Centers

Directs the NSF Director to establish four multidisciplinary Centers for Research on Learning and Education Improvement by awarding grants, using a merit-based, competitive process, to institutions of higher education. Centers are to conduct and evaluate research in cognitive science, education and related fields and to develop ways in which the results of such research can be applied to the teaching of K–12 math and science. Each Center is to have a distinct research focus, determined by the Director in consultation with the National Academy of Sciences. Requires the Director to convene an annual meeting of the Centers.

Authorization of $12 million for each of fiscal years 2002 through 2006.

Subtitle B. Fellowships

Establishes a fellowship program for K–12 teachers to pursue education research fellowships at institutions of higher education. Grants are to be awarded on a competitive, peer-reviewed basis to institutions of higher education to set up programs that will enable K–12 teachers to conduct research on cognitive science or education research under the guidance of a researcher at the institution. Grant recipients must recruit and select teachers, give them opportunities to conduct research, and provide them with mentors and programming support. Grant recipients must provide a stipend to participating teachers and may provide room and board.

$5 million authorized for each of fiscal years 2002 through 2004.

TITLE IV. ROBERT NOYCE SCHOLARSHIP PROGRAM

Establishes a competitive, merit-based grant program for institutions of higher education to obtain grants in order to award scholarships to recruit and train K–12 science and math teachers. Grant recipients are to use the funds to establish programs that encourage top college juniors and seniors majoring in science, math and engineering, as well as science, math, and engineering professionals to become K–12 science and math teachers by administering scholarships and stipends, offering programs to help scholarship/stipend recipients become certified to teach in K–12 schools, and offering programs to help scholarship/stipend recipients to become better mathematics and science teachers. Grant recipients will also offer programs to provide professional and academic support to scholarship/stipend recipients during their early years of teaching.

Scholarships for undergraduates are to be awarded for $7500 or the cost of attendance, whichever is less. Stipends for science, math, and engineering professionals are to be awarded for $7500 or the cost of tuition, whichever is less. Individuals may receive a maximum of two years' worth of support, and must agree to complete two years of teaching in a K–12 school for every year of scholarship or stipend funds awarded.

Scholarship recipients who do not complete even a single year of their service obligation would be required to pay back the amount of the award (plus interest) multiplied by two. Scholarship recipients who complete at least one year of their service obligation but do not complete the rest must repay only the total amount of their award, less $3750 for each year of service completed, plus interest.

Requires NSF Director to ensure, to the extent practicable, that partnership grants be awarded in a geographically diverse fashion, and prepare recipients for jobs in rural, urban and suburban areas.

$20 million authorized for each of fiscal years 2002 through 2005.

TITLE V. REQUIREMENTS FOR RESEARCH CENTERS

Requires the Director of NSF to ensure that grants that establish new research centers at institutions of higher education incorporate an elementary and secondary mathematics, science, engineering or technology education component into their program.

TITLE VI. MISCELLANEOUS PROVISIONS

Sec. 601. Mathematics and science proficiency partnerships

Establishes an NSF program to award grants of not more than $300,000 (on a peer-reviewed, competitive basis) to local educational agencies to develop math, science, and information technology curricula, purchase equipment necessary to establish such programs, and provide professional development opportunities for teachers. In order to qualify for such a grant, the local educational agency must execute an agreement with a private sector entity to provide services and funds that include: donations of computers, establishment of internship and mentoring programs, and the provision of college scholarships for students committed to pursuing a career in math, science or information technology. Special priority is to be given to grant applicants that demonstrate the greatest economic need and the greatest ability to attract funds and services from the private sector.

$5 million authorized for each of fiscal years 2002 through 2004.

Sec. 602. Articulation partnerships between community colleges and secondary schools

For grant awards authorized under section 3(c)(2) of the Scientific and Advanced-Technology Act of 1992, requires the Director to give priority to grant proposals that involve secondary schools with a majority of students from groups that are underrepresented in the science, mathematics, and engineering workforce.

$5 million authorized for each of fiscal years 2002 through 2004.

Sec. 603. Assessment of in-service professional development programs

Requires the Director to review all NSF programs that support teacher training programs to determine (1) what level of resources and degree of emphasis is placed on the training of teachers in the effective use of information technologies and (2) the allocation of resources between summer activities and follow-on training and support to participating teachers during the school year. Requires that a report be made to Congress on the results of the review.

TITLE VII. EDUCATIONAL TECHNOLOGIES

Establishes an NSF program to award grants (on a peer-reviewed, competitive basis) to institutions of higher education to establish centers to evaluate and improve the effectiveness of information technologies in K–12 math and science education. Centers would be required to identify and study the effectiveness of educational approaches and techniques that are based on the use of information technology, to identify the key variables affecting educational effectiveness, and then to ensure that the results of this analysis are widely disseminated and effectively applied by K–12 schools. Allows the Director to sponsor conferences, workshops, and websites in order to disseminate information further.

$25 million authorized for each of fiscal years 2002 through 2004; $30 million authorized for each of fiscal years 2005 and 2006.

H.R. 100, As Reported by the Subcommittee on Research on June 7, 2001

1 **SECTION 1. SHORT TITLE.**

2 This Act may be cited as the "National Science Edu-
3 cation Act".

4 **SEC. 2. FINDINGS.**

5 Congress finds the following:

6 (1) As concluded in the report of the Com-
7 mittee on Science of the House of Representatives,
8 "Unlocking Our Future Toward a New National
9 Science Policy", the United States must maintain
10 and improve its preeminent position in science and
11 technology in order to advance human under-
12 standing of the universe and all it contains, and to
13 improve the lives, health, and freedoms of all people.

14 (2) It is estimated that more than half of the
15 economic growth of the United States today results
16 directly from research and development in science
17 and technology. The most fundamental research is
18 responsible for investigating our perceived universe,
19 to extend our observations to the outer limits of
20 what our minds and methods can achieve, and to
21 seek answers to questions that have never been
22 asked before. Applied research continues the process
23 by applying the answers from basic science to the

problems faced by individuals, organizations, and governments in the everyday activities that make our lives more livable. The scientific-technological sector of our economy, which has driven our recent economic boom and led the United States to the longest period of prosperity in history, is fueled by the work and discoveries of the scientific community.

(3) The effectiveness of the United States in maintaining this economic growth will be largely determined by the intellectual capital of the United States. Education is critical to developing this resource.

(4) The education program of the United States needs to provide for 3 different kinds of intellectual capital. First, it needs scientists, mathematicians, and engineers to continue the research and development that are central to the economic growth of the United States. Second, it needs technologically proficient workers who are comfortable and capable dealing with the demands of a science-based, high-technology workplace. Last, it needs scientifically literate voters and consumers to make intelligent decisions about public policy.

(5) Student performance on the recent Third International Mathematics and Science Study high-

lights the shortcomings of current K–12 science and mathematics education in the United States, particularly when compared to other countries. We must expect more from our Nation's educators and students if we are to build on the accomplishments of previous generations. New methods of teaching science, mathematics, engineering, and technology are required, as well as better curricula and improved training of teachers.

(6) Science is more than a collection of facts, theories, and results. It is a process of inquiry built upon observations and data that leads to a way of knowing and explaining in logically derived concepts and theories. Mathematics is more than procedures to be memorized. It is a field that requires reasoning, understanding, and making connections in order to solve problems. Engineering is more than just designing and building. It is the process of making compromises to optimize design and assessing risks so that designs and products best solve a given problem. Technology is more than using computer applications, the Internet, and programming. Technology is the innovation, change, or modification of the natural environment, based on scientific, mathematical, and engineering principles.

(7) Students should learn science primarily by doing science. Science education ought to reflect the scientific process and be object-oriented, experiment-centered, and concept-based. Students should learn mathematics with understanding that numeric systems have intrinsic properties that can represent objects and systems in real life, and can be applied in solving problems. Engineering education should reflect the realities of real world design, and should involve hands-on projects and require students to make trade-offs based upon evidence. Students should learn technology as both a tool to solve other problems and as a process by which people adapt the natural world to suit their own purposes. Computers represent a particularly useful form of technology, enabling students and teachers to acquire data, model systems, visualize phenomena, communicate and organize information, and collaborate with others in powerful new ways. A background in the basics of information technology is essential for success in the modern workplace and the modern world.

(8) Children are naturally curious and inquisitive. To successfully tap into these innate qualities, education in science, mathematics, engineering, and

technology must begin at an early age and continue throughout the entire school experience.

(9) Teachers provide the essential connection between students and the content they are learning. Prospective teachers need to be identified and recruited by presenting to them a career that is respected by their peers, is financially and intellectually rewarding, contains sufficient opportunities for advancement, and has continuing access to professional development.

(10) Teachers need to have incentives to remain in the classroom and improve their practice, and training of teachers is essential if the results are to be good. Teachers need to be knowledgeable of their content area, of their curriculum, of up-to-date research in teaching and learning, and of techniques that can be used to connect that information to their students in their classroom.

SEC. 3. MASTER TEACHER GRANT PROGRAM.

(a) DEFINITIONS.—In this section—

(1) The term "sponsoring school" means an elementary or secondary school that employs a master teacher who is participating in a program funded in accordance with this section.

(2) The term "nonclassroom time" means time during regular school hours that is not utilized by a master teacher for instructing elementary or secondary school children in the classroom.

(3) The term "master teacher" means a mathematics or science teacher who works to improve the instruction of mathematics or science in kindergarten through 9th grade through—

(A) participating in the development or revision of science, mathematics, engineering, or technology curricula;

(B) serving as a mentor to mathematics or science teachers at the sponsoring school or other schools;

(C) coordinating and assisting teachers in the use of hands-on inquiry materials, equipment, and supplies, and when appropriate, supervising acquisition and repair of such materials;

(D) providing in-classroom teaching assistance to mathematics or science teachers; and

(E) providing professional development, including for the purposes of training other master teachers, to mathematics and science teachers.

1 (4) The term "mathematics or science teacher"
2 means a teacher of mathematics, science, engineer-
3 ing, or technology in an elementary or secondary
4 school.
5 (b) PROGRAM AUTHORIZED.—(1) The Director of the
6 National Science Foundation shall establish a program to
7 award competitive, merit-reviewed grants to institutions of
8 higher education (or consortia thereof) to train master
9 teachers and assist elementary and secondary schools to
10 design and implement master teacher programs.
11 (2) Institutions of higher education receiving grants
12 under this section shall offer programs to train master
13 teachers. As part of such programs, a grantee shall—
14 (A) recruit and select teachers to receive train-
15 ing;
16 (B) ensure that training covers both content
17 and pedagogy;
18 (C) ensure that participating teachers have
19 mentors; and
20 (D) assist participating teachers with the devel-
21 opment and implementation of master teacher pro-
22 grams at their sponsoring schools.
23 (3) Grants awarded under this section may be used
24 to—

1 (A) develop and implement professional develop-
2 ment programs to train elementary or secondary
3 school teachers to become master teachers;
4 (B) provide stipends and reimbursement for
5 travel to allow teachers to participate in professional
6 development programs in the summer and through-
7 out the year;
8 (C) provide guidance to sponsoring schools to
9 enable them to develop and implement a plan for the
10 use of master teachers;
11 (D) support participating teachers during the
12 summer in research programs conducted at institu-
13 tions of higher education, private entities, or govern-
14 ment facilities;
15 (E) provide educational materials and equip-
16 ment to master teachers;
17 (F) provide computer equipment and network
18 connectivity necessary to enable master teachers to
19 collaborate with other master teachers, to access
20 educational materials available online, and to com-
21 municate with scientists or other mentors at remote
22 locations; and
23 (G) fund any other activities the Director deter-
24 mines will accomplish the goals of this section.

1 (c) SELECTION PROCESS.—(1) An institution of
2 higher education seeking funding under this section shall
3 submit an application at such time, in such manner, and
4 containing such information as the Director may require.
5 The application shall include, at a minimum—
6 (A) a description of which classroom subjects
7 and grade levels the training will address;
8 (B) a description of the activities to be carried
9 out, including—
10 (i) how such activities will be aligned with
11 State and local standards and with other activi-
12 ties that promote student achievement in math-
13 ematics and science; and
14 (ii) how such activities will be based on a
15 review of relevant research and why such activi-
16 ties are expected to strengthen the quality of
17 mathematics and science instruction;
18 (C) a description of how the applicant will en-
19 sure the active participation of its mathematics,
20 science, or engineering departments in the develop-
21 ment and implementation of the program;
22 (D) an explanation of how the program will en-
23 sure that teachers are given instruction in both con-
24 tent and pedagogy;

1 (E) a description of how the applicant will re-
2 cruit teachers to participate in the program and the
3 criteria that will be used to select the participants;
4 (F) a description of the type and amount of any
5 financial assistance that will be provided to teachers
6 to enable them to participate; and
7 (G) a description of how the applicant will work
8 with schools to ensure the success of the partici-
9 pating teachers.
10 (2) In evaluating the applications submitted under
11 this subsection, the Director shall consider, at a
12 minimum—
13 (A) the ability of the applicant to effectively
14 carry out the proposed program;
15 (B) the experience the applicant has in devel-
16 oping and implementing high-quality professional de-
17 velopment programs for mathematics or science
18 teachers; and
19 (C) the extent to which the applicant is com-
20 mitted to making the program a central organiza-
21 tional focus.
22 (3) In evaluating the applications submitted under
23 this subsection, the Director shall give priority to those
24 applications that demonstrate the greatest participation of
25 mathematics, science, or engineering departments.

1 (d) TEACHER ELIGIBILITY.—(1) To be eligible to
2 participate in a program funded under this section, a
3 mathematics or science teacher shall submit to the Direc-
4 tor, at such time and in such manner as the Director may
5 require, an assurance executed by the sponsoring school,
6 that, after completing the program funded by this section,
7 the participating teacher will be provided sufficient non-
8 classroom time to serve as a master teacher. A copy of
9 this assurance must be submitted to the institution of
10 higher education as part of the teacher's application to
11 participate in the master teacher program.
12 (2) No funds authorized by this section may be used
13 to train any teacher who has not complied with paragraph
14 (1).
15 (e) ACCOUNTABILITY AND DISSEMINATION.—(1) The
16 Director shall evaluate the activities carried out under this
17 section. At a minimum such evaluations shall use a com-
18 mon set of benchmarks and assessment tools to identify
19 best practices and materials developed and demonstrated
20 with funds provided under this section.
21 (2) The results of the evaluations required under this
22 subsection shall be made available to the public, including
23 through the National Science, Mathematics, Engineering,
24 and Technology Education Digital Library, and shall be
25 provided to the Committee on Science of the House of

1 Representatives and the Committee on Health, Education,
2 Labor, and Pensions of the Senate.
3 (3) Materials developed under the program estab-
4 lished under this section that are demonstrated to be effec-
5 tive shall be made available through the National Science,
6 Mathematics, Engineering, and Technology Education
7 Digital Library.
8 (f) AUTHORIZATION OF APPROPRIATIONS.—There
9 are authorized to be appropriated to the National Science
10 Foundation to carry out this section $50,000,000 for each
11 of fiscal years 2002 through 2004.

12 **SEC. 4. DISSEMINATION OF INFORMATION ON REQUIRED**
13 **COURSE OF STUDY FOR CAREERS IN**
14 **SCIENCE, MATHEMATICS, ENGINEERING, AND**
15 **TECHNOLOGY EDUCATION.**

16 (a) IN GENERAL.—The Director of the National
17 Science Foundation shall, jointly with the Secretary of
18 Education, compile and disseminate information (includ-
19 ing through outreach, school counselor education, and vis-
20 iting speakers) regarding—
21 (1) typical standard prerequisites for middle
22 school and high school students who seek to enter a
23 course of study at an institution of higher education
24 in science, mathematics, engineering, or technology

1 education for purposes of teaching in an elementary
2 or secondary school; and
3 (2) the licensing requirements in each State for
4 science, mathematics, engineering, or technology ele-
5 mentary or secondary school teachers.
6 (b) AUTHORIZATION OF APPROPRIATIONS.—There
7 are authorized to be appropriated to the National Science
8 Foundation to carry out this section $5,000,000 for each
9 of fiscal years 2002 through 2004.

10 **SEC. 5. REQUIREMENT TO CONDUCT STUDY EVALUATION.**

11 (a) STUDY REQUIRED.—The Director of the National
12 Science Foundation shall enter into an agreement with the
13 National Academies of Sciences and Engineering under
14 which the Academies shall review existing studies on the
15 effectiveness of technology in the classroom on learning
16 and student performance, using various measures of learn-
17 ing and teaching outcome including standardized tests of
18 student achievement, and explore the feasibility of one or
19 more methodological frameworks to be used in evaluations
20 of technologies that have different purposes and are used
21 by schools and school systems with diverse educational
22 goals. The study evaluation shall include, to the extent
23 available, information on the type of technology used in
24 each classroom, the reason that such technology works,

1 and the teacher training that is conducted in conjunction
2 with the technology.

3 (b) DEADLINE FOR COMPLETION.—The study eval-
4 uation required by subsection (a) shall be completed not
5 later than one year after the date of the enactment of this
6 Act.

7 (c) DEFINITION OF TECHNOLOGY.—In this section,
8 the term "technology" has the meaning given that term
9 in section 3113(11) of the Elementary and Secondary
10 Education Act of 1965 (20 U.S.C. 6813(11)).

11 (d) AUTHORIZATION OF APPROPRIATIONS.—There
12 are authorized to be appropriated to the National Science
13 Foundation for the purpose of conducting the study eval-
14 uation required by subsection (a), $600,000.

15 **SEC. 6. SCIENCE, MATHEMATICS, ENGINEERING, AND**
16 **TECHNOLOGY BUSINESS EDUCATION CON-**
17 **FERENCE.**

18 (a) IN GENERAL.—Not later than 180 days after the
19 date of the enactment of this Act, the Director of the Na-
20 tional Science Foundation shall convene the first of an an-
21 nual 3- to 5-day conference for kindergarten through 12th
22 grade science, mathematics, engineering, and technology
23 education stakeholders, including—

1 (1) representatives from Federal, State, and
2 local governments, private industries, private busi-
3 nesses, and professional organizations;
4 (2) educators;
5 (3) science, mathematics, engineering, and tech-
6 nology educational resource providers;
7 (4) students; and
8 (5) any other stakeholders the Director deter-
9 mines would provide useful participation in the con-
10 ference.
11 (b) PURPOSES.—The purposes of the conference con-
12 vened under subsection (a) shall be to—
13 (1) identify and gather information on existing
14 science, mathematics, engineering, and technology
15 education programs and resource providers, includ-
16 ing information on distribution, partners, cost as-
17 sessment, and derivation;
18 (2) determine the extent of any existing coordi-
19 nation between providers of curricular activities, ini-
20 tiatives, and units; and
21 (3) identify the common goals and differences
22 among the participants at the conference.
23 (c) REPORT AND PUBLICATION.—At the conclusion
24 of the conference the Director shall—

(1) transmit to the Committee on Science of the House of Representatives and to the Committee on Commerce, Science, and Transportation of the Senate a report on the outcome and conclusions of the conference, including an inventory of curricular activities, initiatives, and units, the content of the conference, and strategies developed that will support partnerships and leverage resources; and

(2) ensure that a similar report is published and distributed as widely as possible to stakeholders in science, mathematics, engineering, and technology education.

(d) AUTHORIZATION OF APPROPRIATIONS.—There are authorized to be appropriated to the National Science Foundation to carry out this section—

(1) $300,000 for fiscal year 2002; and

(2) $200,000 for each of fiscal years 2003 and 2004.

SEC. 7. DISTANCE LEARNING GRANTS.

(a) IN GENERAL.—The Director of the National Science Foundation shall establish a program to award competitive, merit-based grants to institutions of higher education to provide distance learning opportunities in mathematics or science to elementary or secondary school students.

1 (b) USE OF FUNDS.—Grants awarded under this sec-
2 tion shall be used by institutions of higher education to
3 establish programs under which elementary or secondary
4 school students can participate in research activities in
5 mathematics or science occurring at the grantees' institu-
6 tion via the Internet.

7 (c) SELECTION PROCESS.—(1) An institution of
8 higher education seeking funding under this section shall
9 submit an application at such time, in such manner, and
10 containing such information as the Director may require.
11 The application shall include, at a minimum—

12 (A) a description of the research opportunities
13 that will be offered;

14 (B) a description of how the applicant will pub-
15 licize these research opportunities to schools and
16 teachers;

17 (C) a description of how the applicant will in-
18 volve teachers of participating students in the pro-
19 gram;

20 (D) a description of how students will be se-
21 lected to participate;

22 (E) a description of how the institution of high-
23 er education will ensure that the research is enhanc-
24 ing the participants' education and will make it

more likely that the participants will continue their studies in mathematics or science; and

(F) a description of how the funds will be spent.

(2) In evaluating the applications submitted under this subsection, the Director shall consider—

(A) the ability of the applicant to effectively carry out the proposed program;

(B) the extent to which the proposed program will enhance the participants' education and encourage them to continue the study of mathematics or science; and

(C) the extent to which the proposed program will provide opportunities that would not otherwise be available to students.

(3) The Director shall ensure, to the extent practicable, that the program established under this section serves students in a wide range of geographic areas and in rural, suburban, and urban schools.

(d) AUTHORIZATION OF APPROPRIATIONS.—There are authorized to be appropriated to the National Science Foundation to carry out this section $5,000,000 for each of the fiscal years 2002 through 2004.

SEC. 8. DEFINITIONS.

In this Act:

1 (1) The term "elementary school" has the
2 meaning given that term by section 14101(14) of
3 the Elementary and Secondary Education Act of
4 1965 (20 U.S.C. 8801(14)).
5 (2) The term "secondary school" has the mean-
6 ing given that term by section 14101(25) of the Ele-
7 mentary and Secondary Education Act of 1965 (20
8 U.S.C. 8801(25)).
9 (3) The term "institution of higher education"
10 has the meaning given that term by section 101 of
11 the Higher Education Act of 1965 (20 U.S.C.
12 1001).

Mr. SMITH. Would it be possible, with the consent of the sponsor of the bill that maybe we could do this in the next 5 minutes, before we go to the floor?

Chairman BOEHLERT. Dr. Ehlers?

Mr. EHLERS. Mr. Chairman, I am quite sure we can.

Chairman BOEHLERT. All right. I ask unanimous consent that the bill be considered as read and open to amendment at any point. I ask the members to proceed with the amendments in the order of the roster. I move that the first reading of the bill be dispensed with. I—let's see. Chair recognizes Mr. Ehlers.

[Statements of Vernon J. Ehlers and Sheila Jackson Lee follow:]

OPENING STATEMENT OF HON. VERNON J. EHLERS

Today we are marking up H.R. 100, the National Science Education Act, the first of three bills aimed at improving science, math, engineering, and technology education—known as "SMET ed." H.R. 100 is similar to H.R. 4271, which passed this Committee by a unanimous vote during the 106th Congress. I want to thank Chairman Boehlert for his leadership on this issue.

Our K–12 education system serves three main purposes: it is responsible for preparing future scientists and engineers for further study in college and graduate school; it provides all future workers the basic technical skills they will need in a 21st century workforce, where nearly every job will have a technical component; and it provides scientific and technical understanding so that citizens may make informed decisions as consumers and voters. Unfortunately, recent international assessments of student performance in science and math showed that our twelfth grade students were well behind their international peers.

As most of you know, during the 106th Congress, this Committee conducted a series of hearings to further examine the state of the nation's math and science education, and to suggest improvements. While there are many factors that impact student achievement, a common theme that arose from our discussions is that there is no substitute for a knowledgeable and well-prepared teacher in the classroom.

Teachers, particularly at the elementary and middle school level, often lack time and school resources to implement an inquiry-based, hands-on science curriculum. Unlike H.R. 4271 of last year, which authorized grants to elementary and middle schools to hire master teachers, H.R. 100 authorizes a competitive grant program for higher education institutions to train teachers to become master teachers. Teachers with strong backgrounds in math, science, engineering and technology would be trained as master teachers to provide on-going professional development, in-classroom assistance, and oversight of hands-on science materials to a group of elementary and middle school SMET teachers. This is the type of support our teachers deserve and should be receiving.

In addition, this bill requires NSF and the National Academies to evaluate existing studies on the effectiveness of technology in the classroom on learning and student performance. Federal, state, and local governments have done a good job providing funds for technology acquisition, but it is unclear what technologies and software work best and how technology enhances student learning.

This bill also creates a program for higher education institutions to provide distance learning opportunities for elementary and secondary students. Distance learning invites exciting possibilities for student learning, particularly for student scientific research.

I look forward to having my colleagues' input and support today and to consideration by the full House in the future. With this effort, our nation's teachers and students will be one step closer to receiving the support and education they so much deserve.

I would like to close by thanking Chairman Boehlert and subcommittee Chairman Smith for working with me to bring this bill forward today.

STATEMENT OF HON. SHEILA JACKSON LEE

Mr. Chairman, I would like to thank you and Ranking Member Ralph Hall for this opportunity to markup, H.R. 1858, which would make improvements in mathematics and science education in our nation, and H.R. 100, the National Science and Education Act. These bills are long over due and are much needed in ensuring that we have adequate numbers of trained scientists and mathematicians for the technological and economic challenges of tomorrow.

H.R. 1858 offers support to current teachers and help to recruit and retain new teachers who are trained and accredited to teach math and science.

In order to accomplish the goals of this legislation it would create new approaches for the Nations Science Foundation (NSF) to take in building a stronger and more diverse repository of mathematics and science trained teachers. The long range goal is to provide instruction in math and science by teachers who are trained in those areas, and through this effort increase the number of students who pursue math and science undergraduate and graduate degrees.

It is my goal along with the committee's to create a public education system that would develop a technologically capable workforce that can compete in the global economy.

Toward this end, I have offered several amendments to H.R. 1858. The first amendment directs that the National Digital Library contain information about electronic links to materials that educators may access. The second amendment requires that research center awards focus on research and development of educational practices designed to improve the academic performance of a broad range of students, including those from underrepresented groups.

Through the committee hearing process on these particular bills the groups that are underrepresented have been identified as African Americans, Hispanics, Native Americans and women.

The last amendment directs that the NSF provide information on the awarding of Robert Noyce Scholarships. As a result of this amendment the NSF will be required to collect relevant statistically and demographic data on scholarship recipients and information on the locations at which scholarship recipients carry out their teaching requirement. This report is required by year 7 of the program assessing its impact on drawing math and science students into teaching careers, including students from underrepresented groups.

I thank the Chair and committee members for their consideration of these amendments and look forward to their inclusion in the final bill sent to the House by this committee.

Thank you.

Mr. EHLERS. Thank you, Mr. Chairman. I have an opening statement. In the interest of time, I will just give that to the reporter to enter into the record.

Let me just say this bill has had thorough examination and passed this Committee last year, unanimously. It has been improved since that time. I think it deserves the same action today, that is, unanimous passage. And in the interest of time, I will just withhold further comment at this time.

Chairman BOEHLERT. Thank you very much. Is there any other discussion? No amendments? Then—I move that the Committee report that bill H.R. 100, as amend—no amendments. Further, I move to instruct the staff to prepare the legislative report to make technical and confirming amendments and that the Chairman take all necessary steps to bring the bill before the House for consideration. The vote is on the bill, H.R. 100. All in favor say aye. Opposed, no. The ayes have it. The chair notes the presence of a reported quorum. The question is then—well, we already did that. I move that the members have 2 subsequent calendar days in which to submit supplemental, minority or additional views on the measure. Mr. Gordon?

Mr. GORDON. Mr. Chairman, I move the Committee favorably report H.R. 100 as amended to the House, with the recommendation that the bill, as amended, do pass. Furthermore, I move that the staff be instructed to prepare the legislative report and make necessary technical and performing changes. That the Chairman take all necessary steps to bring the bill before the House for consideration.

Chairman BOEHLERT. We do have a reporting quorum. All in favor say aye. Opposed, no. The ayes have it. And I move that the

Members have 2 subsequent calendar days, et cetera. This Committee is now adjourned. Good work.

[Whereupon, at 10:40 a.m., the Committee was adjourned.]

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