

106TH CONGRESS  
2D SESSION

# H. R. 4271

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

---

## IN THE HOUSE OF REPRESENTATIVES

APRIL 13, 2000

Mr. EHLERS (for himself, Mrs. BIGGERT, Mr. BOEHLERT, Mr. BRADY of Texas, Mr. COOK, Mr. GILCHREST, Mr. GILMAN, Mr. HOLT, Mr. JENKINS, Ms. EDDIE BERNICE JOHNSON of Texas, Mr. KUYKENDALL, Mr. PORTER, Mrs. ROUKEMA, Mr. SMITH of Michigan, Mr. SWEENEY, Mr. UPTON, and Mrs. WILSON) 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

---

## A BILL

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

1       *Be it enacted by the Senate and House of Representa-*  
2       *tives of the United States of America in Congress assembled,*

3       **SECTION 1. SHORT TITLE.**

4       This Act may be cited as the “National Science Edu-  
5       cation Act”.

1 **SEC. 2. FINDINGS.**

2 Congress finds the following:

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

12 (2) It is estimated that more than half of the  
13 economic growth of the United States today results  
14 directly from research and development in science  
15 and technology. The most fundamental research is  
16 responsible for investigating our perceived universe,  
17 to extend our observations to the outer limits of  
18 what our minds and methods can achieve, and to  
19 seek answers to questions that have never been  
20 asked before. Applied research continues the process  
21 by applying the answers from basic science to the  
22 problems faced by individuals, organizations, and  
23 governments in the everyday activities that make our  
24 lives more livable. The scientific-technological sector  
25 of our economy, which has driven our recent eco-  
26 nomic 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 and engineers to  
11 continue the research and development that is cen-  
12 tral to the economic growth of the United States.  
13 Second, it needs technologically proficient workers  
14 who are comfortable and capable dealing with the  
15 demands of a science-based, high-technology work-  
16 place. Last, it needs scientifically literate voters and  
17 consumers to make intelligent decisions about public  
18 policy.

19 (5) Student performance on the recent Third  
20 International Math and Science Study highlights the  
21 shortcomings of current K–12 science and mathe-  
22 matics education in the United States, particularly  
23 when compared to other countries. We must expect  
24 more from our Nation’s educators and students if  
25 we are to build on the accomplishments of previous

1 generations. New methods of teaching mathematics  
2 and science are required, as well as better curricula  
3 and improved training of teachers.

4 (6) Science is more than a collection of facts,  
5 theories, and results. It is a process of inquiry built  
6 upon observations and data that leads to a way of  
7 knowing and explaining in logically derived concepts  
8 and theories.

9 (7) Students should learn science primarily by  
10 doing science. Science education ought to reflect the  
11 scientific process and be object-oriented, experiment-  
12 centered, and concept-based.

13 (8) Children are naturally curious and inquisi-  
14 tive. To successfully tap into these innate qualities,  
15 education in science must begin at an early age and  
16 continue throughout the entire school experience.

17 (9) Teachers provide the essential connection  
18 between students and the content they are learning.  
19 High-quality prospective teachers need to be identi-  
20 fied and recruited by presenting to them a career  
21 that is respected by their peers, is financially and in-  
22 tellectually rewarding, and contains sufficient oppor-  
23 tunities for advancement.

24 (10) Teachers need to have incentives to remain  
25 in the classroom and improve their practice, and

1 training of teachers is essential if the results are to  
2 be good. Teachers need to be knowledgeable of their  
3 content area, of their curriculum, of up-to-date re-  
4 search in teaching and learning, and of techniques  
5 that can be used to connect that information to their  
6 students in their classroom.

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

8 Nothing in this Act may be construed to authorize  
9 any department, agency, officer, or employee of the United  
10 States to exercise any direction, supervision, or control  
11 over the curriculum, program of instruction, administra-  
12 tion, or personnel of any educational institution or school  
13 system.

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

15 The National Science Foundation Act of 1950 (42  
16 U.S.C. 1861 et seq.) is amended—

17 (1) by redesignating section 16 as section 18;  
18 and

19 (2) by inserting after section 15 the following  
20 new section:

21 **“§ 16. Grants and awards**

22 “(a)(1) The Director of the National Science Foun-  
23 dation shall conduct a grant program to make grants to  
24 a State or local educational agency or to a private elemen-

1 tary or middle school for the purpose of hiring a master  
2 teacher described in paragraph (3).

3 “(2) In order to be eligible to receive a grant under  
4 this subsection, a State or local educational agency or pri-  
5 vate elementary or middle school shall submit to the Direc-  
6 tor a description of the requirements for a master teacher  
7 of the State or local educational agency or school, includ-  
8 ing certification requirements and job responsibilities of  
9 the master teacher, and a description of how professional  
10 development will be integrated with the math or science  
11 program of the State educational agency or local edu-  
12 cational agency or school including a master teacher.

13 “(3) A master teacher referred to in paragraph (1)—

14 “(A) shall provide support for not more than 10  
15 teachers at public and private schools in math,  
16 science, engineering or technology programs for stu-  
17 dents in grades kindergarten through the eighth  
18 grade; and

19 “(B) shall be responsible for in-classroom as-  
20 sistance and oversight of hands-on inquiry materials,  
21 equipment, and supplies, including supplying and re-  
22 pairing such materials.

23 “(4) Grants shall be made under this section out of  
24 funds available for the National Science Foundation for  
25 Education and Human Resources Activities.

1       “(b) In this section, the terms ‘State educational  
2 agency’ and ‘local educational agency’ have the meaning  
3 given those terms in section 14101 of the Elementary and  
4 Secondary Education Act of 1965.”.

5       **SEC. 5. HIGH-QUALITY EDUCATIONAL SOFTWARE FOR ALL**  
6                               **SCHOOLS.**

7       The National Science Foundation Act of 1950 (42  
8 U.S.C. 1861 et seq.) is further amended in section 16 (as  
9 added by section 4) by adding at the end the following  
10 new subsection:

11       “(c)(1) The Director is authorized to award grants,  
12 on a competitive basis, to secondary school and college stu-  
13 dents working with university faculty, software developers,  
14 and experts in educational technology, or to university fac-  
15 ulty, software developers, and experts in educational tech-  
16 nology working with secondary school or college students,  
17 for the development of high-quality educational software  
18 and Internet web sites by such students, faculty, devel-  
19 opers, and experts.

20       “(2)(A) The Director shall recognize outstanding  
21 educational software and Internet web sites developed with  
22 assistance provided under this subsection.

23       “(B) The President is requested to, and the Director  
24 shall, issue an official certificate signed by the President  
25 and Director, to each student and faculty member who

1 develops outstanding educational software or Internet web  
2 sites recognized under this subsection.

3 “(3) The educational software or Internet web sites  
4 that are recognized under this subsection shall focus on  
5 core curriculum areas.

6 “(4) The Director shall give priority to awarding  
7 grants for the development of educational software or  
8 Internet web sites in the areas of mathematics, science,  
9 engineering, and technology.

10 “(5) The Director shall designate official judges to  
11 recognize outstanding educational software or Internet  
12 web sites assisted under this section.”.

13 **SEC. 6. ESTABLISHMENT OF WORKING GROUP ON SCIENCE,**  
14 **MATHEMATICS, ENGINEERING, AND TECH-**  
15 **NOLOGY EDUCATION.**

16 The National Science Foundation Act of 1950 (42  
17 U.S.C. 1861 et seq.) is further amended by inserting after  
18 section 16 (as added by section 4) the following new sec-  
19 tion:

20 **“§ 17. Establishment of working group on science,**  
21 **mathematics, engineering, and tech-**  
22 **nology education**

23 “(a) There is established in the National Science  
24 Foundation a working group to review and coordinate reg-  
25 ular and supplemental curricula in kindergarten through



1 the twelfth grade for science, mathematics, engineering,  
2 and technology, taking into account—

3 “(1) the content, scope, and sequence of such  
4 curricula;

5 “(2) the research basis for such curricula; and

6 “(3) the demonstrated results of such curricula.

7 “(b) There shall be 15 members of the working group  
8 established by subsection (a), who shall have experience  
9 in the fields of life science, physical science, earth science,  
10 chemistry, technology, math, or engineering, and who shall  
11 be appointed by the Director for a three-year term that  
12 may be extended once for an additional three years. The  
13 members shall be appointed as follows:

14 “(1) 4 members appointed from among rep-  
15 resentatives from appropriate professional societies  
16 representing the scientific disciplines.

17 “(2) 3 members appointed from among business  
18 leaders who are active in education.

19 “(3) 2 members appointed from among rep-  
20 resentatives of institutions of higher education.

21 “(4) 2 members appointed from among rep-  
22 resentatives of schools of education within such in-  
23 stitutions.

1           “(5) 4 members appointed from among rep-  
2       representatives of professional societies that represent  
3       science teaching.

4       “(c)(1) The working group established by subsection  
5 (a)—

6           “(A) shall, beginning not later than three years  
7       after the date of the enactment of this Act, award  
8       recognition annually in predetermined categories;

9           “(B) shall publish all criteria upon which a re-  
10      view by the working group under this section is  
11      based; and

12          “(C) shall disseminate information on award-  
13      winning programs for the purpose of acting as a re-  
14      source for State and local educational agencies—

15          “(i) for determining the best methods for  
16      teachers to present science, mathematics, engi-  
17      neering, and technology subject areas to stu-  
18      dents; and

19          “(ii) for organizing science, mathematics,  
20      engineering, and technology disciplines.

21      “(2) The information required to be disseminated by  
22      paragraph (1)(C) shall include information describing the  
23      activities of the award-winning programs and the awards  
24      made in each category.”.

1 **SEC. 7. DEMONSTRATION PROGRAM AUTHORIZED.**

2 (a) GENERAL AUTHORITY.—

3 (1) IN GENERAL.—

4 (A) GRANT PROGRAM.—The Director shall,  
5 subject to appropriations, carry out a dem-  
6 onstration project under which the Director  
7 awards grants in accordance with this section to  
8 eligible local educational agencies.

9 (B) USES OF FUNDS.—A local educational  
10 agency that receives a grant under this section  
11 may use such grant funds to develop an infor-  
12 mation technology program that builds or ex-  
13 pands mathematics, science, and information  
14 technology curricula, to purchase equipment  
15 necessary to establish such program, and to  
16 provide professional development in such fields.

17 (2) PROGRAM REQUIREMENTS.—The program  
18 described in paragraph (1) shall—

19 (A) provide professional development spe-  
20 cifically in information technology, mathe-  
21 matics, and science; and

22 (B) provide students with specialized train-  
23 ing in mathematics, science, and information  
24 technology.

1 (b) ELIGIBLE LOCAL EDUCATIONAL AGENCY.—For  
2 purposes of this section, a local educational agency is eligi-  
3 ble to receive a grant under this section if the agency—

4 (1) provides assurances that it has executed  
5 conditional agreements with representatives of the  
6 private sector to provide services and funds de-  
7 scribed in subsection (c); and

8 (2) agrees to enter into an agreement with the  
9 Director to comply with the requirements of this sec-  
10 tion.

11 (c) PRIVATE SECTOR PARTICIPATION.—The condi-  
12 tional agreement referred to in subsection (b)(1) shall de-  
13 scribe participation by the private sector, including—

14 (1) the donation of computer hardware and  
15 software;

16 (2) the establishment of internship and men-  
17 toring opportunities for students who participate in  
18 the information technology program; and

19 (3) the donation of higher education scholarship  
20 funds for eligible students who have participated in  
21 the information technology program.

22 (d) APPLICATION.—

23 (1) IN GENERAL.—Each eligible local edu-  
24 cational agency desiring a grant under this section  
25 shall submit an application to the Director in ac-

1 cordance with guidelines established by the Director  
2 pursuant to paragraph (2).

3 (2) GUIDELINES.—

4 (A) REQUIREMENTS.—The guidelines re-  
5 ferred to in paragraph (1) shall require, at a  
6 minimum, that the application include—

7 (i) a description of proposed activities  
8 consistent with the uses of funds and pro-  
9 gram requirements under subsection  
10 (a)(1)(B) and (a)(2);

11 (ii) a description of the higher edu-  
12 cation scholarship program, including cri-  
13 teria for selection, duration of scholarship,  
14 number of scholarships to be awarded each  
15 year, and funding levels for scholarships;  
16 and

17 (iii) evidence of private sector partici-  
18 pation and financial support to establish  
19 an internship, mentoring, and scholarship  
20 program.

21 (B) GUIDELINE PUBLICATION.—The Di-  
22 rector shall issue and publish such guidelines  
23 not later than 6 months after the date of the  
24 enactment of this Act.

1           (3) SELECTION.—The Director shall select a  
2       local educational agency to receive an award under  
3       this section in accordance with subsection (e) and on  
4       the basis of merit to be determined after conducting  
5       a comprehensive review.

6       (e) PRIORITY.—The Director shall give special pri-  
7       ority in awarding grants under this section to eligible local  
8       educational agencies that—

9           (1) demonstrate the greatest ability to obtain  
10      commitments from representatives of the private sec-  
11      tor to provide services and funds described under  
12      subsection (c);

13          (2) demonstrate the greatest economic need;  
14      and

15          (3) use a curriculum recognized by the working  
16      group established by section 17 of the National  
17      Science Foundation Act of 1950 (as added by sec-  
18      tion 6).

19       (f) ASSESSMENT.—The Director shall assess the ef-  
20      fectiveness of activities carried out under this section.

21       (g) STUDY AND REPORT.—The Director—

22          (1) shall initiate an evaluative study of eligible  
23      students selected for scholarships pursuant to this  
24      section in order to measure the effectiveness of the  
25      demonstration program; and

1           (2) shall report the findings of the study to  
2       Congress not later than 4 years after the award of  
3       the first scholarship. Such report shall include the  
4       number of students graduating from an institution  
5       of higher education with a major in mathematics,  
6       science, or information technology and the number  
7       of students who find employment in such fields.

8       (g) DEFINITIONS.—Except as otherwise provided, for  
9       purposes of this section—

10           (1) the term “Director” means the Director of  
11       the National Science Foundation;

12           (2) the term “eligible student” means a student  
13       enrolled in the 12th grade who—

14           (A) has participated in an information  
15       technology program established pursuant to this  
16       section;

17           (B) has demonstrated a commitment to  
18       pursue a career in information technology,  
19       mathematics, science, or engineering; and

20           (C) has attained high academic standing  
21       and maintains a grade point average of not less  
22       than 3.0 on a 4.0 scale for the last 2 years of  
23       secondary school (11th and 12th grades); and

24           (3) the term “local educational agency” has the  
25       same meaning given such term in section 14101 of

1 the Elementary and Secondary Education Act of  
2 1965 (20 U.S.C. 8801).

3 (h) AUTHORIZATION OF APPROPRIATIONS.—There  
4 are authorized to be appropriated to the National Science  
5 Foundation to carry out this section, \$3,000,000.

6 (i) MAXIMUM GRANT AWARD.—An award made to an  
7 eligible local educational agency under this section may  
8 not exceed \$300,000.

9 **SEC. 8. DISSEMINATION OF INFORMATION ON REQUIRED**  
10 **COURSE OF STUDY FOR CAREERS IN**  
11 **SCIENCE, MATHEMATICS, ENGINEERING, AND**  
12 **TECHNOLOGY EDUCATION.**

13 The Director of the National Science Foundation  
14 shall, jointly with the Secretary of Education, compile and  
15 disseminate information (including, but not limited to,  
16 through outreach, school counselor education, and visiting  
17 speakers) regarding—

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



1           (2) the licensing requirements in each State for  
2       science, mathematics, engineering, or technology ele-  
3       mentary or secondary school teachers.

4   **SEC. 9. REQUIREMENT TO CONDUCT STUDY EVALUATION.**

5       (a) STUDY REQUIRED.—The Director of the National  
6   Science Foundation shall enter into an agreement with the  
7   National Academy of Sciences under which the Academy  
8   shall compile and evaluate studies on the effectiveness of  
9   technology in the classroom on learning and student per-  
10   formance, as measured by State standardized tests. The  
11   study evaluation shall include, to the extent available, in-  
12   formation on the type of technology used in each class-  
13   room, the reason that such technology works, and the  
14   teacher training that is conducted in conjunction with the  
15   technology.

16       (b) DEADLINE FOR COMPLETION.—The study eval-  
17   uation required by subsection (a) shall be completed not  
18   later than 180 days after the date of the enactment of  
19   this Act.

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

24       (d) AUTHORIZATION OF APPROPRIATIONS.—There  
25   are authorized to be appropriated to the National Science

1 Foundation \$600,000 for the purpose of conducting the  
2 study evaluation required by subsection (a).

3 **SEC. 10. TEACHER TECHNOLOGY PROFESSIONAL DEVELOP-**  
4 **MENT.**

5 The National Science Foundation Act of 1950 (42  
6 U.S.C. 1861 et seq.) is further amended in section 16 (as  
7 added by section 4) by adding at the end the following  
8 new subsection:

9 “(d) The Director shall establish a grant program  
10 under which grants may be made for instruction of teach-  
11 ers for grades kindergarten through the twelfth grade on  
12 the use of technology in the classroom.”.

13 **SEC. 11. MIDDLE SCHOOL COMPUTER LITERACY ASSIST-**  
14 **ANCE.**

15 The National Science Foundation Act of 1950 (42  
16 U.S.C. 1861 et seq.) is further amended in section 16 (as  
17 added by section 4) by adding at the end the following  
18 new subsection:

19 “(e)(1) The Director is authorized to award grants  
20 to assist States in reaching the goal of making all middle  
21 school graduates in the State technology literate.

22 “(2) Grants awarded under this subsection shall be  
23 used for teacher training in technology, with an emphasis  
24 on programs that prepare 1 or more teachers in each mid-

1 dle school in the State to become technology leaders who  
 2 then serve as experts and train other teachers.

3 “(3) Each State shall encourage schools that receive  
 4 assistance under this subsection to provide matching  
 5 funds, with respect to the cost of teacher training in tech-  
 6 nology to be assisted under this subsection, in order to  
 7 enhance the impact of the teacher training and to help  
 8 ensure that all middle school graduates in the State are  
 9 computer literate.”.

10 **SEC. 12. SCIENCE, MATHEMATICS, ENGINEERING, AND**  
 11 **TECHNOLOGY EDUCATION CONFERENCE.**

12 (a) IN GENERAL.—Within 180 days after the date  
 13 of the enactment of this Act, the Director of the National  
 14 Science Foundation shall convene a conference of rep-  
 15 resentatives from Federal, State, and local governments,  
 16 private industries, professional organizations, educators,  
 17 science, mathematics, engineering, and technology edu-  
 18 cational resource providers, students, and any other stake-  
 19 holders the Director decides would provide useful partici-  
 20 pation in the conference. Such conference shall be known  
 21 as the National Science Education Forum.

22 (b) PURPOSES.—The purposes of the conference con-  
 23 vened under subsection (a) shall be to—

1           (1) identify existing science, mathematics, engi-  
2           neering, and technology education programs and re-  
3           source providers;

4           (2) examine how well existing programs are co-  
5           ordinated and how much collaboration exists among  
6           them;

7           (3) examine the common goals and differences  
8           among the participants at the conference; and

9           (4) develop strategies that will support partner-  
10          ships and leverage resources.

11          (c) REPORT AND PUBLICATION.—At the conclusion  
12 of the conference the Director of the National Science  
13 Foundation shall—

14           (1) transmit to the Committee on Science of the  
15          House of Representatives and to the Committee on  
16          Commerce, Science, and Transportation of the Sen-  
17          ate a report on the outcome and conclusions of the  
18          conference; and

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

23 **SEC. 13. GRANTS FOR DISTANCE LEARNING.**

24          The National Science Foundation Act of 1950 (42  
25 U.S.C. 1861 et seq.) is further amended in section 16 (as

1 added by section 4) by adding at the end the following  
2 new subsection:

3       “(f) The Director may make grants to a State or local  
4 educational agency or to a private elementary, middle, or  
5 secondary school, under any grant program administered  
6 by the Director using funds appropriated for the National  
7 Science Foundation for Education and Human Resources  
8 Activities, for activities in which distance learning is inte-  
9 grated into the education process in grades kindergarten  
10 through the twelfth grade.”.

11 **SEC. 14. AVAILABILITY OF CURRICULAR PROGRAMS**  
12 **THROUGH THE INTERNET.**

13       The Director of the National Science Foundation  
14 shall make available through the Internet at no cost a  
15 complete field-test version (including text and graphics)  
16 of any curricular program, the development for which the  
17 National Science Foundation provided funds.

18 **SEC. 15. SCHOLARSHIPS TO PARTICIPATE IN CERTAIN RE-**  
19 **SEARCH ACTIVITIES.**

20       (a) IN GENERAL.—The President, acting through the  
21 National Science Foundation, shall provide scholarships to  
22 teachers at public and private schools in grades kinder-  
23 garten through the twelfth grade in order that such teach-  
24 ers may participate in research programs conducted at  
25 private entities or Federal or State Government agencies.

1 The purpose of such scholarships shall be to provide teach-  
2 ers with an opportunity to expand their knowledge of  
3 science and research techniques and encourage incorpora-  
4 tion of such techniques into the classroom.

5 (b) REQUIREMENTS.—In order to be eligible to re-  
6 ceive a scholarship under this section, a teacher described  
7 in subsection (a) shall be required to develop, in conjunc-  
8 tion with the private entity or Government agency at  
9 which the teacher will be participating in a research pro-  
10 gram, a proposal to be submitted to the President describ-  
11 ing the types of research activities involved, and how tech-  
12 niques with respect to such research may be incorporated  
13 into the educational process.

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

18 (d) INTERNET SITE.—The Director of the National  
19 Science Foundation shall establish an Internet web site  
20 which may be used by students and teachers participating  
21 in the program under this section to incorporate research  
22 knowledge and techniques into the educational process.

○