

115TH CONGRESS  
2D SESSION

# S. 3471

To direct the National Science Foundation to support STEM education research focused on early childhood.

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IN THE SENATE OF THE UNITED STATES

SEPTEMBER 18, 2018

Mr. SCHATZ introduced the following bill; which was read twice and referred to the Committee on Commerce, Science, and Transportation

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## A BILL

To direct the National Science Foundation to support STEM education research focused on early childhood.

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 “Building Blocks of  
5       STEM Act”.

6       **SEC. 2. FINDINGS.**

7       The Congress finds the following:

8               (1) The National Science Foundation has made  
9       the largest financial investment in STEM education

1 of all Federal agencies, and plays a very powerful  
2 role in helping to set research and policy agendas.

3 (2) Studies have found that children who en-  
4 gage in scientific activities from an early age develop  
5 positive attitudes toward science and are more likely  
6 to pursue STEM expertise and careers later on.

7 (3) However, the majority of current research  
8 focuses on increasing STEM opportunities for stu-  
9 dents in middle school and older.

10 (4) Women remain widely underrepresented in  
11 the STEM workforce and this gender disparity ex-  
12 tends down through all levels of education. Strategic  
13 funding of programs is needed in order to under-  
14 stand and address the root cause of this gap.

15 **SEC. 3. DEFINITIONS.**

16 In this Act:

17 (1) DIRECTOR.—The term “Director” means  
18 the Director of the National Science Foundation.

19 (2) EARLY CHILDHOOD.—The term “early  
20 childhood” applies to children from birth through  
21 the age of 10.

22 (3) INSTITUTION OF HIGHER EDUCATION.—The  
23 term “institution of higher education” has the  
24 meaning given the term in section 101(a) of the  
25 Higher Education Act of 1965 (20 U.S.C. 1001(a)).

1           (4) LOCAL EDUCATIONAL AGENCY.—The term  
 2           “local educational agency” has the meaning given  
 3           the term in section 8101 of the Elementary and Sec-  
 4           ondary Education Act of 1965 (20 U.S.C. 7801), ex-  
 5           cept that such term also includes preschools, after-  
 6           school programs, and summer programs.

7           (5) STEM.—The term “STEM” has the mean-  
 8           ing given the term in section 2 of the America COM-  
 9           PETES Reauthorization Act of 2010 (42 U.S.C.  
 10          6621 note).

11          (6) YOUNG GIRLS.—The term “young girls”  
 12          means female individuals who have not attained the  
 13          age of 11.

14   **SEC. 4. SUPPORTING STEM RESEARCH ON EARLY CHILD-**  
 15           **HOOD.**

16          In awarding grants under the Discovery Research  
 17   PreK–12 program, the Director shall consider age dis-  
 18   tribution in order to more equitably allocate funding for  
 19   research studies with a focus on early childhood.

20   **SEC. 5. SUPPORTING GIRLS IN STEM EDUCATION AND COM-**  
 21           **PUTER SCIENCE.**

22          (a) RESEARCH GRANTS.—

23           (1) IN GENERAL.—The Director shall award  
 24          grants, on a competitive basis, to institutions of  
 25          higher education or nonprofit organizations (or con-

sortia of such institutions or organizations), to accelerate research efforts to increase understanding of the factors that contribute to the participation of young girls in STEM activities.

(2) RESEARCH AREAS.—Research areas funded by a grant under this subsection may include—

(A) the role of teacher training and professional development, including effective incentive structures to encourage teachers to participate in such training and professional development, in encouraging or discouraging young girls from participating in STEM activities;

(B) the role of teachers in shaping young girls' perceptions of STEM and discouraging such girls from participating in STEM activities;

(C) the role of other facets of the learning environment on the willingness of young girls to participate in STEM activities, including learning materials and textbooks, classroom decorations, seating arrangements, use of media and technology, classroom culture, and gender composition of students during group work;

1 (D) the role of parents and other care-  
 2 givers in encouraging or discouraging young  
 3 girls from participating in STEM activities;

4 (E) the types of STEM activities that elicit  
 5 greater participation by young girls;

6 (F) the role of mentorship and best prac-  
 7 tices in finding and utilizing mentors;

8 (G) the role of informal and out-of-school  
 9 STEM learning opportunities on girls' percep-  
 10 tion of and participation in STEM activities;  
 11 and

12 (H) any other activity the Director deter-  
 13 mines will accomplish the goals of this sub-  
 14 section.

15 (3) GRANT RECIPIENT REPORT.—An entity  
 16 awarded a grant under this subsection shall report  
 17 to the Director, at such time and in such manner as  
 18 the Director may require, on the activities carried  
 19 out and materials developed using such grant funds.

20 (b) DEVELOPMENT AND TESTING OF SCALABLE  
 21 MODELS FOR INCREASED ENGAGEMENT.—

22 (1) IN GENERAL.—The Director shall award  
 23 grants, on a competitive basis, to institutions of  
 24 higher education or nonprofit organizations (or con-  
 25 sortia of such institutions or organizations), to de-

1       velop and evaluate interventions in pre-K and ele-  
2       mentary school classrooms that increase participa-  
3       tion of young girls in computer science activities.

4           (2) PARTNERSHIPS.—In order to be eligible to  
5       receive a grant under this subsection, an institution  
6       of higher education, nonprofit organization, or con-  
7       sortium, shall enter into a partnership with one or  
8       more local educational agency or State in carrying  
9       out the activities funded by such grant.

10          (3) USES OF FUNDS.—Grants awarded under  
11       this subsection shall be used for activities that draw  
12       upon the expertise of the partner entities described  
13       in paragraph (2) to increase participation of young  
14       girls in computer science activities, including—

15           (A) offering training and professional de-  
16       velopment programs, including summer or aca-  
17       demic year institutes or workshops, designed to  
18       strengthen the capabilities of pre-K and elemen-  
19       tary school teachers and to familiarize such  
20       teachers with the role of gender bias in the  
21       classroom;

22           (B) offering innovative preservice and in-  
23       service programs that instruct teachers on gen-  
24       der-inclusive practices for teaching computing  
25       concepts;

1 (C) developing distance learning programs  
 2 for teachers or students, including developing  
 3 curricular materials, play-based computing ac-  
 4 tivities, and other resources for the in-service  
 5 professional development of teachers that are  
 6 made available to teachers through the Inter-  
 7 net;

8 (D) developing a cadre of master teachers  
 9 who will promote reform and the adoption of  
 10 gender-inclusive practices in teaching computer  
 11 science concepts in early childhood education;

12 (E) developing tools to evaluate activities  
 13 conducted under this subsection;

14 (F) developing or adapting pre-K and ele-  
 15 mentary school computer science curricular ma-  
 16 terials that incorporate contemporary research  
 17 on the science of learning, particularly with re-  
 18 spect to gender inclusion;

19 (G) developing and offering gender-inclu-  
 20 sive computer science enrichment programs for  
 21 students, including after-school and summer  
 22 programs;

23 (H) providing mentors for girls in person  
 24 and through the Internet to support such girls  
 25 in participating in computer science activities;

1 (I) engaging parents of girls about the dif-  
 2 ficulties faced by girls to maintain an interest  
 3 and desire to participate in computer science  
 4 activities, and enlisting the help of parents in  
 5 overcoming these difficulties;

6 (J) acquainting girls with careers in com-  
 7 puter science and encouraging girls to consider  
 8 careers in such field; and

9 (K) any other activities the Director deter-  
 10 mines will accomplish the goals of this sub-  
 11 section.

12 (4) GRANT RECIPIENT REPORT.—An entity  
 13 awarded a grant under this subsection shall report  
 14 to the Director, at such time and in such manner as  
 15 the Director may require, on the activities carried  
 16 out, materials developed using such grant funds, and  
 17 the outcomes for students served by such grant.

18 (5) EVALUATION REQUIRED.—Not later than 4  
 19 years after the date of enactment of this Act, the  
 20 Director shall evaluate the grant program under this  
 21 subsection. At a minimum, such evaluation shall—

22 (A) use a common set of benchmarks and  
 23 assessment tools to identify best practices and  
 24 materials developed and demonstrated by the  
 25 partnerships described in paragraph (2); and



1 (B) to the extent practicable, compare the  
2 effectiveness of practices and materials devel-  
3 oped and demonstrated by such partnerships  
4 with those of partnerships funded by other local  
5 or State government or Federal Government  
6 programs.

7 (6) DISSEMINATION OF RESULTS.—

8 (A) EVALUATION RESULTS.—The Director  
9 shall make publicly available free of charge on  
10 an Internet website and shall submit to Con-  
11 gress the results of the evaluation required  
12 under paragraph (5).

13 (B) MATERIALS.—The Director shall en-  
14 sure that materials developed under a program  
15 funded by a grant under this subsection, that  
16 are demonstrated to be effective in achieving  
17 the goals of this subsection (as determined by  
18 the Director), are made publicly available free  
19 of charge on an Internet website, including  
20 through an arrangement with an outside entity.

21 (7) ANNUAL MEETING.—The Director may con-  
22 vene an annual meeting of the partnerships partici-  
23 pating in a program funded by a grant under this  
24 subsection, for the purpose of fostering greater na-  
25 tional collaboration.

1           (8) TECHNICAL ASSISTANCE.—At the request of  
 2           a partnership seeking a grant under this subsection,  
 3           the Director shall provide the partnership with tech-  
 4           nical assistance in meeting any requirement of this  
 5           subsection.

6 **SEC. 6. COMPUTER SCIENCE IN THE ROBERT NOYCE**  
 7 **TEACHER SCHOLARSHIP PROGRAM.**

8           Section 10 of the National Science Foundation Au-  
 9           thorization Act of 2002 (42 U.S.C. 1862n–1) is amend-  
 10          ed—

11           (1) by striking “and mathematics” each place it  
 12           appears and inserting “mathematics, informatics,  
 13           and computer science”;

14           (2) in subsection (a)(3)(B), by striking “or  
 15           mathematics” and inserting “mathematics, informat-  
 16           ics, and computer science”; and

17           (3) in subsections (b)(1)(D)(i), (c)(1)(A), and  
 18           (d)(1), by striking “or mathematics” each place it  
 19           appears and inserting “mathematics, informatics, or  
 20           computer science”.

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