

A photograph of two students, a girl and a boy, looking intently at a microscope. The girl is on the left, looking through the eyepiece, while the boy is on the right, looking at the side of the microscope. The image is overlaid with a blue tint and a dashed orange circle. The text is positioned on the left side of the image.

**STEM  
POLICY  
BRIEF**  
**THE POWER  
OF SUMMER**



national summer  
learning association

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Educators recognize the power of STEM learning to engage students, motivate them to direct their own learning, and develop critical 21<sup>st</sup> century skills like teamwork and problem-solving. Communities view STEM education as critical to developing a future local workforce and to attracting businesses that will rely on these skilled workers.

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# why summer STEM?

High-quality summer learning programs have been shown not only to improve reading and math skills, but to increase graduation rates and post-secondary success as well.

STEM summer programs, specifically, offer a unique and multi-faceted opportunity to maintain and build core skills in math and literacy during the high-risk summer months while engaging young people in hands-on, inquiry-based learning that motivates and engages.

According to the National Research Council, many students are not graduating from high school with the knowledge and capacities they will need to pursue STEM careers or understand STEM-related issues in the workforce or in their roles as citizens.

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In 2015 and 2016, NSLA has tracked 35 pieces of legislation in Congress and 15 states that create possibilities for STEM learning in the summer. Additionally, the Every Student Succeeds Act (ESSA) opens many new doors to enhance STEM learning in and out of school, and through school-community partnerships.

# activity in the states:

THREE MAJOR THEMES ARE EMERGING IN STATE POLICY SUPPORTING STEM EDUCATION DURING THE SUMMER MONTHS.

## 1 PROGRAMS THAT EXTEND STEM LEARNING BEYOND THE CLASSROOM, IN PARTNERSHIP WITH SCHOOLS.

These bills recognize that many schools have limited capacity to expand and deepen education experiences on their own. Partnership with community-based programs that are structured and goal-oriented has many benefits. Expanding learning beyond the classroom ensures students have the time to delve deeply in to topics of interest, expands the pool of resources available for education, and sustains student learning after the school day ends.

Examples:

### Maryland (HB 115)<sup>1</sup>

This bill, passed in the 2016 legislative session, establishes a new Robotics Grant Program, through which public schools and nonprofit robotics clubs can purchase materials and otherwise build capacity. The bill mandates a minimum \$250,000 annual appropriation in the state budget, which has been folded in to a \$2 million Science and Mathematics Education Initiative line item for FY 2017. Analysis for the bill states that this funding would support 72 robotics clubs in Baltimore City alone, and many others across the state. These clubs reach students from elementary through high school, both in and outside of school.

### Tennessee (SB43)<sup>2</sup>

In the 2015 legislative session, the Tennessee legislature passed this bill to expand the work of the Tennessee STEM Innovation Network (TSIN), established by executive order in 2010 to promote and expand the teaching and learning of STEM in public schools across the state. The new bill expands the TSIN activities into rural communities of the state, implements STEM leadership training across the state's STEM hubs, and provides for STEM curriculum activities for all middle school students, with a focus on preparing for STEM careers. The bill also requires partnership and collaboration with STEM organizations.

### Virginia (SB 17)<sup>3</sup>

This bill proposed a STEM Education Fund and grant program to be administered by the Board of Education. Community-based, nonprofit organizations with expertise in STEM programming would apply for grants up to \$50,000 to partner with schools to expand STEM programming for students. These programs can include "summer school activities focusing on STEM education, regardless of whether such activities are held at the school or at a remote location."

## 2 PROGRAMS THAT INCREASE STEM OPPORTUNITIES FOR TARGETED POPULATIONS THAT ARE HISTORICALLY UNDER-REPRESENTED IN STEM FIELDS.

While many grant programs prioritize programming for students living in poverty or in low-income communities, these programs further target funding to programs that serve girls and students of color. Programs also frequently target students during the critical middle school years, when young people are forming more concrete ideas about their college and career pathways.

Example:

### New York (A968/S1960)<sup>4</sup>

This bill, passed by the legislature and vetoed by the governor, would provide for competitive grants for STEM programming in grades six through 12, with the goal of encouraging women and minorities to pursue careers in technology. These grants are targeted to career exploration activities, opportunities to attain technical skills, and partnerships between schools and postsecondary education and training programs.

## 3 MENTORING AND WORKFORCE TRAINING PROGRAMS MEANT TO SUPPORT DEVELOPMENT OF A PIPELINE FOR STUDENTS INTO STEM-FOCUSED HIGHER EDUCATION AND CAREERS.

These programs utilize resources beyond the school community to develop the state's STEM-ready workforce, starting as early as middle school. They often involve STEM professionals who can mentor and guide students' STEM learning and career pathways.

Examples:

### New Mexico (HB245)<sup>5</sup>

This bill would appropriate \$350,000 to the University of New Mexico "to fund an ongoing pre-college minority students program that increases knowledge and skills in the areas of science, technology, engineering, art, mathematics, and health sciences and provides career exploration summer camps."

### Washington (SB5303)<sup>6</sup>

This bill creates the Washington academic, innovation and mentoring (AIM) program, supporting community-based programs that provide mentoring around STEM and career exploration, outside of school hours. Programs would be statewide and targeted to middle and high school students who are eligible for free- and reduced-priced lunch. A minimum of 30 hours per week is required for summer programming.



### ADDITIONAL THEMES

Additional examples of state legislation recognize and promote summer STEM in others ways. These include:

Boosting funding for natural resource and learning centers that become a focal point for learning and family engagement during the summer months;

Deepening learning standards for STEM subjects inside and outside of school;

And creating task forces and recognition proclamations to promote the study of STEM learning opportunities in a variety of settings.

# federal opportunities:

WHILE ACTIVITY MOVES MORE SLOWLY AT THE FEDERAL LEVEL, LEGISLATORS IN THE 114TH CONGRESS HAVE CHAMPIONED SEVERAL PROMISING BILLS RELATED TO STEM LEARNING IN THE SUMMER. WE SEE MANY OF THE SAME THEMES FROM THE STATES ALSO REFLECTED IN FEDERAL PRIORITIES FOR STEM EDUCATION.



MANY OF THE SAME THEMES FROM THE STATES ARE ALSO REFLECTED IN FEDERAL PRIORITIES

## *The STEM Education Act (H. R. 1020)<sup>7</sup>*

*Signed into law October 2015*

This law requires the Director of the National Science Foundation (NSF) to continue to award competitive, merit-reviewed grants to support research and development of innovative out-of-school STEM learning and emerging STEM learning environments; and research that advances the field of informal STEM education. While we know a good deal about the impact of summer and afterschool programs generally, this continued research will help the field identify and promote the best practices that make for effective STEM education during out-of-school time.

## *American Innovation and Competitiveness Act (S. 3084)<sup>8</sup>*

*Currently pending in the Senate Commerce, Science, and Transportation Committee*

This effort to reauthorize the America COMPETES Act directs efforts of several major science and technology-focused agencies that include education efforts, including the National Science Foundation (NSF), the National Institute of Standards and Technology (NIST), and the National Science and Technology Council (NSTC).

One provision in the bill directs establishment of a STEM Education Advisory Panel to advise the NSTC Committee on STEM Education on matters related to science, technology, engineering, and mathematics (STEM) learning. Members of this panel must include “individuals from academic institutions, nonprofit organizations, and industry, including in-school, out-of-school, and informal education practitioners.” As it relates to summer STEM programs, this panel would consider “ways to leverage private and nonprofit STEM investments and encourage public-private partnerships to strengthen STEM education and help build the STEM workforce pipeline.”

A new grant program through NSF would be aimed at increasing the participation of women and underrepresented groups in STEM fields, supporting research to advance the engagement in STEM of students in grades K-8. Named in the grant program's list of allowable activities are many ideas frequently found in summer STEM programming:

- “use of a variety of engagement methods, including cooperative and hands-on learning”
- “exposure of students who are members of groups underrepresented in STEM fields to role models, including near-peers, in STEM fields”
- “training of informal learning educators and youth-serving professionals”
- “education of students on the relevance and significance of STEM careers, provision of academic advice and assistance, and activities designed to help students make real-world connections to STEM content activities”
- “attendance of underrepresented students at events, competitions, and academic programs to provide content expertise and encourage career exposure in STEM”
- “activities designed to engage parents of underrepresented students”
- “innovative strategies to engage underrepresented students, such as using leadership skill outcome measures to encourage youth with the confidence to pursue STEM course work and academic study”

The bill also calls for “coordination with STEM-rich environments, including other nonprofit, nongovernmental organizations, classroom and out-of-classroom settings, institutions of higher education, vocational facilities, corporations, museums, or science centers,” creating new opportunities for public-private partnerships around STEM learning.

## *Every Student Succeeds Act (S. 1177)<sup>9</sup>*

*Signed into law December 2015*

The Every Students Succeeds Act (ESSA), which provides the most significant federal funding for K-12 education, elevates STEM learning in many programs and provisions throughout the new law.

- Regular administration of math and science assessments remain in place, as well as the requirement for “challenging academic standards” in math and science.
- The new Student Support and Academic Enrichment grant program (Title IV Part A) names programs including “increas[ing] student access to and improving student engagement and achievement in...STEM [and] computer science...” as specifically allowable activities that contribute to a well-rounded education. In further detail, the law offers these ideas, which we often see reflected in summer STEM programming.
- “programming and activities to improve instruction and student engagement in science, technology, engineering, and mathematics, including computer science, (referred to in this section as ‘STEM subjects’) such as—
  - “(i) increasing access for students through grade 12 who are members of groups underrepresented in such subject fields, such as female students, minority students, English learners, children with disabilities, and economically disadvantaged students, to high-quality courses;
  - “(ii) supporting the participation of low-income students in nonprofit competitions related to STEM subjects (such as robotics, science research, invention, mathematics, computer science, and technology competitions);
  - “(iii) providing hands-on learning and exposure to science, technology, engineering, and mathematics and supporting the use of field-based or service learning to enhance the students’ understanding of the STEM subjects;
  - “(iv) supporting the creation and enhancement of STEM-focused specialty schools;

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“(v) facilitating collaboration among school, after-school program, and informal program personnel to improve the integration of programming and instruction in the identified subjects; and

“(vi) integrating other academic subjects, including the arts, into STEM subject programs to increase participation in STEM subjects, improve attainment of skills related to STEM subjects, and promote well-rounded education;

- The 21st Century Community Learning Centers grant program (Title IV Part B) adds STEM education as a named, allowable use of these grants. This program remains a dedicated source of funding for programs and activities outside of the regular school day.
- Under Title II, the STEM Master Teacher Corps program provides the opportunity for grants to “State educational agencies, or nonprofit organizations in partnership with State educational agencies, to support the implementation, replication, or expansion of effective science, technology, engineering, and mathematics professional development programs in schools across the State through collaboration with school administrators, principals, and STEM educators.”

**Strengthening Career and Technical Education for the 21st Century Act (H. R. 5587)<sup>10</sup>**

*Currently pending in the House Committee on Education and the Workforce*

This bill, which reauthorizes the Carl D. Perkins Career and Technical Education Act, includes funding for local programs and activities that support secondary students in career and technical education that may include “programs and activities that increase access, student engagement, and success in science, technology, engineering, and mathematics fields (including computer science) for students who are members of groups under-represented in such subject fields.” The bill also expands eligibility for these programs down to fifth grade (from seventh), potentially allowing many more students to be served, particularly at the critical middle school level. The bill also allows for more robust distance and blended-learning programs, the flexibility of which fit well into the summer learning space.

**Community STEM Learning Act of 2015 (H.R. 2155)<sup>11</sup>**

*Currently pending in the House Subcommittee on Early Childhood, Elementary, and Secondary Education*

This bill would authorize grants to national and regional intermediaries with proven track records of programming for older youth, and sub-grants to community-based affiliates to operate in-school, after school, summer, and weekend programs that focus on STEM education. These programs would primarily serve students who are traditionally underrepresented in STEM careers and include project-based learning opportunities and individualized instruction.

# policy priorities:

IT HAS NEVER BEEN MORE IMPORTANT TO PROVIDE MEANINGFUL SUMMER LEARNING OPPORTUNITIES THAT EXPOSE YOUNG PEOPLE TO COURSES OF STUDY, MENTORS, AND CAREERS IN SCIENCE, TECHNOLOGY, ENGINEERING AND MATH.

Still, despite a convincing body of research, only about one-third of young people nationally are enrolled in a summer learning program. Most school districts serve fewer than 10 percent of their students during these critical months. There is work to do to promote uptake of proven practices and models of STEM summer learning at scale.

NSLA calls for federal, state, and local policy initiatives that maximize the opportunities for summer STEM learning by the highest-need students, and that connect summer STEM activities to school-year learning and readiness for college and career.



**1/3**  
 ONLY ABOUT ONE-THIRD OF YOUNG PEOPLE NATIONALLY ARE ENROLLED IN A SUMMER LEARNING PROGRAM

**1 PROMOTE STEM LEARNING OPPORTUNITIES THAT TAKE ADVANTAGE OF THE UNIQUE SUMMER LEARNING ENVIRONMENT.**

- Allow students to choose their own learning experience; create intentional peer learning communities of students with similar interests and passions; and prioritize hands-on, inquiry-based learning experiences.
- Support STEM teacher professional development through summer STEM teaching and externship experiences.

**2 PRIORITIZE AND FUND SUMMER STEM EXPERIENCES THAT ADDRESS HIGH AREAS OF NEED, AND HIGH AREAS OF IMPACT.**

- Target students who are part of groups under-represented in STEM fields (women and minorities).
- Target programs that serve students at key educational transition points, such as elementary to middle school, and middle school to high school.
- Invest in solutions to overcome common participation barriers for these students, such as providing transportation, paying wages for summer internships, and awarding school credit (high school or college) for summer learning.



### 3 FOSTER PARTNERSHIPS BETWEEN SCHOOLS AND COMMUNITY-BASED AND INDUSTRY-BASED STEM ENTITIES THAT EXTEND LEARNING BEYOND THE CLASSROOM.

- Prioritize relevant, real-world problem solving activities with intensive and focused STEM skill development.
- Make digital badging meaningful, through connection to academic standards and coordination with schools for badge recognition.
- Partner with community colleges and local universities for high-quality STEM summer learning experiences that maximize existing resources and foster the STEM education pipeline.
- Allow shared professional development for school- and non-school-based STEM educators.
- Include non-school-based and summer STEM educational leaders as stakeholders in LEA and SEA planning and information-gathering for STEM education programs and grant development.
- Measure success of STEM summer programs through academic skill development and social/emotional development, and student engagement/confidence in STEM ability.

### 4 LINK STEM SUMMER LEARNING OPPORTUNITIES TO WORKFORCE DEVELOPMENT INITIATIVES

- Provide career and technical credentialing opportunities through online summer coursework and summer internship/workplace experiences, starting in high school.
- Engage local STEM sector leaders in developing and supporting standards, credentialing programs, and workplace-based learning experiences.

### 5 PROMOTE FUNDING AND SUSTAINABILITY

- Promote blending and braiding of funding streams within and across agencies, and by blending school-year and summer learning opportunities.
- Dedicate investments to launch new STEM initiatives for out-of-school time.
- Incentivize private investment in STEM education.

In summary, policy efforts for STEM learning in out-of-school time should reflect the advantages that summer offers for effective STEM programs and efficient use of state and local resources.

#### TIME AND INTENSITY

The summer learning space offers unique opportunities for students and teachers to concentrate deeply on an area of interest, with greater intensity and with resources often not available during the school year. Youth have more flexibility to choose a topic of exploration, such as robotics, environmental science, computer programming, game design, or biotechnology that stems from their personal interests and fosters deeper commitment and engagement. Students spend a concentrated amount of time, usually 5-6 weeks, taking a deep dive into their topic of choice, stimulating their enthusiasm about learning that carries into the school year.

The summer learning space allows educators to develop and deliver concentrated curriculum covering a particular project or area of study, with lower stakes and greater flexibility in curriculum design and execution. Teachers use the summer to cover topics about which they are personally passionate, and to hone their own teaching.

#### VARIETY OF EXPERIENCES

Summer STEM activities happen in many places: summer school classrooms, libraries, community-based programs, museums and recreation centers. For older youth, summer provides a focused opportunity for connection to career exploration in STEM fields. Each unique setting brings different STEM-related resources, and partnership between them is common during the summer months.

#### ENDNOTES

1. <http://mgaleg.maryland.gov/webmga/frmMain.aspx?pid=billpage&stab=01&id=hb0115&tab=subject3&ys=2016RS>
2. <http://wapp.capitol.tn.gov/apps/BillInfo/Default.aspx?BillNumber=HB0946>
3. <https://lis.virginia.gov/cgi-bin/legp604.exe?161+sum+SB17>
4. <https://www.nysenate.gov/legislation/bills/2015/a968/amendment/original>
5. <https://www.nmlegis.gov/Legislation/Legislation?Chamber=H&LegType=B&LegNo=245&year=16>
6. <http://apps.leg.wa.gov/billinfo/summary.aspx?bill=5303>
7. <https://www.congress.gov/bill/114th-congress/house-bill/1020>
8. <https://www.congress.gov/bill/114th-congress/senate-bill/3084>
9. <https://www.congress.gov/bill/114th-congress/senate-bill/1177>
10. <https://www.congress.gov/bill/114th-congress/house-bill/5587>
11. <https://www.congress.gov/bill/114th-congress/house-bill/2155>



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