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# STEM Learning in Afterschool on the Rise, But Barriers and Inequities Exist

# Acknowledgements

The America After 3PM special report, *STEM Learning in Afterschool on the Rise, But Barriers and Inequities Exist*, is based on research commissioned and funded by Overdeck Family Foundation. Overdeck Family Foundation was founded in 2011 by John and Laura Overdeck with the goal of providing all children the opportunity to unlock their potential. They focus exclusively on enhancing education, funding efforts both inside and outside of school in the areas of early childhood, informal STEM education, and K-9 programs that include supporting educators and student-centered learning environments.

Data from the report is based on the 2020 America After 3PM survey, which would not have been possible without the generous support of the New York Life Foundation, Overdeck Family Foundation, The Wallace Foundation, the S.D. Bechtel, Jr. Foundation, Altria Group, the Walton Family Foundation, and the Charles Stewart Mott Foundation.

National and state America After 3PM STEM data can be found on the interactive data dashboard at: [afterschoolalliance.org/AA3PM/](https://afterschoolalliance.org/AA3PM/).

# Methodology

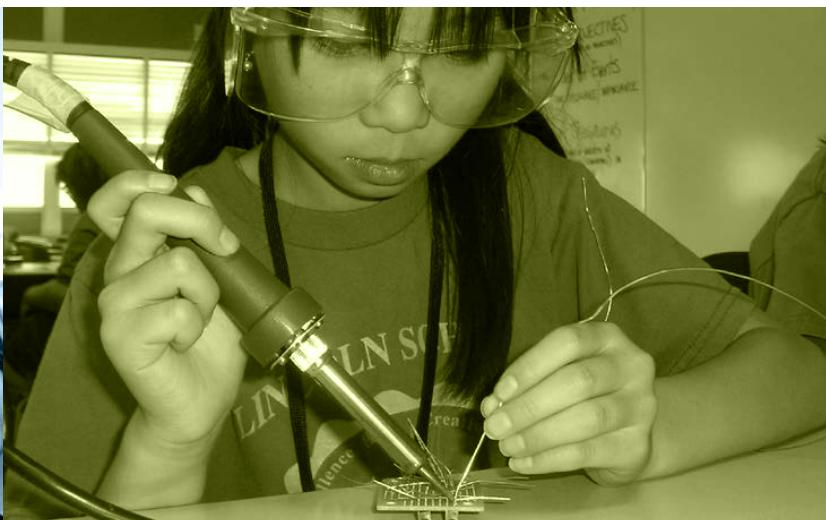
America After 3PM is a nationally representative survey of randomly selected adults who live in the United States and are the parent or guardian of a school-age child who lives in their household. The survey was conducted using a blend of national consumer panels, with the goal of completing at least 200 interviews in every state and Washington, D.C. In states where this goal could not be reached using online panels, supplementary telephone interviews were conducted. This is the second wave of America After 3PM to be carried out using an online survey and supplementary telephone interviews, after the 2004 and 2009 waves were conducted using paper surveys distributed through the U.S. mail and using random-digit telephone dialing. For the 2020 wave of America After 3PM, interviews were conducted in both English and Spanish.

America After 3PM data included in this report was collected between January 27 and March 17, 2020. A total of 31,055 households were surveyed and answered questions regarding

ways in which their child or children are cared for in the hours after school, participation in organized activities, participation in summer experiences, and demographics. A subset of households, 14,391 respondents, answered a series of follow up questions regarding afterschool experiences or barriers to participation in afterschool, and perceptions of afterschool programs. On average, the online survey took 13 minutes to complete, landline telephone surveys took 20 minutes, and mobile telephone surveys took 23 minutes. Data from interviews are weighted on race and income within state and by state population. The overall margin of error for child-level and household-level data is +/- < 1 percent.

Projections for child-level data represent the 57.4 million children and youth in the United States based on numbers from the U.S. Census Bureau's October 2018 Current Population Survey.

Photos in *STEM Learning in Afterschool on the Rise, But Barriers and Inequities Exist* include both photos taken pre-pandemic and photos taken during the pandemic.



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# Introduction

In 2017, NASA launched Artemis, an ambitious program to return to the Moon, conducting a variety of activities on the Moon’s surface and in orbit to better understand the universe and our home planet. One of Artemis’ goals is to successfully land the first woman on the moon, and inspire a new generation of scientists, astronauts, and aerospace professionals in the science, technology, engineering, and mathematics (STEM) fields.

Getting more young people engaged in STEM is essential in part because jobs in STEM continue to grow at rates double those of non-STEM professions. The United States Bureau of Labor Statistics expects STEM occupations to grow by 8 percent between 2019 and 2029, compared to 3.4 percent for non-STEM occupations (*Figure 1*).<sup>i</sup> Wages for STEM occupations are also much higher than for non-STEM occupations, meaning they provide financial security to individuals from all backgrounds and a pathway to financial independence for students from low-income communities.<sup>ii</sup>

Providing greater opportunities for STEM learning isn’t just about preparing the future workforce. As our world continues to rely more and more on technology, we all require a greater level of STEM literacy and fluency to understand how science and technology play a role. Greater STEM literacy also helps prepare students to better understand challenges and issues that affect them and their communities.

Young people need sustained opportunities to engage with STEM learning, develop an interest in and comfort with STEM subjects, and understand the career pathways to pursue STEM interests. Research shows that what happens outside of school can be equally as important as what happens inside of school in terms of activating students’ interest in STEM or other school subjects.<sup>iii</sup> In turn, interest in STEM is correlated to success in STEM, and young people who see themselves as STEM students are more likely to pursue STEM majors.<sup>iv,v</sup> To land

**Figure 1:** Expected Growth in STEM Occupations vs Non-STEM Occupations (2019–2029)

	Projected employment change 2019–29	Median annual wage, 2020
STEM occupations	<b>8</b>	<b>\$89,780</b>
Non-STEM occupations	<b>3.4</b>	<b>\$40,020</b>

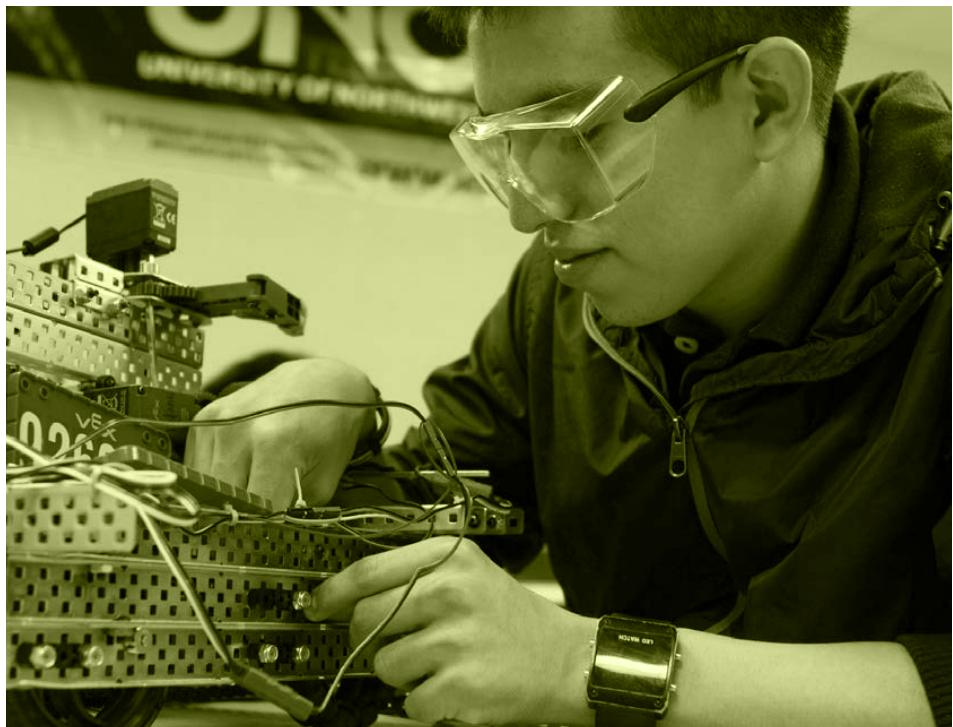
in STEM careers, students must also understand the pathways to pursue these interests.<sup>vi</sup>

Research clearly shows that the experiences students have with STEM can have a huge impact on whether they study STEM subjects or pursue STEM careers. Students need opportunities to engage in hands-on learning to connect what they learn in their classrooms to potential careers. An informal learning environment that provides encouragement and the opportunity to struggle through different problems—and even embrace the learning that comes from failing—is also important. Experiencing the joys of solving problems through project-based activities can spark interest in STEM for many learners and help them develop skills that lead to careers in STEM fields.<sup>vii</sup> Perhaps most importantly, access to STEM opportunities must be expanded to the young people who are typically underrepresented in STEM careers. All students need opportunities to engage in quality STEM learning experiences.

These can take place across different informal environments, but over the last decade, afterschool programs have become a cornerstone in providing STEM learning for students from all backgrounds in all regions of the country. Research conducted on the role that afterschool programs play in supporting STEM learning for students has established the field as a key player in helping students develop their science identity and belief that they can succeed in STEM careers (*Figure 2*).<sup>viii</sup>

Whether piloting the next crewed mission to the Moon or helping solve the greatest challenges facing our country and world, students in afterschool programs today will soon be on the front lines, in the labs developing solutions, and applying their STEM knowledge to make informed decisions about the world around them. Working together with schools, businesses, community organizations, and informal science institutions, afterschool programs can help equip all young people to play a role in addressing our most pressing issues.

America After 3PM began collecting data on STEM afterschool in 2014 to help document the role that afterschool programs play in supporting STEM learning, offering the nation's first look at the prevalence of STEM learning in afterschool and how parents view its value for their children. This report, based on new data collected in 2020, provides an opportunity to compare data to 2014, and gauge current parent perspectives. This data was collected before the COVID-19 pandemic closed schools and impacted learning for students across the country. Follow-up surveys were conducted to better understand how programs have responded to the pandemic, and whether they are offering STEM learning to students after school and during the summer, or plan to do so in the future.



**Figure 2:** Large-scale study supports role of afterschool STEM in improving attitudes and interest in STEM

In a study by the PEAR Institute of 160 afterschool STEM programs serving 1,600 students across 11 states:\*

Students said their STEM career knowledge increased because of their afterschool experience



Students said they had a more positive attitude about STEM because of their afterschool experience



Students said they had a more positive STEM identity because of their afterschool experience



Students said their perseverance and critical thinking skills increased because of their afterschool experience



\*Source: Allen, P. J., Noam, G. G., & Little, T. D. (2017). Multi-state evaluation finds evidence that investment in afterschool STEM works. STEM Ready America: Inspiring and Preparing Students for Success with Afterschool and Summer Learning. Retrieved from <http://stemreadyamerica.org/multi-state-evaluation-finds-evidence-that-investment-in-afterschool-stem-works/>



Photo Credit: Thompson Island Outward Bound

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# Key Findings

The 2020 America After 3PM report on afterschool demand and supply in the United States, “Demand Grows, Opportunity Shrinks,” found a dramatic escalation in the unmet demand for afterschool programs since the last survey in 2014.<sup>ix</sup> For every child in an afterschool program, three more children are waiting to get in. A total of 24.6 million children would participate in an afterschool program if one were available—an increase of nearly 6 million children from 2014. And parents with a child enrolled in an afterschool program give high marks to program offerings and recognize the benefits of programs, with more than 9 in 10 parents reporting satisfaction with their child’s afterschool program and majorities agreeing that their child’s afterschool program plays an important role in meeting the academic and social and emotional needs of their children.

This report offers a deeper dive into the 2020 America After 3PM survey findings to provide important new insights about STEM learning in afterschool, a first-ever look at trends in afterschool STEM learning, areas for further exploration, and recommendations to help ensure that all young people have access to high-quality afterschool STEM opportunities.

## I. Opportunities for STEM learning are on the rise in afterschool programs

America After 3PM finds that nearly 3 out of 4 afterschool participants, or 5,740,836 kids, have STEM learning opportunities in their afterschool programs. Parents reporting that their child’s afterschool program offers STEM learning opportunities increased from 69 percent in 2014 to 73 percent in 2020. STEM learning is tied as the third most common offering of afterschool programs across the country, according to parents, along with homework help and learning responsible decision-making.

- **Variety of STEM activities has grown:** According to parents, technology and engineering offerings have increased significantly, from being offered in 30 percent of afterschool programs in 2014 to 39 percent in 2020. Parents reporting that their child’s afterschool program offers science learning activities increased from 46 percent in 2014 to 49 percent in 2020. Math activities, the most commonly reported STEM offering in afterschool programs, also saw a slight increase, from 60 percent of parents reporting their child’s afterschool program offers math in 2014 to 62 percent in 2020.
- **Computer science is available in afterschool:** For the first time, America After 3PM included computer science activities as a response option for parents, finding that 41 percent of afterschool participants have access to computer science in their program.
- **STEM learning in afterschool is most likely to be offered in elementary school:** Parents of children in elementary school are more likely to report that their child’s afterschool program offers STEM learning (75 percent) compared to parents of children in middle school (74 percent) and high school (70 percent). However, there are variations in the specific disciplines of STEM, with technology and engineering most common among high school students.
- **Frequency of STEM learning opportunities in afterschool programs has increased:** Among families with children in afterschool programs that offer STEM learning, 60 percent of parents report that their child participates in STEM activities two or more times per week, up from 52 percent in 2014. Parents reporting that their child takes part in a STEM activity at least once a week increased from 77 percent in 2014 to 82 percent in 2020.
- **Highest frequency of STEM offerings is found in high school:** While the participation rate for high school aged students in STEM is the lowest among the three grade ranges, the frequency of participation among this age group is the highest, with 66 percent of parents of a high school student reporting that their child takes part in a STEM activity at least twice a week, compared to 56 percent of parents of an elementary school student and 62 percent of parents of a middle school student.

## II. Parents increasingly see afterschool as important for STEM learning

Three out of four parents say that afterschool programs help children gain interest and skills related to STEM. The percentage of parents agreeing with this sentiment increased from 65 percent in 2014, a jump of 11 percentage points.

- **Parents prioritize STEM learning:** STEM and computer science learning opportunities are a greater priority for parents now than in 2014, with a higher percentage of parents wanting these opportunities in their child's afterschool program. More than 7 in 10 parents (72 percent) report that STEM and computer science learning opportunities were important in their selection of an afterschool program, up 19 percentage points from 2014 (53 percent). This is the largest increase among the various afterschool program activities and supports in the survey.

- **Parents are largely satisfied with STEM offerings in afterschool:** More than 2 in 3 parents (67 percent) report that they are satisfied with the STEM learning opportunities offered by their child's afterschool program. Notably, 41 percent of those parents are extremely satisfied. These findings are similar to 2014, when 69 percent of parents reported that they were satisfied with the STEM offerings in their child's afterschool program. STEM is one of the few afterschool offerings tracked in America After 3PM where parent satisfaction grows as grade levels increase; rising from 65 percent of parents of elementary school students to 71 percent of parents of high school students.



Photo Credit: 4-H

## III. Programs are serving students underrepresented in STEM careers

Afterschool programs are providing STEM learning opportunities for those traditionally underrepresented in STEM. Parents of Black and Hispanic/Latinx students (77 percent, all) report higher rates of STEM learning opportunities in their child's afterschool program than the national average, and report rates higher than White parents (72 percent). Asian American parents, at 68 percent, report the lowest rate of STEM offerings in their child's afterschool program. Nationally, 73 percent of parents report that their child's afterschool program offers STEM learning.

Parents of boys and girls report similar rates of STEM learning opportunities in their child's afterschool program; parents of boys report 75 percent of programs offer STEM learning while parents of girls report 72 percent. Opportunities for STEM learning in afterschool for boys and girls have grown from 2014, when both were reported at 69 percent.

Compared to overall STEM learning, there are bigger gaps in access to STEM discipline-specific offerings by gender:

- **Technology and engineering:** Boys are more likely to have opportunities to participate in technology and engineering activities in their afterschool program than girls (42 percent vs. 36 percent). This six-point difference is the largest of the STEM disciplines.
- **Computer science:** Boys are more likely to have opportunities to participate in computer science activities than girls (43 percent vs. 39 percent).
- **Math and science learning:** For math (62 percent boys vs. 61 percent girls) and science learning (49 percent boys and girls) there is little to no difference in opportunities to participate between boys and girls.



#### IV. STEM opportunities are not evenly distributed to all families

In addition to the gender differences outlined above, America After 3PM reveals other troubling inequities in access to STEM learning in afterschool. The frequency of STEM learning activities varies between the lowest-income and highest-income brackets and the cost of afterschool programs with STEM learning opportunities exceeds the cost of programs not offering STEM learning.

- **The frequency and variety of STEM learning varies by income:**

While parents from the lowest-income and highest-income brackets report very similar rates of STEM learning opportunities in afterschool (74 percent vs. 75 percent), differences exist in the types and frequency of activities offered to children in afterschool programs.<sup>1</sup> Parents from the highest-income bracket are more likely to report that their child participates in STEM learning at least twice a week than parents in the lowest-income bracket (62 percent vs. 56 percent). There are also gaps when looking at individual disciplines of STEM.

- The largest gap exists in technology and engineering activities. Just 27 percent of parents with the lowest incomes report that their child has technology and engineering activities compared to 44 percent of parents with the highest incomes, a gap of 17 points.
- For computer science learning, there is a 15-point gap between the lowest- and highest-income families (33 percent vs. 48 percent).
- Similarly, there is a gap of 14 points between the lowest- and highest-income families regarding their child's afterschool program offering science learning opportunities (43 percent vs. 57 percent).
- Math activities are the only discipline of STEM learning where there is no difference between families from the lowest- and highest-income brackets, with 65 percent of both groups reporting their child's program includes math activities.

- **STEM program costs exceed non-STEM programs:**

Afterschool programs offering STEM learning are more expensive than programs that do not offer STEM. Parents report a mean cost of \$107 per week to attend programs offering STEM learning, compared to \$74 per week for programs that do not offer STEM learning. Over the course of a 36-week school year, that makes the cost \$3,852 for programs offering STEM learning compared to \$2,664 for those without. More frequent STEM offerings come at a higher cost to parents, with programs offering STEM at least twice a week having a mean cost of \$116 per week (\$4,176 over the school year) compared to \$95 (\$3,420 over the school year) for programs offering STEM learning once a week or less.

- **Differences exist among rural, suburban, and urban communities:**

There is a geographic gap in participation in afterschool STEM programs. Parents in urban communities (79 percent) are more likely to report that their child has STEM learning opportunities in her or his afterschool program than suburban (72 percent) and rural (70 percent) parents.

## V. Fewer students benefit due to increased barriers to afterschool participation

America After 3PM finds that STEM learning is a more common offering in afterschool programs nationwide than it was in 2014. Despite STEM's growth as a component of afterschool programs, the number of children with access to afterschool STEM learning has dropped as barriers to participating in afterschool programs have increased.

In the 2020 America After 3PM survey, a greater percentage of parents report challenges related to affordability and availability of afterschool programs than in 2014. Cost, transportation, and access top the list of roadblocks to afterschool participation and are even greater barriers for low-income families. Today, just 7.8 million children are enrolled in an afterschool program, down from a high of 10.2 million

children in 2014. The number of children from low-income households participating in afterschool fell from 4.6 million in 2014 to 2.7 million in 2020, while the number of higher-income children in afterschool fell by just under 450,000 over the same period. Among families with low incomes, cost is the number one barrier to afterschool participation.

As barriers to participation in afterschool programs have increased since 2014, support for public funding for afterschool programs has grown. The percentage of parents in favor of public funding for afterschool has increased to its highest level of support (87 percent) since America After 3PM began tracking this support in 2009.



Photo Credit: Club Invention



Photo Credit: BellXcel



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# Opportunities for STEM learning are on the rise in afterschool programs

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America After 3PM finds that nearly 3 out of 4 afterschool participants, or 5,740,836 kids, have STEM learning opportunities in their afterschool programs. Parents reporting that their child's afterschool program offers STEM learning opportunities increased from 69 percent in 2014 to 73 percent in 2020<sup>1</sup>.

STEM learning is tied as the third most common offering of afterschool programs across the country, according to parents, along with homework help and learning responsible decision-making (*Figure 3*).

## Opportunities in all disciplines of STEM have grown

The data from America After 3PM shows that learning opportunities in each of the individual disciplines of STEM—science learning, technology and engineering, and math activities—are more available in afterschool programs now than in 2014 (*Figure 4*).

Technology and engineering offerings have increased significantly, from being offered in 30 percent of afterschool programs in 2014 to 39 percent in 2020. The significant increase in technology and engineering is even more pronounced for students in grades 9-12, with 46 percent of parents with a high school student reporting that their child's afterschool program now offers technology and engineering activities compared to 32 percent in 2014. This jump may be explained in part by greater participation among high school students in robotics programs and competitions through groups including FIRST, VEX Robotics, or other leagues and competitions. For example, from 2015 to 2020 participation in FIRST robotics leagues grew from 71,000 high school students to nearly 98,000 high school students.<sup>x,xi</sup>

**Figure 3:** Most common offerings provided by afterschool programs

Percent of parents reporting that their child's afterschool program offers the following:

	% offered
Opportunities to interact with peers and build social skills	90%
Physical activity	85%
STEM learning opportunities	73%

There are also distinct increases in science learning and math activities offered by afterschool programs from 2014 to 2020. Parents reporting that their child's afterschool program offers science learning activities increased from 46 percent in 2014 to 49 percent in 2020. This gain is consistent across grade levels, with 48 percent of parents with an elementary student, 49 percent of parents with a middle school student, and 51 percent of parents with a high school aged student reporting that their child's afterschool program offers science learning activities (*Figure 5*). Math activities, the most commonly reported STEM offering in afterschool programs, also saw a slight increase, from 60 percent of parents reporting their child's afterschool program offers math in 2014 to 62 percent in 2020.



Photo Credit: Allison Shelley/  
The Verbatim Agency for EDUimages

<sup>1</sup> The 2020 America After 3PM survey included the following options for parents to select for STEM learning: science learning, technology and engineering, math activities, and computer science. Computer science was not included in the 2014 survey.



Photo Credit: Allison Shelley/  
The Verbatim Agency for EDUimages



## AFTERSCHOOL STEM IN THE TIME OF COVID-19:

A [survey](#) of afterschool program providers conducted February 19 –March 15, 2021 found that 76 percent of afterschool programs reported providing STEM learning opportunities to participants, which is similar, although slightly higher than, the pre-pandemic rates of STEM offering reported by parents in America After 3PM.

**Does your program currently offer any of the following for your students?**

Time to interact with peers and build social skills	<b>86%</b>
Homework or academic help	<b>85%</b>
Physical activity opportunities	<b>81%</b>
Opportunities to talk with peers or staff members about their feelings and emotions	<b>80%</b>
<b>STEM learning opportunities</b>	<b>76%</b>

It is worth noting a change in the survey language on math activities from 2014 to 2020. In 2020, the survey explicitly excluded homework help as a math activity, yet there was a slight increase in parents reporting that their child's afterschool program offers math. This suggests that afterschool math offerings skew toward hands-on learning and not remediation or homework help.<sup>2</sup> It is also notable that math activities are the only STEM discipline that are less available as students age. Sixty-five percent of parents with an elementary school student, 61 percent of parents with a middle school student, and 53 percent of parents with a high school student report that their child's afterschool program has math activities.

<sup>2</sup> The 2014 America After 3PM survey answer option was "math learning opportunities (such as math games, puzzles or working with geometric shapes)." The 2020 America After 3PM survey answer option was updated to read, "math learning opportunities (such as puzzles or working with geometric shapes, but excluding math homework help)."

Finally, computer science activities—captured for the first time in the 2020 survey—are available to 41 percent of afterschool participants. Similar to technology and engineering offerings in afterschool programs, computer science is more commonly available to older students, with nearly half of parents of a high school student (47 percent) or a middle school student

(48 percent) reporting their child has access to computer science in her or his afterschool program. Only 37 percent of parents of elementary students report that their child's afterschool program offers computer science.

**Figure 4:** Growth in STEM offerings in afterschool

ACTIVITY	2014	2020
<b>STEM overall</b>	<b>69%</b>	<b>73%</b>
Science learning	<b>46%</b>	<b>49%</b>
Technology and engineering	<b>30%</b>	<b>39%</b>
Math activities	<b>60%</b>	<b>62%</b>
Computer science	<b>N/A</b>	<b>41%</b>



## STEM IN AFTERSCHOOL SPOTLIGHT

### Science Action Club (National)

In Science Action Club, middle school youth investigate their local environment and design strategies to protect the planet. The program uses citizen science—a process where the general public collects various data in partnership with professional scientists—to advance STEM learning goals, and supports out-of-school time educators with hands-on teaching kits and professional development training. Launched in 2011 and administered by the California Academy of Sciences, Science Action Club programming is implemented through community partnerships in more than 450 communities across 37 states, and in Europe.

**Figure 5:** STEM learning activities in afterschool programs by grade level

ACTIVITY	K - 5TH	6TH - 8TH	9TH - 12TH
<b>STEM overall</b>	<b>75%</b>	<b>74%</b>	<b>70%</b>
Science learning	<b>48%</b>	<b>49%</b>	<b>51%</b>
Technology and engineering	<b>36%</b>	<b>43%</b>	<b>46%</b>
Math activities	<b>65%</b>	<b>61%</b>	<b>53%</b>
Computer science	<b>37%</b>	<b>48%</b>	<b>47%</b>

**Figure 6:** Frequency of STEM learning in afterschool has increased since 2014



#### Frequency of STEM learning opportunities in afterschool programs has increased

Among families with children in programs that offer STEM learning, 60 percent of parents report that their child participates in STEM activities two or more times per week, up from 52 percent in 2014 (Figure 6). Parents

reporting that their child takes part in a STEM activity at least once a week increased from 77 percent in 2014 to 82 percent in 2020.

High school students have the highest frequency of STEM offerings in afterschool. While the participation rate for high school aged students in STEM is the lowest among the three grade

ranges, the frequency of participation among this age group is the highest, with 66 percent of parents of a high school student reporting that their child takes part in a STEM activity at least twice a week, compared to 56 percent of parents of a K-5<sup>th</sup> grade student and 62 percent of parents of a 6-8<sup>th</sup> grade student.



#### AFTERSCHOOL INSIGHT

The increased frequency of STEM opportunities in afterschool programs is an encouraging sign that afterschool programs have taken on a greater role in engaging students in hands-on STEM activities that can support their classroom learning. Research on afterschool STEM has also found that frequency of offerings is an important factor in building and maintaining a young person's interest in STEM fields.<sup>xii, xiii</sup>



Photo Credit: Allison Shelley/The Verbatim Agency for EDUimages



# Parents increasingly see afterschool as important for STEM learning

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More than 3 out of 4 parents (76 percent) say that afterschool programs help children gain interest and skills related to STEM. The percentage of parents agreeing with this sentiment increased from 65 percent in 2014, a jump of 11 percentage points (**Figure 7**).

Latinx (80 percent), Asian American (79 percent), and Black (78 percent) parents all are more likely than White parents (75 percent) to agree that afterschool programs help children gain interest and skills related to STEM.

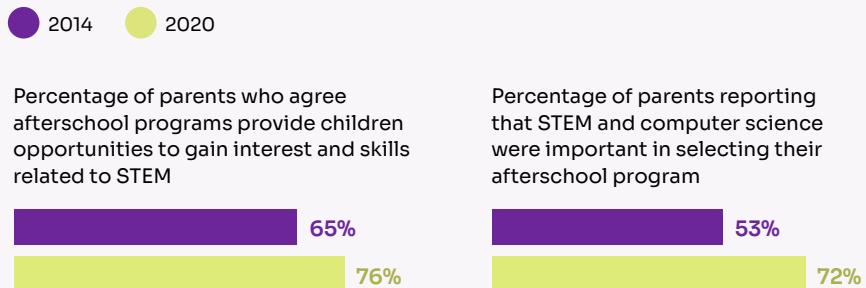
Even parents who do not have a child enrolled in an afterschool program see afterschool as a space that supports STEM learning. Seventy-five percent of parents of nonparticipants agree that afterschool programs help children gain skills related to STEM, an increase from 61 percent in 2014.

## Parents prioritize STEM learning in selecting their child's afterschool program

STEM and computer science learning opportunities are a greater priority for parents now than in 2014, with a higher percentage of parents wanting these opportunities in their child's afterschool program.<sup>3</sup> More than 7 in 10 parents (72 percent) report that STEM and computer science learning opportunities were important in their selection of an afterschool program, up 19 percentage points from 2014 (53 percent) (**Figure 7**). This is the largest increase among the various afterschool program activities and supports in the survey.

Latinx (79 percent), Asian American (76 percent), and Black (75 percent) families are more likely than White (68 percent) families to report that afterschool STEM and computer science opportunities

**Figure 7:** More parents recognize the value of STEM learning



### STEM IN AFTERSCHOOL SPOTLIGHT

#### Club Invention (National)

Club Invention® and Camp Invention® are National Inventors Hall of Fame® (NIHF) education programs that engage children through the dynamic lens of innovation. NIHF educational programs weave together science, technology, engineering, art, and math (STEAM), critical thinking, and creative problem solving, as well as entrepreneurship and intellectual property. Children are hooked by immersive storylines and discover how to bring an idea from their imagination into reality, and then pitch their idea to the world. Pictured

here is a program participant reverse engineering a microphone that powers on with a message from NIHF Inductee Jim West (the inventor of the electret microphone), stating that he looks forward to hearing about their ideas.

<sup>3</sup> The definition of STEM learning opportunities in the 2014 America After 3PM survey was "science, technology, engineering, and math learning opportunities." In the 2020 wave of the survey, STEM learning opportunities was defined as "science, technology, engineering, math, or computer science learning opportunities."



## STEM IN AFTERSCHOOL SPOTLIGHT

### Girls Inc. (National)

Girls Inc. Operation SMART develops girls' enthusiasm for and skills in STEM by connecting students with professionals in STEM careers and opportunities for hands-on STEM activities. By interacting with women and men pursuing STEM careers, girls come to view these careers as exciting and realistic options for themselves. Through hands-on activities, girls explore, ask questions, persist, and solve problems.

**Figure 8:** STEM learning activities in afterschool programs by grade level

GRADE	STEM is “extremely important in the selection of my child’s afterschool program”
K–5 <sup>th</sup>	<b>38%</b>
6 <sup>th</sup> –8 <sup>th</sup>	<b>46%</b>
9 <sup>th</sup> –12 <sup>th</sup>	<b>48%</b>

were important to their selection of an afterschool program for their child.

The importance of STEM learning to parents increases as their children get older. Parents of children in middle (46 percent) and high school (48 percent) are more likely to say that STEM is “extremely important” in the selection of their child’s afterschool program than parents of younger children (Figure 8).

Families in the lowest-income bracket place a greater importance on STEM in selecting their child’s afterschool program. Nearly half of parents in the lowest-income bracket (48 percent) say STEM is extremely important in

the selection of their child’s afterschool program compared to 42 percent of parents in the highest-income bracket.

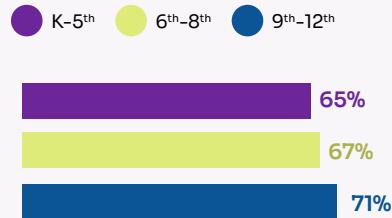
#### Parents are largely satisfied with STEM offerings in afterschool

More than 2 in 3 parents (67 percent) report that they are satisfied with the STEM learning opportunities offered by their child’s afterschool program. Notably, 41 percent of those parents are extremely satisfied. These findings are similar to 2014, when 69 percent of parents reported that they were satisfied with the STEM offerings in their child’s afterschool program.

STEM is one of the few afterschool offerings tracked in America After 3PM where parent satisfaction grows as grade levels increase; rising from 65 percent of parents of elementary school students to 71 percent of parents of high school students (Figure 9).

Examining satisfaction with STEM offerings in afterschool programs by race and ethnicity, Hispanic/Latinx parents report the highest satisfaction (74 percent), followed by Black parents (72 percent), Asian American parents (69 percent), and White parents (63 percent). Satisfaction levels are consistent between lower-income families and higher-income families (67 percent, all).

**Figure 9:** Satisfaction with STEM offerings grows across grade levels



#### AFTERSCHOOL INSIGHT

The high rates of parents reporting that afterschool programs are important for STEM learning and a priority in selecting a program could suggest that parents perceive STEM learning as important to their child’s career and/or higher education. As children move into middle school and high school, the afterschool activities they participate in, often geared toward career exploration and skill building, play a role in building interest in STEM careers and education pathways.

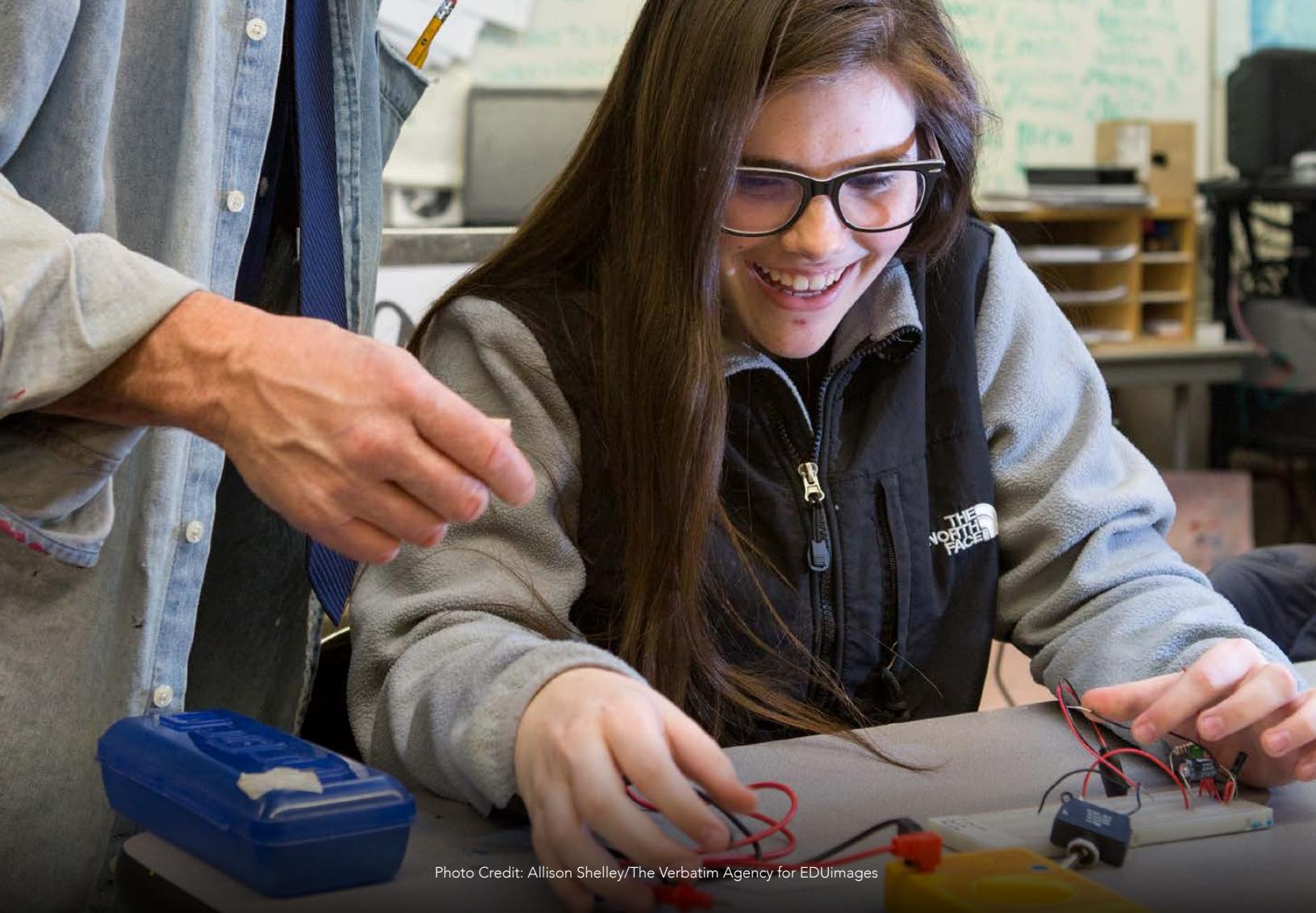


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## Programs are serving students underrepresented in STEM careers

# Programs are serving students underrepresented in STEM careers

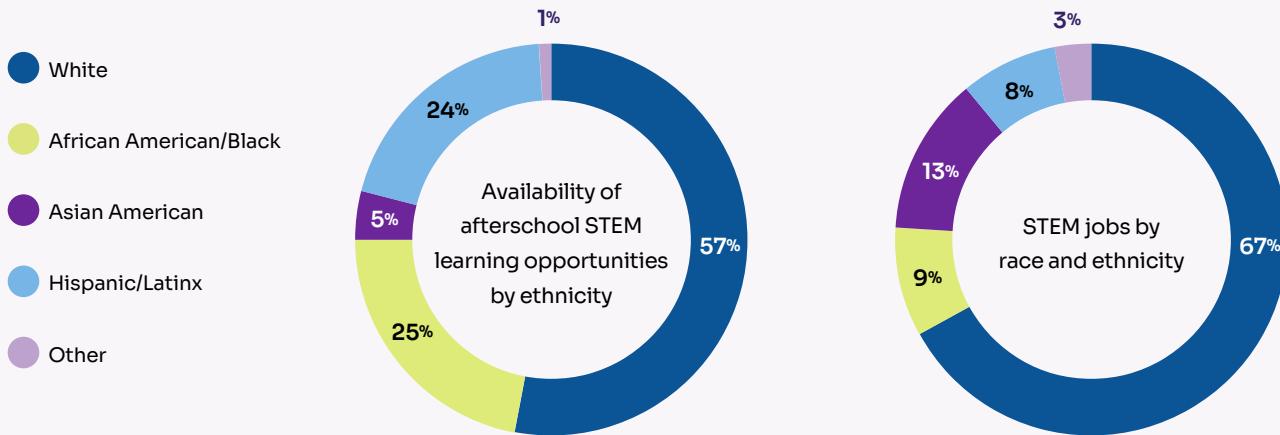
Women and people of color are underrepresented in STEM professions. Women make up a very small percentage of the workforce in STEM fields; just 15 percent of engineers and 25 percent of computer science professionals are women, and less than 4 percent of all engineers are Black and Latinx women. Racial and ethnic diversity also remains a problem in STEM professions; 67 percent of the STEM workforce is White, 13 percent Asian American, 9 percent Black, and 8 percent Latinx (**Figure 10**).<sup>xiv, xv</sup>

Afterschool programs are providing STEM learning opportunities for those in demographic groups traditionally underrepresented in STEM. Seventy-seven percent of parents of Black and

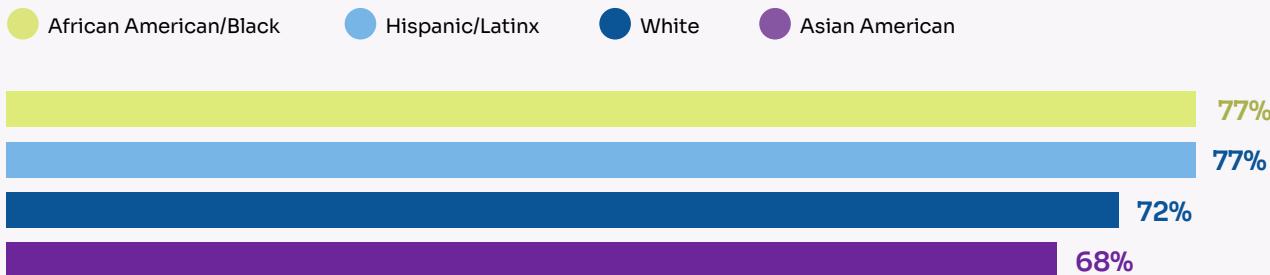
Latinx students report that there are STEM learning opportunities in their child's afterschool program, while 72 percent of White parents say the same. Asian American parents, at 68 percent,

report the lowest rate of STEM offerings in their child's afterschool program (**Figure 11**). Nationally, 73 percent of parents overall report that their child's afterschool program offers

**Figure 10:** Comparison of composition of STEM workforce by ethnicity and afterschool participants with STEM opportunities by ethnicity



**Figure 11:** Opportunities for STEM learning among afterschool participants by ethnicity





## STEM IN AFTERSCHOOL SPOTLIGHT

### Learn Fresh (National)

NBA Math Hoops features a comprehensive community program, board game, mobile apps, and classroom curricula that allow students to learn fundamental math and social and emotional skills through the game of basketball. Initially developed in the classroom of a math educator in Southern California, the program is now implemented in partnership with the NBA, WNBA, NBPA, WNBPA, and most teams across both leagues.

Over 350,000 students have participated in the program globally, with math fluency scores shown to improve by 35 percent as of the program's most recent annual evaluation.

## Difference in afterschool STEM offerings by gender

Parents of boys and girls report similar rates of STEM learning opportunities in their child's afterschool program; parents of boys report 75 percent of programs offering STEM learning while parents of girls report 72 percent. Opportunities for STEM learning in afterschool for both boys and girls have increased since 2014, when both were reported at 69 percent.

Of the 5.7 million children in afterschool programs with STEM learning opportunities in 2020, 52 percent are male and 48 percent are female.



Photo Credit: Allison Shelley/The Verbatim Agency for EDUimages

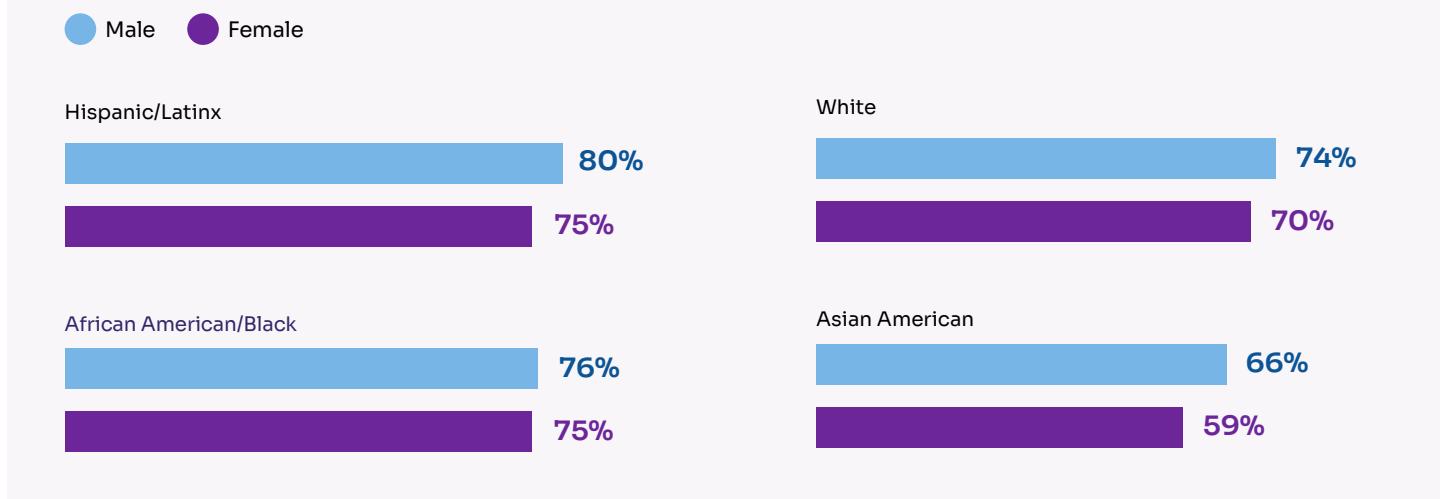
There are bigger gender gaps in access to some STEM disciplines:

- **Technology and Engineering:** Boys are more likely to have opportunities to participate in technology and engineering activities in their afterschool program than girls (42 percent vs. 36 percent). This six-point difference is the largest of the STEM disciplines.
- **Computer Science:** Boys are more likely to have opportunities to participate in computer science activities than girls (43 percent vs. 39 percent).
- **Math and Science:** For math (62 percent boys vs. 61 percent girls) and science learning (49 percent boys and girls) there is little to no difference in opportunities to participate between boys and girls.

There is also a gap in how often boys and girls participate in STEM learning in their afterschool programs. Parents of boys are more likely to report their child participates in STEM learning at least twice a week than parents of girls (62 percent vs. 57 percent). This gap has narrowed from the 2014 survey, where parents reported that 57 percent of boys participated in STEM learning at least twice a week compared to 48 percent of girls.

While girls overall are less likely to have afterschool STEM learning opportunities than boys, the gaps vary by ethnicity (*Figure 12*). The variation between afterschool STEM offerings for boys and girls is smallest for Black students (76 percent boys vs. 75 percent girls). White (74 percent boys vs. 70 percent girls), Hispanic/Latinx (80 percent boys vs. 75 percent girls), and Asian American (66 percent boys vs. 59 percent girls) students have similar, larger gender gaps in STEM learning opportunities. This data also shows Black and Latinx girls have higher rates of STEM offerings (75 percent for both groups) than their White (70 percent) and Asian American (59 percent) peers.

**Figure 12:** Opportunities for STEM learning among afterschool participants by combined ethnicity and gender



#### AFTERSCHOOL INSIGHT

The findings show a clear need to increase efforts to address gender equity in STEM programming in afterschool. While parents report growing participation among girls in STEM since 2014 (69 percent in 2014 vs. 72 percent in 2020), it lags behind the growth for boys (69 percent vs. 75 percent). The gaps in access to technology and engineering and computer science between boys and girls indicate an opportunity to provide more focused programming efforts in those areas. Efforts like the Million Girls Moonshot, an initiative designed to spur girls' interest, understanding, and confidence in STEM through afterschool programs are a part of the solution and will be critical to closing the gender gaps in STEM learning in the coming years.



#### STEM IN AFTERSCHOOL SPOTLIGHT

##### Digital Harbor Foundation (Baltimore, MD)

Digital Harbor Foundation (DHF)'s Tech Center is a "playground for the mind" where youth in grades 1-12 engage in dynamic, hands-on STEM education activities and employment opportunities. DHF's education programs include afterschool courses, summer camps, and 3D-Printing field trips. Its youth employment programs allow youth to develop work experience in STEM fields, including digital fabrication, web development, and podcasting. Pictured is a youth in DHF's 2D Design to 3D Printing Summer Maker Camp.



## IV

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**STEM opportunities  
are not evenly distributed  
to all families**

# STEM opportunities are not evenly distributed to all families

## Afterschool STEM learning is less available to families with the lowest incomes

In addition to the gender differences reported above, America After 3PM reveals other troubling inequities in access to STEM learning in afterschool. While parents from the lowest-income and highest-income brackets report very similar rates of STEM learning opportunities in afterschool (74 percent vs. 75 percent), differences exist in the types and frequency of activities offered to children in afterschool programs.<sup>4</sup>

These gaps become apparent when looking at individual disciplines of STEM (*Figure 13*). The largest gap exists in technology and engineering activities. Just 27 percent of parents with the lowest incomes report that their child has technology and engineering activities compared to 44 percent of parents with the highest incomes, a gap of 17 points. For computer science learning, there is a 15-point gap between the lowest- and highest-income families (33 percent vs. 48 percent). Similarly, there is a gap of 14 points between the lowest- and highest-income families regarding their child's afterschool program offering science learning opportunities (43 percent vs. 57 percent). Math activities are the only discipline of STEM learning where there is no difference between families from the lowest- and highest-income brackets, with 65 percent of both groups reporting their child's program includes math activities.

Income is also linked to the frequency of STEM offerings in afterschool programs. Although majorities of parents from both the highest- and lowest-income brackets report that their child participates in STEM learning twice a week or more, parents from the highest-income bracket are more likely to report that their child participated in STEM learning at least twice a week than parents in the lowest-income bracket (62 percent vs. 56 percent).

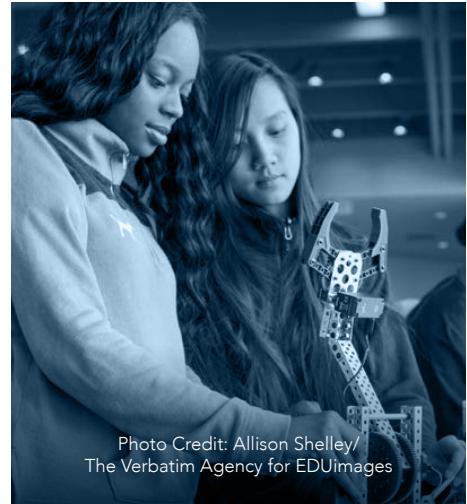
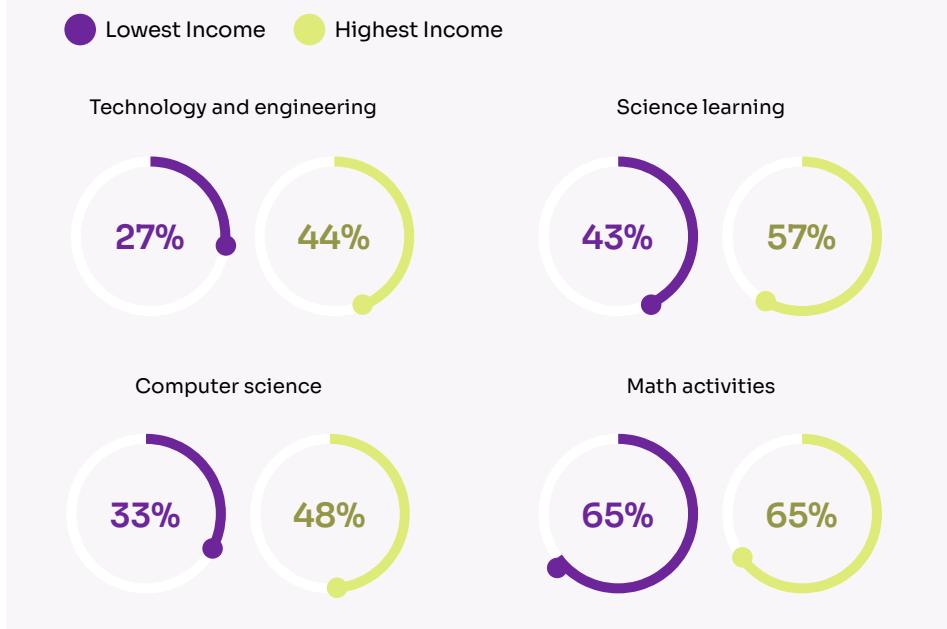


Photo Credit: Allison Shelley/  
The Verbatim Agency for EDUimages

**Figure 13:** Variety of STEM offerings greater for higher-income families



<sup>4</sup> Household income brackets were comprised of percentiles/quintiles: 20<sup>th</sup> percentile (under \$25,000), 40<sup>th</sup> percentile (\$25,000 to just under \$50,000), 60<sup>th</sup> percentile (\$50,000 to just under \$75,000), 80<sup>th</sup> percentile (\$75,000 to just under \$100,000), 90<sup>th</sup> percentile (\$100,000 to just under \$200,000), 90<sup>th+</sup> percentile (\$200,000 or more). In this section, "lowest income bracket" refers to the respondents in the 20<sup>th</sup> percentile and "highest income bracket" refers to respondents in the 90<sup>th+</sup> percentile. This is different from families with lower incomes and higher incomes, which refers to parents who do or do not qualify for the free or reduced-price lunch program based on guidelines by the United States Department of Agriculture.

## Cost may drive disparities in frequency of STEM learning

The cost of programs offering STEM learning are more expensive than programs that do not. Parents report a mean cost of \$107 per week to attend programs offering STEM learning, compared to \$74 per week for programs that do not offer STEM learning. Over the course of a 36-week school year,

that makes the cost \$3,852 for programs offering STEM learning compared to \$2,664 for those without. More frequent STEM offerings come at a higher cost to parents, with programs offering STEM at least twice a week having a mean cost of \$116 per week (\$4,176 school year) compared to \$95 (\$3,420 school year) for programs offering STEM learning once a week or less.

## AFTERSCHOOL INSIGHT



The data shows that consistent and diverse STEM learning in afterschool programs is less available to students with the lowest incomes. Cost could be the primary factor driving this gap.



### STEM IN AFTERSCHOOL SPOTLIGHT

#### Techbridge Girls (National)

Techbridge Girls is an award-winning, nonprofit organization re-engineering the way STEM is taught to BIPOC (Black, Indigenous, and people of color) girls who experience economic insecurity. For more than 20 years, Techbridge's approach has centered girls' brilliance and potential, with an emphasis on increasing STEM access, belonging, and persistence. Techbridge reaches girls through educator-driven STEM enrichment programs, STEM events, and partnerships. Through Techbridge, hundreds of teachers, nonprofit facilitators, and

STEM professionals are equipped with STEM equity training. With school, nonprofit, and network partners in 27 states and Washington, D.C., Techbridge plans to reach 1 million girls with its programming by 2030 so no girl is shut out or left behind in the STEM revolution.

## Differences exist among rural, suburban, and urban communities

There is a geographic gap in participation in afterschool STEM programs. Parents in urban communities (79 percent) are more likely to report that their child has STEM learning opportunities in her or his afterschool program than suburban (72 percent) and rural (70 percent) parents. For rural students, families, and communities, this gap is especially concerning because rural schools also struggle to provide high-quality STEM learning opportunities due to limited STEM offerings and lower STEM teaching capacity among educators.<sup>xvi</sup>

However, the geographic gap could be driven, in part, by how parents in different parts of the country prioritize STEM when selecting their child's afterschool program. Parents in urban communities place greater importance on afterschool programs offering STEM learning, with 50 percent saying STEM learning is extremely important in the selection of their child's afterschool program compared to 35 percent of rural parents and 38 percent of suburban parents. Urban parents are also more satisfied with the STEM offerings in their child's afterschool program (73 percent) than parents in suburban and rural

communities (64 percent for both rural and suburban). Urban parents who place a higher importance on STEM learning may be more likely to seek out programs that offer those opportunities to their children and thereby incentivize more programs in urban communities to offer STEM.



Photo Credit: Alison Shelley/The Verbatim Agency for EDUimages

# V

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**Fewer students benefit from STEM learning due to increased barriers to afterschool participation**

# Fewer students benefit from STEM learning due to increased barriers to afterschool participation

America After 3PM finds that STEM learning is a more common offering in afterschool programs nationwide than it was in 2014. Despite STEM's growth as a component of afterschool programs, the number of children with access to afterschool STEM learning has dropped as barriers to participating in afterschool programs have increased.

In the 2020 America After 3PM survey, a greater percentage of parents report challenges related to affordability and availability of afterschool programs than in 2014 (*Figure 14*). Cost, transportation, and access top the list of roadblocks to afterschool participation and are even greater barriers for families with low incomes. Today, just 7.8 million children are enrolled in an afterschool program, down from a high of 10.2 million children in 2014 (*Figure 15*). The number of children from low-income households participating in afterschool fell from 4.6 million in 2014 to 2.7 million in 2020, while the number of higher-income children in afterschool fell by just under 450,000 over the same period. Among families with low incomes, cost is the number one barrier to afterschool participation.

As barriers to participation in afterschool programs have increased since 2014, support for public funding for afterschool programs has grown. The percentage of parents in favor of public funding for afterschool has increased to its highest level of support (87 percent) since America After 3PM began tracking this support in 2009.

Support for public funding of afterschool programs is strong across political parties, with 91 percent of parents who identify as Democrat, 87 percent of parents who identify as Independent, and 85 percent of parents who identify as Republican, in favor of such support.

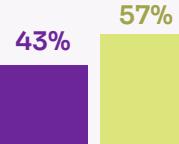
**Figure 14:** Barriers to afterschool program participation are increasing

Percentage of parents reporting that:

● 2014 ● 2020



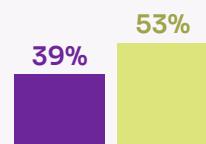
Programs are too expensive



Percentage point change: +14



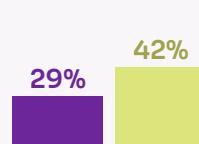
Transportation issues, no safe way to and from program



Percentage point change: +13



Lack of available programs



Percentage point change: +14

**Figure 15:** STEM learning is rising while afterschool participation declines

10.2 million kids in afterschool



2014

7.8 million kids in afterschool



2020

# Summertime STEM

America After 3PM includes essential data on summer learning program participation, in addition to the afterschool data, and offers specific insights into summertime STEM opportunities.

America After 3PM examines the types of structured summer experiences young people take part in, from mandatory summer school to specialty camps to summer internships or jobs. Overall, 12.6 million young people participated in summer learning opportunities in the summer of 2019. Of those, nearly 2 million kids (1,905,846) participated in summer STEM camps. Boys make up the majority of those 2 million kids; 53 percent of STEM camp participants are boys compared to 47 percent who are girls. Parents were overwhelmingly satisfied with their child's summer STEM program, with 96 percent of parents with a child in a STEM camp reporting they are satisfied with their child's experience.

Parents prioritize STEM learning when selecting a summer experience for their child. Seventy-five percent of parents say STEM learning opportunities are important (42 percent extremely important) in selecting their child's summer experience. This aligns closely to the 72 percent of parents who prioritize STEM learning in the selection of their child's afterschool program. Similar to afterschool, there are variations in the importance placed on STEM learning among parents of different ethnicities. Black (57 percent), Latinx (52 percent), and Asian American (40 percent) parents are much more likely than White parents (35 percent) to say that STEM learning was of extreme importance when selecting their child's summer activities.

Families with low incomes are more likely than families with higher incomes to look to their child's summer experience to provide a wide range of support, including STEM learning. At similar rates to afterschool, low-income parents place greater importance on STEM learning opportunities when selecting their child's summer experience than higher-income parents (49 percent vs. 39 percent report STEM is extremely important).



## SUMMER IN THE TIME OF COVID-19:

In a June 2021 [survey](#) of summer program providers, 83 percent report being physically open this year, a nearly 70 percent increase compared to the summer of 2020. Among summer programs that are open, 72 percent report offering STEM learning opportunities.

**Figure 16:** Parents reporting STEM learning is “extremely important” in selecting their child’s summer experience

African American/Black



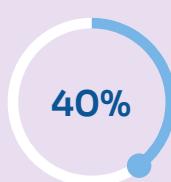
Hispanic/Latinx



White



Asian American



But despite low-income parents valuing STEM learning, children from higher-income households are three times more likely to participate in a summer STEM camp than children from lower-income households. It is reasonable to conclude that the reason is cost, as STEM camps are the most expensive structured summer experience in America After 3PM. STEM camps are also the structured summer experience category with the lowest reported average number of weeks children spent time in.<sup>5</sup>

**Figure 17:** Comparison of summer STEM camp to other voluntary summer programs

Voluntary summer programs	STEM camps
4.6 Average weeks	2.9 Average weeks
5.7 Average hours per day	5.3 Average hours per day
\$164.70 Average cost per week*	\$317.10 Average cost per week*

\*Among parents who report paying a fee

\*Among parents who report paying a fee



#### STEM IN AFTERSCHOOL SPOTLIGHT

##### Thompson Island (Boston, MA)

Located in the Boston Harbor Islands National Park, Thompson Island Outward Bound delivers immersive summer and school-year programs to public middle school students that bridge academic and social and emotional learning. Students who visit Thompson Island form strong bonds during multi-day and overnight visits, practice field science in their diverse ecosystems, and build teamwork and leadership skills through sea kayaking, wilderness, and climbing adventures.

During the pandemic, the organization delivered online crew classes to more than 1,000 middle school students in order to meet their most immediate needs: community, connection, and support. A crew is an intact team of 12 students who engage in Outward Bound curriculum focused on personal and group reflection, compassion, and resilience.

In response to the intense demand for in-person, nature-based programs after more than a year of remote learning, Thompson Island Outward Bound launched a new 21-day overnight Summer Learning Expedition (SLE). The program is part of the Boston's 5<sup>th</sup> Quarter of Learning initiative, which gives public school children access to free, high-quality summer learning opportunities.

<sup>5</sup> Structured summer experiences asked about in America After 3PM include STEM camps, voluntary summer programs, non-STEM specialty camps or programs, mandatory or optional summer school, college readiness or preparation programs, and work or internships.



Photo Credit: Thompson Island Outward Bound

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# Areas for Further Exploration

# Areas for Further Exploration

The 2020 America After 3PM survey highlights many bright spots for STEM learning in afterschool programs. STEM has become more available in afterschool programs, with parents reporting STEM learning in their child's afterschool program rising from 69 percent in 2014 to 73 percent in 2020.

Parents have developed a deeper understanding of the benefits of STEM learning in afterschool, with three quarters agreeing that these programs help children gain skills related to STEM. STEM learning also saw the largest increase of the factors that parents prioritize in selecting their child's afterschool program, with STEM learning making a 19-point jump from 53 percent in 2014 to 72 percent now.

But America After 3PM also reveals inequities that go beyond access to STEM learning in afterschool, showing gaps in the frequency and variety of STEM learning in afterschool programs between children from low-income families and their peers from higher-income families. In addition, children in rural communities are less likely to have STEM learning opportunities in their afterschool programs than children in urban and suburban communities. Finally, while afterschool STEM opportunities have increased for both boys and girls since 2014, the gap in STEM learning opportunities between boys and girls, particularly in technology and engineering and computer science activities, highlights a need to ramp up efforts to ensure more programs provide STEM learning opportunities for girls, and those opportunities are provided more frequently. These findings are troublesome because research shows that the more students participate in STEM learning after school, the more interested they become in STEM subjects and college majors.<sup>xvii</sup> If these inequities in access to afterschool STEM learning opportunities persist, they threaten to exacerbate existing inequities in K-12 STEM education and the STEM workforce.

The following areas deserve deeper exploration to help ensure that more young people have access to afterschool STEM learning opportunities:

## Variations across ethnicities and geographic regions regarding the importance of STEM learning

White parents are less likely than Latinx (79 percent), Asian American (76 percent), and Black parents (75 percent) to report that STEM and computer science learning are important in the selection of their child's afterschool program. Additionally, parents in urban communities place a greater importance on STEM learning, with 50 percent saying STEM learning is extremely important in the selection of their child's afterschool program compared to 35 percent for rural parents and 38 percent for suburban parents. Understanding these differences, and how attitudes vary across ethnicity and geography, could shed light on whether these findings are linked. Is the lower participation in STEM learning among families in rural and suburban communities driven by less demand for these programs? Or are attitudes toward importance and satisfaction of STEM learning among rural and suburban parents driving the lower rates of participation? Uncovering the answers to these questions would help in understanding how afterschool programs and partners could make STEM learning more widely accessible.



### STEM IN AFTERSCHOOL SPOTLIGHT

#### Girls Who Code (International)

Girls Who Code is an international nonprofit leading the movement to close the gender gap in technology. Through its free and flexible coding programs, marketing campaigns, and advocacy efforts, Girls Who Code works to inspire, educate, and equip girls and non-binary students with the skills they need to pursue 21<sup>st</sup> century opportunities. The Girls Who Code Clubs program provides educators with free curriculum and resources to encourage 3-12<sup>th</sup> graders to be brave and resilient as they learn how to use computer science to change the world.

## **Availability of computer science and technology and engineering programming**

According to parents, there are fewer opportunities for students to participate in computer science and technology and engineering activities than math and science across all grade levels in afterschool, and especially for girls. Understanding why could help in the creation of strategies to expand offerings, either through additional training and professional development opportunities for staff, curricula for programs, and/or supplies and hardware. With states increasingly prioritizing computer science for students, there will be opportunities for afterschool and summer programs to solidify their role in providing computer science education, but having opportunities for staff to receive the support they need will be increasingly important.<sup>xviii</sup>

## **Inequities between families with low incomes and high incomes in diversity of activities and frequency of programming**

The gap in frequency and diversity of STEM learning activities reported by low-income parents versus higher-income parents is apparent in America After 3PM. These inequities are likely driven by some of the same barriers that have led to lower overall participation rates in afterschool by low-income students, such as the cost of programs. A greater understanding of the needs of parents and the programs serving low-income students is essential to address inequities in the informal STEM learning landscape.

## **Gender differences in access to afterschool STEM learning**

While parents report that girls and boys have similar levels of access to afterschool STEM opportunities, and both have increased since 2014, the pace of growth for girls lags behind boys. The largest gender gaps in access are found in technology and engineering and computer science activities, but the reasoning for these gaps is unclear. Additionally, parents of boys report STEM learning opportunities are provided more frequently than parents of girls. Are these gaps due to parent selection of afterschool programs, or are they due to other factors that impact girls' interest in STEM activities within afterschool programs? Closer examination of the barriers to STEM learning for girls is needed, as is a greater focus on helping girls see and connect to the opportunities in STEM fields.



Photo Credit: JR Sheetz

### **STEM IN AFTERSCHOOL SPOTLIGHT**

#### **ExpandED Schools STEM Educators Academy (New York, NY)**

STEM Educators Academy is taught by collaborative teams of school-day and afterschool educators at middle schools across New York City. Focused on relevant, hands-on, and design-based projects connected to the city's science standards—spanning biology, engineering, chemistry, and more—the program is designed to nurture student interest and engagement in STEM while also supporting educator skill development. Educators have access to training, curriculum, coaching, and planning materials from ExpandED Schools and its partners at the New York Hall of Science, which they utilize for support in creating interactive and inclusive STEM learning experiences with young people.



Photo Credit: Allison Shelley/The Verbatim Agency for EDUimages

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# Recommendations and Resources

# Recommendations

Parents recognize that afterschool programs are helping students develop interest and skills related to STEM. Parents also place a higher level of importance on STEM learning in selecting their child's program now than in the past. But too many students are without access to afterschool programs of any kind. Students cannot access STEM learning in afterschool if they are not in afterschool programs. Stakeholders in the afterschool field must work in partnership with researchers, policymakers, and STEM-rich institutions to identify the barriers and solutions to expanding access to out-of-school-time programs.

## Explore parent attitudes toward and perceptions of STEM learning overall and how they may impact demand for afterschool STEM opportunities

In particular, explore how parents in rural and suburban communities view STEM learning and the role STEM learning can play in building their children's interest and skills in STEM fields. Differences in attitudes toward STEM or understanding of STEM careers may be driving differences in demand for and access to afterschool STEM, and more research on effective engagement strategies for parents may help shed light on the best ways to address the differences in participation.



## Increase the computer science and technology and engineering programming available in afterschool

Progress has been made in increasing access to technology and engineering in afterschool since the last America After 3PM survey, but it still remains the least common STEM learning activity in afterschool programs, according to parents. Afterschool programs are often cited as an ideal space for technology and engineering programming, due to the flexible environment and frequency of hands-on project-based learning. Understanding what the barriers are and how programs can expand these offerings, particularly for low-income children, will be key to reducing inequities in STEM learning.

Jobs in computing and information technology are projected to grow at higher rates (11.5 percent) than STEM occupations as a whole (8 percent).<sup>xix</sup> For these careers to be truly accessible to all students, all students need opportunities to develop interest and skills in computing. America After 3PM found a significant gap in access to computer science learning by income, with a 15-point gap between the lowest and highest income families (33 percent vs. 48 percent). To address this gap and provide opportunities for all students will require investments in training, hardware, and curricula, especially to those in low-income communities.

## Increase partnerships between the larger STEM education community and afterschool programs

Progress has been made in forging greater alignment and partnerships between afterschool programs and the greater STEM education community since the last America After 3PM survey in 2014. Recent federal STEM education strategies and initiatives highlight afterschool and informal STEM learning, but these relationships and partnership opportunities should be expanded further. STEM-rich institutions like colleges and universities, national labs, and science centers and museums hold immense STEM expertise and resources that can be tapped to support afterschool through expanded training and professional development, technical assistance, and in-kind and financial resources. These partnerships not only increase the availability of STEM learning but the quality of opportunities for students in afterschool and extend the reach and impact of the STEM-rich institutions.<sup>xx</sup>

Including afterschool programs at collaborative tables that include STEM-rich institutions, such as local or state STEM education ecosystems and regional STEM education networks, can help increase the effectiveness and quality of afterschool STEM offerings. These collaborative efforts can bring together a powerful mix of STEM expertise from the existing partners and youth development practices from the afterschool providers that will lead to more engaging and intentional STEM learning opportunities for young people.

## Improve assessment measures of afterschool STEM learning

America After 3PM provides data on the availability of afterschool STEM learning opportunities for children and the demographics of students with access to those opportunities, but assessment tools that measure the quality of the offerings and the outcomes associated with them are necessary to understand if there are further discrepancies based on a student's income, ethnicity, and/or geography. The findings from America After 3PM outline gaps between families with lower incomes and higher incomes related to the frequency of offerings and variety of STEM activities, but do not shed light on how these programs impact participating students. Further studies that assess STEM learning, particularly large-scale longitudinal studies, are needed to better understand how different approaches can lead to differing outcomes related to lifelong engagement with STEM. These large-scale studies can also provide valuable insight into any differences that higher frequency and variety of STEM activities between families with lower or higher incomes may have on outcomes of participants.



### STEM IN AFTERSCHOOL SPOTLIGHT

#### **Bridge to Enter Advanced Mathematics (BEAM) (New York, NY and Los Angeles, CA)**

Bridge to Enter Advanced Mathematics (BEAM) creates pathways for students from low-income and historically marginalized communities in New York and Los Angeles to become scientists, mathematicians, engineers, and computer scientists. BEAM provides ten years of comprehensive support beginning in middle school and continuing through college, including summer camps in advanced math, enrichment classes, field trips, and

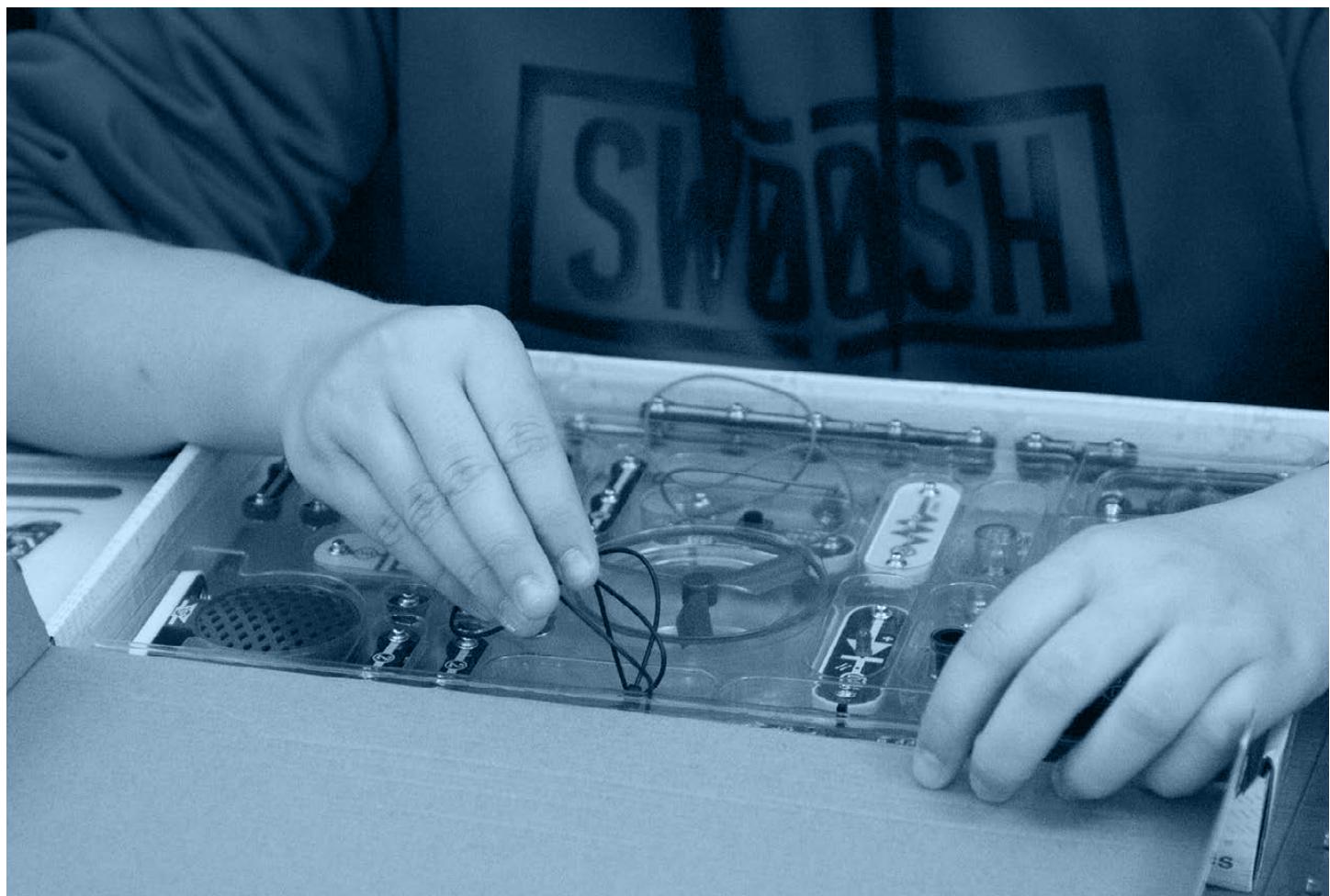
individualized advising to help students access STEM opportunities and match with well-aligned high schools and colleges. BEAM's supports continue into college, where BEAM provides mentoring to help students understand everything from financial aid to finding internships and jobs.

### **Expand efforts to promote STEM learning for girls in afterschool and summer**

The findings from America After 3PM show boys have more opportunities for STEM learning in afterschool than girls. The largest gender gap in access to afterschool STEM learning is in access to technology and engineering and computer science activities. Increased public and private investments in efforts that are aimed at building interest, understanding, and confidence in STEM for girls through afterschool programs will be needed to propel growth in afterschool STEM learning opportunities for girls and ultimately help address gender disparities in the STEM workforce. Million Girls Moonshot, an effort launched in 2020, is one of those initiatives. But the Moonshot, and similar efforts aimed at promoting diversity and equity in STEM for girls, need the sustained support and funding of businesses, education systems, and policymakers to break down the systemic barriers to STEM learning for girls and ensure greater access to these opportunities in and out-of-school.

### **Increase investment in afterschool programs**

The demand for afterschool programs has grown while barriers to participation have increased, indicating a clear need for greater investment in afterschool programs from federal, state, and local governments. While STEM has become a greater part of afterschool programming, these programs are available to fewer students overall, even as parents prioritize and value STEM learning after school. Public and private investments at the national, state, and local levels are needed more than ever to ensure afterschool programs can serve all students and provide the diversity of experiences that inspire learning and success in school and career.



# Resources

There are many resources available to parents and afterschool programs interested in accessing STEM opportunities. Below are a selection of initiatives, organizations, and professional development resources for afterschool programs.

## Afterschool STEM Hub

A project led by the Afterschool Alliance in collaboration with national afterschool and summer leaders and stakeholders, the STEM Hub has created resources to help program providers and stakeholders share their stories and make the case for STEM learning in afterschool and summer programs. [AfterschoolSTEMHub.org](http://AfterschoolSTEMHub.org)

## Million Girls Moonshot

The Moonshot is designed to spur girls' interest, understanding, and confidence in STEM and equip them to become problem solvers with an engineering mindset. Afterschool programs interested in incorporating an equity and inclusion framework and engineering mindset into their programming can sign up with their state afterschool network for news and updates about STEM training and resources available through the Million Girls Moonshot. [milliongirlsmoonshot.org](http://milliongirlsmoonshot.org)

## Click2Science PD

Click2Science is an interactive professional development site for trainers, coaches, site directors and frontline staff/volunteers working in out-of-school-time STEM programs serving children and youth. [click2sciencepd.org](http://click2sciencepd.org)

## Connectory

A comprehensive collection of STEM opportunities and programs, the Connectory is the go-to place for families to discover local STEM opportunities for the children in their lives and for afterschool program providers to find partners for collaboration. [theconnectory.org](http://theconnectory.org)

## InformalScience.org

A central portal for project, research, and evaluation resources designed to support and connect the informal STEM education community in museums, media, public programs, and a growing variety of learning environments. [informalscience.org](http://informalscience.org)

# Resources

## Lights On Afterschool

An annual nationwide event celebrating afterschool programs and their important role in the lives of children, families, and communities. Get involved to showcase your program or visit an event in your community to see what programs can offer you. [afterschoolalliance.org/loa.cfm](http://afterschoolalliance.org/loa.cfm)

## National Girls Collaborative Project

A national network that brings together organizations throughout the United States that are committed to informing and encouraging girls to pursue careers in STEM. [ngcproject.org](http://ngcproject.org)

## Statewide Afterschool Networks

Statewide afterschool networks foster partnerships and policies to develop, support, and sustain high-quality afterschool and expanded learning opportunities for children and youth. [statewideafterschoolnetworks.net](http://statewideafterschoolnetworks.net)

## STEM Curriculum and Activities

Explore some of the best curriculum, professional development, and evaluation tools specifically developed for teaching STEM in the out-of-school-time environment. [afterschoolalliance.org/STEM-curriculum.cfm](http://afterschoolalliance.org/STEM-curriculum.cfm)

## STEM Program Profiles

See examples and models of exemplary afterschool STEM programs and what makes them work so well. [afterschoolalliance.org/STEMprofiles.cfm](http://afterschoolalliance.org/STEMprofiles.cfm)

## You for Youth

You for Youth (Y4Y) is an online hub run by the U.S. Department of Education highlighting best practices, lesson plans, check lists, videos, and more around STEM learning for the afterschool community. Although the site was created for 21<sup>st</sup> Century Community Learning Centers, resources are publicly available at: [y4y.ed.gov](http://y4y.ed.gov)

# Endnotes

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[afterschoolalliance.org/aa3pm](http://afterschoolalliance.org/aa3pm)