

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. But, 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.



Hands-on STEM learning opportunities help students develop an interest and comfort with STEM subjects, and understand the career pathways to pursue STEM interests. These STEM learning opportunities can take place in school and 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.

America After 3PM began collecting data on afterschool STEM opportunities 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. *STEM Learning in Afterschool on the Rise, But Barriers and Inequities Exist*, is based on new data collected in 2020, and provides 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.

Key Findings

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.

STEM learning in the time of COVID-19:

Nationally, afterschool and summer programs continue to offer STEM learning opportunities

A survey conducted in early 2021 found that 76 percent of afterschool programs were providing STEM learning opportunities, which is similar to the rates of STEM offerings before the pandemic. A June 2021 survey found that 83 percent of summer programs were physically open this year, a nearly 70 percent increase from 2020, with 72 percent offering STEM learning opportunities.

Afterschool programs offering STEM learning opportunities during the pandemic



Summer programs offering STEM learning*



*Among programs operating during summer 2021

Source: Afterschool Alliance. (2021). *Afterschool in the Time of COVID-19 Surveys*.

II. Parents increasingly see afterschool as important for STEM learning

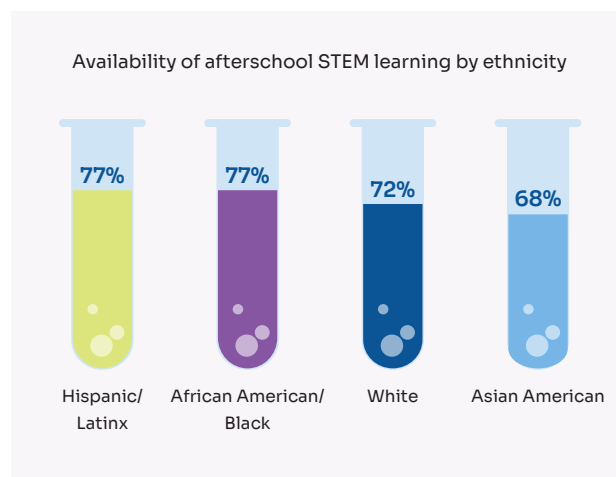
More than 3 out of 4 parents (76 percent) say that afterschool programs help children gain interest and skills related to STEM. The percentage of parents agreeing with this sentiment increased from 65 percent in 2014, a jump of 11 percentage points.

- **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.

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.¹ 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.

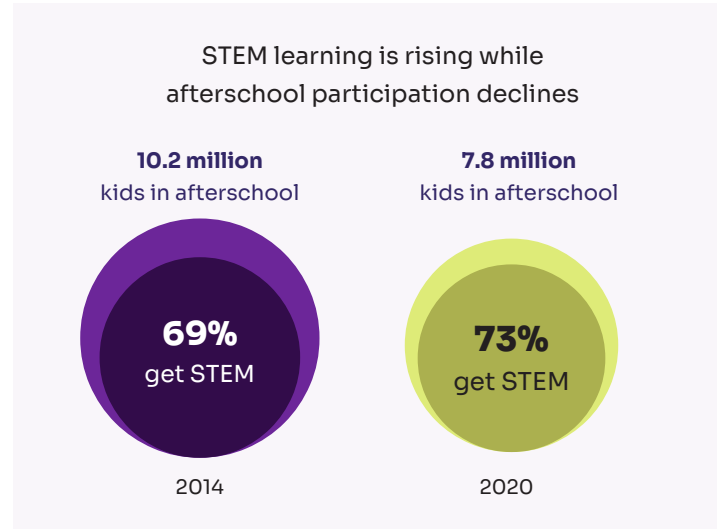
¹ Household income brackets were comprised of percentiles/quintiles: 20th percentile (under \$25,000), 40th percentile (\$25,000 to just under \$50,000), 60th percentile (\$50,000 to just under \$75,000), 80th percentile (\$75,000 to just under \$100,000), 90th percentile (\$100,000 to just under \$200,000), 90th+ percentile (\$200,000 or more). In this section, "lowest-income bracket" refers to the respondents in the 20th percentile and "highest-income bracket" refers to respondents in the 90th+ 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.

V. 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. 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.



Summertime STEM

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 (35 percent) parents 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).

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.²

Parents report that STEM is important in choosing their child’s summer program



Parents are satisfied with their child’s STEM camp



² 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.

Conclusion

The 2020 America After 3PM survey highlights many bright spots for STEM learning in afterschool programs. STEM learning 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 in 2020.

But, America After 3PM reveals specific gender, economic, and geographic inequities to STEM learning in afterschool, as well as barriers that limit the availability of afterschool programs overall and thereby reduce the number of young people with access to STEM learning in afterschool. 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.³ 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.

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 afterschool and summer programs. The following recommendations provide opportunities to more fully explore some of the findings from America After 3PM and develop strategies that address the root causes of inequities.

- Explore parent attitudes toward and perceptions of STEM learning overall and how those may impact demand for afterschool STEM opportunities.
- Increase the computer science and technology and engineering programming available in afterschool.
- Increase partnerships between the larger STEM education community and afterschool programs.
- Improve assessment measures of afterschool STEM learning.
- Expand efforts to promote STEM learning for girls in afterschool and summer programs.
- Increase overall investment in afterschool and summer programs.

For more information about the national and state-specific America After 3PM survey findings, visit afterschoolalliance.org/AA3PM.

The Afterschool Alliance is a nonprofit public awareness and advocacy organization working to ensure that all children and youth have access to quality afterschool programs. More information is available at afterschoolalliance.org.

³ Wai, J., Lubinski, D., Benbow, C. P., & Steiger, J. H. (2010). Accomplishment in science, technology, engineering, and mathematics (STEM) and its relation to STEM educational dose. *Journal of Educational Psychology*, 102(4), 860-871.

Acknowledgements

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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.

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.



Afterschool Alliance