

MILLION GIRLS MOONSHOT

HOW GIRLS BENEFIT FROM THE MILLION GIRLS MOONSHOT

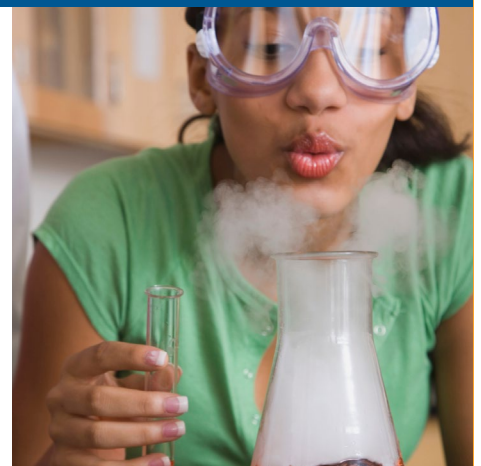
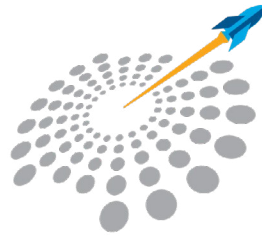


Table of Contents



MILLION GIRLS MOONSHOT

About the Million Girls Moonshot.....	1
The power of the Million Girls Moonshot partnerships.....	2
Insights from youth and staff in the Million Girls Moonshot-connected programs.....	2
Measuring STEM attitudes and skills.....	3
115,000 Girls Had In-Depth STEM Experiences Connected to the Million Girls Moonshot.....	5
Girls in the Million Girls Moonshot-connected programs are more interested in STEM.....	6
Practice Highlight: Act Now.....	8
Girls in the Million Girls Moonshot-connected programs are building future-ready skills.....	10
Practice Highlight: Vermont Afterschool.....	11
Practice Highlight: Girlstart.....	13
Afterschool educators create conditions for girls to thrive in STEM.....	15
Practice Highlight: Techbridge Girls.....	17
The Learning Continues: Sustained Measurement in Year Four.....	19



MILLION GIRLS MOONSHOT

The Million Girls Moonshot

An initiative to reimagine who can engineer, who can build, who can make.

The Million Girls Moonshot (MGM) is a nationwide out-of-school time (OST) initiative of STEM Next Opportunity Fund aimed to inspire and prepare the next generation of innovators by engaging one million more girls in science, technology, engineering, and math (STEM) learning opportunities to help them develop an engineering mindset. This set of ten skills and attitudes includes math and science, iteration, persistence, teamwork, and envisioning multiple solutions.

Visit milliongirlsmoonshot.org to learn more!

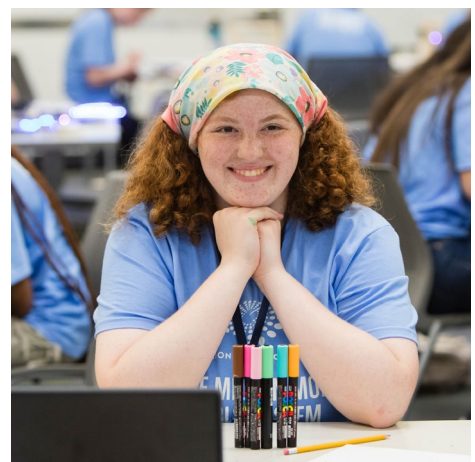


The power of the Million Girls Moonshot partnerships

STEM Next's Million Girls Moonshot brings together partners with shared values, a spirit of collaboration, and an unwavering belief that by empowering girls to lead us into the future, lasting change happens. The Million Girls Moonshot seeks to build robust partnerships at the national, state, and local level to get more industry, policy, educational, and community leaders engaged in transforming the afterschool STEM landscape. STEM Next collaborated with Public Profit and Partnerships in Education and Resilience (PEAR) to help OST programs collect data about young people's experiences.

Insights from youth and staff in the Million Girls Moonshot-connected programs

Between September 2022 and August 2023, the Million Girls Moonshot's state-level partners asked several of the afterschool and summer programs they work with to survey youth and staff members that participated in STEM activities curated through the support of STEM Next's Million Girls Moonshot initiative. These programs were asked to solicit youth and staff input because their STEM offerings were connected to the Million Girls Moonshot in a meaningful way, including participating in ongoing STEM-focused communities of practice, receiving a STEM-focused mini-grant, or receiving coaching and/or STEM curriculum from a STEM expert. Sharing the perspectives of youth and educators engaged in intensive STEM activities provides information to understand how young people are influenced by those STEM learning experiences, and how the Million Girls Moonshot and its system-level partners are contributing to shifting the afterschool STEM field at large.





Measuring STEM attitudes and skills - the Common Instrument Suite

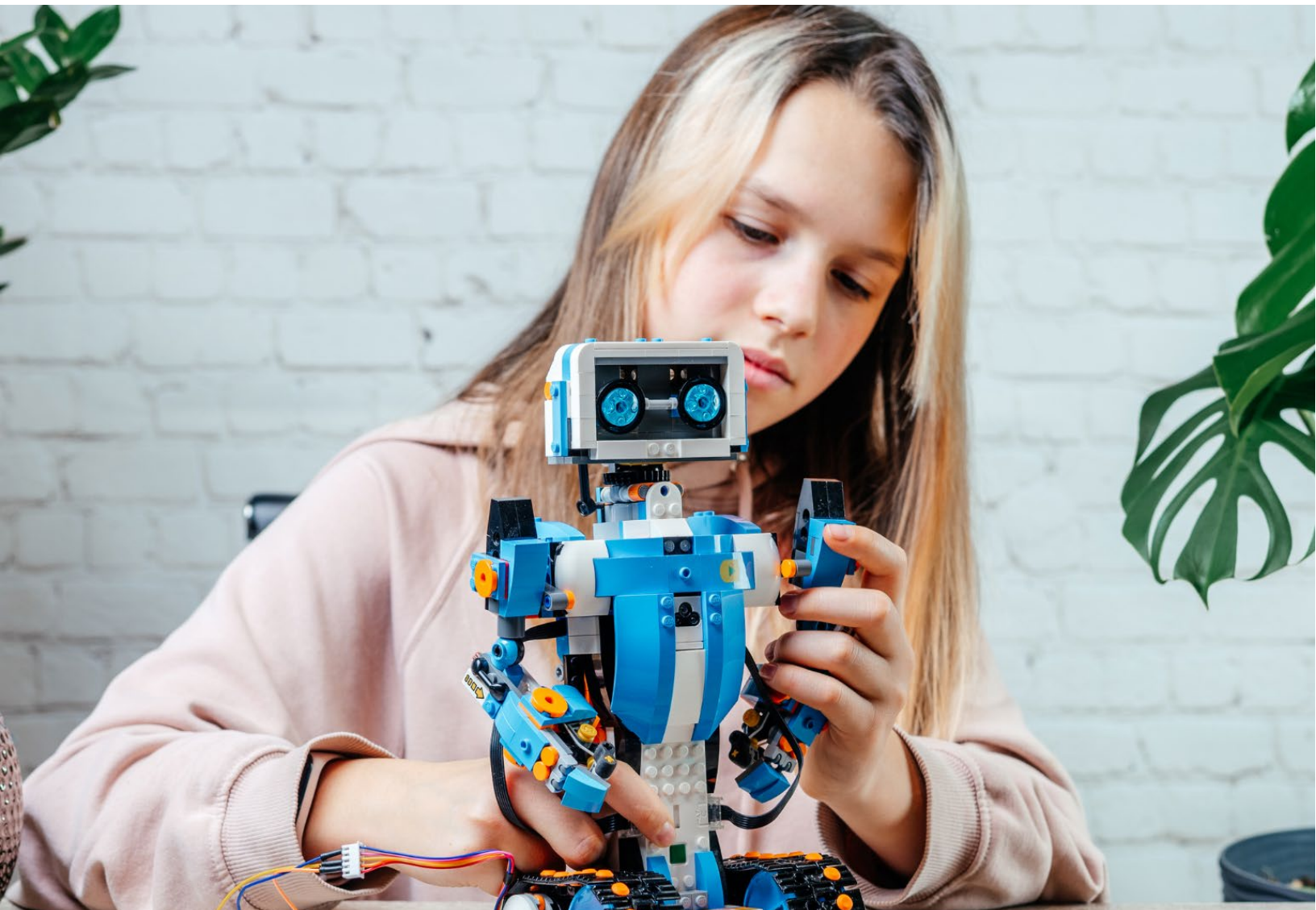
A national partner of STEM Next, Partnerships in Education and Resilience (PEAR) played a critical role in supporting state partners' data collection. PEAR developed the research-based set of surveys for youth and staff featured in this brief, the Common Instrument Suite (CIS), as well as the Dimensions of Success (DoS) observational tool. In its role as the Million Girls Moonshot Implementation Partner, PEAR supported 27 state-level Million Girls Moonshot partners through their survey and observational data collection efforts with STEM programs in Year 3 of the initiative (September 2022-August 2023).

The Common Instrument Suite for Students (CIS-S) is a self-report survey that measures a variety of science, technology, engineering, and math (STEM)-related attitudes, including STEM engagement, STEM career knowledge, and STEM identity. It was specifically developed with OST programs in mind. The purpose of the survey is to better understand how informal STEM programming impacts students' perceptions or attitudes towards STEM. The Common Instrument Suite Educator Survey (CIS-E) is a self-report survey designed to capture the unique qualities of STEM programs and the practitioners who lead them. Developed to complement both the Common Instrument Suite-Student (CIS-S), the CIS-E enables programs to capture key information about who is leading STEM activities, educators' levels of support, and perceived efficacy in delivering STEM content. The survey was designed for any in- and out-of-school time staff leading or co-leading STEM activities.¹

¹ To learn more about the CIS, visit www.pearinc.org/common-instrument-suite.

State-level partners gathered data to demonstrate how afterschool STEM programming benefits girls and youth in different ways. Some partners used internal or state-specific tools, while others leveraged STEM Next's data collection partnership with PEAR. The collective effort of state-level partners to collect youth and educator data demonstrates the benefit afterschool STEM can offer young people, and the data more broadly showcases how the Million Girls Moonshot indirectly contributes to the shift. Examples of how state-level partners combined the CIS tools with ongoing supports for STEM programs are shared in Practice Highlights throughout this memo.

This brief draws together examples of the ways in which young people in Million Girls Moonshot-connected STEM programs benefit. Whether gaining new skills, meeting like-minded young people, or setting course for a STEM-related career, input from young people show that their STEM experiences are meaningful and impactful. This brief summarizes evidence collected in the third year of the Million Girls Moonshot (September 2022-August 2023) through youth data collected by PEAR's validated instruments and other evidence provided by state-level partners.



115,000 Girls Had In-Depth STEM Experiences Connected to the Million Girls Moonshot

In the Million Girls Moonshot's third year, 115,000 girls and 220,000 youth overall participated in one or more in-depth STEM experiences connected to the Million Girls Moonshot. These in-depth experiences are the types of settings most likely to help girls and youth from diverse backgrounds develop an engineering mindset, along with other future-ready skills and attitudes.

As a collective impact initiative, the Million Girls Moonshot supports an exceptional variety of STEM opportunities for young people across the country.

"In addition to distributing materials and tools and promoting trainings from STEM Next and others, we are building youth voice, service learning and academics into our work. Through pilots and beyond, girls and youth are learning about and even addressing many community issues, such as cyber safety, environmental concerns, agriculture, and beyond. [Afterschool programs] have received training in STEM, service learning, and the engineering mindset."

– Tennessee Afterschool Network, Spring 2023

The state-level Million Girls Moonshot partner in Iowa provides ongoing coaching and training to Jewels Academy, a girl-focused STEM afterschool program:

"Jewels Academy's mission is to provide young women the competitive edge needed to succeed academically, and vocationally in science, technology, engineering, mathematics, leadership, financial stewardship, and the arts within an encouraging and nurturing environment. Their programs are designed for 4th-9th grade girls and are hands-on workshops, where each session is designed to complete a project that links to a STEM career."

They also engage in a peer mentors' program, where 10th-12th grade girls aid instructors and learn to serve as mentors to the younger girls in STEM, while also learning project management, leadership, problem-solving, and public speaking skills."

– Iowa Afterschool Alliance, Spring 2023



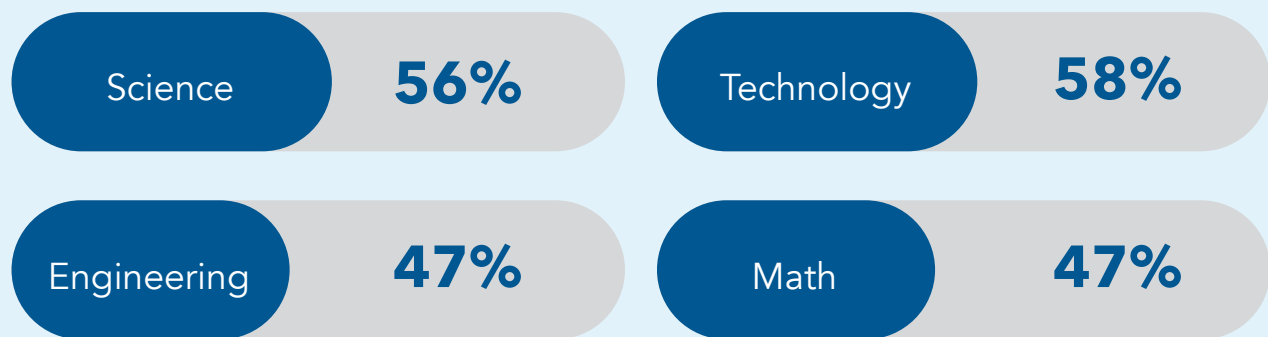
Girls in the Million Girls Moonshot-connected programs are more interested in STEM

Between fall 2022 and summer 2023, 1,725 young people, including 879 girls, and 70 staff members shared their perspectives toward STEM-related experiences with the Million Girls Moonshot using the Common Instrument Suite. See the Appendix for more information about the youth and staff who completed the survey.

These respondents engaged in STEM programming that was indirectly connected to the Million Girls Moonshot in some way. Examples of programming include educators engaging in intensive training on quality STEM instruction around the Million Girls Moonshot's Transformative Practices, the implementation of a STEM curriculum coupled with educator professional development, or a girls' summer camp focused on a specific STEM discipline.

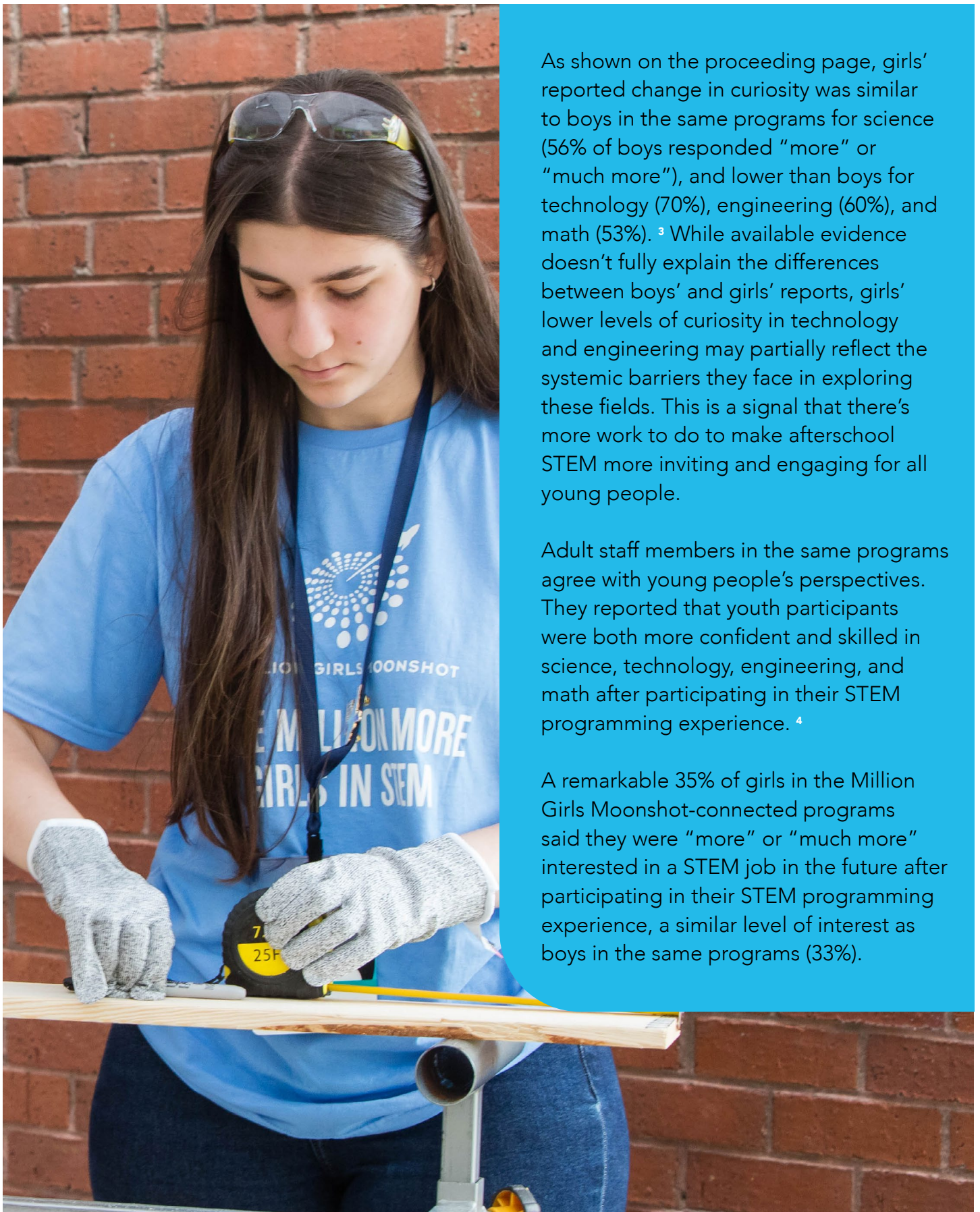
Young people's interest in different subjects is an important predictor of their choices later in life, including the courses they take and careers they pursue.² Girls' perspectives on changes in their STEM-related attitudes and 21st century skills after participating in Million Girls Moonshot-connected programs is promising. Figure 1 shows that girls reported they were more - or much more - interested in science, technology, engineering and math after participating in their STEM programming experience.

Girls are now more curious about science, technology, engineering, and math.



Source: PEAR Million Girls Moonshot CIS-S Survey 2022-2023, N = 872.
Note: Proportions are for self-identified female respondents who selected "more" or "much more now."

² To learn more: <https://afterschoolalliance.s3.amazonaws.com/documents/Evidence-Base-for-Investing-in-Afterschool-STEM.pdf>



As shown on the preceding page, girls' reported change in curiosity was similar to boys in the same programs for science (56% of boys responded "more" or "much more"), and lower than boys for technology (70%), engineering (60%), and math (53%).³ While available evidence doesn't fully explain the differences between boys' and girls' reports, girls' lower levels of curiosity in technology and engineering may partially reflect the systemic barriers they face in exploring these fields. This is a signal that there's more work to do to make afterschool STEM more inviting and engaging for all young people.

Adult staff members in the same programs agree with young people's perspectives. They reported that youth participants were both more confident and skilled in science, technology, engineering, and math after participating in their STEM programming experience.⁴

A remarkable 35% of girls in the Million Girls Moonshot-connected programs said they were "more" or "much more" interested in a STEM job in the future after participating in their STEM programming experience, a similar level of interest as boys in the same programs (33%).

³ PEAR Million Girls Moonshot CIS-S survey 2022-23, N=612..

⁴ Common Instrument Suite – Educator surveys for 70 adult staff in the Million Girls Moonshot-connected programs.

Practice Highlight

ACT NOW

Afterschool for Children & Teens

STEM Club for Illinois Afterschool Programs

STEM Next's Million Girls Moonshot partner, **Illinois' ACT Now**⁵ strives to assure that young people across the state have access to quality, affordable youth development programs. ACT Now is the quality coach for the Teen REACH programs, a network of publicly funded afterschool programs.⁶ In 2021, the Department of Human Services required Teen REACH programs to incorporate STEM activities into their offerings, creating an invaluable opportunity to share the Million Girls Moonshot's resources with afterschool professionals statewide. Illinois ACT Now leveraged PEAR's CIS to capture youth and educator data and capitalized on their partnership with the Million Girls Moonshot to certify eight team members as Dimensions of Success observers, which provides observational data on key aspects of a quality STEM learning experience.

ACT Now's dedicated STEM Lead used this rich survey and observational data to work intensively with 11 OST programs as they adopted the Million Girls Moonshot's Transformative Practices. She describes a notable shift in STEM-related confidence among staff.

"Now that [staff members] have a better understanding of what high quality STEM looks like, and feel more confident about leading STEM activities themselves, they can tailor activities specific to their young people's interests. Agriculture, math... these are examples of the things that youth are interested in."

— STEM Manager, ACT Now Illinois

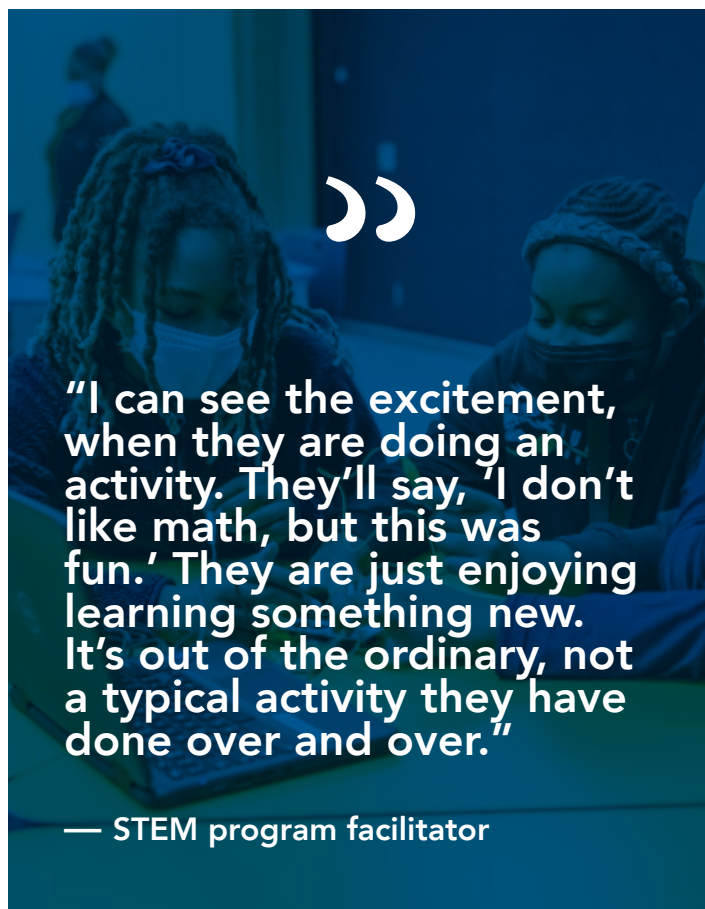
⁵ This summary is based on information shared by Susan Stanton and Kim Turnbull in an interview conducted by Public Profit on July 6, 2023.

⁶ <https://actnowillinois.org/grantees/teen-reach/>

Illinois' ACT Now

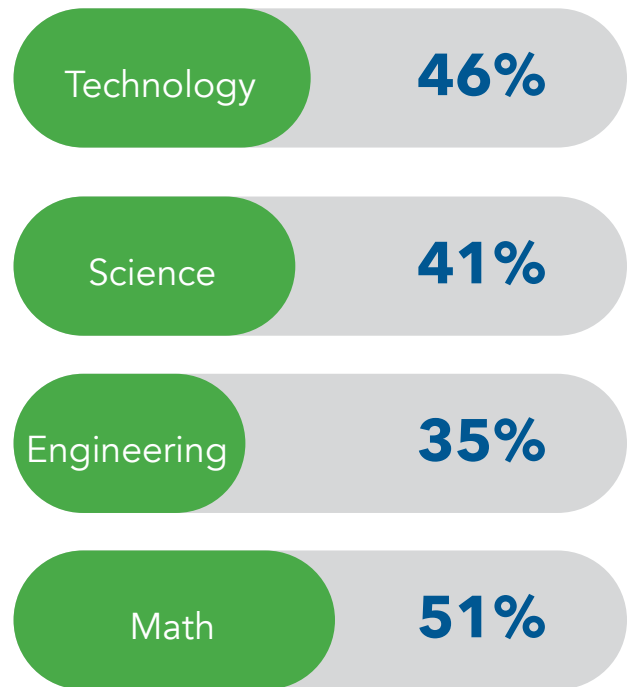
Dimensions of Success-based observations of programs in ACT Now's STEM Club show that staff offer high quality experiences for young people. External certified observers measure the quality of the STEM activities offered in STEM Club programs. They were particularly strong in having ample materials, using the space well, using a variety of ways to engage young people in STEM learning, encouraging all young people to participate, and promoting positive relationships between youth and adults.⁷

Young people are benefitting from these enhanced opportunities.



Youth survey results showed that out of 122 girls in STEM Club programs, 20% want a STEM job in the future “more” or “much more” than before participating. Additionally, 41% of girls reported their experience in STEM Club programs made them more curious in science, 46% in technology, 35% in engineering, and 51% in math.⁸

Girls are more curious about STEM after participating in Illinois STEM Club programs



Adult staff describe additional skills the young people in STEM Club programs demonstrated: 69% of surveyed staff said young people in their STEM activities had improved critical thinking skills, and 69% reported that young people were more perseverant and had better relationships with adults.⁹

⁷ Dimensions of Success ratings data for 11 out-of-school time programs in the ACT Now STEM Club.

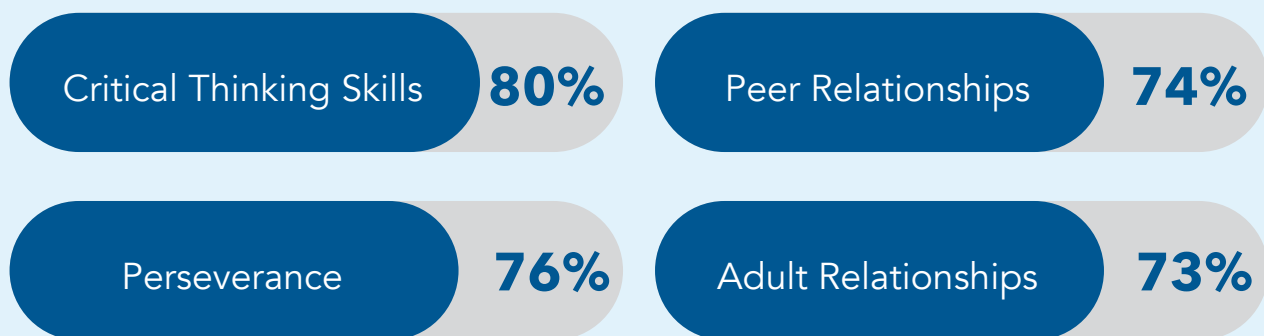
⁸ Source: Illinois 2022-23 CIS-S data, N = 122. Results shown for girls in STEM Club programs.

⁹ Illinois 2022-23 CIS-E data, n = 14. The percentages above reflect the percentage of respondents who reported that their students showed changed in their social skills “more now” or “much more now.”

Girls in the Million Girls Moonshot-connected programs are building future-ready skills

High-quality STEM experiences help kids to build key life skills, such as the ability to work with others, to persevere with difficult tasks, and to problem solve. As shown in Figure 3, more than 70% of girls in the Million Girls Moonshot-connected programs said they grew these future-ready skills, further setting them up for success.

Figure 3. Girls reported growing their critical thinking, perseverance, and relationship skills.



Source: PEAR CIS-S Survey 2022-2023, N = 879. Proportions are for self-identified female respondents who selected "more" or "much more now."

Girls' self-reported skill building, shown in the figure above, was similar to boys in the same program, who reported growth in critical thinking skills (76%), perseverance (74%), peer relationships (71%) and positive adult relationships (68%).¹⁰

Adult staff who facilitated the girls' STEM programming concur. The 70 staff members in the same OST programs reported notable improvements in youths' critical thinking, perseverance with challenging tasks, relationships with adults, and relationships with peers.¹¹

¹⁰ PEAR Million Girls Moonshot CIS-S survey 2022-23, N=612.

¹¹ Common Instrument Suite – Educator surveys for 70 adult staff in Moonshot-connected programs.

Practice Highlight



Linking Engineering to Life: Hands-On STEM for Vermont's Girls

With the support of STEM Next, **Vermont Afterschool, Inc.** developed Linking Engineering to Life (LEL) in 2020 as part of the Million Girls Moonshot initiative. LEL is a hands-on learning experience for middle school girls and non-binary youth who have historically been underrepresented in STEM fields. ¹²

LEL includes two related ten-week courses: the Basics engineering course is offered in fall and focuses on multiple aspects of engineering (i.e., electrical, civil, environmental), providing young people a strong foundation in the engineering design process.

The second course, Biomedical Engineering, is offered in spring and has opportunities for youth to apply their new skills, with activities such as creating a prosthetic leg device. Since its founding in 2020, LEL has served more than 1,000 youth across Vermont. In fall 2022, LEL's Fall clubs served 5 sites, 15 towns, and 24 girls (of 36 youth) in person.

Afterschool programs serving youth in fifth through eighth grade apply to be part of LEL. Once selected, they receive a robust curriculum, a materials kit, training for staff, access to guest speakers, and up to three college student mentors, who led the LEL activities. ¹³

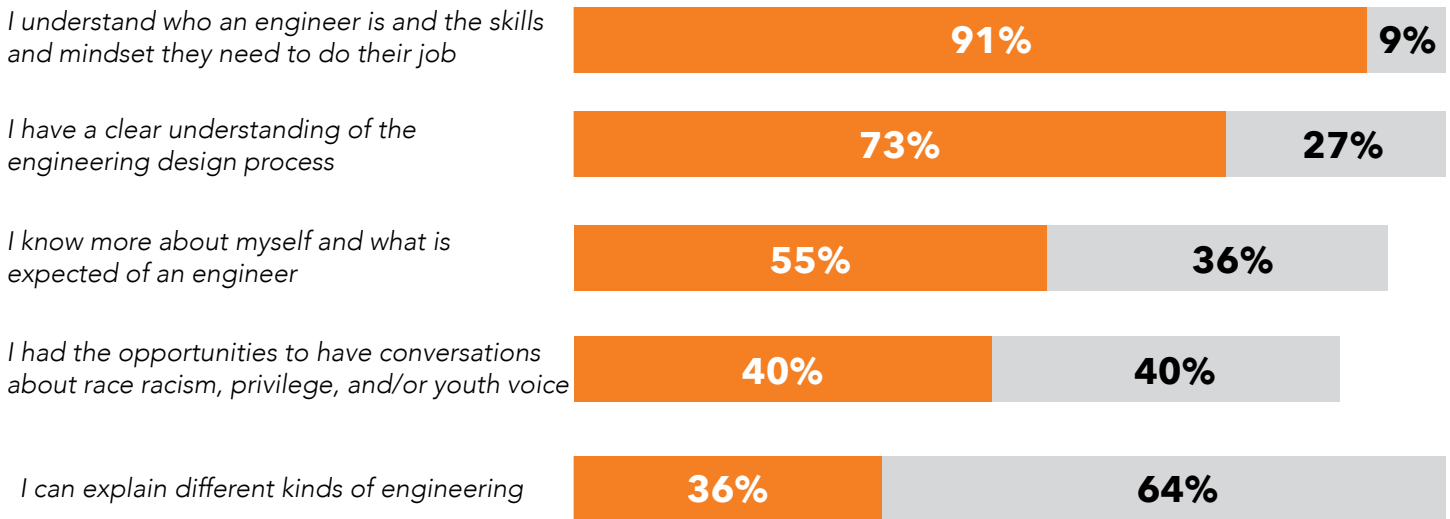
Youth reported positive feedback to their experience. All 11 youth who completed a program-specific survey in 2022 reported that they understand who an engineer is and the skills and mindset they need to do their job, have a clear understanding of the engineering design process, and can explain different kinds of engineering.

¹² Learn more at www.milliongirlsmoonshot.org/news/2022/11/27/go-the-distance-programs-impacted-by-the-million-girls-moonshot.

¹³ Source: <https://vermontafterschool.org/lel/>

LEL participants reported new knowledge about the Engineering Mindset

● Strongly Agree ● Agree



Source: P/Fall 2022 LEL Youth Equity and Inclusion Survey, n = 11.

Linking Engineering to Life is a locally designed STEM enrichment program reaching hundreds of young people in a predominantly rural state. Participants get experience with both the theory of the engineering design process and hands-on practice creating practical, engaging projects with real-world uses. This is just one example of how the Moonshot’s partners bring a spirit of innovation to out-of-school time STEM opportunities.



Practice Highlight



Girlstart Summer Camp

Girlstart ¹⁴, a Million Girls Moonshot implementation partner, is a national nonprofit whose mission is to empower girls through engaging STEM experiences. Since 1997, Girlstart has offered enriching hands-on STEM activities for girls in fourth through eighth grade.¹⁵ In 2023, STEM Next supported Girlstart's two-week long STEM summer camp for 67 fourth and fifth grade girls in the San Francisco Bay Area.

Pet Vet was the summer camp theme for 2023. Participating girls coded a pet-themed computer game, learned about cat genetics, and designed a unique animal shelter. These thematic activities gave girls access to technologies including 3D design and printing, video game development, and object-to-computer interface programming. Talks from role models in STEM included a comic book creator, a nursing student, and employee panel from Applied Materials.

The 65 girls who completed an end-of-summer survey demonstrated a strong understanding of scientific inquiry and related STEM skills:

- **98%** reported that they would "redesign their activity" if it didn't work at first.
- **91%** demonstrated a thorough knowledge of the engineering design process.
- **89%** agreed with the statement "I enjoy STEM."

When asked what they learned in their STEM summer camp, girls wrote:

"How to solve problems, stitch sutures, build prosthetic limbs, and much more STEM concepts that I enjoyed very much."

– 5th Grader

"[I learned] more about STEM and women in STEM."

– 4th Grader

"[I learned about] a lot of jobs about animals so now I can study more about those things!"

– 4th Grader

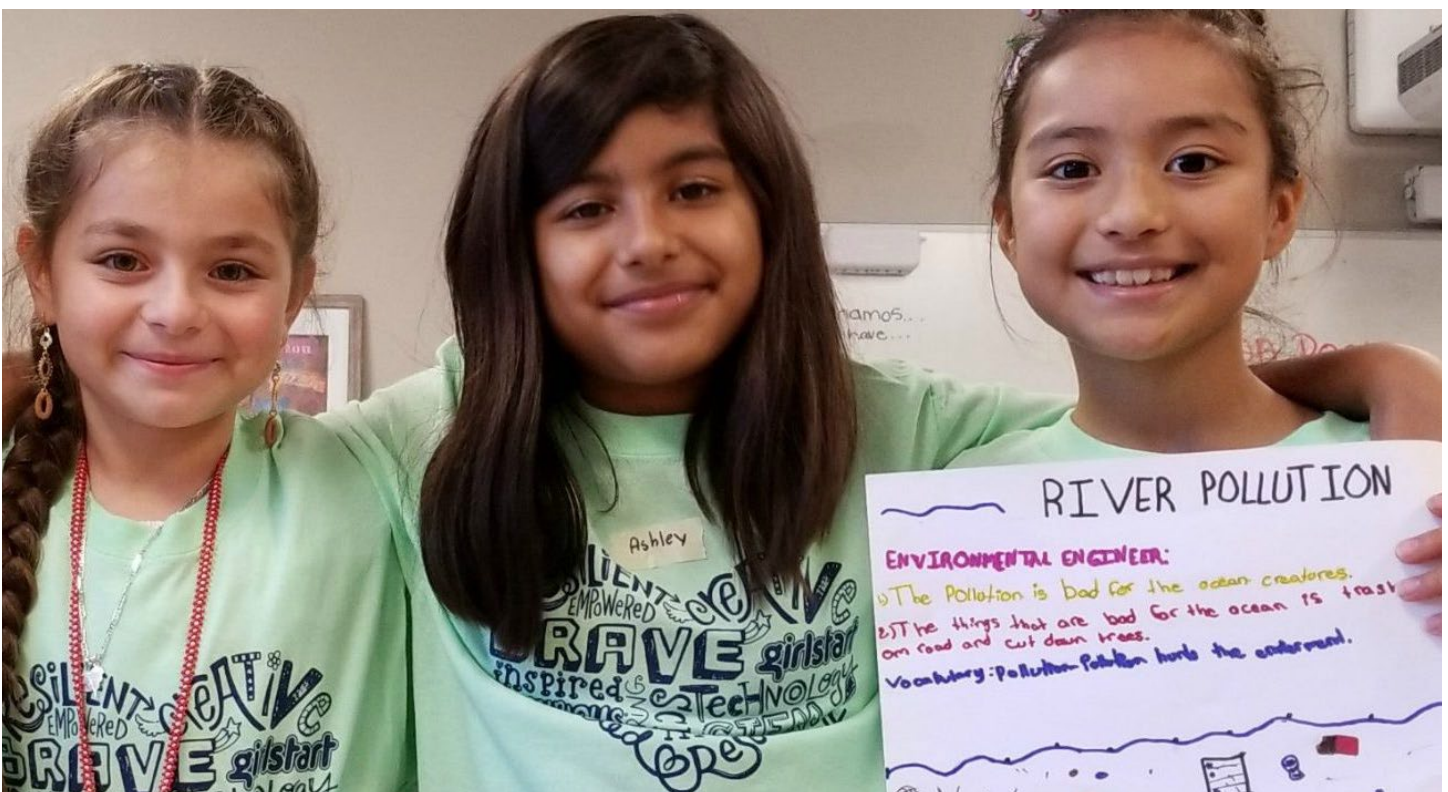
¹⁴ Girlstart Year End Grant Report to STEM Next, fall 2023.

¹⁵ Source: <https://girlstart.org/about-us/>

Girlstart



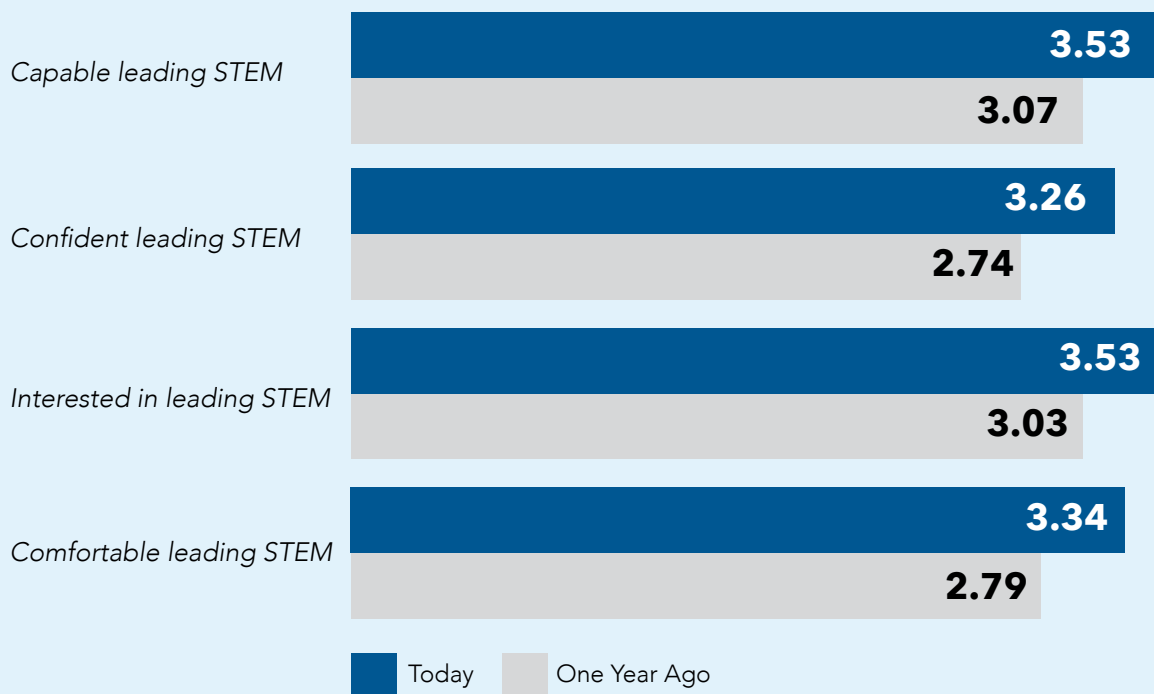
These 67 girls, along with hundreds of fellow Girlstart participants across Texas and California in summer 2023, showcase how STEM experiences can build their enthusiasm and interest in STEM, and help girls continue to see themselves as "a STEM person."



Afterschool educators create conditions for girls to thrive in STEM

Girls are having meaningful experiences in the Million Girls Moonshot-connected STEM programs, which depend on the skills, confidence, and support of the adult staff who work with them. Common Instrument Suite survey results from seventy OST summer program staff show that they feel more comfortable and confident leading STEM activities than in the past. When asked to rate themselves today and one year ago, participating staff reported substantial increases in several components of their professional knowledge and confidence.

Staff are more confident in leading STEM today versus one year ago.



Source: PEAR CIS-E Survey 2022-2023, N = 70.

Note: Averages are based on respondents' ratings, in which Strongly Agree=4, Agree=3, Disagree=2, Strongly Disagree=1.

An out-of-school time professional who has attended several trainings from the Million Girls Moonshot national partner Afterschool Coaching for Reflective Educators in STEM (ACRES) describes how she's become a more reflective STEM educator on the following page:



"[By reflecting on my STEM teaching practice with peers,] then it's kind of open to all of this feedback from the people in your cohort. And then you learn so many amazing things. How could I have done this better or differently? Or what extra challenge could I have layered on there that I didn't? And so having those and capturing them, I feel like that's the kind of stuff that has improved my practice."

— ACRES Training Participant from Maine

Practice Highlight



STEM Equity Learning Community: Exploring Personal and Systemic Factors Affecting Access to STEM

STEM Next partnered with a national leader in informal STEM education, Techbridge Girls, to scale nationally and launch the STEM Equity Learning Community.¹⁶ In close collaboration with STEM Next, Implementation Partner Techbridge Girls leveraged its STEM Next Opportunity Fund award to more than double the number of educators participating in its STEM Equity Learning Community. In 2022-23, the Learning Community served 48 educators from 45 partner sites across the U.S, who in turn educated nearly 8,500 girls. Through both pre/post experiential surveys and a focus group with five Learning Community participants, findings suggest that participating out-of-school time educators developed their collective identities as equity advocates in the workplace and gained strategies to ensure youth from historically marginalized communities thrive and persist in STEM careers.

Educators reported substantial growth in confidence and competence, particularly in

addressing diversity, equity, racism, and gender bias within their organizations. For example, 62% of respondents in the post-assessment strongly agreed to the statement “I am confident in my ability to create an intentional, inclusive and safe space for diverse perspective and identities to be shared and celebrated within STEM” in comparison to 49% in the pre-assessment.

Participating educators described changes in their STEM equity practice, such as auditing gender terminology, updating five OST program-specific websites to use more inclusive language, and revising mission statements and policies to reflect a commitment to diversity, equity, and inclusion. Some participants dedicated time to discussing racism and biases with their teams, demonstrating an active effort to disrupt these inequities. Learning Community participants stressed the need for more open discussions on race and gender, particularly in regions where certain topics may be challenging due to laws or societal norms.¹⁷

¹⁶ This summary is based on information reported on in the Techbridge Girls STEM Next Partnership Report: Booster Pack with Million Girls Moonshot - 2022/2023.

¹⁷ This summary is based on information reported on in the Techbridge Girls STEM Next Partnership Report: Booster Pack with Million Girls Moonshot - 2022/2023

Techbridge Girls

When asked how their experiences affected them, participants said that they increased their confidence around STEM equity and became more aware of the people in their environment.¹⁸ In their practice, they focused on making more connections to their youth either through stories or drawing. The participants also really enjoyed the activities presented at the Learning Community and brought them to their students and staff.

"I love that we learned about true equity. Some of us thought we were teaching equity and were intending to, but we may have been taught incorrectly. This taught us practices we hadn't been a part of before and everyone had fabulous intentions, but we did a lot of learning of what true equity and inclusion is rather than what we thought it was. I thought that was valuable and will continue to be."

When working with youth, the focus group participants shared how critical it was to make the activities relevant and interesting to youth. They spoke about how offering subject areas that the youth relate to increases their engagement level with the activities.

"We did the Changemakers curriculum, and they have a session on hair care and the girls really connected with it and learned about sulfates and shampoo and Madame CJ Walker. They connect with it in a different way than when you put something not relevant in front of them."

¹⁸ In June 2023, the Public Profit team held a focus group with five individuals that participated in the STEM Equity Community of Practice. These participants had varying levels of experience in STEM equity and attended the Community of Practice to further their work on the subject. Quotes are drawn from that session.

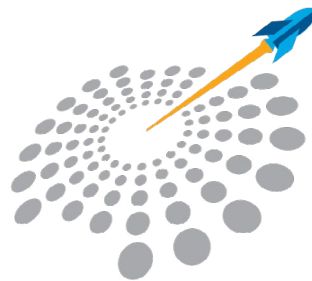
The STEM Equity Learning Community exemplifies the expansive impact that high quality professional development can have, both for adult staff and the youth they work with. STEM educators had extended opportunities to learn about Equitable and Inclusive STEM, one of the Million Girls Moonshot's transformative practices, which in turn benefited nearly 8,500 young people. This exponential reach is made possible through cross-organizational collaborations between STEM Next, the Million Girls Moonshot partners, and out-of-school time professionals.



"Kids didn't care for engineering design because they didn't want to make that rollercoaster that didn't mean anything to them... It comes back to being relevant to the students."

- Participating Educator

The Learning Continues: Sustained Measurement in Year Four



MILLION GIRLS MOONSHOT

The Million Girls Moonshot continues to evolve, building on what's working well for girls in STEM and incorporating new features based on what we're learning together.

In Year Four, through STEM Next's ongoing strategic partnership, hundreds of afterschool and summer programs will have access to PEAR's Common Instrument Suite to help them demonstrate the benefit of quality OST STEM for young people. Similarly, even more Million Girls Moonshot partners will leverage the Dimensions of Success quality observation tool to observe STEM education in action, offering valuable insights for out-of-school time professionals and system leaders to better understand how to improve STEM practices and engage more youth. When out-of-school time programs are more inclusive, more girls can benefit, setting the stage for lifelong interest in STEM.

Looking ahead, STEM Next is further deepening the impact of the Million Girls Moonshot by partnering with field-leading organizations like Girlstart to directly expand the reach they have with girls. High quality STEM providers, including Scientific Adventures for Girls and STEM From Dance, are further expanding their reach through partnering with STEM Next's the Million Girls Moonshot. The longstanding partnership with PEAR is yielding important insights into the impact of existing partners, including

Techbridge Girls and Teen Science Café, further strengthening their benefit to girls.

The Million Girls Moonshot has already surpassed its goal to reach a million girls by 2025. Thanks to the collective effort of the Million Girls Moonshot's partners, more youth will be excited and inspired to pursue careers and possibilities as engineers and innovators of today and tomorrow. The Million Girls Moonshot has served as a launch pad for the STEM Next Opportunity Fund to grow the nationwide capacity of afterschool and summer educators as they prepare a more diverse and future-ready STEM workforce.

About this Brief

This brief was co-authored by staff at Public Profit and Partnerships in Education and Resilience (PEAR).