Afterschool programs have become essential partners in STEM education, offering engaging STEM enrichment experiences that support and enhance what is learned during the school day. Over the course of a year, students spend more than 80% of their waking hours outside school, leaving that time available to learning in settings such as afterschool and summer programs, libraries, museums, science centers, and other community-based programs. Such programs are essential to restoring and maintaining a healthy learning ecosystem now more than ever. Research shows that high-quality, expanded STEM learning opportunities can improve academic outcomes, increase college and career readiness, and foster positive youth development. While the pandemic negatively impacted learning in STEM subjects, increasing investments in quality afterschool STEM programs will help re-engage youth by offering all learners opportunities to build perseverance and agency, by stimulating career interests through fostering a sense of identity and belonging in STEM, by building STEM-specific knowledge and skills, and by providing joyful learning experiences that demonstrate the relevance and applicability of STEM in daily life.
WHAT AFTERSCHOOL STEM PROGRAMS OFFER

Perseverance & Agency
Afterschool settings give youth opportunities to learn through problem-solving and to fail without fear. Hands-on engagement is one of the distinguishing characteristics of afterschool, which can help bring STEM to life and motivate inquiry, reasoning, hypothesizing, experimenting, and problem-solving.6 These experiences are crucial for developing the persistence that STEM fields require.3 Providing opportunities that empower youth voice and choice, while nurturing decision-making skills are keys to re-engaging students in learning recovery efforts. Afterschool STEM programs offer a low-risk environment for project-based learning that empowers youth agency and skill building around effective communication, teamwork, and problem-solving skills.3 Moreover, applying STEM knowledge to community challenges and solutions can encourage young people’s sense of purpose in STEM.7, 8 For instance, the I AM STEM community-based program “ignited an interest in STEM learning through field trips and direct engagement in scientific phenomena that allowed the girls to become agentic in continuing their engagement in STEM activities throughout the year”.7

Career Exposure and STEM Identity
Afterschool STEM programs can spark student interest in STEM topics and careers. They are also uniquely situated to support youth historically underrepresented in STEM learning experiences.7, 9 Highly engaging STEM activities can spark interest, build self-confidence, and nurture a sense of belonging in STEM fields, especially when program staff reflect the identities of the youth served.10 Research demonstrates that mentoring and exposure to role models—critical components of afterschool programs—effectively promotes a sense of belonging, particularly for youth of color.4, 11, 12 Moreover, when youth feel connection and belonging within STEM, they are more likely to develop a STEM identity, resulting in more frequent and deeper engagement in STEM learning.13 Afterschool STEM programs provide opportunities for students to connect with role models, including those who challenge stereotypes in STEM fields.9, 14, 15

RESEARCH HIGHLIGHT:
An 11-state research study showed that among nearly 1,600 youth in 158 afterschool programs, more than 70% of students reported positive gains in their attitude towards STEM, their personal STEM identity, STEM career knowledge, and 21st-century skills, including perseverance and critical thinking. The authors highlight that consistent engagement in inquiry-based afterschool STEM positively affects STEM career interest and participation in informal STEM activities.3

PROGRAM SPOTLIGHT:
Techbridge Girls
In offering enrichment opportunities that “bring STEM alive”, Techbridge Girls provides extensive opportunities for career exploration for 5th–12th grade girls. As a result, 9 out of 10 student participants knew more about various jobs, and 82% said they were more interested in working in technology, science, or engineering because of the role models they were exposed to and the field trips they went on.16
STEM Knowledge and Skills

A summary of evaluation reports from afterschool STEM programs across the United States found that attending high-quality STEM afterschool programs yields STEM-specific benefits, including increased math test scores compared to non-participants, gains in computer and technology skills, increased general knowledge of science, and gains in 21st century skills such as communication, teamwork, and analytical thinking. Several additional evaluation studies also demonstrate the ability of afterschool programs to support the learning that takes place during the school day and help boost students’ academic performance, increasing the likelihood of graduating from high school—especially for students who have fallen behind in school and need extra support and mentoring.

Joyful Learning Experiences

Afterschool STEM programs offer flexibility for intertwining emotional, aesthetic, and social elements into learning activities in ways not as easily accommodated by schools. These learning opportunities can appeal to youth who may be disengaged or struggling with traditional classroom instruction. They also offer spaces for youth-led solutions to real-world problems, all while developing a new generation of problem solvers in STEM fields.

Support Afterschool STEM

The future is unpredictable. However, education experts, business leaders, and policymakers agree that STEM equips students with the 21st-century skills needed to be successful, critical-thinking, and productive members of society. Afterschool STEM programs are not a luxury but a necessity. They are a vital investment for the STEM learning ecosystem and for preparing the next generation of innovators, problem-solvers, and citizens. By supporting afterschool STEM programs, we can ensure that all students have access to high-quality STEM education and opportunities to help them thrive in the 21st century.

For more information, please visit us at www.afterschoolstemhub.org or email us at stemhub@afterschoolalliance.org

PROGRAM SPOTLIGHT: Technovation

Technovation equips girls in under-resourced settings with skills of the future, including problem-solving, technology, self-management, and teamwork to overcome the fear of failure as they develop mobile apps and artificial intelligence prototypes. Beginning with inspiration as a motivating factor, students in the program develop their projects by focusing on a real world problem. They then engage in learning the technology and developing their own as means to solving these tangible problems. Eighty-nine percent of students reported that they felt confident to persist with challenging work and 80% reported an improved ability to see projects through from start to finish. Moreover, 60% of alumnae end up working in STEM careers and 53% continue to actively improve their communities or take actions to mitigate gender inequality.
References:


