



Photo courtesy of
Teen Science Café



MILLION GIRLS MOONSHOT
A STEM NEXT INITIATIVE

Empowering Youth in STEM: Moonshot Fellows and the Teen Science Café Network

August 2023

TABLE OF CONTENTS

01.

Introduction

02.

Million Girls Moonshot
Theory of Action

03.

Evaluating the Million Girls
Moonshot Initiative

04.

Collectively Impacting One
Million More Youth in STEM

05.

Teen Science Café Network

08.

Touching Down in Alabama

11.

Challenges and
Recommendations

13.

Looking Ahead

14.

Accknowledgments



INTRODUCTION

The Million Girls Moonshot is a nationwide out-of-school-time (OST) initiative aimed to inspire and prepare the next generation of innovators by engaging millions more girls in Science Technology Engineering and Math (STEM) learning opportunities. Experience in quality STEM experiences lead to the development of an engineering mindset, a set of ten skills and attitudes including using math and science, iteration, persistence, teamwork, and envisioning multiple solutions.^{1 2}

The 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 Moonshot uses a collective impact model to engage girls in OST STEM learning opportunities by partnering with exceptional STEM learning providers, corporate partners, and afterschool intermediaries in each of the 50 states.

Million Girls Moonshot Transformative Practices

The Million Girls Moonshot removes barriers from youth by raising awareness of the research-based Transformative Practices and supporting grantees and partners in enhancing program practice in afterschool and summer STEM programming with youth. The four Transformative Practices serve as a backbone for the resources, training and curricula offered by the Moonshot, and they guide the development of new partnerships.

Engineering mindset – activities that engage girls in developing a set of ten skills and attitudes including using math and science, iteration, persistence, teamwork, and envisioning multiple solutions.

Inclusive and equitable STEM – practices that encourage girls and marginalized youth to engage in STEM, including selecting topics of interest to all genders, incorporating community issues into activities, and working in cooperative groups.

Role models, mentors, and families – engaging young people with STEM professionals from underrepresented backgrounds and encouraging families to participate in STEM activities together.

Continuous STEM learning pathways – working across programs and organizations to assure that young people who are interested in additional STEM-related activities experience a “warm hand-off” between experiences.

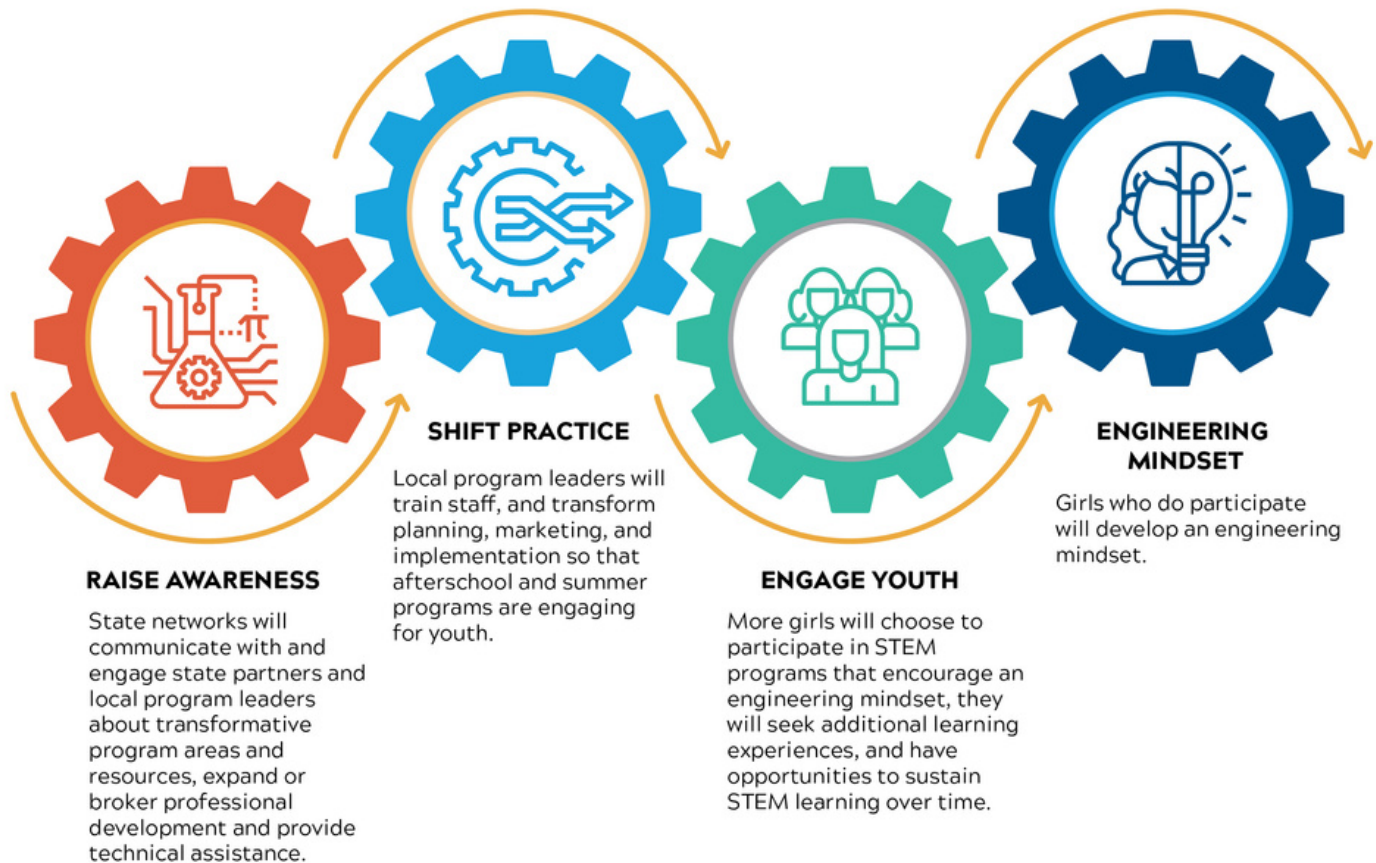
These strategies drive all aspects of the Moonshot initiative- partnership cultivation, technical assistance offerings, research and evaluation and more. They are the foundation of the Moonshot's Theory of Action.

1. Cunningham, C. M. (2018). Engineering in elementary STEM education: Curriculum design, instruction, learning, and assessment. New York, NY: Teacher College Press.

2. Cunningham, C. M., & Kelly, G. K. (2017). Epistemic practices of engineering in education. *Science Education*.101, 486–505.

Million Girls Moonshot Theory of Action

The **Moonshot Theory of Action**, depicted in Figure 1, describes a sequence of interconnected steps that can result in the achievement of the Moonshot Initiative's major goals:



1. **Build capacity and raise awareness** of state leaders to provide the support needed to youth-serving programs in their states and engage new partners to help with the Initiative.
2. **Shift Practice** by supporting local programs to adopt transformative practices through professional development and technical assistance.
3. **Engage youth in STEM** through welcoming marketing, engaging programming, and multiple opportunities to sustain their interests over time.
4. **Foster engineering mindset** among girls, non-binary youth, and other underrepresented young people.

Evaluating the Million Girls Moonshot Initiative

The Million Girls Moonshot initiative is evaluated to ensure youth are positively impacted by the four Transformative Practices and partners are aligning their collective efforts with the Theory of Action.

Reports. The Moonshot's evaluation team, Public Profit, authors reports that share the initiative's progress toward its goals. The first [2021 Report](#) focused on the first two phases of the Theory of Action in the initiative's infancy: 1) building capacity and raising awareness of state leaders; and 2) shifting practice of local programs. The second [Mid-Initiative Report](#) denotes progress along the Theory of Action highlighting 2) shifts in quality STEM with local programs and 3) increased youth engagement. These reports rely on interim updates provided by the 50 Afterschool State Network leaders and the Moonshot's implementation partners, surveys of local program leaders, educators and youth who are engaged in afterschool STEM learning supported by the Moonshot. They cast a broad net to learn about the impact of the initiative from as many partners and individuals engaged in the Moonshot as possible.

Case Studies. As a complement to the evaluation of the Moonshot initiative, STEM Next Opportunity Fund commissions case studies to examine what the initiative looks like "on the ground," where local organizations and individuals influenced by the Moonshot and its partners are working to implement the Transformative Practices and/or change the face of OST STEM. Case studies aim for a narrower but deeper understanding of the Moonshot's impact on local leaders, organizations and/or youth, with emphasis on the second, third, and fourth phases of the Theory of Action.

In contrast to the Annual Report's quantitative analysis of the initiative's national scope, the data retrieved from case studies is predominantly qualitative, which involves meaningful interviews and detailed observations. Case studies paint vivid pictures of how transformative practices are being implemented with OST youth and how youth are impacted by quality STEM experience.

This case study's purpose is to dive into the experiences and impact on youth attending Gadsden City High School's 21st Century Afterschool Program, a northeastern Alabama program reached by the [Teen Science Café Network](#)- an Implementation Partner of the Million Girls Moonshot.

This report begins by framing how the Million Girls Moonshot "touches down" in over 65,000 OST programs across the United States through the collective impact of its partner organizations. It then introduces the Teen Science Café Network, discussing the impact the Teen Science Café model has had on over 50,000 high school-age youth since its inception in 2008. It will briefly touch on the drawbacks the global pandemic had on the Teen Science Café Network and how the organization has rebounded to meaningfully engage more educators and youth in partnership with the Moonshot.

Most importantly, this case study will step through the Teen Science Café experience of over 60 high school youth from Gadsden City High School in Alabama during the second year of the Moonshot initiative. A recount of the youth experience will be offered from the lens of the Teen Science Café Moonshot Fellow who guided the youth experience, and it will present youth impact data captured through a concurrent National Science Foundation study. Finally, challenges and recommendations to continue growing and scaling the Teen Science Café experience with high school-age youth will be offered.

COLLECTIVELY IMPACTING ONE MILLION MORE YOUTH IN STEM

The Power of Partnerships

In Year 2 of the Million Girls Moonshot (2021/2022), six corporations, eight foundations, 50 Afterschool Networks, and more than 1,200 new partners in the education, workforce, and nonprofit communities were brought together to re-imagine who can engineer, who can build, and who can make. Together, the Moonshot's partners are working to raise awareness, shift practice, engage more youth in STEM and cultivate an engineering mindset in one million more girls across the country.

The Moonshot has grown its partnership base by connecting with organizations that have alignment with the Transformative Practices. Exploratory conversations are held with leaders to understand the vision and goals of each organization, and alignment and/or areas of collaboration are discovered to grow the initiative's collective impact. Whether they are sharing existing curriculum or trainings in a particular STEM discipline, connecting a cohort of STEM role models or mentors to afterschool programs and youth, or co-creating a training series for the afterschool field, each partnership is unique, capitalizing on the strengths of the organization, and striving to engage one million more girls in quality STEM experiences.

Three different kinds of partnerships exist with the Moonshot: Funding, Coalition and Implementation Partnerships. Funding partners provide the foundational resources to grow the reach of the initiative; funding the experts who indirectly provide quality STEM experiences for youth. Coalition partners are committed to the Moonshot's mission and offer resources or services that align with the Transformative Practices, but funds are not exchanged. The Moonshot supports and promotes the work of its Coalition Partners- and Coalition Partners do the same for the Moonshot. Both continuously explore avenues for deeper connection and meaningful opportunities to engage as their respective work grows. Implementation partners are supported by the Moonshot (STEM Next Opportunity Fund) to provide a service to the OST field. These may include trainings, resources or other intensive opportunities that the partner organization is primed to implement.

Partnering with the Teen Science Café Network

The Teen Science Café Network (TSCN) joined the Moonshot in fall 2021 as a Coalition Partner to directly support youth-serving afterschool programs focused exclusively on cultivating meaningful STEM experiences for more high school-age youth. At that time they were implementing a National Science Foundation grant project focused on supporting youth in STEM from rural areas of the U.S. The TSCN was connected with the Million Girls Moonshot team in hopes to amplify TSCN's recruitment efforts.

Discussed in more detail in a later section, the impact of COVID-19 had stymied the sustainability of many Teen Science Cafés across the nation. As schools reopened and OST informal learning experiences resumed, the TSCN and Moonshot partnered to co-create and launch the initial "Booster Pack" opportunity in fall 2021 with a goal of recruiting 10 "Moonshot Fellows" in rural regions of the United States to implement post-pandemic Teen Science Cafés in OST high school programs. Recruitment introduced the opportunity for new rural Teen Science Cafés to form, and OST educators in Louisiana, Iowa, Maine, Wyoming, Illinois, Indiana, Missouri, Texas, Kentucky and Alabama engaged with the opportunity through the Moonshot's recruitment efforts.

TEEN SCIENCE CAFÉ NETWORK

About the Teen Science Café Network

The Teen Science Café Network (TSCN) is a free community of practice and support system for those offering Teen Science Café programs.³ TSCN members have free access to professional development materials as well as learning and networking opportunities including a national conference and regional affinity groups to help each adult leader independently develop, organize, and facilitate Teen Science Cafés (TSC) at a variety of informal education organizations, including museums, libraries, community organizations, and schools. The national network provides high quality resources, guidance, and support to new and continuing TSC Adult Leaders – the staff who organize and run their local TSC program.⁴

Supported by that Adult Leader, cafés are events for teens- led by teens- where teens socialize over food and drink and have roughly 90-minute recurring conversations with local scientists or engineers from their community about current cutting-edge developments in their field. All of the resources, guidance and support they receive from TSCN are grounded in a set of six Core Design Principles (depicted in Figure 1) to create meaningful, engaging STEM experiences for high school-age youth.

The Six Guiding Principles of Teen Science Cafés, as depicted on the first page of the self-reflection tool.

Programs are highly engaging and interactive

Committed Adult Leader

Teen leadership and ownership

Vetting and guiding scientists

Cultivating strong community relationships

Attracting diverse teens (motivations, life experience, interests)

3. About the Teen Science café Network. (2023, May 26). <https://teensciencecafé.org/about-us/>

4. Sickler, J., Lentzner, M. & Hall, M. (2022). Rubrics for researching depth of implementation: Creating tools practitioners can use for Teen Science cafés. [Poster Presentation]. Association of Science and Technology Centers Poster Presentation. Pittsburg, PA.

TSCs stemmed from the "Café Scientifique" model, introduced in the UK and France, where citizens interact with a scientist to learn about a contemporary science topic.⁵ Holding cafés in collegial, social settings and satisfying curiosity about a science-based topic through lively interaction with a scientist are the two essential, interactive elements of a successful café. As the model was embraced as a way to communicate science to adults, a National Science Foundation grant was awarded to the founding Teen Science Café team (formerly Science Education Solutions) in 2008 to test the model with 383 participating youth across New Mexico. Youth convened under the oversight of an adult leader at an array of informal settings and co-created cafés that engaged youth with a scientist living and working within their New Mexican community. Findings from the NSF study⁶ include:

- The café program influenced participants' attitudes toward science, including interest in science, knowledge of scientists' work, interest in science careers and cognitive competence toward science.
- The most essential elements of the café model are the people involved and the implementation of the program at multiple, diverse sites.
- Youth who attended the café program were more likely to feel they belonged or were connected to the café; higher attendance led to feeling more connected and able to contribute.

Findings from this initial study led to TSCs being implemented and evaluated at more than 130 diverse sites. Ongoing evaluation data show very clearly that café programs positively influenced participants' attitudes toward science, including interest in science and science careers, knowledge of scientists' work, awareness that science affects their daily lives, and interest in science careers.⁷ TSCs also positively influenced their self-efficacy and cognitive competence toward science including understanding of the nature of scientific research, their understanding of science issues in the news, the ability to use facts to support scientific points of view, and considering multiple sides of an issue before making a decision.⁸

The TSCN team has made continual improvements to the program, both as TSCN interfaces with teens and with the scientist-presenters. The maturity of the program and its clear impacts make a strong case for other communities to start their own programs, and 55 TSCs are presently being held across 20 US states. See [this map](#) of past, present and future TSC sites across the country.

5. Mayhew, M. & Hall, M. (2012). Science communication in a café Scientifique for high school teens. *Science Communication*, 34(4), 546-554.

6. Institute for Learning Innovation (2010). A youth-directed café Scientifique Summative Evaluation.

7. Goodyear, L., Kaminsky, A., & McMahon, T. (2014). [Teen Leader Focus Group Evaluation Report](#).

8. Sickler, J. (2018). [Long-Term Impact of Teen Science cafés: Results of a Pilot Study with café Scientifique New Mexico](#). J. Sickler Consulting, LLC.

Scaling Teen Science Cafés in a Post-COVID World

As was the case with a number of organizations and businesses, the COVID-19 pandemic dramatically impacted the growth of the TSCN. When schools and businesses closed, many TSC leaders strived to hold virtual cafés, some paused until social distancing bans were lifted, and others permanently ended their region's TSC. A research study was commissioned in 2022 after the peak of the pandemic to understand the pandemic's impact on the TSCN, and assess the overall status of cafés across the U.S. during the 2021-2022 school year.

Of the 94 TSC sites connected to the national network in 2022, only 32 sites (34%) reported themselves as active, or actively rebuilding their TSC program. Seventeen sites remained paused at the time of the study, 18 sites reported ending their TSC program, and 27 sites failed to respond to status checks.⁹ This was a dramatic setback in TSC programming across the country.

Though many cafés ceased engaging teens as a result of the pandemic, the persistent adults and teens who "weathered the storm" collectively engaged almost 4,000 teens in a café experience in the 2021-2022 school year. Cafés were reported to have been held both virtually and in person that year- and in total- 182 café events were held with a local scientist with roughly 4 cafés held within each regional program. This is a launching point by which the TSCN aims to grow in a post-pandemic world.

Launching the 2021 Teen Science Café Booster Pack

To return- and potentially grow- the number of TSCs happening post-COVID-19, the Million Girls Moonshot and Teen Science Café Network partnered in 2021 to offer a "Booster Pack," or training and professional development opportunity, that directly served OST educators who were interested in bringing a TSC to their community. This specific opportunity was tied to an NSF grant that specifically targeted youth from rural areas of the United States, so eligibility was limited to educators who exclusively served rural youth.

The Moonshot promoted the TSC Booster Pack through their communication channels, and 16 educators from rural regions applied to be Moonshot TSC Fellows. Ten were invited to participate in the experience where they attended webinars on the Moonshot's Transformative Practices, received implementation support from the TSCN team and a small stipend to help implement cafés with their youth.

A Moonshot Booster Pack is a training and/or professional development opportunity.

Moonshot TSC Fellows held a minimum of 3 cafés with youth during the 21-22 school year and reached approximately 350 teens.

9. J. Sickler Consulting. (2022). [Creating a Teen Science café Movement: Year 2 Research Results Summary](#).

TOUCHING DOWN IN ALABAMA

Five of the 16 educators who applied to be rural Moonshot TSC Fellows were affiliated with afterschool programs in Alabama. One of these applicants was a high school science teacher and OST educator at Gadsden High School in Gadsden, Alabama.

According to the Alabama After 3PM report, for every child in an afterschool program in Alabama there are 4 more children waiting to gain admittance.¹⁰ Afterschool programming is available for only 8% of Alabama's 9-12th grade youth, and 33% of the high school-age Alabama youth who were surveyed would participate in afterschool programming if it were available. Forty three percent of surveyed high school youth reported being alone and unsupervised afterschool between the hours of 3 and 6pm.

Of the afterschool programming that does exist in Alabama, the number of programs offering STEM learning decreased by 15% from 2014 to 2020, even though over 75% of parents agree afterschool programming helps children gain interest and skills in STEM.¹¹ The supply and demand for OST STEM remains imbalanced in the state of Alabama, as it is in many states across the U.S.

This imbalance is- in part- attributed to barriers in afterschool program participation in Alabama that have increased as well. Fourteen percent more parents (44%-58%) reported their child's afterschool programming has become too expensive, 10% more parents (36%-46%) reported afterschool programming to be unavailable in their community, and over half reported their child does not have a safe way to/from programming. Such barriers to more youth in Alabama engaging in afterschool programs are high, but for those youth fortunate enough to participate, 91% of the parents report high satisfaction with their child's experience.

Gadsden, Alabama & Gadsden City High School

Gadsden, Alabama is located in the northeastern corner of Alabama, about 56 miles from Birmingham and 100 miles west of Atlanta, GA. It is a relatively small, rural town of approximately 34,000 people, and they were formally a center of heavy industry until Goodyear Tire and Rubber and Republic Steel saw declines in 1991.

Gadsden City Schools serves approximately 4,700 students across 8 elementary, 3 middle, 1 alternative and 1 high schools. Twelve afterschool programs are directed throughout the school district by the Gadsden City Schools Community Education program and are sustained by 21st Century funding. One of those 21st Century programs is held at the high school, the largest school in the district serving approximately 1,500 students. It is through the high school's 21st Century afterschool program that a Teen Science Café took shape.



Gadsden City High School students learn hands-on training on a tightrope orthopedic procedure thanks to Wesley Dean of Arthrex. Photo courtesy of Miranda Prescott/the Gadsden Times

10. Afterschool Alliance (2020). [Alabama After 3PM](#).

11. Afterschool Alliance (2021). [America After 3pm STEM](#).

Gadsden City High School Teen Science Café

Ms. Christina Caldwell is a Chemistry and Physics teacher at Gadsden City High School (GCHS) and has been in education for over 20 years. She was referred to the Moonshot Teen Science Café Booster Pack opportunity by the STEM Coordinator of Alabama Expanded Learning Alliance, the Moonshot's afterschool network partner in the state, and she applied because she considered the opportunity a good fit with her science background and her involvement with GCHS's 21st Century Afterschool Program. Ms. Caldwell directs the Teen Science Café at GCHS and has engaged over 60 youth in afterschool STEM experiences since the 2021-2022 school year. GCHS's OST program continues to implement TSCs under Ms. Caldwell's leadership, and plans to for the foreseeable future.



The afterschool programming team at GCHS began implementing TSCs in February 2022. Following the TSCN's recommended model, they began by finding a core group of teens excited about STEM who were interested in implementing cafés. Those youth made announcements about upcoming cafés over the school's intercom, invited interested teens to attend by word of mouth, and concurrently reached out to local scientists to generate a pool of potential presenters for upcoming cafés. Ms. Caldwell also called upon her colleagues, parents and former students to help make connections with local STEM professionals who could serve as TSC Scientist Presenters.

Four TSCs were held during the 2021-2022 school year at GCHS, and the experience continued and grew into 2022-2023. Approximately 25 youth attended each café, and attendees were diverse with respect to grade level, race/ethnicity, and interest in STEM. To Ms. Caldwell, it seemed that TSCs attracted students who were already interested and engaged in STEM, as well as those who hadn't previously gravitated toward STEM experiences during the school day. "About 10-15 kids each time were a STEM focused student," shared Ms. Caldwell as she reflected on the youth who attended TSCs, "and the rest of them were just curious about STEM. Some of them came back and some didn't- and that's OK- we just kept trying."

Youth Experience and Impact

Finding, Vetting and Coaching Presenters and Diverse Motivations and Life Experiences are two of the Core Design Principles of a successful TSC, and the TSCN provides training and support to Adult Leaders before and while they implement cafés within their communities. Ms. Caldwell, and her leadership team strived to introduce a diverse group of engaging scientists to present a variety of STEM careers to students. Each of the four cafés during the 2021-2022 school year offered a unique opportunity for youth to learn from STEM experts working and supporting the Gadsden, Alabama area.

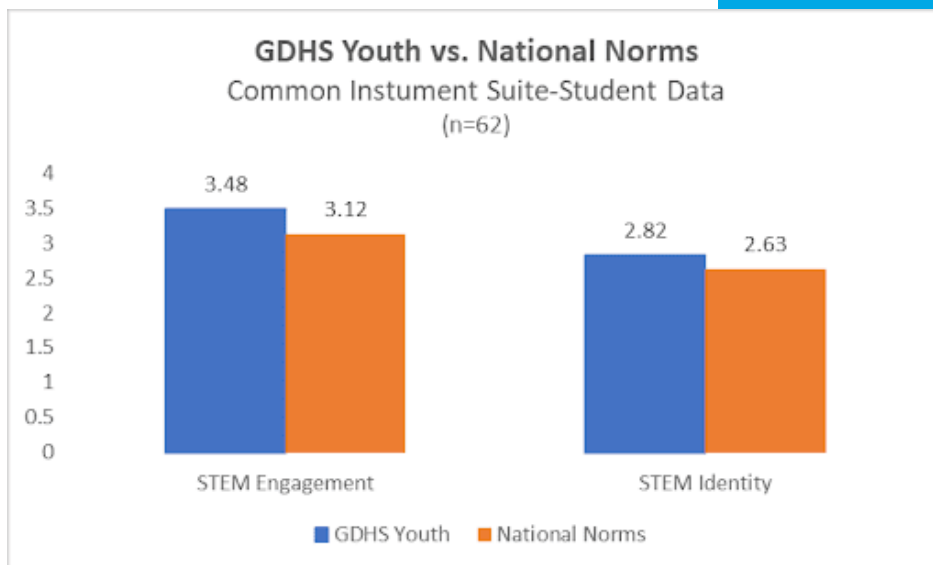
In one of GCHS's cafés, a local orthopedist and his medical team served as Scientist Presenters. They showcased three surgery simulators and engaged students in "blood-free" procedures of knee replacements and other orthopedic tactics.¹² See [this video](#) of youth in action. In another TSC, a GCHS graduate employed as a programmer at Georgia Tech University returned to GCHS and spoke with café attendees about technical programming and app development. Ms. Caldwell reflected on this café, "He talked about programming the whole- time and the kids just loved him more than anything!"

12. Prescott, M. (March 15, 2022). [GCHS students take hands-on approach to STEM with the Teen Science Café](#). The Gadsden Times.

Ms. Caldwell reflected on a number of successes throughout the 2021-2022 school year as TSCs took shape at GCHS. One of the greatest successes of the cafés, she feels, is when students choose to stay past 5pm to keep the café going. "About a third of the students stay after every time to ask questions. Maybe once they get there, you know, they're obligated to stay. When the time is up, that's their time and many stay to speak one-on-one with the presenter. That's a success to me."

As part of the TSC experience at GCHS, youth completed the Common Instrument Suite- Student Survey, a validated self-report survey that measures a variety of STEM-related attitudes including STEM engagement, STEM career knowledge and STEM identity. Developed by Partnerships in Education and Resilience (PEAR), this survey was specifically developed with informal, OST STEM programs in mind, and six scales include a variety of questions that help understand youths' STEM-related attitudes at the conclusion of a STEM learning experience.

Sixty-two youth (38 male, 23 female, 1 declined to answer) completed the Common Instrument Suite-Student Survey in 2021-2022. They answered each question on a 1-4 scale, where 1 equates to strong disagreement and 4 is strong agreement. Examples of questions include I like to participate in STEM projects (STEM Engagement), and I think of myself as a STEM person (STEM Identity). Findings show GCHS youth had higher ratings in STEM Engagement and STEM Identity compared to national norms, which suggests youth had favorable STEM-related attitudes toward- and experiences in- their TSC.



CHALLENGES AND RECOMMENDATIONS

Following the 2021-2022 TSC Moonshot Fellow Booster Pack, participating OST educators, TSCN and Million Girls Moonshot team members reflected on challenges and recommendations to scale and improve the TSC experience for more youth in 2022-2023. Finding diverse scientist presenters with respect to sociodemographics and STEM disciplines and engaging youth as teen leaders to facilitate the café experience are the two prominent challenges that surfaced.

Challenge: Finding Diverse Science Presenters

"Finding scientists to serve as presenters was one of the biggest challenges," offered Ms. Caldwell. Living in a rural area and finding professionals who could make themselves available during the hours of 3-5 pm proved tricky given the schedules and services they offered to the public. "We talked about what the students wanted to learn and what they were interested in, but also knew it was a numbers game. So we'd put feelers out to 10 scientists for everyone that might be available to present." Though the GCHS team tried recruiting a variety of Science Presenters, those who were able to join were not always those with STEM careers of greatest interest to the youth, or they were inconsistently diverse with respect to gender, ethnicity and other sociodemographics.

Exposure to diverse role models is proven to encourage students of all backgrounds to gravitate toward STEM.^{13 14}

Identifying Science Presenters was a challenge that the TSCN team heard from many of the Moonshot Fellows, and finding diverse presenters who look like the youth participating in TSCs can be even more challenging. Plans are underway to compile a "resource bank" of diverse STEM experts TSC Moonshot Fellows can call upon when a virtual presenter could be beneficial to their TSC community.



13. National Alliance for Partnerships in Equity. Role Models and Mentors

14. Young, J. L., Ero-Tolliver, I., Young, J. R., & Ford, D. Y. (2017). Maximizing opportunities to enroll in advanced high school science courses: Examining the scientific dispositions of Black girls. *Journal of Urban Learning, Teaching, and Research*, 13, 174-183.

Challenge: Engaging Youth as TSC Leaders

A second challenge involved handing ownership of the TSC experience to the Youth Leaders. Though there is no "one" right way to engage Teen Leaders in the implementation of a TSC, Youth Leaders are expected to hold a degree of responsibility to plan, organize and carry out their site's cafés. "Everyone wants to be a part of something, but not everyone wants to actively work at it," offered Ms. Caldwell. She had a group of 4 students who served as Teen Leaders during the 2021-2022 school year at GCHS, and all four were driven to-and currently are-pursuing STEM degrees in college. They were also all in the same graduating class, so Ms. Caldwell will enter the upcoming school year with the challenge of recruiting a new core group of Teen Leaders.

Recommendations

With discussions of challenges comes opportunities for growth, and the Moonshot and TSCN teams are actively deepening their partnership to support more educators to engage more teens. Conversations with educators have led the Moonshot and TSCN Teams to generate this list of recommendations to maximize the TSC experience:

- **Hold at least one TSC with your highschoolers at the middle school.** Introducing TSCs to middle schoolers prior to them entering highschool offers a Near Peer experience that excites rising freshman about the café experience. "You've got to get them roped in early before the distractions come. It's tough competition out there," offered Ms. Caldwell.
- **Start Cafés in the Fall.** The training and implementation timeline of the TSC Moonshot Fellows opportunity resulted in cafés starting midway through the 2021-2022 school year. At that time of year, most teens were committed to other extracurricular activities, or weren't actively exploring ways to get involved in afterschool organizations. Upcoming opportunities are being designed with this timeline in mind, and 2023-2024 TSCs are planned to get underway at the start of the school year.
- **Recruit diverse Teen Leaders.** Identifying Teen Leaders who are upper and lower classmen is a strong strategy to promote the longevity of TSCs. Underclassmen will remain as youth graduates to sustain the TSC, and they'll be present to recruit new underclassmen leaders over time.
- **Strive to recruit diverse Science Presenters.** Research affirms the importance of young people seeing themselves reflected in role models,¹⁵ and providing access to diverse role models from a variety of STEM backgrounds is a pivotal step toward diversifying the STEM workforce. Supporting TSC leaders with strategies to identify, recruit and prepare an array of professionally and sociodemographically diverse role models is an ongoing effort of the TSCN.
- **Support the cultivation of partnerships between regional TSC leaders and STEM organizations.** TSCN has forged a relationship with Legacy, an Alabama-based organization focused on environmental stewardship and education, who is funding a number of budding TSCs in the state through their vanity "Protect Our Environment" license plate program. This partnership is growing the number of TSCs in the state of Alabama and providing access to a number of environmental sustainability scientists who are serving as Science Presenters. Fostering such state or regional partnerships to grow TSCs has been a successful model.

15. Gladstone, J. & Cimpian, A. (2021). Which role models are effective for which students. A systematic review and four recommendations for maximizing the effectiveness of role models in STEM. *International Journal of STEM Education*, 8(58), pp 1-20.

LOOKING AHEAD

The Moonshot's success since its launch in 2020 can be attributed to the strong partnerships formed with expert STEM organizations whose efforts are grounded in the Moonshot's Transformative Practices. Their collective impact across the United States is underway through proven techniques to meaningfully engage more underrepresented groups of youth in STEM.

Teen Science Café is a longstanding and successful model that engages high school youth in STEM and gives them the autonomy to form and grow cafés with Science Presenters from STEM disciplines that are of interest to them. TSCs connect youth with their surrounding community, introduce STEM experts to discuss their career in a friendly and engaging atmosphere, and provide a safe space for teens to convene and engage with one another after the school day. Each café is unique, and the Adult Leader's in partnership with the Teen Science Café Network provides guidance and support to recruit and activate Youth Leaders, identify and recruit Science Presenters, and ultimately connect more high schoolers to local STEM experts and STEM career options.

The TSC Moonshot Fellows who joined the movement from rural regions of the United States helped elevate OST STEM post-COVID-19, and many of those cafés continue in their rural corners of the country today. Ms. Caldwell at Gadsden City High School has continued her work to bring STEM to more young people in northeast Alabama, and aims to continue expanding the impact in the years to come.



Photo Courtesy of
Teen Science Café

ACKNOWLEDGMENTS

We are grateful to Ms. Caldwell and the 2021-2022 participating Teen Science Café youth at Gadsden City High School. Sharing your stories and experiences enhances STEM equity for more girls and non-binary youth.

We also acknowledge the Teen Science Café Network team for the amazing work they do for youth across the U.S. We value your partnership and the opportunity to support your impact.

We are additionally grateful to the team at Lockheed Martin Corporation for providing the foundational support necessary to accomplish the set goals for the Million Girls Moonshot. We are excited to see what this growing team of youth will accomplish in the future.

Contributors to Case Study

Corey Newhouse, Public Profit
Katey Ahmann, Teen Science Café Network
Jessica Sickler, J. Sickler Consulting

STEM Next Opportunity Fund

Executive Director:

Director of Moonshot Initiative:

Staff and Consultants:

Ron Ottinger

Teresa Drew

Victoria Wegener, Sabrina Gomez, Andria Parrott

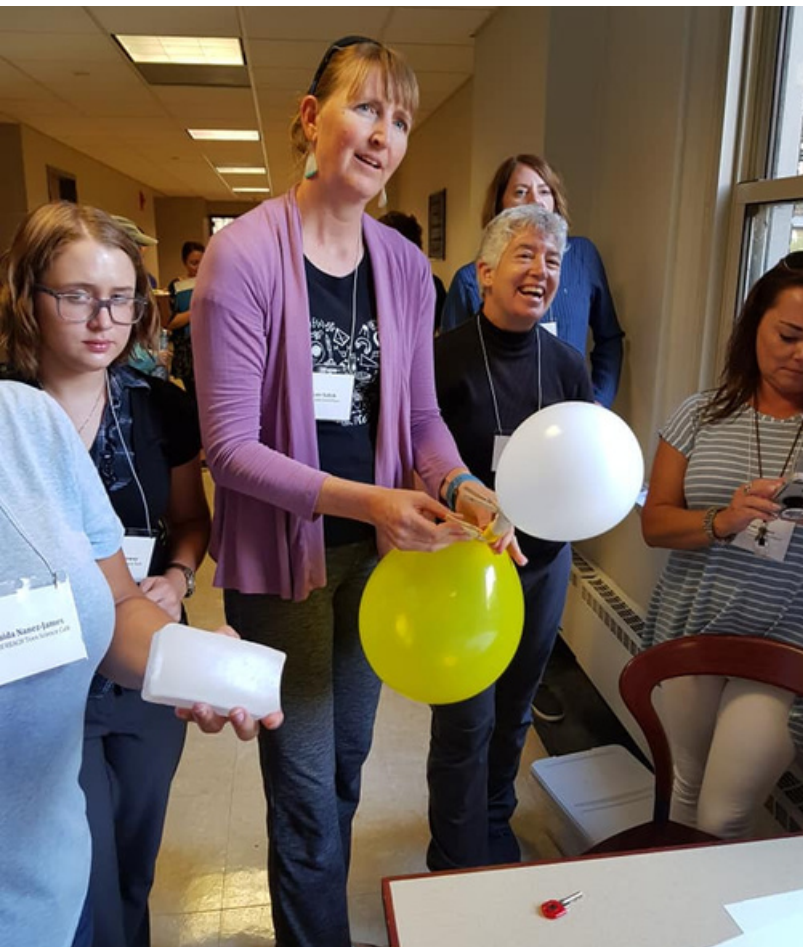


Photo Courtesy of
Teen Science Café