

# Centering Inclusivity and Equity Within Family Engagement in STEM



# Introduction and Context

The United States is in dire need of an increase in science, technology, engineering, and mathematics (STEM) professionals. It is estimated that between 2017-2029, the number of STEM jobs will grow by 8%, however only 20% of high school students are prepared to pursue a STEM major in higher education (Zilberman & Ice, 2021). On the international stage, the United States ranked 30th out of 64 countries in math and 11th in science, demonstrating that there is much to be done domestically to ensure educational and economic opportunities in the future (Organisation for Economic Co-Operation and Development, 2019).

Research shows that elementary education, particularly K-5, is a key time to build students' interests and foundation in STEM (Waters, 2018). Early exposure not only introduces students to STEM disciplines, but also develops their creativity and curiosity (Samaroo et al., 2018). Early exposure also influences families' attitudes towards the various STEM disciplines and career opportunities (Felton-Canfield, 2019). The US needs to engage with diverse families and their communities in inclusive and equitable ways to support students in seeking out and completing pathways in STEM fields.

## Purpose of the Brief

The brief focuses on the importance of engaging families in STEM activities through sustained support of their role as STEM champions for their children in the early years. We present three case studies that illustrate effective strategies for building the capacity of families and professionals working with families to better support children in STEM-related activities. Audiences for this brief include educators, staff, and leadership at K-12 schools and out-of-school programs, who work directly with families to enhance participation of children in STEM as well as others such as funders and researchers with interest in the efforts to engage families.

## Value of Engaging Families in STEM Learning

Families are an important part of students' success, particularly for young children when the family influence is greatest. Involving students and families in STEM activities bridges the gap between school and home, helping students make meaningful connections between STEM content taught at school and skills learned at home (Sias et al., 2016). When STEM teaching and learning is contextualized in ways that connect to students' and families' experiences and community needs, it deepens students understanding of scientific concepts and their application and social relevance in the real world (Brown et al., 2005). When they understand the value and basics of STEM education, families feel encouraged to engage students in STEM-related activities in or outside the home.

Students whose families are engaged in their education and schooling have increased literacy attainment, higher grades and test scores, and a higher enrollment rate in higher education (Henderson & Mapp, 2002). Students who see their families actively engage in school activities also tend to show more positive attitudes towards schooling (McClure et al., 2017). A strong family-school partnership directly and indirectly affects students as parents also gain a sense of self-efficacy and feel more confident in their knowledge to help their student succeed (McClure et al., 2017). This increases their interactions and communication which provides a degree of confidence to the student to help them prosper academically.

Throughout the COVID-19 pandemic, families have become even more influential in their students' learning, as students were forced to leave school and shift to online learning at home. Limiting their access to teachers, educational activities, out-of-school programs, and social learning, leaving parents and family members responsible for engaging students in learning. The pandemic illuminated the importance of nurturing a strong family-school partnership to integrate students' education in home and at school. Schools that had partnership and communication avenues with families were more effective in adjusting to virtual schooling whereas others found it more challenging (Domina et al., 2021). Fostering communication between families and schools is key to ensuring every student has the skills and knowledge they need to succeed in the future.

## Case Studies

In this section, we present three cases of current efforts focused on impactful family engagement. We preview a family engagement toolkit and highlight best practices and lessons learned from three projects (presented in alphabetic order):

- » [Institute for the Study of Resilience in Youth \(ISRY\)](#): the first case study focuses on a STEM Family Engagement Planning Tool for out-of-school time (OST) programs engaging families in STEM programming.
- » [SEAS Islands Alliance](#): the second case study discusses various opportunities in which the Alliance incorporates family programming.
- » [STEM Next Opportunity Fund](#): the third case study focuses on a community of practice (CoP) model to support family engagement in STEM for professionals working with families in the out-of-school space.

Some inclusive practices highlighted in these case studies include: building authentic relationships with families and other key stakeholders, listening to families to understand their needs and involving them in creating solutions to those needs, engaging staff who can relate with families, utilizing inclusive messaging strategies, providing professional development opportunities, and providing time and space (for families, staff, and youth) to reflect and share learnings/feedback. The cases were written by individuals from three projects in the NSF INCLUDES Network that engage families or professionals working with families in STEM programming. The voice, tone, and writing style of the brief changes according to the author(s).

# Case Study One: Impactful Family Engagement Requires Strategic Visioning and Planning: Lessons from the STEM Family Engagement Planning Tool Pilot

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## Overview of the STEM Family Engagement Planning Tool

The STEM Family Engagement Planning Tool was designed to promote effective and equitable family engagement in STEM. The Planning Tool was created to help STEM-providing out-of-school time (OST) programs engage families in STEM programming, especially to broaden participation of diverse families in STEM, including members of underrepresented and underserved groups, but the key ideas and strategies are also relevant for schools. The Planning Tool is designed for both beginners just starting to learn about family engagement in STEM and practitioners who already have a family STEM program in place.

The following sections describe the Planning Tool's organizing framework and lessons learned to date. Detailed information about the process of developing and field testing the Planning Tool are included in Appendix A.

### The C.A.R.E. Framework

The C.A.R.E. framework, with four domains – Connect, Act, Reflect, Empower – guides programs to empower families as partners in STEM learning and pathways. CARE expands upon familiar ideas with a focus on creating diverse, equitable, inclusive, and accessible STEM family engagement experiences. It also takes a strengths-based approach, emphasizing that work be done alongside families, not to families, to ensure collaborative, co-created culture and practice within OST STEM. CARE encompasses eight separate attributes organized around the four domains (see Figure 1).

The Institute for the Study of Resilience in Youth (ISRY) at McLean Hospital and Harvard Medical School is located in Boston, MA. ISRY was created to promote innovation in youth resiliency and education research. Based on a belief that high-quality programming can build youth social-emotional resiliency and contribute to school and life success, Dr. Gil Noam founded the institute in 1999 as a collaboration between the Harvard Graduate School of Education and Harvard Medical School before relocating to McLean Hospital. ISRY develops innovative ideas, theories, and research methods in collaboration with communities. The Institute prioritizes translational research and practical, evidence-based tools to support the well-being of young people and the adults who support them.

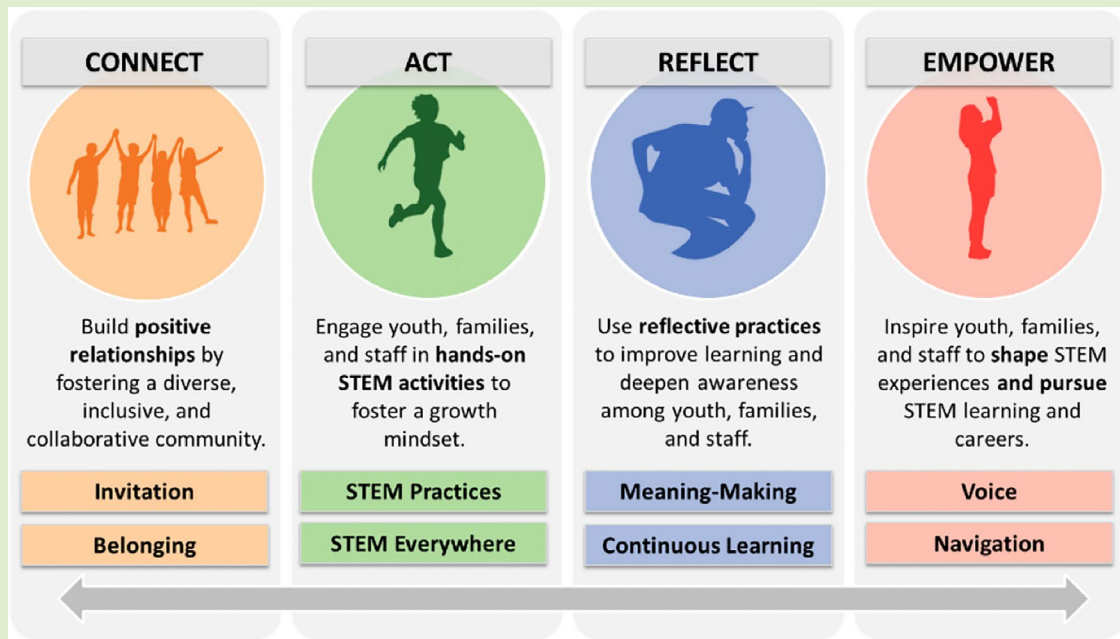


Figure 1. The CARE Framework (developed by ISRY, with funding and support from STEM Next).

CARE domain summary and highlights:

- » **Connect** is about building positive relationships between people (youth, families, and staff) to make the STEM learning environment more welcoming and inclusive, and also about developing partnerships to increase program capacity to better support families.
- » **Act** involves engaging caregivers in hands-on STEM activities with their children and encouraging caregivers by building their confidence and capability by learning and doing STEM practices alongside their children. Bringing caregivers into the educator-student dynamic changes the focus from individual learning to collaboration and shows caregivers they do not need STEM expertise to impact their child’s learning or success.
- » **Reflect** is about dedicating time to thoughtful reflection and analysis and can include practices that help caregivers make sense of their children’s STEM learning experiences and practices that help programs identify the strengths they brought to families and areas needing improvement. Listening and learning with families, by bringing family members into reflection processes, will help identify problems and design and implement solutions.
- » **Empower** means to give caregivers agency to support their children’s STEM learning. Making families partners and putting them in the “driver’s seat” can promote of trust, respect, and morale, leading to more engagement and support for the program. Agency can also increase caregivers’ self-efficacy and self-esteem.

## Lessons Learned

The journey to refine and implement the STEM Family Engagement Planning Tool will continue long after this brief is published. This Tool is considered a living document that will be continuously updated as more programs and families provide feedback and examples from their own experiences. Based on the reflections and feedback received from programs and networks who participated in the development of the Tool (see Appendix), several themes have emerged that make it possible to introduce significant recommendations for the field.

- **Make connections the backbone of all family engagement efforts**

All staff prioritized the ideas related to Connect as the highest priorities for family engagement—especially building positive relationships between staff, children, and families in STEM teaching and learning. Related to this finding is the important discovery that the implementation of CARE is nonlinear—meaning it is not a stepwise process from the C to the E but an iterative or cyclical process that has different start and end points depending on the program’s interests, needs, and capacity. Programs shared the belief that the “C” for Connect is an essential “backbone” for all STEM family engagement activities, because building significant and positive relationships with families and showing families they are valued and respected can open families’ minds to new opportunities outside their current roles, comfort levels, and realms of experience. In sum, the “C” was viewed as foundational, whereas the “E” was viewed as aspirational—an achievement made possible when the other domains are strengthened through organizational/systems-level changes.

- **Set expectations for family engagement in STEM**

Several programs desired descriptions of “successful” family engagement for each domain of CARE. As programs progressed through the Tool, questions would often arise about how much time or money should be spent on a given practice or task, who should be involved, where they should start, and so on. We found that it is important to set these expectations before creating and implementing a family engagement strategy:

- » Family engagement requires time and effort; programs will have different starting points and staff will have different roles (depending on resources, capacity, and staff/families’ interests, knowledge, and needs); the work will be ongoing and requires continuous reflection and improvement. It is not recommended to address all elements upfront, and CARE allows for flexibility in planning by distinguishing eight different areas for focus.
- » A positive mindset and some creativity can stretch smaller budgets for greater impact. It has been recommended that programs think about what can be done with the staff, resources, and time that are already available.
- » There is no “one-size-fits-all” family engagement plan or approach. For example, the age of children in a program makes a huge difference in terms of caregivers’ level and type of involvement.

- **Reflect on messaging for more inclusive and welcoming family engagement and STEM**

An unfortunate reality of family engagement work is that not all youth live with parents, and not all have good relationships with their parents or other caregivers, and not all caregivers have the means or capacity to get involved. Programs have recommended that instead of saying “your mom or your dad,” practitioners say, “whoever you live with” or instead of saying “family” consider “your caregiver(s)” or “your support system.” Programs have shared that youth should be centered in family engagement efforts to better understand their preferences for

caregiver involvement, and to have staff be present for children who do not have caregivers during family activities/ events. Additionally, the word “STEM” is often cited as a barrier to attracting families; “STEM” has been described as “scary” and “intimidating” or associated with “stigma” and “too much work,” among other negative associations. It will be important for programs to spend time reflecting on what messaging will be most effective and inclusive for their families.

- **Be mindful of who is tasked with diversity, equity, inclusion, and access (DEIA) work**

When embedding DEIA into family engagement, several programs noted the need to be mindful of who is doing the work and carrying the responsibility. An important quality of the Planning Tool is its explicit acknowledgement that a variety of biases and injustices exist in STEM education (for example, unequal access to resources and opportunities, negative stereotypes, hostile learning environments). To ensure that youth, families, and educators are equally valued and supported in STEM, the Planning Tool supports building a program culture that actively works against all forms of bias, including racism, sexism, ableism, and classism, among other “isms.” However, when prioritizing family engagement work, it is critical that the responsibility not be placed entirely on staff or families from groups that are underserved and underrepresented in STEM (especially women, people of color, people with disabilities, people fluent in languages other than English). DEIA work can be stressful and emotionally taxing. It has been recommended that programs ensure that everyone is held accountable for DEIA work; that staff’s regular program duties are balanced with any new DEIA-focused work, and that efforts beyond regular duties are compensated or recognized in a significant way.

- **Cultivate partnerships that can increase learning opportunities, resources, and capacity**

Once a program has decided on its family engagement priorities and goals, it can network and find partners who can provide resources or expertise that are needed. Building partnerships can bring in assets and resources without needing additional funds. For example, local businesses might contribute materials for family STEM kits or assist with distribution. Smaller programs might sponsor joint events to share the time and cost of planning and coordination.

## Closing Thoughts

The Planning Tool includes strategies and examples that can guide program efforts to engage families. The Tool presents a range of methods, including many that are resource- and cost-effective and that do not require significant time investment from practitioners. The Tool is designed for use by a) out-of-school time (OST) program leaders to facilitate professional development about family engagement in STEM and to guide staff to improve their training and activity plans, and/or b) front-line staff who want to understand best practices and learn about programs that are effectively engaging families in STEM learning. Here is the link to the STEM Family Engagement Planning Tool: <https://stemnext.org/stem-family-engagement-planning-tool/>



## Case Study Two: SEAS Islands Alliance Family Programming

*Prepared with and by the following SEAS Alliance members (including their associated roles): Allison Black-Maier (Backbone) Jon Boxerman (Research Team/WestEd), Allie Durdall (UVI Hub), Genaé Gonsalves (UVI Hub), Rodney Hopson (Research Team/UIUC), Keisha Martin (Backbone), Sharon Nelson-Barber (Research Team/WestEd), Kim Nguyen (Research Team/WestEd), Manuel Perez (Research Team/UIUC), Kristin Wilson Grimes (UVI Hub)*

### Overview of The SEAS Islands Alliance

[The SEAS Islands Alliance](#) works to broaden participation and possibilities in STEM education, inclusion of nuanced cultural expertise from diverse underrepresented minority (URM) and underserved populations in U.S. territories and U.S.-affiliated islands, focused primarily on Guam, Puerto Rico, and the US Virgin Islands. Island regions are strongly connected to the oceans that surround them and are among the country's most diverse communities. SEAS Islands Alliance collaborates with these communities to broaden participation of the STEM workforce.

By “empowering students to pursue their interest in marine and environmental sciences through scientific and professional development training and mentoring”, the Alliance is committed to involving and engaging participants of the SEAS Islands Alliance: i) middle/high school, ii) undergraduate, iii) graduate, and iv) workforce.

[The SEAS Islands Alliance](#) was funded in 2020 by the NSF Inclusion across the Nation of Communities of Learners of Underrepresented Discoverers in Engineering and Science (NSF INCLUDES). It is a collaborative effort with the following partner institutions: Pennsylvania State University University Park, University of Guam, University of Illinois at Urbana-Champaign, University of Maryland Center for Environmental Sciences, University of The Virgin Islands, and WestEd.

A primary goal of the Alliance is to establish a national network focused on coastal geoscience pathways in seven U.S. or U.S.-affiliated island jurisdictions (U.S. Virgin Islands, Puerto Rico, Guam, Commonwealth of the Northern Mariana Islands, Republic of Palau, Federated States of Micronesia, and the Republic of the Marshall Islands). The project empowers youth, undergraduates, graduates, and post-graduate adults through scientific and professional development trainings, mentorship, family support programs, and cohort-building activities to pursue their interests in the marine and environmental sciences.

The Alliance gives participating partners and coastal communities agency to engage, address, and solve collective coastal problems and grow the national STEM workforce by increasing the understanding of context-specific, culturally-relevant best practices for engaging underrepresented and underserved groups in STEM.



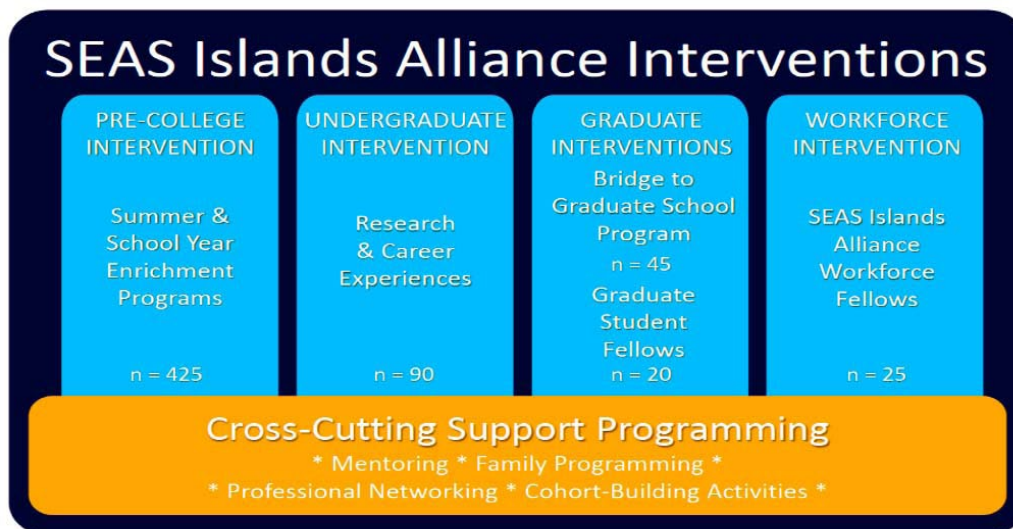


Figure 2. The SEAS Islands Alliance Interventions

Over the five years of funding, the SEAS Alliance will support i) middle/high school students in summer and school year geoscience enrichment programs, ii) undergraduate students in early-career research and career experiences, iii) upper-level undergraduate and/or master’s students in an 8-week summer intensive Bridge to Graduate School Program, iv) Bridge Program students who will receive graduate training at partnering institutions (MS or PhD. levels), and v) Island Alliance Fellows in local workforce positions in each of the island hubs.

### Lessons Learned in Years 1 and 2 of SEAS Islands Alliance Family Programming

The SEAS Islands Alliances incorporates family programming through an all-Alliance cross-hub workgroup; surveys of participating students; videos of families involved in an April 2020 All-Alliance summit; and the involvement of families in SEAS Islands Alliance events.

We continue to learn from carrying out the work of the SEAS Alliance. Some of the most illustrative lessons we have learned involving and engaging with family from our first two years are reflected below:

- » One of our Alliance cross-cutting working groups, the Family Programming Workgroup has charted a plan for workgroup meetings, developed consensus on “family” as defined by participants, brainstormed ideas to communicate with parents about all SEAS alliance activities, and considered ways of collecting data from families during the year.
- » A cultural audit of the Family Programming Workgroup has revealed key issues and strategies related to i) importance of multilingualism in all correspondences, ii) ensuring a welcoming and accessible environment for all families, and iii) involving family at all planning and execution levels of the project.
- » The Family Programming Workgroup developed a listening session protocol for families in the Alliance. Recent results from the USVI Hub listening session protocol for Youth Ocean Explorers (YOE) middle/high school intervention parents reveal important suggestions about their own involvement; namely their role as chaperones, in providing professional expertise as needed, and in attending events where their children are featured. This quote shows the expectation of involvement among YOE parents.

*For us, it's very important, because we're very close with our child and they – we have a good relationship with them and they like to share with us, and I think they would enjoy it if we actually shared at the same time or were a part of it. They like that, and we like it, too, definitely..*

- » Additionally, parents have suggestions about ways to increase the YOE programming such as exposing their children to marine and biologists on the Island, developing outings and fieldtrips, and engaging peers of participants. The following quote from a YOE parent below extends the suggestion about involving peers into the SEAS Alliance experience:

*...maybe do a “bring a friend” who was not involved in YOE...it's a way for the student who is and was involved in YOE to pass on all that information, not just gather with the kids they went to camp with. I think if they bring a different friend every time they come so they can see what it's about, they can learn about the ocean.*

## Key Strategies for Family Engagement

The following three strategies for family engagement are takeaways from our SEAS Alliance Y1 and Y2 planning:

- » Programming for family engagement is a process  
As we share above, our Alliance has multiple touch points for family engagement and we maintain viable and dynamic means of programming for families within hubs, across hubs, and in designing our broadening participation interventions. We recognize that keeping family engaged is a process at all levels of the SEAS Alliance.
- » Identifying key roles for family engagement is critical  
All SEAS Alliance families want to know and participate in the success of their children and community aspirations and success in science learning. Finding roles and opportunities for families to play roles is key and requires a deeper understanding of the type of roles and contributions they can contribute.
- » Families have important *funds of knowledge* to contribute to data collection and understanding  
Based on Y1 and Y2 data collection, we are making changes in the data collection process to include families, their contributions to knowledge and meaning-making in science for their children and youth, and ways families can contribute to data collection and understanding.

## Closing Thoughts

In summary, the SEAS Alliance continues to learn about the process of building understanding and trust across all our three hubs, understanding the unique roles of family and their levels of engagement as we plan and execute our interventions in our unique island communities, collect data across SEAS inventions and island hubs in culturally responsive and indigenous affirming ways, and continue to make the necessary adjustments for success for all involved.

<sup>1</sup>The notion of funds of knowledge asserts that culturally and linguistically diverse families, communities, and households contain positive and reinforcing cultural and cognitive resources that have potential utility for academic learning and classroom instruction (Moll, 2019; Gonzalez, et.al, 2005; Gonzalez & Moll, 2002; Moll, et.al, 1992).

# Case Study Three: Shifting Mindsets: Lessons from a Community of Practice Focused on Impactful Family Engagement

Linda Kekelis, PhD, Family Engagement Advisor, STEM Next Opportunity Fund

As the research and programs described in this brief illuminate, family engagement is so much more than one-time events where families come to listen, watch, and participate in STEM activities. Family engagement is *built on relationships* where educators, families, and community members work in partnership to address the needs of families in support of the well-being of children. This work is resource-intensive and impactful. So too is capacity building for family engagement. It requires a long-term commitment to build and sustain within individual relationships and across partnerships.

## Supporting equitable and inclusive family engagement through professional development

Just as impactful family engagement requires deep touch points, so too does professional development. There is limited study of family engagement in pre-service education programs. Most in-service learning is limited to webinars or conference sessions where promising practices are lightly covered. STEM Next is addressing this need with deep investment in professional development for the out-of-school-time field.

## Community of practice

STEM Next is building a community of practice (CoP) demonstration model to support family engagement in STEM for professionals working with families in the out-of-school space. This capacity-building model provides for reflection, sharing strategies and resources, and planning with partners over an extended period for greater collective impact. Here are six program elements and lessons learned from this CoP model with the [50 State Afterschool Network](#) as part of the [Million Girls Moonshot initiative](#).

[STEM Next Opportunity Fund](#) works toward dismantling the opportunity gap in STEM so that all youth can thrive and reach their potential. Central to this mission is elevating the role of families in supporting children to find their genius in STEM. In coordination with [The Family Engagement Project](#), STEM Next develops resources to build the capacity of organizations, challenging them to be more inclusive and expansive. With [case studies](#), [research-to-practice blogs](#), and [white papers](#) like [Changing the Game in STEM with Family Engagement](#), STEM Next highlights promising practices and research.

## Program Elements and Lessons Learned

- **Recruiting statewide networks**

STEM Next worked with 50 State Afterschool Network for maximum potential for impact and sustainability. Two to four members from each Network participated. Members were diverse with a mix of Network leads, program managers, and staff. In their positions, they shared resources and planned for greater impact through programs and professional development.

**Lesson learned:** Some practitioners who were relatively new to their work felt intimidated by those with decades of experience. Our takeaway is to be aware of how differences among participants can affect confidence and participation and to validate the importance of their experiences.

- **Assigning readings**

We offered two to three readings per session. These readings addressed topics like listening to families, designing programs with families, and making STEM part of families' routines. We shared quick reads, informed by research and practice, and written in an accessible style. Feedback indicated we found the "sweet spot" and that the readings were practical and readily shared across staff, partners, and organizations.

**Lesson learned:** While most participants were satisfied with our reading selection, a few wanted more. In our next go-round we will offer additional optional readings and more choices to accommodate a range of participants. This takes away the pressure of selecting the exact right readings for every person.

- **Providing time and space to reflect**

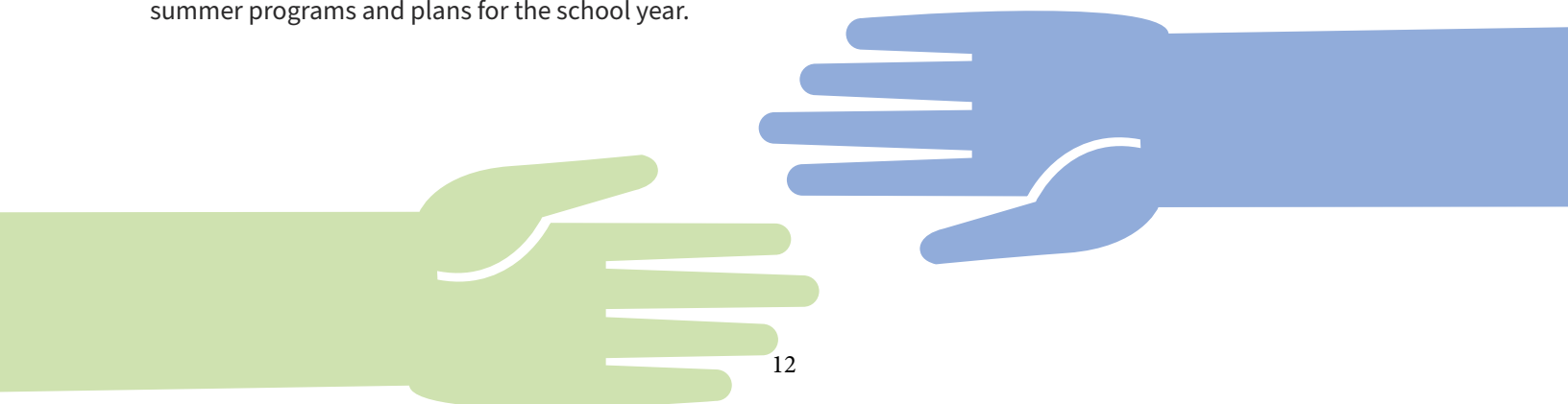
We asked participants to write reflections a few days in advance of the meetings. These could be ideas or questions inspired by the readings. We used these reflections to understand the group's interests in advance so that we could generate discussion questions.

**Lessons learned:** People are busy and often read assignments the night before. Some people reflect through writing, others want a more social process, and some feel insecure about their writing skills. We are working on options for reflecting that account for these differences.

- **Sharing learnings**

Participants valued the chance to learn from one another. Discussions affirmed what they were doing well, addressed challenges, and introduced new ideas and resources to try. We offered a variety of ways to share and participants appreciated having choices in participating in these formats.

**Lesson learned:** We are extending our CoP sessions from 60 to 75 minutes to allow for more opportunities to share. We are planning a follow-up for the fall so that participants can share on family engagement efforts from their summer programs and plans for the school year.



- **Creating a roadmap for planning next steps**

The CoP presented lots of promising practices and resources. We spent the final session sharing goals from the CARE framework (see more details under case study three) to help participants plan how to put the information into action. Strengths as well as barriers for this work were mapped. Partners and resources were identified. The STEM Family Engagement: A Planning Tool described in this brief was used in this exercise.

**Lesson learned:** We plan to use this planning tool throughout the CoP and allow participants to build goals over time.

- **Offering coaching**

We offered personalized coaching in which Network partners discussed ideas to deepen family engagement across partners with equity and inclusion as priorities. With these calls and follow-up emails we offered resources to support the Networks' growth plans and talked through challenges.

**Lesson learned:** These calls were scheduled well into the CoP, and we missed an opportunity to respond with adjustments as quickly as we would have liked. Next go-round we plan to end each session with a quick survey to solicit just-in-time feedback to help adjust future sessions.

## Closing Thoughts

Professional development for family engagement is a journey. Organizations can start small and host a CoP among staff or with another partner or two. What is important is to make a CoP a safe place and support a growth mindset that allows for trying new ideas and sharing lessons learned. STEM Next encourages funders to take up this cause with [\*The Essential Funders' Guide to STEM-Focused Family Engagement: Seven Strategies to Support Families in Advancing Young People's Interests, Persistence, and Achievement\*](#). Collectively, we can build upon lessons learned and advance family engagement so that STEM opportunities are diverse and inclusive. For additional details on this CoP and its readings and resources, contact STEM Next.

## Next Steps

Inclusive and equitable family engagement is critical to advancing access and participation in STEM. Families should be central to efforts geared toward designing and creating solutions to their needs. By collaborating with families to co-create programs and resources, projects are able to provide resources that families actually need to fully engage. As part of the next steps, we will continue with the conversation on the value of inclusive family engagement on the NSF INCLUDES National Network online community at [www.includesnetwork.org](http://www.includesnetwork.org). Here are a few questions to drive the conversation:

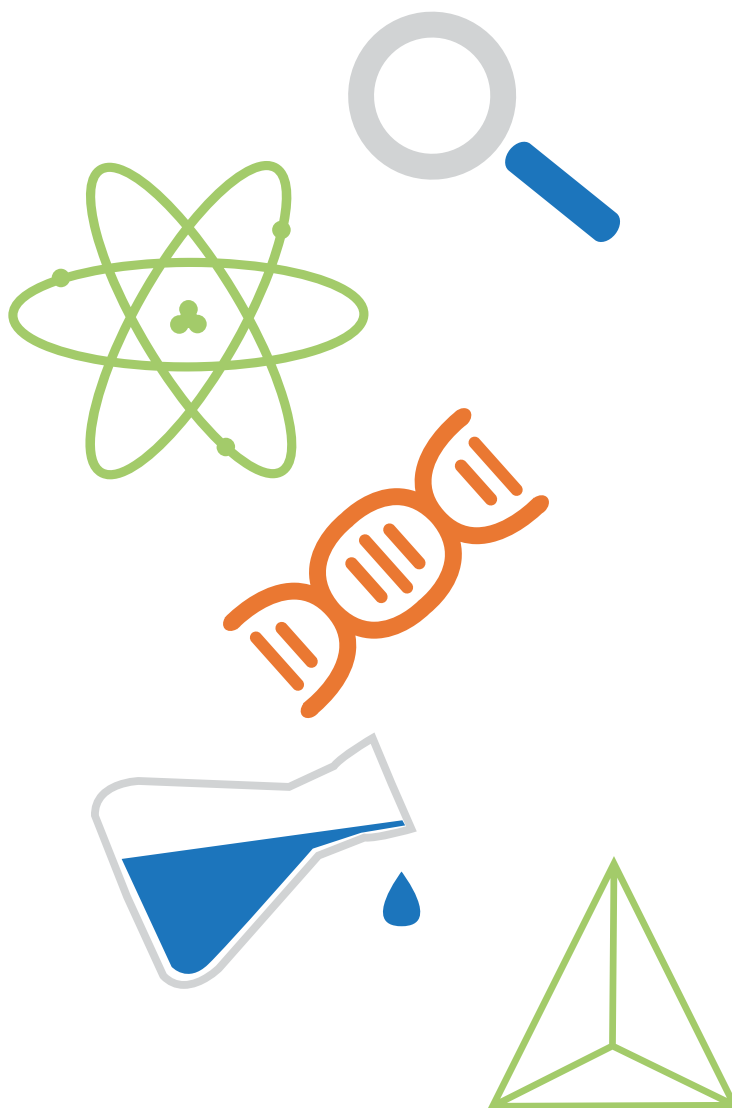
- » What practices have you found effective in engaging families?
- » How has your project supported family engagement during the COVID-19 pandemic? What adjustments did you have to make?

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# Appendix A: Planning Tool Development

Developing the Planning Tool and CARE has been a collaborative two-phase process involving researchers, practitioners, caregivers, state network leaders, and others with expertise in STEM, family engagement, and diversity, equity, inclusion, and access (DEIA).

**Phase I – Research Synthesis & Expert Review:** Building upon recent research and promising practices, the Tool and CARE framework draw inspiration from many methods, frameworks, and models—most notably the Dual Capacity-Building Framework for family-school partnerships (Mapp & Bergman, 2019), Equitable Collaboration Framework (Ishimaru et al., 2019), the Dimensions of Success Framework for high-quality informal STEM activities (Shah et al., 2018), and the Clover Model of social-emotional development (Noam & Triggs, 2018, Malti & Noam, 2016). Planning Tool content was critically reviewed by an advisory board of experts, including Andrés Henriquez, M.A. (New York Hall of Science), Linda Kekelis, Ph.D. (STEM Next Opportunity Fund), Karen Mapp, Ed.D. (Harvard Graduate School of Education), and Ricarose Roque, Ph.D. (University of Colorado Boulder). The Planning Tool underwent another round of revisions in preparation for the most essential phase—input from practitioners and caregivers.

**Phase II – Field Testing & Practitioner Review:** The “beta” version of the Planning Tool was piloted with six geographically and demographically diverse programs between March and July 2021. Program partners included (*in alphabetical order*): [City Sprouts](#) (Cambridge, MA); [Martin Luther King, Jr. Elementary School Afterschool Program](#) (Tuscaloosa, Alabama); [Project Exploration](#) (Chicago, IL), [SPARKS](#) (Coleman, MI); [Young Entrepreneurs of the Future](#) (Omaha, Nebraska); and [YouthQuest](#) (Flint, Michigan). All programs are connected to C.S. Mott Statewide Afterschool Networks and receive some level of system-building support; regularly engage K-12 age groups in STEM-related activities; and engage families in STEM-related activities at least once per month. State network leaders and partners participating in the 2021 Million Girl Moonshot Family Engagement Community of Practice also reviewed the Planning Tool, and these reflections were integrated into the Tool revision process alongside program feedback. Several network leaders in the CoP were instrumental for identifying program partners.

Each program partner had a minimum of two staff members reflect on the Planning Tool together with ISRY staff. All programs provided feedback on each domain of the tool, paying special attention to the accuracy and feasibility of the ideas and practices as well as contributing new ideas and examples. The pilot culminated in a cross-program virtual focus group and online survey. Survey results showed that staff represented a variety of roles (Executive Directors, Program Managers, Site Coordinators, and Educators/Facilitators) and levels of experience with OST STEM



(ranging from less than one year to more than 10 years). Approximately 71.4% identified as women, and the group was racially and ethnically diverse (i.e. 42.9% Black/African American, 14.3% American Indian or Alaska Native, 14.3% Hispanic/Latinx/Spanish origin). More than half (57.1%) reported having a college degree or higher.

An essential part of this pilot was getting input from caregivers. Programs invited caregivers who were currently engaging in the program's STEM-related activities to participate in a virtual focus group and online survey. Five mothers (100% African American/Black) from three programs across three states provided feedback on the CARE framework in the context of their local program environment and their own children's experiences in STEM. All mothers reported being very familiar with the acronym "STEM" and all reported living in urban areas. Three programs declined or were unsuccessful in their caregiver recruitment efforts (citing capacity or pandemic-related barriers).

## Planning Tool Refinement

Work on the Planning Tool will continue, especially to engage more value-holders (staff, caregivers, youth) to further refine Tool ideas, strategies, and examples, and also to support the implementation of the Planning Tool. For questions or feedback on the STEM Family Engagement Planning Tool, please contact Dr. Patty Allen at [pallen@mclean.harvard.edu](mailto:pallen@mclean.harvard.edu) or Dr. Gil Noam at [Gil\\_Noam@hms.harvard.edu](mailto:Gil_Noam@hms.harvard.edu).

**Suggested Citation:** NSF INCLUDES Coordination Hub (2021). Centering Inclusivity and Equity Within Family Engagement in STEM (Research Brief No. 7).

**Acknowledgements:** This research brief was compiled by the following NSF INCLUDES Coordination Hub members: Dr. Mercy Mugo and Dr. Simone Soso (QEM Network), Dr. Alemayehu Bekele (Educational Development Center), Greta Olivares and Daniela Saucedo (SRI International). We thank the authors of the three projects from Institute for the Study of Resilience in Youth, SEAS Islands Alliance, and STEM Next Opportunity Fund for sharing best practices and lessons learned from their work engaging families and/or professionals working with families in STEM programs.