Evaluation of Black SciGirls

Front-End Study (2021–2022)

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1 Introduction

1.1 Overview of SciGirls

National trends for science, technology, engineering, and mathematics (STEM)-prepared students continue to be dismal, but the shortage is especially apparent for women and some students of color (e.g., African American, Latino, and American Indian). Women, who comprise 48 percent of the workforce, only account for 24 percent of the STEM workforce and 30 percent of undergraduate STEM degrees (Noonan, 2017), indicating that women move away from STEM disciplines early on compared to male counterparts.

In 2005, Twin Cities Public Television (TPT) responded to this need by developing the PBS SciGirls initiative that includes a television show, online activities on PBSKids.org/SciGirls, and a national outreach program with over 200 partners designed to engage girls in STEM-related disciplines. TPT SciGirls includes a set of strategies grounded in research called the SciGirls Strategies, revised and updated in 2019, which are available to educators for use in informal settings and educational communities at SciGirlsConnect.org. SciGirls has focused its most recent educator efforts on supporting and providing culturally responsive practices to engage girls—especially girls of color. “Girls from racial backgrounds underrepresented in STEM have the ability to succeed in and contribute to STEM fields but may never realize their potential as they lose interest by early adolescence” as cited in the funded National Science Foundation (NSF) Black SciGirls Proposal. Black SciGirls partners will integrate the six SciGirls Strategies to maximize efforts to connect with girls in a culturally responsive way:

1. Connect STEM experiences to girls' lives.
2. Support girls as they investigate questions and solve problems using STEM practices.
3. Empower girls to embrace struggle, overcome challenges, and increase self-confidence in STEM.
4. Encourage girls to identify and challenge STEM stereotypes.
5. Emphasize that STEM is collaborative, social, and community-oriented.
6. Provide opportunities for girls to interact with and learn from diverse STEM role models.

Black SciGirls
Partner Organizations

The following organizations were awarded Black SciGirls partner grants to support educator training and role model integration for Black girls in STEM:

1. Black Girls Do STEM, MO*
2. Brown Girls in Tech, GA*
3. Community Code, SC*
5. Morrison Mentors, NY*
6. Mott Hall Bridges Academy, NY
7. Park Forest–Chicago Heights School District, IL
8. Project Scientist MN*
9. Project Scientist NC*
10. SheWill, GA*
11. The YMCA of Metropolitan Washington D.C.*
12. TBD*

*Participating in the front-end study

Note: The project will have 12 partner organizations but one has not yet been replaced.
SciGirls has observed how obstacles associated with STEM identity for girls of color continue to be a significant factor in girls’ confidence in and pursuit of STEM college and career options. In short, STEM programs and educators must be equipped to leverage the everyday experiences of underrepresented groups, particularly Black girls, in their STEM activities while confronting the white supremacist constructs plaguing the learning environment. Building on the prior work of SciGirls and the NSF-funded project Latina SciGirls, our evaluation focus is on understanding the experiences unique to Black girls and their families, supporting program improvements to materials and activities designed to support STEM-related identity development, and addressing STEM engagement barriers among Black girls.

1.2 Black SciGirls

In fall 2021, Black SciGirls was funded as a 2-year Research in Service to Practice project as part of the NSF’s Advancing Informal STEM Learning (AISL) program. While TPT seeks to improve STEM outcomes for girls through promotion of the SciGirls Strategies and free educational STEM activities and media, this project addresses factors that uniquely contribute to the shortage of Black women in STEM: limited female role models, gender stereotyping (Beede et al., 2011), and microaggressions (Grossman & Porche, 2014).

To accomplish this, the organization we are1 is using evidence-based practices to engage 24 educators at 12 partner sites in the use of culturally responsive anti-racist teaching practices (in addition to the SciGirls Strategies) through training and programs over the 2022–2023 academic year. Summer sessions will kick off the effort, followed by quarterly webinars and ongoing support from TPT. Supported by Black SciGirls, 12 girl-serving partners will employ the SciGirls Strategies, including the integration of gender-equitable media, to establish learning spaces that support the growth of a positive STEM identity within participants and provide Black girls (ages 10–14) with access to various STEM enrichment opportunities, role models, and hands-on activities in STEM afterschool and/or summer camps.

1 The nonprofit organization “we are” stands for “working to extend anti-racist education.”
https://www.weare-nc.org/mission
2 Evaluation

2.1 Overall Study Design

In terms of overall study design, accomplished scholars and practitioners in the field of broadening participation in STEM were offered advisory roles on the project. These invited advisory members participate in professional learning communities (PLCs) in partnership with staff and project leadership to provide support for research and evaluation activities and strengthen Black SciGirls project implementation: partner outreach, role model video development, and professional development. PLC 1 is focused on role model recruitment and training, PLC 2 is focused on educator training, and PLC 3 is focused on research and evaluation. To facilitate this work using a collaborative approach, the professional development (PD) lead, evaluation team, and researcher partnered with PLC 2 and PLC 3 are working to examine the use of gender-equitable, culturally responsive, and anti-racism strategies by educators and the impact of in-person and media-based role models on girls’ interest and confidence in pursuing STEM.

Each PLC serves a primary project-aligned goal, but with a shared purpose to support key components of the evaluation design, as shown in Figure 1. This collective effort revolves around three evaluation studies (front-end, formative, and summative) to support PD implementation of STEM educational outreach by professionals to incorporate SciGirls best practices use of in-person and media-based role models.

The front-end evaluation serves as the foundation for both formative and summative evaluation studies by identifying necessary STEM interests and barriers of a sampled set of participants using a pre-focus group questionnaire, feedback sessions, and a “final thoughts” exit form. In doing so, it also supports role model video development (a primary project deliverable for PBS) and educator professional development. During the formative evaluation—through focus groups, site visits, and program documents—supported by PLC 2, our team will also examine the quality of project activities, implementation challenges, breadth of services, key stakeholder satisfaction with services, and suggestions for...
improvement. Finally, to measure summative program efforts, PLC 3 will support the examination of student, family, and educator impacts.

## 2.2 Front-End Study Design

The front-end study design utilized multiple data sources—both qualitative and quantitative from feedback sessions, exit forms, and questionnaires—to inform the development of media-enriched STEM programming for Black girls. As visualized in Figure 2, the overall front-end evaluation approach included two primary activities—feedback and development—to support a continuous improvement cycle necessary for stakeholders, and to provide updates on the progress, process, and outcomes achieved. Specifically, project leadership, advisory teams (PLCs), and partner organizations were involved in the development of and revisions for the protocols and data collection used to capture the findings presented below.

### 2.2.1 The “Who” (Who Participated)

#### 2.2.1.1 Descriptive Findings

Of the 12 Black SciGirls program partners, 8 participated in the front-end study. Of those, at least half of the partners represent a program focus on the education development and mentorship of girls of color. While most partners work with students to gain exposure to varied STEM-related careers and project-based activities, two partners target information technology (IT) or computer-based content. A convenience sample of 28 Black girls and their parents or guardians (referred to as “caregivers” in this report) was selected from these 8 partner programs to participate in the front-end study. Qualified girl participants included those who met the following criteria: (a) aged 10–14, (b) identified as Black, (c) connection to partner program site as a potential participant in the Black SciGirls project. The evaluation team facilitated focus groups with the 28 participants of varying ages in grades 5–8, who were accompanied by a caregiver (N=25). Of those girl participants, over half represented the Southeast region (N=16), including Georgia, North Carolina, and South Carolina. Four girls reside in New York, three in Missouri, two in Virginia, and two in Minnesota. (Note: Four additional partners in Minnesota, California, Illinois, and Florida [pending] will participate in future evaluations.)
2.2.2 The “How” (Sources of Data)

The ICF study team developed three types of data collection instruments—a pre-focus group assessment survey, a focus group script, and an exit form—to guide information gathering during the front-end study (see Appendices B–D). All instruments were the same across the eight sites participating in the study and contributed to student and family partner feedback summarized in the following memo.

2.2.2.1 Student and Family Assessments

With the input of PLC 3 members, evaluation staff developed assessment questionnaires for online dissemination to girls and caregivers to explore their needs/barriers related to STEM education and their reactions to existing SciGirls content. ICF sent reminders to complete the surveys to achieve at least a 70 percent participation rate. For both students and caregivers, the assessments included items covering the following:

- Current interests in STEM activities
- Sources of information about STEM activities, courses, and careers
- Suggestions for upcoming STEM programming efforts

2.2.2.2 Focus Group Sessions

A script was developed to facilitate focus groups with caregivers and girls. The scripts covered interest in STEM, feedback on two SciGirls role model videos of Black women in STEM watched during the focus group, other ways the girls and their families learn about STEM, and the supports that they have to increase their engagement with STEM.

A total of eight focus groups were coordinated by ICF and facilitated by partner program leadership. The 45–60-minute focus groups included 2 to 6 girls and 2 to 6 caregivers; overall, 28 girls and 25 caregivers participated. To foster an open environment in which students felt comfortable being candid about their experiences, ICF staff invited partners to provide their own “facilitators” as opposed to ICF conducting the sessions themselves. ICF staff helped to moderate the discussion and ask supplemental questions, as needed, to ensure that pertinent questions were addressed and both caregivers’ and students’ perspectives were represented. ICF support was accomplished through virtual participation.
2.2.2.3 Exit Forms

Exit forms were short—consisting of only two items—capturing final thoughts on two key themes from the session: future programming suggestions for Black SciGirls participation and role model video takeaways to help develop new and more culturally responsive media designed for Black girls and their families.

3 Findings

3.1 Analysis (How Did We Get Here?)

This section summarizes analyses of data collected. Details about the evaluation design and specific instruments can be found in the appendices to this report.

3.1.1.1 Qualitative Coding

The evaluation team digitally recorded and transcribed all interviews. We used emic and etic codes to categorize qualitative data. Etic coding was driven by the evaluation questions and the program’s Black SciGirls conceptual framework (e.g., program experience, barriers to access, influences on STEM identity). Once transcripts were obtained, the analysis team developed emergent themes using open (or emic) coding, ensuring findings are grounded in participants’ experiences. We facilitated this process using qualitative data analysis software Dedoose. Common themes emerging from codes were summarized within and across sites and participant types. For each theme we identified, ICF extracted illustrative quotes to support the theme and provide feedback from program participants in their own voices.

3.1.1.2 Assessment Data

The evaluation team used descriptive statistics, such as frequencies and means, to analyze and identify trends among student and caregiver responses to categorical assessment questions. Thematic coding was used to analyze feedback provided in open-ended question responses.

3.2 Results (What Did We Find?)

3.2.1 STEM Interest/Uninterest

Girls and their caregivers first identified STEM career fields they were aware of, and then girls were asked to indicate which they were most interested in of those listed. Girls described career fields that showcased varying levels of STEM skill. For example, a few mentioned lawyer, doctor, and teacher. Others mentioned more traditional fields such as builder, architect, and engineer. Girls in virtually all of the focus groups cited game designer and scientist. The word art in Figure 4 displays the various careers mentioned and the font
size reflects the frequency with which each career was mentioned across and within focus groups. Specifically, each unique term mentioned was included.

**STEM Awareness.** Survey and focus group respondents were also asked to indicate their most- and least-preferred STEM fields. Over half of survey respondents indicated that they intend to study computer science in college (52 percent), followed by other selected options: art/performing arts (33 percent), architecture/building design (26 percent), and business (19 percent). While not indicated in the survey as a career choice, nearly two-thirds of session participants mentioned a preference for science-related disciplines. Two girls specifically talked about their interest in chemistry, with one sharing:

> I really enjoy chemistry. I just seek all the reactions, different things [I] can do. I think it was sodium, someone put it in a pool, and it just exploded and I was just really interested in it and I want to put sodium in water one day. Yeah, I want to put it in the water so I could see it explode and stuff. I think it would be really sweet.

**Science.** Two girls expressed recognition of the science-based skills that would be needed for their career interest and described the connection to other STEM areas as well.

> I’ve been wanting to be a firefighter when I grow up and they’re doing some research about it and that they do use almost every single one [in STEM]. I don’t think they use a lot of technology though, but they use a lot. For the science, they use the science to see what type of materials they need to use for the fire, what type of fire there is. And the math, they have to see how big it is, how much space it takes up. And I think I’ll really do good with that job.

> I put geology on the most because I’ve always wanted to be a geologist. And I know that they use a lot of math to calculate how far back it was there, how long it was there. I know they use technology to put it into the computer, put it into the system where they found it. They do a lot of engineering, so they take the rocks and they can—they can engineer them to see or they can cut them in half things like that. And they use a lot of science, it’s a science-related career. That’s what I was looking for. I just really—I just really like geology.
Others discussed varied areas of science. One girl expressed interest in life science and another pointed to neuroscience, sharing that she was interested in “dissecting the brain and things like that.” Yet another expressed her interest in physical science, particularly “light and sound.” Describing an interest in space science, another girl said:

*I want to become an astronaut. I don’t think that’s what I’m actually going to end up doing, but I think an astronaut is kind of cool—exploring the galaxy and stuff like that. Why not? You get to walk on the moon. I think that’d be kind of fun. I don’t know.*

**Technology.** In terms of technology, game design was frequently mentioned when respondents were asked about their most-preferred STEM fields:

*For game design, I’ve been wanting to make my own game for a while. I think I have a feel on how to do it, I just need a good time to start it because I’ve been in school a lot, so I mean, I didn’t want to fit that hinder me for like a bit.*

*I was also going to talk about the other thing I put to the side. It’s video game development. I love playing video games. If I’m not doing homework, you can usually find me playing video games. I just find it so cool how they code everything in the game and it’s just amazing to think about how all those graphics are made to put into the game. I just think it’s really cool.*

Several respondents expressed interest in computer science, particularly in the area of coding. Two caregivers expressed that their daughters have an interest in coding, and two girls shared that their participation in computer classes at school prompted them to think about a future career in STEM, sharing:

*I like computer classes. Technology is probably the biggest thing I’m good at and engineering, but only really on the computer side of engineering. Then math is my favorite subject besides computer classes. It’s like STEM is a bigger opportunity in the future.*

*I like computer programming because I’ve been learning it in school and I really like it. I think I might want to major in it in the future.*

Another respondent noted that coding was one of her most-preferred STEM areas, stating “I’ll put an M [for “most favorite”] next to coder because I just think it’d be kind of cool, say if you work for the CIA or the FBI and you get to hack into certain things, you get paid to hack into certain files. I feel like that’d be kind of cool.”
**Engineering.** Two girls expressed interest in engineering, with one noting that “for auto mechanics, on the last day before school starts, I was at this aviation center that’s near my house, and I got to fly in a plane and I thought that I kind of want to build a plane and do test flights and stuff.” Another girl shared that while she likes “engineering and building things,” she doesn’t “like coding that much because sometimes [it] is hard to put blocks in the right place.”

**Mathematics.** Although an interest in mathematics was not expressed as frequently as an interest in science, some caregivers and girls did elaborate on their interest or uninterest in that content area. Math was generally cited by two caregivers as a favorite STEM area, with one noting that “math has always been my favorite” and another sharing that “math and numbers have always been my favorite subjects thanks to dealing with money.” In addition, two caregivers specified areas of math, with one noting, “I love math, but geometry not so much,” and another sharing that “anatomy is lots of hard math.”

Alternatively, girls expressed different opinions on their interest in math. Several reported it as one of their greatest challenges to overcome. One girl shared that “math is my least favorite” and another noted that she likes math because “I like division and fractions.” One girl shared that “… math is my favorite subject besides computer classes.” However, another girl noted her dislike for a career area because of the math that would be required: “…and the reason why I chose electrician as my least favorite was I’m pretty sure it involves math.”

Caregivers also talked about their children’s interest in STEM-related areas and how their interest was aligned to real-world applications and careers. One such caregiver described her child’s interest in an area that not only involves science, but mathematics and technology:

> Well, I know, I didn’t really think about the makeup that I actually apply on my face in the morning and how much that impacts me, because depending on just your biological makeup, every product is not going to work for you. ... All of that breaks down into the science and the mathematics that’s actually brought into it as well as the combination of the colors that you have to use, the whole scheme, and the technology that you have to use when you’re trying to create those particular brands. You can have a fancy [brand] or you can have something from COVERGIRL, and it’s going to be completely different.

Respondents also described various examples of how STEM-related expertise can translate to real-world applications. In addition to one girl who chose firefighter as a career, a few other girls provided examples about how they view STEM in the real world. One girl expressed her science interest through fashion design, saying that science is a “favorite to me” and “I love fashion.”
3.2.2 Supports

3.2.2.1 Existing Supports

This section presents key findings from focus group and survey questions regarding existing and desired supports mentioned by girls and their caregivers. The supports that were available to girls can be broadly classified as school-based; family or close friends; and organizations or groups (including the partner program) such as afterschool clubs, recreation, or community programs. When asked about how they learn about available STEM opportunities, girls most often selected through an organization, club, or group. “[The tech program Brown Girls Code] I’m enrolled in has been very helpful. Cyber security is one of the valuable things I’ve learned to help support my interest in the tech industry,” one girl reported.

**School Mentors.** Girls and caregivers identified school mentors as key supportive roles in their exposure to STEM and in their experience navigating STEM interests. The mentors that participants described can be broken into two groups: experts and champions.

Generally, girls and caregivers attributed value to school mentors due to their experience with STEM topics. This can include teachers and school administrators. For example, when asked about who they would go to for support or information, several of the girls said:

> Even though English is not necessarily in the name STEM, my English teacher would be a big help because she already be telling us about classes we needed to take if we want to go to have certain careers or go to a certain college and I forgot what it’s called—IB [International Baccalaureate]. She’s like an IB teacher, so she’s always trying to give us extra resources and help us with what classes to take in order to be in a certain spot in the future. So, I would say my English teacher.

> I would talk to my science teacher because STEM is mostly science stuff … and my science teacher that I do experiments [with]. The other day, he made [me] choose [an] experiment we wanted to do and that was really fun. So, I’d speak with my science teacher.

> My teacher, she usually gives me a lot of good suggestions for colleges or universities I could look into that are best for that field of trying to become an architect or any one of those fields involved with architecture.
Others mentioned a counselor rather than a teacher as a source of information. Both roles were valuable because of their proximity and availability to girls. One girl said, “Even though I just started this school, I’d go to my counselor because she is easy to talk to … .”

Caregivers also reported contacting teachers or counselors to help understand STEM subjects. In response to the question about someone they would ask questions of, one caregiver discussed how other than the program partner contact she would “reach out to the counselors at the schools, or the teachers that are teaching those courses.”

Overall, mentors cultivated a relationship and rapport with the girls built on mutual trust. These individual school-level staff or faculty seemed to have a holistic interest in their students’ experiences, providing both academic guidance and personal advice. This is an illustrative example from a caregiver:

> Because she [teacher] tells them the truth, even though it might be harsh; but she’s never going to sugarcoat anything. She’s going to tell them the importance of what she’s teaching them and where it’s going to lead them down the road. Because as African-American women, we have to build our own pathways because people don’t want to see you succeed. So, it’s going to be instances where I try to teach them, like, you’re not going to always get a yes. So, you got to get used to people saying no. So, she teaches them that as well; so, they have good mentors.

**Family Support.** In addition to mentors at school, focus group discussion also indicated that girls and caregivers relied on family members with STEM experience to learn more about STEM courses and careers. Two girls specifically mentioned their father, and one shared, “Usually when I need help, I go to my father because he’s very, very smart and he just helps me with a lot of things.” Another two participants mentioned their “grandmother or nana” as a possible source of information. In some instances, students shared how they used specific supports available through family and, in other cases, it was the caregiver who mentioned they initiated the connection with family or will do so in the future.

> Girl: I think I would talk to my aunt because, I mean, that’s the only person I know who does real estate and something around STEM. My mom does it but I would talk to my aunt. I would talk to everybody because most of my family does it actually.

> Caregiver: My brother-in-law, he does a lot of IT work and he was able to get us connected with someone who does do some game development work because it was someone that he knew through more of the IT world.
Overall, most girls in the focus groups reported having at least one family member available as a source of information about STEM careers. One caregiver said, “She [girl] has an uncle who’s an engineer—so family members mostly, but also teachers.” Another caregiver added, “Same here for [my daughter]; she bounces ideas off of me. My husband is an engineer, so she bounces ideas off of him as well and then she does take STEM in school, so she has a chance to get a little hands on it in school as well.”

Girl survey respondents indicated the STEM activities and opportunities they most frequently participate in were facilitated at their school. Specifically, 96 percent of focus group respondents reported participation in an in-class STEM project. Over half of girl respondents indicated participation in a STEM extracurricular activity, and this was followed by participation in organizations or clubs.

Caregivers were most involved in activities resourced by youth programs, through use of at-home resources or chaperoning an education trip. Alternatively, just over forty percent (43%) indicated no involvement in engaging in STEM opportunities. Table 1 below displays a percentage breakdown of caregiver STEM involvement so far.

Table 1. Caregiver Involvement in STEM Opportunities So Far

<table>
<thead>
<tr>
<th>Ways Caregivers Engage in STEM Opportunities</th>
<th>% Of N=37</th>
</tr>
</thead>
<tbody>
<tr>
<td>At–home resources families can use alongside their youths’ program activities</td>
<td>35.1%</td>
</tr>
<tr>
<td>Chaperone an educational trip focused on STEM enrichment (e.g., visit to a museum)</td>
<td>29.7%</td>
</tr>
<tr>
<td>No opportunities have been provided to me</td>
<td>21.6%</td>
</tr>
<tr>
<td>I do not currently participate in any STEM activities</td>
<td>21.6%</td>
</tr>
<tr>
<td>Volunteer during one or more program sessions to help support an activity</td>
<td>16.2%</td>
</tr>
<tr>
<td>Outreach with other parents/guardians to build a STEM–supporting community</td>
<td>8.1%</td>
</tr>
<tr>
<td>Volunteer during one or more program sessions to help lead an activity</td>
<td>2.7%</td>
</tr>
</tbody>
</table>

Partner Program. Focus group participants considered partner programs another viable source of information and support, reporting it is an important way the girls and their families are provided with information on STEM careers.
Girl: I would talk to you [partner program] because you’re the one who started around girls coding, which is how this all-started and … that’s all I can think of.

Caregiver: I agree with the other parents when they say, ‘I’ll come to you,’ as well as here … As well as we have, just the different STEM events within our neighborhood. Keeping in contact with those people and making those resources available.

Afterschool/Community Program. For program experiences, supports outside of school experiences that were used by girls included both community organizations (53 percent) and recreation centers (26 percent). Girls reported a difference in experiences with supports by location, indicating that some girl/caregiver pairs relied more heavily on recreational programs because their schools or districts were less resourced. One caregiver noted, “She’s also a Girl Scout so they do a lot of those little different engineering things.”

One of the girls said, “I guess the people at CodeRVA,² because I think that was my only experience with coding. So, I really don’t know who else I would go to. So, I’m guessing I would just go back to the people at CodeRVA.”

3.2.2.2 Desired Supports

While girls and caregivers identified a myriad of supportive resources, they also identified several gaps in information, services, or overall support that can be improved upon. These can be classified as desired supports. This section presents key findings regarding the desired supports expressed by girls and their caregivers. The findings were largely related to a desire for greater availability of STEM in school. Subthemes that emerged were school-sanctioned programs and peer support. The following themes emerged across participants in the various partner programs:

Greater Availability of STEM in School. Girls and caregivers indicated they felt there was a gap in the availability of school resources for their age group. This sentiment was reinforced by various participants sharing that there were reduced STEM courses in the curriculum for their grade level. Two of the girls shared the following:

… in my school we don’t have a STEM program, we have science and math and [English language arts], but we don’t have a STEM program where we learn. And so, we don’t really get deep into it in our class. We still learn; I’m still learning in my class, but not as much as I want to in STEM.

I think we see things related to STEM all the time, but we just don’t know it—in our normal lives, in our normal day. So, I think that’s my opinion on that.

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2 CodeRVA is a public school focused on preparing students for computer science and coding careers. [https://coderva.org]
And I would love to see more. In school, I would love for them to show us something around STEM, probably every day like the news, CNN, they show us something like that. What if they show us a video like the two videos we watched today every day at school to get us going.

In schools where STEM courses were available, one girl shared that she felt that although the resource was available at the school, it was not accessible to all students. Namely, the issue is that girls who are not in the gifted program are not able to access these classes. As paraphrased by the facilitator, she said:

So, you’re saying some of the gatekeepers are grades. That even if you have an interest in it, you have to be in a GT program—a Gifted & Talented—or an accelerated program. Otherwise, you’re not invited to be a part of some of these STEM courses that would lead you to the STEM careers that would give you the background.

School Sanctioned Programs. When asked about challenges encountered in learning about STEM, several survey respondents—girls and caregivers—reported a lack of programming or resources in school. This sentiment was echoed by participants during the session in which they also expressed a desire to have more access to a STEM-related curriculum. Specifically, some girls were interested in STEM-focused clubs and activities through their schools.

Girl: If I were to have kind of like something at school, like a STEM club, I would most likely join it because I like STEM and I want to learn more.

Caregiver: Other than the YMCA for TechBridge, which was a program that was in her school, John Burns. Her middle school that she’s in now, and the one that she attended prior to this one, which was a charter school. And the one she’s in now is a Montessori charter. They don’t actually have STEAM [science, technology, engineering, the arts, and mathematics] or STEM programs. They don’t have it. Most schools, they might say that they offer it, but the program isn’t implemented in school. Because for her, where she’s going, they have a … we just call a squad group, where they do hands-on learning. They might go on trips or they might talk about science projects. But as far as actually doing actual active projects—no. The only thing that she’s done is the iD Tech coding. And that’s because it was a scholarship offer.

As a teacher myself, I find that, for me, the irony in the whole situation is like, let’s get girls excited, let’s get them excited about STEM, and then really, let’s get girls of color excited about STEM, but after 8th grade—oh, well the excitement, it kind of fizzles out. … There aren’t very many programs that are geared specifically towards girls in STEM and/or African-American girls in STEM.

— Caregiver
This gap in support at the school level seemed to translate to low confidence levels in girls’ ability to perform in STEM-related courses, as recognized by caregivers and girls. One caregiver believed that having more resources in STEM would improve her daughter’s confidence in mathematics courses. Other caregivers recognized their own lack of confidence in STEM-related courses as a barrier to their ability to support their girl’s academic growth in those areas, underscoring the need for supports outside of the home. A few illustrative comments from caregivers follow:

Yeah. I will say she is big with STEM. I guess it would be great if she ... I guess some math resources to build confidence … I mean, you need your math, you need all that.

When I was in school, I needed a tutor for algebra. And so, I’m like, okay, my money is accounted for. So, who am I going to get to tutor me—I’m not going to pay $65 for a tutor.

But, for my children, I just make sure that they stay on top of their math. Or if their additional classes, to help them for a computer—that they have the basic knowledge that they need. But I mostly let them choose what career path they want. But I don’t know how it directly relates to STEM for the specific careers they want to choose in their life. But maybe I have to educate myself more and push more, but I’m a big advocate on math and just ensuring that they have the technology tools that they need. ...

Another impending factor is the girls’ STEM efficacy. Specifically, when asked about the two greatest challenges to STEM learning, girl respondents were most likely to cite not enough knowledge in math and limited supports. In both the survey and the focus groups, girls elaborated on this belief saying they were not confident in their abilities to perform in mathematics–related courses. A lack of confidence in a particular subject may deter students, resulting in disinterest as reflected in responses from some of the girls.

For me, something that sometimes, like, makes me stay away from STEM is sometimes I just struggle with it and I just think … It’s mostly math, I just feel like sometimes I’m not the best at math, so it kind of worries me if there’s going to be a lot of it, and if I’m going to be behind on something.
*Being a mathematician is not really one of my majors because I’ve never been good at math.*

Some girls surveyed reported staying on task despite their struggles in the subject matter. “Trial and error have been the two greatest challenges encountered. I have just learned not to give up,” one said. Two girls specifically shared project examples:

*The two greatest challenges I’ve encountered so far was programming robots and making my first game because I have struggled a bit since I was unable to program them for the first few tries.*

*I feel like engineering is difficult because of all the steps you have to figure out and I just generally struggle with math.*

Other girls talked about limited academic and financial support:

*Math is one of the biggest challenges I face as well as limited tools and resources offered to me for the area of engineering.*

*Finding programs available to me for free. Or a small fee.*

When the caregivers were asked what are the two greatest challenges they encountered in supporting their child’s interest in STEM, respondents also indicated content knowledge or interest as limited. “… Math isn’t one of our favorite subjects, so I’m not big on it,” one caregiver said. Other caregivers shared that although they are good in math, they are not as confident in teaching it to their children.

**Peer Support.** Notably, girls did not often refer to their classmates as potential resources in this context. It appears that girls do not perceive other students as a resource, possibly due to the perception of low interest and limited opportunity to collaborate. One girl shared how “finding a program and finding friends who are interested” are an undesirable pair. When sharing about their afterschool program experiences, two of the girls noted:

*I really liked doing Project Scientist’s [STEM Club], but it was so sad because it ended at 8th grade, but it would be really cool if more people my age, who look like me, and in higher grades in like high school, were able to do it and collaborate on some more difficult things throughout the process of STEM, and we could still learn more about the career field we wanted to go to, going through.*

*Not many girls in STEM and it’s hard and there is not enough representation; getting more of my friends involved and see[ing] more girls that look like me at competitions.*
3.2.3 Feelings About STEM Identity

To understand the influence of specific supports, our pre-focus group survey asked caregivers to rate school and program influence on aspects of their connection to a STEM community. In most instances, caregivers reported the strongest influence on career interests and learning from program experiences, including addressing gender and racial stereotypes about careers in STEM (shown in Figure 6).

Figure 6. Extent to Which School or Program Supports Influence STEM Ideas

<table>
<thead>
<tr>
<th>Statement</th>
<th>Program</th>
<th>School</th>
</tr>
</thead>
<tbody>
<tr>
<td>Promotes engagement of fathers’ involvement in encouraging STEM interest</td>
<td>48%</td>
<td>67%</td>
</tr>
<tr>
<td>Addresses gender or racial stereotypes about careers in STEM</td>
<td>39%</td>
<td>65%</td>
</tr>
<tr>
<td>Promotes engagement of sibling(s) involvement in encouraging STEM interest</td>
<td>50%</td>
<td>65%</td>
</tr>
<tr>
<td>Offers college or career advice about STEM</td>
<td>47%</td>
<td>71%</td>
</tr>
<tr>
<td>Supports collaboration with other families/girls on real-world STEM work</td>
<td>48%</td>
<td>76%</td>
</tr>
<tr>
<td>Introduces career learning through STEM role models</td>
<td>52%</td>
<td>76%</td>
</tr>
<tr>
<td>Promotes engagement of mothers’ involvement in encouraging STEM interest</td>
<td>59%</td>
<td>68%</td>
</tr>
<tr>
<td>Connects STEM learning to my everyday life</td>
<td>45%</td>
<td>62%</td>
</tr>
<tr>
<td>Helps you motivate your child to think about STEM careers</td>
<td>65%</td>
<td>71%</td>
</tr>
<tr>
<td>Helps to foster creativity through understanding interesting problems</td>
<td>65%</td>
<td>76%</td>
</tr>
</tbody>
</table>

Girl participants were asked to rate the extent to which they “feel like a scientist, engineer, computer scientist, or mathematician because the following statements (shown in Figure 7) are true.” The girls used a scale ranging from “A Great Extent” to “None at All” when responding. Organized in Figure 7 by potential girls’ support areas, the graphic shows the percentage of respondents who believed each statement to be true.

Overall, most girls (88 percent of 26) had the strongest support to feel like a scientist, engineer, computer scientist, or mathematician from family members, particularly mothers. The statement “My mother encourages me to do better in STEM” had the strongest response. This was only surpassed by most girls (92 percent of 26) also feeling supported in their STEM identity through the application of STEM: “I get to be creative through understanding interesting STEM problems.” Finally, encouragement by fathers and having family members in STEM also contributed to girls’ identifying with feeling like a STEM professional. The least likely to occur for girls was school-level support. While one girl in a focus group said, “My teacher, she usually gives me a lot of good suggestions for colleges or universities I could look into that are best for that field of trying to become an architect or any one of those fields [that] are involved with architecture,” this was not the case for most. Almost 80 percent of girls who responded to the survey felt little or no support from
teachers or counselors at school, responding “None at All” (44 percent) or to “A Small Extent” (35 percent). Nearly 80 percent of respondents described limited access to a role model who inspired them to learn about STEM, with 21 percent saying “None at All” and 58 percent saying to “A Small Extent.”

Figure 7. Extent to Which Supports Help Girls Feel Like a Scientist

| Source: Student Needs Assessment. Note: Items may not total 100 percent due to rounding. |
3.2.4 Barriers

Participants described barriers in two major ways: a combination of lack of representation in STEM and limited access to information and opportunities. Such challenges are reflected in the individual stories of girls and their caregivers, and in the discussions with partner program facilitators during the session who do not exhibit the culturally responsive behavior and discourse expected of this program.

**Representation.** When asked to share what STEM means, one caregiver wrote the comment shown in the image at right: “STEM = A Man’s World.” This echoes what research has shown about Black women’s experiences, which is that the STEM environment is unwelcoming and isolating.

Prior to the focus group, participants took a survey and were asked to express levels of agreement with certain statements related to their child’s exposure to Black women in STEM. Overall, most caregivers strongly agreed (measured as a 3.55 mean on a 4-point scale with 4 being the highest) with the statement: “I am concerned that the perspectives and contributions of women belonging to an historically marginalized racial/ethnic group in the United States are undervalued in STEM careers.” They were also the least likely to agree with the statement: “My child knows at least one Black woman scientist, engineer, computer scientist, or mathematician personally” (measured as a 2.97 on the same 4-point scale). Both caregivers and girls were asked about challenges, with three of the respondents indicating lack of representation and one respondent saying,

*Not many girls in STEM and it’s hard and there is not enough representation; getting more of my friends involved and see[ing] more girls that look like me in competitions.*

During the focus group, caregivers also discussed the link between their Black community and self-identity, expressing its strong influence on feelings of belonging and empowerment. “I grew up in Ghana and schooled through high school. And so, everyone around me was like me, looked like me. And the different professions in medicine, in whatever field. So that was very empowering,” one caregiver said. This statement illustrates the importance of revisiting the STEM experience for Black students within certain communities. While American communities are very different than African communities by historical, social, and political measures, this caregiver raised an important point: Black people deserve to see themselves in all careers—and regularly. “We don’t have a lot of females doing those jobs,” one caregiver noted early on. Other caregiver participants
discussed how not having access to Black STEM communities leaves the onus on the family or the girl to provide them.

A couple of illustrative comments from caregivers:

*I always put out: I want you to not work as hard as I did and be more knowledgeable about what’s out there, because in the community it’s not there. They don’t provide that type of stuff for our kids, so we ... have to go out and find it. But one thing I could say: If I know, they’re going to know.*

*Yeah. Just because she has a pink mohawk doesn’t mean she’s not able to do the job, but is it somebody that you would normally see or what you would think that you would normally see in that environment? Probably not. But we can make a way, change the narrative.*

Some facilitators cited their lived experience in STEM as riddled with challenges, often with stereotypes around gender and race. In doing so, they invited the girls and their families to engage in that discussion or directly share their own motivations for persisting through college and entering the workforce. One facilitator said,

*There were a majority of men that were doing the same types of work that I was doing. And there were experiences that I would have, that were very negative. For me, what I saw was that there are not enough women here, and that has to be why this is so terrible.*

However, in one case this conversation initiated during the session seemed to miss the mark and turned into language that appeared to the evaluation team as condescending for girls and their families. Educators involved in promoting the STEM identity of black girls must consider the correct lens to be examining issues through. This is something to be worked through during culturally responsive and anti-racism training efforts.

*Facilitator: ... So, you're lucky even though you may not feel like it's lucky that you have transportation to school—in some districts it’s just not provided. ... So, you see little itty-bitties [sic] just taking public transportation to get themselves to school. Because parents have to work, so what are they going to do?*

**Access.** Girls and their caregivers cited access to information as an ongoing obstacle to helping students learn about or experience STEM careers and activities. “I think STEM should be more accessible. And different programs to help them throughout the year” one girl said. Caregivers described technology and social media as communication streams used to get information to people but noted that STEM itself is not accessible. One caregiver shared how the schools in her district are not typically the ones receiving information about STEM opportunities. She stated:
I don’t know if I want to say it is about race, but definitely income bracket. ... No Title I schools get the flyers. Title I schools equals your Black children, your Latino children, your immigrant children. Those are your Title I schools. They don’t even get the marketing.

Another shared how it is offered, but not made available to Black students.

So, they do have that experience, but I just feel in our communities, they do not offer it enough to women of [and] children of our color and also young ladies as well. So, I feel that they should offer more programs as geared to those groups.

She continued to describe this experience, sharing sentiments of microaggression and reporting how her children were excluded from representing the program:

Even that week, I noticed that they took pictures and they kept uploading them to all their social media. My children didn’t make it to any of those pictures.

While in the pre-focus group survey, approximately half of respondents indicated that they learned about STEM activities from family or friends (54 percent) and/or their child’s school (49 percent), this was one of the greatest concerns among caregivers. Figure 8 shows some additional ways caregivers learn about opportunities.

Specifically, schools have few options for students in the way of courses and programs.

Figure 8. How Caregivers Learn About STEM
Even if participants have an interest or want to explore STEM careers, girls lack support in schools, making it challenging to engage in STEM. Two of the caregivers said:

*I think from an educational standpoint: infrastructure. So, someone who might have a career in computer science, that person ... Just because you might have a career in computer science, does your learning support STEM in school? Does it support the teaching or the infrastructure in order for it ...*

*...They don’t have it. Most schools, they might say that they offer it, but the program isn’t implemented in school. Because for her, where she’s going, they have a ... We just call [it] a squad group, where they do hands-on learning. They might go on trips or they might talk about science projects. But as far as actually doing actual active projects, no. The only thing that she’s done is the iD Tech coding. And that’s because it was a scholarship offer.*

Within the classrooms, teachers also act as gatekeepers of knowledge and information. For example, if programs or activities are available in some cases, they may only be offered to certain students or seem not as accessible to girls. As one girl commented:

*And also, I wanted to add that sometimes it’s, like, I guess maybe our teachers don’t think that, like, my whole class won’t go into that field or they think that, not many per se, people in the class, specific people in the class won’t go into that field, so they won’t teach us as a whole. They might mention to a few people, ‘Hey, you should join this.’ And then to the people they don’t think will go into STEM, they will just stay quiet and continue on.*

*So, the resources that I find that are available for that age group, they’re never gender specific, so it’s like everyone. And then, we do have a chemistry club at my school, but [it is] run by a male chemistry teacher, and the crowd is mostly boys. So, I think that because of that reason, the girls are a little bit intimidated to go in. So, I just find that it’s a little less inviting; it exists, but I have not participated.*

### 3.2.5 Role Model Video Feedback

Among the purposes of the feedback sessions was to help evaluate the effect of and potential use of role model videos in STEM partner outreach efforts. Participant perceptions of role model videos were extremely positive. While we found some varying levels of personal interest in the career goals presented in the videos, girls and their families agreed that they were able to relate to the lived experiences of the role models. Findings below are
organized by focus group questions across four main categories: 1) filmmaker goals, 2) relatability, 3) informational value, and 4) suggestions for future videos.

**What do you think were the filmmakers’ goals for creating the video?**

**Awareness.** Asked specifically about the filmmakers’ goals, caregivers noted fostering awareness and knowledge of career options and pathways was a clear focus. Girls also engaged in the discussion and focused on how the video promoted the role of Black women in nontraditional career fields, which according to both sets of participants often goes unnoticed.

> I don’t know, maybe they’re just trying to gain awareness. Because I know usually you don’t see a lot of Black people or Black women doing things where it’s mostly white people. And so, I think they’re just trying to inspire people. ... And inspire other people who want to go in these career paths, I guess.

> Oh, I was just going to say that, definitely; I think their goal was to highlight women of color being in that field. And also, just to show that she had that support from her family in doing something that she was interested in.

At a minimum, participants supported the central idea that the videos were designed to encourage girls and women. Most participants noted the video they watched showcased a woman’s performance and highlighted “girl power.” Several said the two videos positively reflected women and their career pursuits in STEM, despite obstacles in a male-dominated field. One caregiver participant commented, “… woman is ruling the world at this point. We can do anything a man can do.” Another caregiver echoed these sentiments, saying, “You don’t have to be a man.” Several participants cited how the video highlighted the limited number of girls in STEM careers, which reminded the audience of the disproportionality compared to men in those same careers. “I think the second one was about how we need more girls and not only males in our society to code,” one participant said. When discussing the goal, participants agreed there was a spotlight on the life of one woman’s career—not a promotional video for the company.

**Role Model Videos**

These are the videos that session participants viewed:

- **Software Engineer: Antoinette Smith**

- **Architectural Estimator: Brennetta Harris**

- **Data Analyst: Omayra Ortega**
As one participant said:

*That they’re not putting on their self or a company, just putting it on the one woman who’s telling about how [she] got to where [she is] and they’re not making sure a drift is off to someplace else; [it] is just staying on [the woman].*

The childhood photos, hobbies, and family support shared in the videos resonated with many caregivers, with one saying, “I guess in both videos they showed you the whole aspect of their lives from going to school to even their personal lives.” This caregiver said the filmmakers’ goal seemed to be to provide the audience with an example of a lived experience that captured the career trajectory, including any relevant personal experiences along the way. One caregiver stated, “I liked how they showed their younger days, how they developed to where they are, the struggles they had. But I also like the fact that they showed that they are well rounded, [it’s] not just [about] their work lives, but that they have things outside of work that they really enjoy.”

**Inspiration and Motivation.** Facilitators, caregivers, and girls unanimously agreed the video development empowered, inspired, or motivated young girls and women alike to pursue their goals. As one facilitator shared:

*In my opinion, I feel that these two videos—they were to inspire women to be able to become career oriented in those career fields because [the] majority of those fields, women do not partake in those fields, especially women of color. So, they inspire in us women and us girls that pretty much we can do anything that we want to be and just inspiring us to know that no matter what, we also can focus on science, technology, STEM, coding—whatever we want to do.*

Caregivers focused on the connection one video made to real life experiences and needs, with one saying “I need a house too. So, I’m going to build my house. … I think it’s a positive thing to put it out there for the girls. If this is something that you need, you can create it yourself.” Girl participants generally agreed the role model videos showcased a connection between having a dream and accomplishing it. “I felt like the goal was to show people to go out there and try what your dreams are, so I think that was the goal of the video, just to push people,” one girl said. Caregivers mostly praised the well-rounded lifestyle promoted by both videos and suggested future videos should continue to portray this lifestyle. As two caregivers expressed:

“I grew up in Chicago, Illinois, with my mom and dad, and then four brothers. Chicago has a population that’s about 33% black. Minneapolis is 7% black. So, it’s a huge difference. What I find is that just being around a lot of people that look exactly like you, just makes you feel more confident. And [you] just feel more supported.”

— Role Model
You should get a full aspect of a person's job and also personal life to see that it’s somebody that reflects and kind of look just like you or is in the same situation that you’re in. ... It should give you motivation to be able to push and maybe reach a goal of being a coder or architect.

The filmmakers just showed how [the role models] live outside of what they do. And I feel like that was important because people need to see similarities in people's lives and I think that would motivate them to do what they want to do or what they love or what they dream to do.

Participants mentioned the role models as a source of inspiration in the lives of young girls, which suggests that the video developers were successful in making STEM more accessible. “I think the filmmaker’s reason for making this video was to inspire more Black young girls to do their dream and get involved with STEM,” one girl said. In their description of the video, a few participants noted how it targeted girls interested in the career field highlighted, which may make it less appealing to the wider audiences and limit viewing options by girls not yet interested in that specific career.

I think that the filmmakers’ goal was to, like, inspire other girls out there who want to code and do architect[ure], so that they could get to where they are.

In my opinion, I feel that these two videos ... they was [created] to inspire women to be able to become career oriented in those career fields because [in the] majority of those fields, women do not partake in those fields—especially women of color.

The careers cited by girls as most interesting were gaming and graphic design. At one site, two participants said they would prefer more content options that connected with their interest in a gaming career or highlighted more subject content to which they could directly relate. One girl stated, “So basically, I feel like they didn’t really show us that many examples. More so, they explained it, give us a general idea of how they go through a day-to-day, what their career is about. They didn’t really show us that many examples.”

What aspects of the video were most relatable for girls? For caregivers?

Participants valued role models who shared unique challenges associated with being Black and women in a STEM career.

I think I would not take advice from any—not anybody—but I would take advice from her. I felt comfortable. I felt safe in a way that I could listen to both of the women in the video. And I think I would listen to her and it helped me because it was two women, the same color as me. And that helped me a lot and I would definitely take advice from them and it showed me that I
could go for what I believe in and what my dreams are. So, yeah, I really enjoyed the two videos.

I found them relatable to me because they looked like me.

Those caregivers identifying as “mothers” especially appreciated the representation of one role model as a single mother. Caregiver participants described this video as important to demonstrate resiliency and grit, specifically connecting with the adult audiences. When talking about the relatability, one caregiver shared that it “especially [relates] to the parents on this call, who hustle every day for their kids.” In this comment, the caregiver described hustle as the ability to overcome life obstacles and persevere in the face of adversity.

The single mom was relatable to me because I am a single mom. And the message that she was conveying is that I tried a school, but that school wasn’t for me. So, I found another path, and the path is working for me.

I was able to relate to her as a mom with the younger kids and how she’s balancing everything and how she still stayed true to her passion, wanting to do what she’s doing. Even though she’s a single mom and she has to raise her two little ones, she’s going to incorporate her mission with wanting to build houses for single moms, that just may lead somewhere.

While neither caregivers nor girls commented on the need to have Black women role models, many noted the benefits of having someone who “looks like you” or who shares similar lived experiences—which expresses a desire for relatable role model videos through cultural representation. Specifically, two caregivers’ earlier comments are revisited and one new girl’s comment is included to illustrate this point:

You should get a full aspect of a person’s job and personal life to see that it’s somebody that reflects and kind of look just like you or are in the same situation that you’re in. And it’s not [that] they should be able to stop you, it should give you motivation to be able to push and maybe reach a goal of being a coder or architect.

The filmmakers just showed how [the role models] live outside of what they do. And I feel like that was important because people need to see similarities in people’s lives and I think that would motivate them to do what they want to do or what they love or what they dream to do. It showed that normal girls could do things like that—being an architect and all those big jobs. Just from being a normal girl, you don’t have to be from a fancy neighborhood or anything or have everything.
Several participants cited the systemic barriers associated with being underrepresented in the field. Many echoed the view of role models on the challenges with work environments that lack the necessary diversity, equity, and inclusion to create a sense of belonging. Said two participants:

*Caregiver:* I think a challenge that we might face is not really being taken seriously since we’re women and we’re Black. And like she was saying that it was *hard to work in [an] environment with just straight whiteness*, so she had to move to another environment where it was more open and accepting and I just think it’s just harder for us to be taken seriously.

*Girl:* And also, the area that you come from, a lot of people don’t want to give you those opportunities.

**What provided the most informational value to students? To caregivers?**

Participants agreed they know more about STEM careers because of watching the videos. Most believed they gained new insight into the careers of women in the STEM fields presented in the videos. Learning about their daily lives and work experiences, participants said, was especially helpful. One student said:

*I also use science. I also use technology a lot every day. We use our Chromebooks at school every day, a lot. We also do a lot of math [at] the same time, because math can be difficult, we use it a lot more than I would think in our daily lives. What else? Oh, science. We do science every other day, but science is still like super useful. Science is probably my favorite subject, and then [English language arts] is my second favorite. That’s pretty much all.*

Girls also reported a greater awareness of STEM careers, but a few focused on an awareness of the challenges faced by Black women in STEM. Most did not seem to understand or were unsure what was awaiting them in a career dominated by white men. While they were cautiously optimistic about their ability to handle unwanted comments or grave stereotypes, they noted that role models touched on this in the video; some facilitators discussed this further with girls during the session.

*I learned that men might say weird things or jokes or things that don’t belong in the workplace while women are there.*

Others mentioned new knowledge about the feasibility of pursuing such STEM areas. “I learned that coding is easier than you think. Yeah, that’s it,” one girl said. Others mentioned that they became more informed about more career options overall.

*I was made aware that there are many careers in STEM that I didn’t know about, like dental health on pregnant women and programmers.*
Others spoke about learning how much math was involved in particular careers such as computer programming or architecture. Girls were generally satisfied with their overall viewing experience and said they would watch other videos. Most participants seemed engaged in the video while watching it and, when asked about key takeaways, they all agreed on the inspirational value. One girl said:

> So, it made me feel empowered knowing that even women of color can do all these things; they have more opportunities now. And it also made me think of the science project I did.

Role models motivated and connected with the girls and their families. Both girls and caregivers praised videos on coding and architecture.

> It helped me understand that I could do whatever I put my mind to; no matter what I look like or who I am.

> One of the takeaways that I had was really just that all—no matter how hard it may be for you, if you just continue to work hard, then you can get to your goal. And also, that ... even though people may bring you down because you are either a female or [for] your race or skin color, you can always bring yourself back up by thinking of your goals and what you will accomplish.

One group viewed another video about Omayra based in New York. In this video, the role model introduced the families to her hobby, capoeira. Her showcase of this martial art that mixes acrobatics and dance and started in Latin America retained the interest of the girls.

Caregiver: I liked the second video a lot, because she was really talking about inspiring Black women. But something I found interesting in the first video was when she was talking about a type of martial art that involves dance. I thought that was really interesting.

Girl: Well, I really liked ... I thought the capoeira was really cool. I did a little bit of it before, but not very much.

Caregiver: When we lived in New York—Omayra was born in Brooklyn—so we connected to that part. And one of my good friends when I was a teacher out in Brooklyn taught capoeira.

Facilitators also engaged girls and caregivers around the video role models’ connection to family. “Both videos show the support of the family and encouragement, and that without that family support, you may not achieve your goals. But the family continued to encourage and push them to meet those goals,” one facilitator shared.
Most caregivers also acknowledged the active group of parents and family who participated in the video, and clearly offered their involvement and support to the women. “I admired how supportive both of their families were,” one caregiver noted.

**What suggestions do you have for making future videos?**

Participants were asked to talk about ways the videos could be improved or suggestions for future videos. Only a small number of participants had suggestions for future videos. In an exit form, respondents cited the ways the videos connected with them. The most frequently cited descriptions included: informative, positive, inspiring, motivating, and connects to girls’ lives. Other topics cited less frequently included: exciting, shows problem solving, and makes connections to other subjects, such as art—these sentiments echoed the focus group comments related to general interest in the video topics.

Respondents agreed the careers chosen were appealing (e.g., architecture, software developer), but a few girls suggested more feedback from the role models about the actual on-the-job activity and specific problem-solving examples. For example, after watching the video with the chemist, one girl shared how she was more interested in the manufacturing process: “What she made, how it got to look like it did, because that part went really fast.” Three comments illustrate this point:

- *I would talk more about the jobs and how to get to working my dream job.*
- *I thought software engineering is cool. I didn’t really hear the part where she was talking about her job though.*
- *They can be longer and talk more about their jobs.*

Others had several inquiries about STEM being related to nontraditional careers like law and fashion design. In fact, caregivers overwhelmingly shared examples from everyday objects and connected them back to STEM. One said, “STEM is everywhere. ... with appliances, energy efficiencies, STEM on the road with more of your civil engineer—with roads and bridges.” Another caregiver noted:

*Lighting, acoustical; there is a lot of STEM in theater. And so, there is a possibility of you combining both of your loves—your theater, the acting—along with something in STEM. It may [be] something in STEM and theater that you’re doing on the side, while you’re pursuing your career. STEM is in everything.*

Given that caregivers agreed “STEM is everywhere,” and in response to girls’ reported interest in jobs that may be overlooked as using STEM skills, video developers may want to offer additional videos specific to that trend and highlight the on-the-job STEM skills used (e.g., fashion designer, baker, makeup creator). Others suggested more diversity in the STEM careers shown and people within the videos. When asked on the exit form for ideas in
future videos, one caregiver said, “More role models in fields that interest the girls more.” Other caregivers suggested expanding the diversity of videos to include more representation by age, community, and race. It may also be worth noting that for Black girls, statements that include “like me” may also be a request for representation by skin color, shape, or size.

4 Conclusions and Recommendations

This section synthesizes findings from the evaluation.

4.1 Conclusions

This report highlighted many positive findings for girls’ STEM interests and interactions between people who share similar interests. Based on feedback sessions, pre-focus group assessment questions, and a short exit form, the three SciGirls videos shown during focus group videos appeared to benefit girls and their families as intended. For example, findings showed that girls’ viewing of role model videos ignited some previous STEM experiences or interests, a secondary goal of the project. In terms of fostering a sense of belonging in the STEM community, girls and caregivers believed the role models connected with them and provided some inspiration to pursue those chosen careers. The presence of role models, as evidenced in the research and confirmed by the girls’ responses to their limited support, suggests Black SciGirls production of future videos and any efforts to integrate the role models into programming would be well received.

The number of girls who reported they had existing support or someone to talk to was high, but those resources varied by girl and her family and/or school network. Specifically, girls indicated learning about STEM opportunities from their teachers and using them as a source of information, but when asked how this support translated into feelings of a STEM identity, there were mixed responses. More commonly, girls relied on their parents and family supports to introduce them or support their efforts to tap into STEM-based experiences.

Caregivers reported higher relatability to the role model video featuring a single mother, as more indicated it was inspiring and resonated with their lives. Girls were more likely to appreciate the videos for showcasing areas of job-specific tasks or topics of interest. In fact, caregivers agree that both videos and programming should focus on “age-appropriate resources” and “incorporating STEM into everyday life” as shared on the survey. However, both girls and caregivers agreed the integration of family was a critical feature. In addition, girls cited a need to have more connection to their interest through likeminded peers and hands-on, in-person programming; another feature to be addressed through the Black SciGirls project.
4.2 Recommendations for PBS/TPT/Advisory Group

In response to these findings, and to address some of the trends in barriers and desired supports, the evaluation team offers the following recommendations for the Black SciGirls leadership team, project staff, and PLC members as it approaches the start of implementation later this year.

Consider new content area and/or enhanced STEM skill highlights within the next iteration of role model videos. While girls and their caregivers have cited increased knowledge and motivation around the STEM careers highlighted, specifically how it relates to women of color, they still can be improved. Specifically, adding more details that incorporate more relevant subject-level content may resonate better with this age group (e.g., area and perimeter in mathematics, gaming codes, design). Other ways to expand the interest of our youth is by incorporating siblings or younger demographics into the video as either role models, supports, or mentors. In several cases, caregiver participants noted resources within their family such as siblings, grandparents, uncles; and that same representation should be echoed in videos.

- **Establish opportunities to connect STEM to nontraditional STEM careers.** To improve opportunities for connecting with girls, the Black SciGirls team might consider establishing a series of videos that goes beyond traditional careers (e.g., robotics). Girls and caregivers often expressed their interest in or understanding of STEM outside of the typical STEM careers such as engineer, scientist, or software developer. Based on girls’ interests, one option may be to identify a role model with a career relating to a high-interest area for the girls of this age (e.g., fashion designer). This request may also be translated as asking role models to use an example from their job and relate it directly back to students’ frequent interest.

- **Provide alumni or high school/college-age role model videos.** One area of concern was near peer exposure. Survey results and focus group data indicated a desire for girls to hear from people closer to their age. One focus group uses college students to deliver services; this may be one way to carry out this ask. Use existing college-age program staff as mentors and/or role models in video production and/or integration.

- **Display connections with leadership, teaching, and/or school experiences.** School was identified as a source of information and mentorship throughout the study. If the role model in the video can connect their lived experience with actual school-level topics—experience, resources, and/or content—this could build a stronger connection with girls’ school experiences. Additionally, role model videos may consider how they highlight aspects of service projects, training, or leadership by providing specific examples of ways this is done in or through their work (e.g., group projects, conferences).
Provide educators with information on the existing SciGirls strategies and best practices from previous efforts. What became increasingly obvious in the observation of these group sessions is the variation in experience running programs that target Black girls. While some facilitators have expertise working with youth and integrating STEM into program design, the same strategy may not translate well when supporting Black girls and their families. Specifically, careful attention must be paid to understand the historical, political, and social contexts of structural bias and discrimination influencing the girl and her family daily. That said, language and expressions of white fragility and microaggressions must be carefully identified and minimized.

Consider targeted communication and outreach for caregivers. Compared to girls, focus group caregivers were more often concerned with the girls’ STEM interest or opportunities to develop STEM skill building. Moreover, caregivers were just as interested in the lives of the role models displayed, making connections to their own lives and interests. Black SciGirls leaders and staff may consider leveraging the strong family interest and ties by providing caregivers and family mentors access to STEM information and updates on their child’s STEM journey; especially because of the strong variation in program type, local family engagement may not be consistent across sites. To meet this need, the Black SciGirls team may also want to provide or remind caregivers of the national resources geared toward helping better support their children.

Math is a gatekeeper. Finally, one of the greatest barriers girls noted in terms of STEM was being able to do math well. Girls expressed they had multiple challenges related to this subject, and caregivers, while more confident with math, believed their experience was no longer relevant due to curriculum changes. Leadership might consider specific ways to improve math efficacy by equipping girls and their families with materials but may also consider a national media campaign with partners to better address this issue.

4.3 Suggestions for Partner Implementation

Interrelated themes from across the data sources indicate opportunities for partner programs to examine their lesson planning and/or program structure. Specifically, ICF identified the following recommendations partner programs may consider:

Provide opportunities for girls and their families to engage in hands-on STEM activities at the program site and/or at home. Survey and focus group data confirm that girls and caregivers appreciated opportunities to see the girls engage and participate in STEM activities on site. Compared to the virtual space, girls preferred working alongside others on problem solving and real-life examples.

- Ensure caregivers and families have access to girls’ learning. Some also added that they enjoyed the activities their daughter’s program sent home for families to work on together. These opportunities for mutual engagement helped the caregivers better understand the program and the interests of the girls. The continuation of
these opportunities may help increase family engagement and at-home support caregivers can provide to help foster girls’ interest in STEM.

- **Design and implement hands-on activities for the girls.** Both girls and their caregivers commented throughout assessment responses their preference for hands-on activities and how these types of activities help to increase interest and engagement. Partner programs may consider how they continue to include these types of activities for girls in their curriculum and increase the number of these activities where possible.

**Consider how partners can collaborate with schools to increase STEM awareness.** Survey findings indicated that girls most often participated in STEM activities through opportunities at school. The need to disseminate information about STEM and program opportunities and provide activities for the girls (and their families) appears to be a heavy lift for a partner. However, collaborations with schools, where the girls are already engaged in STEM, may help partner programs to promote their curriculum and help schools to increase the number of high-quality, hands-on activities for all students, including those who are not currently program participants.

**Consider how to support girls in their perceived lack of content expertise.** Some girls and their caregivers noted in assessment responses that they/their daughter struggled with math, which may hinder engagement and interest in current STEM activities and future work. Partner programs may want to consider how they increase the girls’ expertise and confidence in math through hands-on activities that promote math skills.

**Increase access to Black role model videos for all participants and within their communities as part of programming to introduce girls, peers, and their families to a variety of STEM careers.** Assessment results as well as focus group findings indicated that students and caregivers would like opportunities to hear more often from Black women in STEM careers. Girls reported having limited opportunity to work alongside other girls that look like them and through this Black SciGirls experience, girls and their caregivers are hoping to build their peer network. That said, partner programs may want to consider additional ways that they can leverage the new and existing Black SciGirls role model videos within their own curriculum, during information sessions, expo events, or coordinating a youth STEM night for public housing.

**Explore resources to help staff stay informed of the local context in which the girls and their families live, and how to interact in a culturally responsive manner.** Partner programs provide opportunities for Black girls to learn about STEM and the work in STEM done by women who look like them. Some students and caregivers noted it was sometimes difficult to find Black women represented in STEM. To maximize their excitement about seeing other girls and women doing STEM work and activities, staff at partner programs must be culturally responsive in their communication and interactions with the girls and their families. Partner programs may want to consider exploring resources for their staff to
ensure staff understand the local context and background of the girls so that they are always able to interact with the girls and their families in a positive and uplifting manner.

**Commit educators to the training provided through Black SciGirls to help staff self-reflect.** *Black SciGirls* training provided through the “we are” organization will help educators focus on both the micro (i.e., implicit biases) and macro (i.e., systemic racism) impacts of race and identity in education for Black girls. Educators will learn to make clear connections between educator practice and these concepts. PD will utilize caucusing, in which educators of color will meet among themselves and white educators will meet together to process and reflect in racially-similar spaces. Topics such as colorism and white fragility will be addressed in these brave, safe spaces.
References


Appendix A. Partner Program Descriptions

**Black Girls Do STEM**, founded in 2019, is located in St. Louis, the largest metropolitan area in Missouri. With a population of more than 300,000, it is the second largest city by population in the state and is near the confluence of the Mississippi and Missouri Rivers. The median household income in St. Louis in 2020 was $57,290. According to the organization’s 2021 annual report, 55 students were served that year, and the year-over-year retention rate was 70 percent. The organization serves Black girls from all school districts in the St. Louis area, including through a day program for Black girls in grades 6–8, and through STEM academies that are held at four sites once each month from February through October each year. Funding sources include a higher education institution, grants, and individual donors.

**Brown Girls in Tech** is based in Augusta, Georgia, the state’s third-largest city, near one of the state’s most remarkable geologic features—the Fall Line—which marks the dividing line between the flat coastal plains and the plateau region to the north. In 2020, the median household income for the year was $61,224. The organization’s focus is on engaging and empowering “brown girls and women who are passionate about technology and entrepreneurship.”

Among the several South Carolina cities served by **Community Code** are Anderson, Clemson, Gantt, Greenville, and Pendleton in South Greenville, which is the largest city in this upstate region located in the westernmost part of the state. This area of the state reports a cost of living about 10 percent lower than the national average, a dedication to research and innovation, and a median household income of $48,817. The organization’s work isn’t limited by state boundaries, however. In addition to serving more than 100 students in upstate South Carolina, a recent blogpost on the organization’s website indicates the organization reached 900 students in Gainesville, Florida, to help them achieve personal and career goals. Students are recruited through an application process for IT awareness events, afterschool programs, and summer camps. Teacher development events are also offered. Various types of organizations—school districts and middle/high schools, institutions of higher education, a science center, community/enrichment centers, a children’s home, a library—serve as host sites for Community Code events, which are supported through organizational sponsorships, individual donations, and volunteers.

**Marion P. Thomas Charter School**, established in 1999, is located in Newark, New Jersey, home to one of the nation’s major air, shipping, and rail hubs. Newark is the largest city in the state and is also considered part of

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4 https://drive.google.com/file/d/1ho2o0MlodSyKFuiJNmqkBdAO66uzFOpZ/view
6 https://www.facebook.com/browngirlsintech/
8 http://www.communitycode.org
the New York metropolitan area. The median household income in 2020 was $85,245. According to the school's website, it is one of only a few Black-led charter schools and is the “largest independently-operated free public charter school” in Newark, serving 1,300 students. Students apply to attend the school, which is sponsored by state funding, grants, fundraising efforts, and the Marion P. Charter School Foundation. The organization is home to two academies—the STEAM Academy and the PAC Academy—and the Marion P. Thomas Charter High School. Two partner organizations are located in New York, where the median household income in 2020 was $71,117. Morrison Mentors is in Hempstead, New York, a town located on the western half of Long Island. It is considered one of the largest towns in the state with a population of nearly 800,000 citizens. One of the Morrison Mentors founders was a local volunteer basketball coach with access to community resources who saw a need to help students achieve success. Though the organization is housed in Hempstead, work has taken place in various underserved communities, and more than 7,350 students have been served. Morrison Mentors is supported through donations and funding from several well-known partner organizations. Mott Hall Bridges Academy, in operation since 2010, is located in Brooklyn, one of New York’s five boroughs. Brooklyn is in King’s County, the second most populous county in the state and the fourth-smallest county by land area. The borough is known for the numerous bridges and tunnels that connect it to Manhattan and to Staten Island. In 2020, the median household income was $71,117. The Mott Hall Bridges Academy serves students in grades 6, 7, and 8—the majority of whom are African American—and was founded on the premise that “scholars need to realize their connections to the past, present and future and understand how it all connects to their success.”

Park Forest–Chicago Heights School District in located nearly 35 minutes south of Chicago, the largest city in Illinois, the third-largest city in the nation, and one of the 40 largest urban areas in the world. The median household income in 2020 was $68,428. The Chicago metropolitan area is home to numerous higher education institutions and is well-known for its cultural attractions. The Park Forest–Chicago Heights School District employs 358 staff members who are committed to educating nearly 2,000 pre-kindergarten to 8th grade students across six schools; the average class size is 22 students. Students in grades 4–8 have the “opportunity to choose between two schools, STEM and Leadership, and Arts and Technology.”

Project Scientist, established in 2011, serves more than 2,000 women and girls of all ages at six campus sites. The mission of this organization is to “expose a diverse population of young girls to a high-quality STEM curriculum
that inspires confidence in their pursuit of learning throughout the year.”  

Organizational activities include STEM camps, a summer STEM Academy, field trips, and visits to STEM-related companies. The organization is supported through grants, earned revenue, contributions, fundraisers, sponsorships, and volunteer efforts. Project Scientist Minnesota is based at Macalester College in the Twin Cities area, which is home to nearly 3.5 million people. The Macalester campus is near the downtown area of St. Paul, the capital city, and the Mississippi River. Project Scientist North Carolina is based in Charlotte, the largest city in North Carolina and the hub of the Charlotte metropolitan area, which has a population of more than 2.5 million people. In 2020, the median income in St. Paul was $73,382 and the median income in Charlotte was $56,642.

In operation for more than 10 years, SheWill is located in Gwinnett County in the small city of Norcross, Georgia, which has a population of under 20,000. However, the city is part of the Atlanta-Sandy Springs-Marietta metropolitan area. The median household income in 2020 was $61,224. The organization has nine sponsors and six corporate sponsors. Corporate sponsors and partners as well as volunteers and individual donors support the organization, whose founder left the corporate world to help young girls build self-esteem and competence in the area of financial literacy. Students apply for a mentorship program and SheWill staff visit schools, community centers, social clubs, and other public organizations to educate girls in the areas of literacy and career empowerment.

The YMCA of Metropolitan Washington D.C., a nonprofit charity organization, has a long history as the second YMCA established in the nation. Throughout the early 1900s, the organization was “a social and cultural center for Washington D.C.’s African American community.” The organization has several locations in and around the District of Columbia, the nation’s capital city. The Potomac River flows through this historical and cultural city, which is one of the most visited in the nation. In 2020, the median household income was $90,842. The organization’s funding comes from partners, sponsors, individual and corporate donors, grants, and membership dues and fees. The YMCA of Metropolitan Washington D.C. also boasts nearly 300 program volunteers and more than 100 board volunteers.

17 https://projectscientist.org/about-us/about-us
19 https://shewill.org/about-us/
20 https://www.ymcadc.org/
Appendix B. Facilitator Script

Facilitator Guidelines:

1. **Introduce yourself and any colleagues in the room.** Please ask representatives of ICF (the evaluators) to introduce themselves and describe your role as the facilitator and notetaker. Ask if they have any questions for you before you begin. Now, let them know they can ask any follow-up questions.
   - **For questions:** If you have any questions about the study or your rights as a study participant, you may contact the study director, Dr. Johnavae Campbell, ICF International, at (703) 200-9576 or by email at johnavae.campbell@icfi.com.
   - **Describe or ask ICF Rep to discuss the purpose of this session:** Black SciGirls has contracted with ICF to conduct a front-end evaluation study to explore the needs/barriers related to STEM education of Black girls and their reactions to existing SciGirls content. The purpose of this data is to help inform our initial planning and development for role-model videos, incorporation of role-model videos in the project, professional development efforts, and outreach. Your contribution to this effort is extremely valuable and will give you the opportunity to share your perspective on the successes, benefits, and challenges associated with STEM exposure, classes and pursuing interests in STEM careers. We expect this session to take approximately 45-55 minutes.

2. **Ask permission to record the interview:** To capture the discussion, I would like to record the session. All the feedback session recordings and transcripts will be kept confidential; only evaluation team members will have access to these files. The session poses no risk to you and there is no penalty if you decline to respond to any question. You are free to stop the interview or ask me to stop the recording at any time, and we hope you will share your candid feedback. Do you have any questions before we begin? STEM educators will lead feedback sessions and the evaluator will analyze and report findings to the SciGirls team.

3. **Benefits:** As part of participation in this session families who participate will each receive a gift card.

4. **You will indicate your consent to participate by answering the questions.** **START RECORDING NOW!**

### Side-By-Side Protocols (Student/Parent Questions)

<table>
<thead>
<tr>
<th>Time</th>
<th>Student Question</th>
<th>Parent/Caregiver Question</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Background - Tell us a bit about your perspective</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>3-5m</td>
<td>Can you each start by telling me your first name and what grade you’re in?</td>
<td>Can you each start by telling me your first name and your relationship to the girl in the program?</td>
</tr>
<tr>
<td>5-7m</td>
<td>Let’s everyone start by talking about what Science, Technology, Engineering, and Mathematics, also known as STEM means to you. Write on the board courses and careers you consider to be STEM-related.</td>
<td>Let’s start by talking about what Science, Technology, Engineering, and Mathematics, also known as STEM means to you. What kinds of courses and careers do you consider to be STEM-related?</td>
</tr>
</tbody>
</table>
### Evaluation of Black SciGirls: Front-End Study (2021–2022)

<table>
<thead>
<tr>
<th>Time</th>
<th>Student Question</th>
<th>Parent/Caregiver Question</th>
</tr>
</thead>
</table>
|       | a. Which of the mentioned courses or careers interest you the most (place an ‘M’ next to it)? Which careers interest you the least (place an ‘L’ next to it)?  
|       | b. Can anyone explain the reason for their responses?                              | (If no one responds, look at the board and find the most voted for in each category and ask why people chose that category.) |
| Video Feedback - You just finished watching two videos about STEM professionals and now I would like to hear your reactions to the video. | In your opinion, what do you think were the filmmakers’ goals for creating the video?  
| 5-7m   | In your opinion, what do you think were the filmmakers’ goals for creating the video?  
|       | a. If you were to make your own video, what, if anything would you change about the video? What would you keep the same? | a. In what ways do you believe these goals were met?  
|       |                                                                                   | b. In what ways do you believe these goals were unmet? |
| 5-7m   | What conclusions or takeaways do you have after watching the video?  
|       | a. What did you like most about the video?  
|       | b. What did you like least about the video? | What conclusions or takeaways do you have after watching the video?  
|       | a. What did you like most about the video?  
|       | b. What did you like least about the video? | a. What did you like most about the video?  
|       | b. What did you like least about the video? | |
| 5-7m   | What did you learn about that you didn’t know before you watched the video?  
|       | a. Did you learn anything about education requirements? If so, what?  
|       | b. Did you learn anything about what you need to do to become a STEM professional or pursue that specific career? If so, what?  
|       | c. Did you learn about any challenges you may encounter as a black woman in this career? | What did you learn about that you didn’t know before you watched the video?  
|       | a. Did you learn anything about education requirements? If so, what?  
|       | b. Did you learn anything about the supports needed to pursue that career? If so, what? | a. Did you learn anything about education requirements? If so, what?  
|       |                                                                                   | b. Did you learn anything about the supports needed to pursue that career? If so, what? |
| 3-5m   | What did you think of the person you saw in the video?  
|       | a. Did you find them relatable to you? Why or why not? | What did you think of the person you saw in the video?  
|       |                                                                                   | a. Did you find them someone you would want your child to take advice from? Why or why not? |
## Time | Student Question | Parent/Caregiver Question
--- | --- | ---
**b.** | Did you think this is someone you would want to take advice from? (credible?) Why or why not? | Did the video make you want to look up other information about the career? (Probe for education path, salary, high school classes to take, workplaces.)

| 3-5m | Did the video make you want to look up other information about this career or other similar ones? (Probe for education path, salary, high school classes to take, workplaces.) | Who does your child talk to most often about career interests? | 3m - 5m | What kinds of other information would you like to have or would you like for your child to have about this career in STEM? |
| 3m | Is there someone specific you would talk to about STEM careers you’re interested in? Is there anyone you would not talk to? What are some reasons you might not talk to someone about your interest? | a. | Where else do you go to find information about STEM careers? |
| 5m | Who do you speak with to learn more about how to do well in STEM courses at your school (teachers, mentors, friends, family members, etc.)? | a. | What are some factors that might deter or keep you from taking STEM courses at school or pursuing a STEM career? |
| 5m | **b.** | Is it easy to access these people and/or other resources? |
| 5m | What information about STEM courses and careers do you not currently have that you would like to have? | a. | What format(s) do you prefer to receive that type of information (for example Email, poster, video, social media, talking to teachers)? |
| **Final Thoughts - Is there anything else you would like for me to know or would like to add?** | Who do you speak with to learn more about how your child is doing in STEM courses at her school (teachers, mentors, friends, family members, etc.)? | a. | What are some factors that might deter or keep your child from taking STEM courses at school? |
|  | **b.** | Is it easy to access these people and/or other resources? |
|  | **What information about STEM courses and careers do you not currently have that you would like to have?** | a. | What format(s) do you prefer to receive that type of information? |

Thank you very much for your time.
Appendix C. Caregiver Pre-Focus Group Assessment

Greetings!

We are asking you to complete a short questionnaire today. The questionnaire will help us understand STEM efforts in your daughter’s life and at school. Specifically, we are studying a program called Black SciGirls funded through the National Science Foundation for PBS. It is helping your after-school program to improve science, technology, engineering, and math, or STEM programs. A company called ICF is doing an evaluation study of the program. As part of our evaluation study, you are being asked to complete a 15–20 minute questionnaire.

Please answer the questions thinking about your own experiences, your attitudes, your beliefs about STEM content, and your thoughts about your child’s future education plans. Please read the following before you decide if you want to take the questionnaire:

There are no risks to completing the questionnaire as your answers will be kept confidential. Your name is NOT collected on the survey. That means the research team cannot put your name in any reports. Educators, administrators, other parents, and your child will not be able to see your answers either.

All questionnaire results will be reported as a group for all parents who complete the questionnaire. All parents in your child’s program are being asked to take the questionnaire. We hope you will take part. Parent feedback is important to us because answering the questions will help Black SciGirls learn how to better support Black students. Your school might also use the questionnaire results to change program content or coursework or other things.

We hope you will answer each question on the questionnaire, but you can skip any question that you do not want to answer. The questions do not ask about anything that should make you feel uncomfortable. But, if you feel uncomfortable or upset during or after the questionnaire and want to talk with someone, please let someone at your school/program know.

Thank you for filling out this questionnaire for Black SciGirls. Your responses will help program developers understand what we’re doing well and where we might be able to improve. It should take no more than 15-20 minutes to complete. Thanks again!

Please select “I agree to take the survey” button to complete the questionnaire

- I agree to take the questionnaire
- I do NOT agree to take this questionnaire
Background

1. Please select your school/program (drop down menu)

2. Please select which of the following resources you have used to learn about activities related to STEM. (Select all that apply.)
   - Child’s school
   - Someone who works at a college.
   - Family or friends.
   - Other parents
   - Recreation center
   - Organization/group (e.g., NSBE, church, club, team)
     - Please include names:
   - Facebook or social media
   - Local newspapers/publications
   - Other: _____________
   - None. I have not used any resources.

3. As a parent or guardian, how have you been involved in the STEM opportunities provided to you so far (select all that apply)
   - volunteer during one or more program sessions to help lead an activity
   - volunteer during one or more program sessions to help support an activity
   - chaperone an educational trip focused on STEM enrichment (e.g. visit to a museum)
   - outreach with other parents/guardians to build a STEM-supporting community
   - at-home resources families can use alongside their youths’ program activities
   - no opportunities have been provided to me
   - I do not currently participate in any STEM activities.

Program experience

4. For each of the following items, rate the extent of influence of (a) your School and (b) After school program on promoting interest in STEM (using a scale None At All to A Great Extent).

<table>
<thead>
<tr>
<th></th>
<th>School</th>
<th>Program</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>A great extent</td>
<td>A moderate extent</td>
</tr>
<tr>
<td>a. Promotes engagement of fathers’ involvement in encouraging STEM interest</td>
<td>4</td>
<td>3</td>
</tr>
<tr>
<td>b. Promotes engagement of sibling(s) involvement in encouraging STEM interest</td>
<td>4</td>
<td>3</td>
</tr>
<tr>
<td>c. Promotes engagement of mothers’ involvement in encouraging STEM interest</td>
<td>4</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>School</td>
<td>Program</td>
</tr>
<tr>
<td>--------------------------</td>
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<td>---------</td>
</tr>
<tr>
<td></td>
<td>A great extent</td>
<td>A moderate extent</td>
</tr>
<tr>
<td>d. Helps to foster creativity through understanding interesting problems</td>
<td>4</td>
<td>3</td>
</tr>
<tr>
<td>e. Helps you motivate your child to think about STEM careers</td>
<td>4</td>
<td>3</td>
</tr>
<tr>
<td>f. Connects STEM learning to my everyday life</td>
<td>4</td>
<td>3</td>
</tr>
<tr>
<td>g. Offers college or career advice about STEM</td>
<td>4</td>
<td>3</td>
</tr>
<tr>
<td>h. Addresses gender or racial stereotypes about careers in STEM</td>
<td>4</td>
<td>3</td>
</tr>
<tr>
<td>i. Supports collaboration with other families/girls on real world STEM work</td>
<td>4</td>
<td>3</td>
</tr>
<tr>
<td>j. Introduces career learning through STEM role models</td>
<td>4</td>
<td>3</td>
</tr>
</tbody>
</table>

5. Please indicate your level of agreement with the following items as it relates to your child’s STEM exposure.

<table>
<thead>
<tr>
<th>Statement</th>
<th>Strongly agree</th>
<th>Agree</th>
<th>Disagree</th>
<th>Strongly disagree</th>
</tr>
</thead>
<tbody>
<tr>
<td>I am concerned that the perspectives and contributions of women belonging to an historically marginalized racial/ethnic group in the US are undervalued in the STEM careers.</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>I feel comfortable communicating with my child’s educators about behavior toward myself or my child that involves racial/ethnic bias.</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>I think my child is encouraged to pursue STEM career fields.</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>My child’s hobbies outside of school connect to interest in STEM.</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>My child knows at least one Black woman scientist, engineer, computer scientist, or mathematician personally.</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

6. What strategies offered by your program site have been most effective in serving students and their families?
7. What are the two greatest challenges you have encountered in supporting your child’s interest in STEM? For the challenges you noted, what has been done to resolve them?

8. What tools or sources of information have you found most valuable in fulfilling your role as a parent/caregiver helping to support your child?

9. What ideas do you have for activities within your child’s program site that could better support a positive STEM experience?

Additional thoughts or experiences you’d like to share.

Thank you for completing this questionnaire.
Appendix D. Student Pre-Focus Group Assessment

Greetings!

We need your help in planning the Black SciGirls program. Specifically, the information you provide in this questionnaire will assist the leadership in making decisions about the Black SciGirls program. A company called ICF is doing an evaluation study of the program. As part of our evaluation study, you are being asked to complete a 15-20-minute questionnaire. Please reply to the items below regarding your current program and/or school participation and submit this form by Monday, January 24, 2022. If you need any assistance to complete and/or submit this form, please contact your program teacher or if you prefer email johnavae.campbell@icf.com. Please read the following before you decide if you want to take the questionnaire:

- There are no risks to taking the questionnaire as your answers to the questionnaire will be kept confidential. Your name is NOT collected on the questionnaire. That means the evaluation team cannot put your name in any reports. Your teachers, administrators, other students, and your parents/legal guardians will not be able to see your answers either. All questionnaire results will be reported as a group for all students who complete the questionnaire.

- All students who are part of the program are being asked to take the questionnaire. We hope you will take the questionnaire. Student feedback is important to us because answering the questions will help Black SciGirls learn how to better support students in STEM. Your school might also use the questionnaire results to change class work or other things.

- We hope you will answer each question, but you can skip any question that you do not want to answer. The questions do not ask about anything that should make you feel uncomfortable. But, if you feel uncomfortable or upset during or after the questionnaire and want to talk with someone, please let someone at your school know or see your guidance counselor.

Thank you for filling out this questionnaire for Black SciGirls. Your responses will help the evaluation team understand what the program staff are doing well and where they might be able to improve. It should take no more than 15-20 minutes to complete.

Thanks again!

Please select “I agree to take the questionnaire” button to complete the questionnaire,

○ I agree to take the questionnaire,
○ I do NOT agree to take this questionnaire.
Background

1. What do you hope to study in college? (Select all that apply.)
   - Humanities/Liberal Arts (English, Communications, Cultural Studies, Languages)
   - Social Sciences (Psychology, Sociology, Anthropology)
   - Architecture/Building Design
   - Natural Sciences (for example, Biology, Chemistry, Physics)
   - Computer science (for example, coding, graphic design, game design)
   - Mathematics
   - Engineering
   - Business (Marketing, Accounting, Finance)
   - Education/Social Work
   - Health/Medicine (for example, Sports Medicine)
   - Art/Performing Arts
   - I don’t know.
   - I don’t plan to attend college.
   - None of the above

2. How do you learn about available science, technology, engineering, and math (STEM) opportunities? (Select all that apply.)
   - My school
   - Someone who works at a college
   - Family or close friends
   - Other students
   - Recreation center
   - Organization/group (for example, National Society of Black Engineers, church, club, team)
     - Please include names:
   - Facebook or social media
   - Local newspapers/publications
   - Other: _____________
   - I do not currently participate in any science, technology, engineering, and math (STEM) activities.

3. As a student, how have you been involved in the following science, technology, engineering, and math (STEM) opportunities so far? (Select all that apply.)
   - In-class hands-on science, technology, engineering, and math (STEM) projects
   - Science, technology, engineering, and math (STEM) extracurricular activities
   - Projects or class lessons involving technology
   - Science-, technology-, engineering-, and math-related (STEM) competitions (for example, Academic Decathlon, science fair, math team)
   - Organization or club to promote science, technology, engineering, and math (STEM) learning
   - Shadow someone in their job related to science, technology, engineering, and math (STEM)
     - (if selected, drop down that asks to list details about the person(s) you spoke with about careers)
   - Talk with someone about the types of jobs and careers that use science, technology, engineering, and math (STEM)
Social supports for science, technology, engineering, and math (STEM)

4. For the next question, rate the extent you ‘feel like a scientist, engineer, computer scientist, or mathematician’ or ‘see yourself as a scientist, engineer, computer scientist or mathematician’ because the following statements are true (using a scale: A Great Extent to None At All).

<table>
<thead>
<tr>
<th>I feel like a scientist when...</th>
<th>A great extent</th>
<th>A moderate extent</th>
<th>A small extent</th>
<th>None at all</th>
<th>NA</th>
</tr>
</thead>
<tbody>
<tr>
<td>a. my father encourages me to do better in science, technology, engineering, and math (STEM) classes.</td>
<td>4</td>
<td>3</td>
<td>2</td>
<td>1</td>
<td>99</td>
</tr>
<tr>
<td>b. my sister or brother encourages me to do better in my math, technology, engineering and science classes.</td>
<td>4</td>
<td>3</td>
<td>2</td>
<td>1</td>
<td>99</td>
</tr>
<tr>
<td>c. my mother encourages me to do better in science, technology, engineering, and math (STEM) classes.</td>
<td>4</td>
<td>3</td>
<td>2</td>
<td>1</td>
<td>99</td>
</tr>
<tr>
<td>d. one or more of my family members likes science, technology, engineering, and math (STEM).</td>
<td>4</td>
<td>3</td>
<td>2</td>
<td>1</td>
<td>99</td>
</tr>
<tr>
<td>e. my best friend likes science, technology, engineering, and math (STEM).</td>
<td>4</td>
<td>3</td>
<td>2</td>
<td>1</td>
<td>99</td>
</tr>
<tr>
<td>f. Most of my friends do well in science, technology, engineering, and math (STEM).</td>
<td>4</td>
<td>3</td>
<td>2</td>
<td>1</td>
<td>99</td>
</tr>
<tr>
<td>g. I get to be creative through understanding interesting science, technology, engineering, and math (STEM) problems.</td>
<td>4</td>
<td>3</td>
<td>2</td>
<td>1</td>
<td>99</td>
</tr>
<tr>
<td>h. I see other Black girls interested in science, technology, engineering, and math (STEM).</td>
<td>4</td>
<td>3</td>
<td>2</td>
<td>1</td>
<td>99</td>
</tr>
<tr>
<td>i. I feel a connection to science, technology, engineering, and math (STEM) in my everyday life.</td>
<td>4</td>
<td>3</td>
<td>2</td>
<td>1</td>
<td>99</td>
</tr>
<tr>
<td>j. I have a role model who makes me want to learn science, technology, engineering, and math (STEM).</td>
<td>4</td>
<td>3</td>
<td>2</td>
<td>1</td>
<td>99</td>
</tr>
<tr>
<td>k. my teacher or counselor offers me college or career advice about science, technology, engineering, and math (STEM).</td>
<td>4</td>
<td>3</td>
<td>2</td>
<td>1</td>
<td>99</td>
</tr>
<tr>
<td>l. my teacher or counselor tells me I can do science, technology, engineering, and math (STEM).</td>
<td>4</td>
<td>3</td>
<td>2</td>
<td>1</td>
<td>99</td>
</tr>
<tr>
<td>m. I can turn to someone outside school when I have questions about science, technology, engineering, and math (STEM).</td>
<td>4</td>
<td>3</td>
<td>2</td>
<td>1</td>
<td>99</td>
</tr>
<tr>
<td>n. I work in a team with other girls like me on real-world science, technology, engineering, and math (STEM) problems.</td>
<td>4</td>
<td>3</td>
<td>2</td>
<td>1</td>
<td>99</td>
</tr>
<tr>
<td>o. I know someone personally with a career related to science, technology, engineering, and math (STEM).</td>
<td>4</td>
<td>3</td>
<td>2</td>
<td>1</td>
<td>99</td>
</tr>
</tbody>
</table>
5. What activities offered by your school or program site have been most effective in serving students like you and their families?

6. What are the two greatest challenges you have encountered in learning about science, technology, engineering, and math (STEM)?

7. What tools or sources of information have you found most valuable in helping to support your career interests?

8. What ideas do you have for activities in your program that could better support a positive science, technology, engineering, and math (STEM) experience?

Add additional thoughts or experiences you’d like to share here:

Thank you for completing this questionnaire.