Great Science for Girls

Gender Equitable STEM Strategies: Stories from the Field

Strategies that intermediary organizations and afterschool centers implemented to carry out the GSG Unified Program of Change

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Background

About Great Science for Girls

Great Science for Girls: Extension Services for Gender Equity in Science through After-School Programs (GSG) was a five-year STEM (Science, Technology, Engineering and Math) initiative (2006-2011) led by the Educational Equity Center at FHI 360,[1] and funded by the National Science Foundation Program for Gender in Science and Engineering (NSF/GSE). NSF/GSE envisioned the extension services model as a way to address the vast and persistent underrepresentation of girls and women in STEM education and careers, by creating a cadre of "agents" who use research-based approaches to increase the participation of girls and women in STEM education and careers.

GSG worked with Intermediary organizations to build their capacity and, in turn, the capacity of the afterschool centers they served to deliver high quality programming that would broaden and sustain girls' interest and persistence in STEM. GSG services included on-site professional development institutes, reboot sessions on request, and site-based consulting services. GSG project staff conducted rigorous research to vet curricula that had shown evidence of increasing girls' interest and persistence in STEM, and provided information on research and resources that related to gender equity in STEM. Ongoing technical assistance was provided via telephone, email, webinars, and quarterly all-site meetings conducted online.

Why Gender Equity in STEM?

It's the twenty first century – the era of the global economy, which requires an American workforce that is highly qualified in the area of science, technology, engineering and mathematics (STEM). In 2004, the National Science Board reported that 80 percent of *all* occupations require some knowledge of science and engineering. Yet, at a time when huge shortages in a scientifically skilled workforce are looming, the number of U.S. engineering graduates *declined by 20 percent* while Chinese, Japanese, and Korean students greatly increased their number of graduates.[2] Business leaders are warning of a critical shortage of skilled workers in STEM-related areas that is threatening our ability to compete in the global marketplace.[3]

Why is there such a critical shortage? One important reason is that until quite recently, the pipeline to careers in STEM has, for the most part, not been inclusive of girls, underserved minority students, and students with disabilities. *Land of Plenty: Diversity as America's Competitive Edge in Science, Engineering and Technology*, a 2000 report issued by the Congressional Commission on the Advancement of Women and Minorities in Science, Engineering and Technology Development, says:

> *Unless the SET (science, engineering, and technology) workforce becomes more representative of the general U.S. workforce, the nation will undercut its own competitive edge in the future.*

[1] The grant was awarded originally to AED. During Year 5 of the initiative, FHI 360 (formerly FHI, Family Health International) acquired the assets, expertise and programs of AED.
[2] National Science Foundation (2004). Science and Engineering Indicators, Appendix tables 2-34. Cited in *The Looming Workforce Crisis*.
[3] National Association of Manufacturers (2005). *The Looming Workforce Crisis: Labor Day Report*. Washington, DC: Author.

However, increasing the flow and diversity of workers doesn't begin with adults —it begins at the K-12 level of education, which has not adequately prepared underserved and underrepresented students to fulfill current or future STEM workforce needs. These students, with an emphasis on girls, are the target audience for Great Science for Girls Extension Services.

Why Afterschool?

Afterschool education is a burgeoning field. It is estimated that 6.5 million students currently spend an average of eight hours per week in afterschool programs, with the field growing both in numbers and in terms of its educational value. Also, afterschool programs play a key role in engaging youth in the learning process by providing opportunities to explore interests, gain competency in real world skills, solve problems, assume leadership roles, develop a group identity with similarly engaged peers, connect to adult role models and mentors, and become involved in improving their communities.[4]

Most importantly, the demographics of students in afterschool correlate with those students who are underserved in STEM.[5] California Tomorrow (2003) reports that more than 90% of afterschool programs serve some youth of color; 57 percent serve between two to four different ethnic populations; 89 percent serve two or more language groups; and more than 40 percent enroll a majority of youth from low-income households.[6] Thus, underrepresented groups in STEM are in fact the students who are the "represented groups" in afterschool.

STEM in Afterschool

Regarding STEM, research has documented the role of afterschool in fostering improved attitudes and enthusiasm among girls and other underserved groups. These include: greater confidence in science ability, improved performance in scientific subjects, persistence in the scientific pipeline, increased knowledge of and interest in STEM careers, change in course-taking behavior, improved problem-solving skills, and changes in perceptions of who can do science.[7,8] In a 2003 report on *Science Gender, and After-School*,[9] Beatriz Clewell states:

> *The schools are doing a much better job of getting girls to take higher level math and science courses and performing well in these subjects. But they are not doing a good job of sustaining girls' interest in STEM careers at the postsecondary level where a lot of the drop-off occurs.*

[4] Miller, B. M. (May 2003). *Critical Hours: Afterschool Programs and Education Success*. Washington, DC: Afterschool Alliance.
[5] Afterschool Alliance (2004). *America after 3pm: A household survey on afterschool in America: Key findings*. Washington, DC: Author.
[6] California Tomorrow (2003). *Pursuing the promise: Access, equity and diversity in after school programs, National research findings*. Oakland: Author.
[7] Clewell, B. and Darke, K. (2000). *Summary Report on the Impact Study of the National Science Foundation's Program for Women and Girls*. Washington, DC: The Urban Institute Education Policy Center.
[8] Crane, V., et al. (1994). *Informal Science Learning: What the Research Says about Television, Science Museums, and Community-Based Projects*. Ephrata, PA: Science Press.
[9] Froschl, M., Sprung, B., Archer, E., and Fancsali, C. (2003). *Science, Gender and Afterschool: A Research-Action Agenda.* New York: EEC/AED.

In fact, women who are interested in science and engineering careers are lost at every educational transition.[10]

In the *Science Gender and Afterschool Report*, Clewell goes on to say that, "Afterschool programs have the potential to keep interest going. Additionally, early afterschool programs have the potential to awaken the interest of very young girls in the physical sciences." Her statement underscores the opportunity that afterschool science programming presents to keep girls and other underserved students engaged in STEM.

A report from NASA confirms that the afterschool arena is uniquely suited for implementing learning experiences that engage young people, build their capacity to succeed, and provide a continuity of opportunities to prepare them to participate in STEM education and careers.[11]

Youth Development and Gender-Equitable STEM

Principles of youth development and best practices endorsed by GSG are a natural fit for each other, providing strength to the programs that embrace them. For example, high quality youth programming provides: a safe and supportive psychological and emotional environment; activities that support active engagement; support and encouragement provided by staff; small group interaction; goal setting; and opportunities for reflection. GSG encompasses these principles of youth development and offers students: engagement in inquiry-based activities and exposure to STEM resources and careers; staff interactions that support gender equity; organizational policies that support gender equity; and organizational support for family interaction. Taken together, principles of youth development and gender-equitable STEM create an afterschool educational environment that allows students to develop positive life, education, and workforce skills.[12]

Conclusion

In deciding about how to reach the largest number of underrepresented girls for its extension services initiative, GSG chose to work in the area of afterschool education for all of the reasons cited above. A study done in 2004 identifies a triad of elements that research has shown to be key for success in science: Engagement (awareness, interest and motivation), Capacity (increased knowledge and skills), and Continuity (opportunities and resources to support advancement).[13] If there is to be real change in girls' interest and persistence in STEM education and career pathways, all three elements must be in alignment. GSG uses evidence-based programs that foster the abovementioned triad by providing girls opportunities for leadership, active engagement with inquiry-based, hands-on STEM experimentation, educational risk-taking, challenges and problem-solving, opportunities for cooperative learning, access to mentors and role models, and non-stereotyped messages about who does science. In addition, GSG involves local businesses in providing role models; provides avenues for articulation between schools and afterschool centers serving the same student population; provides families with vital information about the importance of STEM to their children's future education and career choices; and involves the media in public awareness about the importance of STEM.

[10] National Academy of Sciences (2007). *Beyond Bias and Barriers: Fulfilling the Potential of Women in Academic Science and Engineering.* Washington. DC: National Academy of Sciences, National Academy of Engineering, and Institute of Medicine. Free summary available at http://www.nap.edu//catalog/11741.html

[11] Walker, G., Wahl, E., & Rivas, L. M. (2005). *NASA and afterschool programs: Connecting to the future*. New York: American Museum of Natural History.

[12] Great Science for Girls *Program Quality Tool*, 2011. Available at http://www.greatscienceforgirls.org

[13] Jolly, E. J., Campbell, P. B., and Perlman, L. (2004). *Engagement, capacity and continuity: A trilogy for student success*. GE Foundation.www.smm.org, retrieved September 2011.

Purpose of this Strategy Guide

Throughout the five-year GSG initiative, participants from Intermediary organizations and afterschool programs have contributed their knowledge and experience in youth development, as well as their insights, strategies, and outreach techniques to providing gender equitable science experiences to the students, both girls and boys, they serve. All of this shared experience has contributed to a set of strategies that will serve as a guide for new Intermediaries and afterschool programs that want to become part of GSG beyond the grant years.

Each section of this guide features "Stories from the Field," which are presented in italics, along with creative strategies based on participants' experiences in bringing GSG into their communities. This guide is one of several tools developed by GSG as a way to share peer strategies for expansion and sustainability. Its purpose is to complement other implementation resources developed by the initiative. We hope you will find it, and all the other tools developed by GSG, useful as you carry out gender equitable STEM programming throughout your youth-serving agency or afterschool center. Strategies are organized around three key areas of GSG§ Unified Program of Change (see following page).

Recruitment and Expansion

Intermediaries who signed on to GSG were expected to bring approximately ten afterschool centers on board initially, and expand to new centers each year. In this section, you will learn which GSG resources were most helpful in the initial recruitment process and what strategies Intermediaries used to expand GSG to new sites.

Professional Development

Professional Development is a key element of GSG. Intermediaries participated in training at two/three-day GSG Professional Development Institutes, and then were expected to provide turn-key training and technical assistance to afterschool centers who were implementing the program. In this section, Intermediaries share their most effective strategies for providing staff development and technical assistance to center personnel – including administrators and line staff. They also share the GSG tools that were most effective, including online modules, videos, and print materials.

Community Outreach

The vision for GSG is to reach out to the larger community, including role models and mentors, families, the business community, the media, and the schools. Intermediaries share what worked best in recruiting role models and mentors, and arranging for students to visit STEM workplaces. They also talk about successful strategies for attracting media attention, and for involving parents in getting the word out about GSG. Because there are so many aspects to community outreach, this section is divided into the following areas:

- Engaging the Media
- Finding Role Models and Mentors
- Creating Community Partnerships
- Developing Afterschool/In-School Connections
- Involving Families

Great Science for Girls Unified Program of Change

What Does it Look Like?

From the beginning, our vision was that the concept of GSG would extend far beyond the implementation of evidence-based STEM curriculum. To truly fit the concept of extension services, intermediary organizations are expected to **recruit** afterschool centers, **expand** to new sites over time, provide **professional development** to the centers they serve, and engage in **community outreach** to spread the word to businesses, media, schools, and parents about the importance of STEM equity for girls and other underrepresented groups. We called this expansive vision the GSG Unified Program of Change, and intermediaries and center-based participants developed many creative strategies to carry out the challenge. The Unified Program of Change encompasses the following aspirations and outcomes.

- Increased positive attitudes towards women and STEM
- Less stereotyped attitudes about science
- Increased STEM skills and content knowledge
- Increased science literacy
- Increased interest in pursuing STEM education and careers

In a GSG Afterschool Program:

- The program partners with schools and science-rich institutions
- Staff engage families
- Staff are knowledgeable about gender-equity issues and foster inclusiveness
- Staff model behaviors and attitudes that are gender equitable
- Programs and activities offer girls:
  - opportunities for leadership
  - active engagement with concerned adults
  - Inquiry-based, hands-on science experimentation
  - risk-taking, challenges and problem-solving opportunities
  - cooperative learning environments
  - mentors and role models
  - books about women doing science
  - non-stereotyped messages about who does science
  - pictures and posters that convey the message that "science is for me"

In a GSG Community:

<u>Local industry and businesses support GSG by:</u>
- Mentoring youth in science
- Providing opportunities for youth to see women in science
- Advocating for GSG
- Securing corporate sponsorship of GSG programming

<u>Local media supports GSG by:</u>
- Conveying positive and empowering messages to girls and about girls
- Covering the importance of girls' participation in STEM education and careers
- Publicizing GSG programming and efforts

<u>Schools support GSG by:</u>
- Partnering with afterschool centers to offer GSG programming
- Coordinating in-school and out-of-school programs
- Being aware of and promoting student participation in GSG programming
- Promoting family engagement and support for STEM and GSG

<u>Parents support GSG by:</u>
- Advocating for strong STEM-related instruction in school and afterschool programs
- Providing opportunities and experiences that support their child's interest in STEM
- Increased awareness regarding education and career paths in STEM

Recruitment and Expansion

The Intermediaries that joined GSG took on two tall challenges: 1) to recruit afterschool centers that would implement the evidence-based curricula as well as the gender equity aspects of GSG and 2) expand to new centers yearly. There are commonalities in ways the Intermediaries went about these tasks but, there are also strategies that are unique to individual sites based on geography, demographics, locale, and size of the Intermediary. Taken as a whole, these strategies become a guide for others who want to become part of the GSG community.

Kate Shem, formerly the Director of Programs at Partners in Out-of-School Time (POST) in Charlotte, North Carolina shares how POST went about recruiting afterschool sites in their first GSG year:

> *Marketing, marketing, marketing! When POST became a GSG Intermediary, we worked with Post Partners, an agency that we use to provide direct service to our afterschool sites, to get the word out about this exciting new opportunity. Flyers went out offering free training, free resources, free curriculum and, in our under-resourced afterschool community, that really got attention. Then, we made a presentation about GSG at one of the quarterly meetings that Post Partners conducts for afterschool Ed Directors and administrators. After the presentation, large and small programs signed on to take the training provided by GSG staff. For example, the coordinator for one large agency wanted GSG for three sites and a very small site with few students also wanted to incorporate GSG. All in all, about 11 sites joined GSG. At POST, we felt that our process of self-selection created a good collection of GSG sites.*
>
> *Next, there was follow up, follow up, follow up. We involved the sites that had signed on in the selection of evidence-based curriculum we would use. We kept in touch via email and, since we wanted to break down any cost barrier to implementation, we provided each site with a modest stipend for purchasing supplies.*

Kathy Vinson, Leaf and STEM Coordinator, picks up the story of how POST expanded GSG in year two:

> *For help in recruiting new GSG sites, we returned to our Post Partners who were so helpful in the first year of recruitment, and we added two new partners, Leaf and STEM and the Metroliner Alliance of School-Age Professionals. Leaf and STEM and their advisory board members provided strong outreach into the local community. The Metroliner Alliance of School-Age Professionals has monthly meetings, they provide training and direct service and they have a big push for STEM. We also had outreach help from the After School Enrichment Program (ASEP) a network of 108 local schools.*
>
> *In other words, we couldn't have asked for better partners to help us conduct outreach for new GSG sites. We made presentations at meetings, word about GSG went out through newsletters, we used personal contacts, and we made follow-up phone calls to every potential site. Our efforts resulted in 12 new GSG sites that come from a variety of afterschool programs in our region. The response was so active that we moved to a system of online registration.*

Kathy also shared a wonderful GSG story:

> *One of the directors of an afterschool program told me that GSG sparked her interest in science, so now she takes advantage of every STEM program she can get!*

Strategies for Recruitment and Expansion:

- Market GSG as an exciting opportunity for STEM in afterschool.
- Let sites self-select to join the GSG community.
- Involve sites in curriculum selection.
- Provide ongoing follow-up to sites via email.
- Provide resources and technical assistance to the fullest extent you can.
- Pair up first year sites with second year sites in a mentorship relationship.
- Use the local science museum as a resource. Arrange field trips or museum visits to centers.
- Start an intra-site newsletter so GSG sites can share tips and resources.
- Follow up via phone and email, and arrange at least one on-site visit to see GSG in action.

Additional Strategies for Recruitment and Expansion:

- In a large urban site, the City's Department for Children and Youth can help disseminate information.
- Start by spreading the word through community-based organizations where relationships already exist.
- Use and adapt GSG recruitment materials (Starter Kits, flyers, fact sheets, etc.).
- Offer resources such as supplies or a small stipend as incentives.
- Include GSG as a choice in curriculum fairs.
- Market GSG as a program that benefits all students, especially those from underrepresented groups in STEM, such as girls, students of color, students with disabilities, and students from low-income families.
- Make presentations about the importance of STEM for underrepresented groups at local meetings and professional conferences.
- Spread the word about GSG at local, state, and national professional conferences such as National AfterSchool Association (NAA), 21st Century Community Learning Centers (21st CCLC), National Science Teachers Association (NSTA), and the Association of Science-Technology Centers (ASTC). Distribute flyers, and other information sheets available on the GSG website and in the Starter Kits.

Professional Development

Professional development is a key element of GSG. Each Intermediary organization that joined GSG participated in a two-three day Professional Development Institute. The institute was open to Intermediary staff and afterschool personnel, including administrative and line staff. The Institutes provided grounding in the GSG Unified Program of Change, introduced the evidence-based curricula choices, provided strategies for implementing gender equitable STEM, and gave participants technical assistance as they planned how they would carry out GSG in their locales. Following the institute, GSG staff provided ongoing technical assistance by telephone, email, and through quarterly webinars. In many instances, the GSG staff provided additional "reboot" training to jumpstart program expansion. The expectation was that Intermediaries would provide turn-key training and technical assistance to afterschool centers who were implementing GSG. Following the Professional Development Institutes, Intermediaries brought their own creativity to the professional development and technical assistance that they, in turn, provided to afterschool staff.

Partners in Out-of-School Time (POST) has developed a unique system for providing professional development and *ensuring* that it leads to direct implementation with students. As Claire Tate, Executive Director of POST, describes it:

> *Our training is meant to "incite wonder in adults" so they, in turn, can "incite wonder in kids." We know that afterschool centers are strapped for funds so as an incentive we offer GSG training and curriculum free of charge. In return, we ask center staff to sign a letter of commitment stating that they will implement the program they have been trained on in the afterschool program. We also offer course credit for people who take the training—but only if they carry out the implementation part of the commitment. We offer training followed by on-site observations and technical assistance, and then further training. We build gender equity activities such as "draw a scientist" into our sessions. We find that our training results in increased use of gender equity and STEM vocabulary.*

Rachel Chase relates how she brought her love of and background in science to her work for Hunter FUSE, where she directs four 21st Century Community Learning Centers in The Bronx and Harlem with predominantly Latina/Latino students, many of them from families who are recent immigrants to the United States.

> *When my program received a 21st Century grant to work with afterschool site coordinators to provide 60 hours of STEM learning per student per semester, I viewed it as a positive "twist of fate," because it so dovetailed with my background in science and my love of teaching! The bi-lingual afterschool site coordinators and group leaders I work with are creative and comfortable about providing arts programs, culturally-relevant activities, and year-end events for families and students that are full of dance and music. Because they are from the same demographic as the students, these afterschool educators play a very important role in children's lives, often serving as translators between the Spanish-speaking children and their English-speaking day school teachers.*
>
> *However, these same educators were petrified by the idea of delivering STEM curriculum! It took a lot of thinking and careful planning about how to develop their comfort level and build their confidence so that they could be as successful delivering STEM as they were with arts programming. My first task was to help staff define what STEM learning is, and to recognize that they already were doing activities that were in the realm of science. My job was to remove the high stakes' fears, to focus on team building, and to let participants discover the fun in doing science. We focused on building a process of inquiry – of "let's find out together" not on producing right answers.*

As we engaged in self-reflection after each training, site coordinators and group leaders came to understand what STEM learning means, and they welcomed having access to STEM content that they could do with students.

Karen Polk, is the ExCEL District Coordinator for the San Francisco Unified School District, encompassing more than ninety programs serving over 14,000 students in grades K-12. STEM has been designated a priority area of professional development for the afterschool providers who deliver afterschool services in partnership with the District. Two years ago, Karen, in her role as coordinator did outreach to recruit a cohort of site coordinators to join her in an effort to bring high quality afterschool STEM programming to elementary, K-8, and middle school students. As Karen tells it:

When I put out the word out to site coordinators that we were going to focus on STEM, I got a very positive response, especially when I said that the initiative would focus on career options for children from underrepresented groups in STEM – girls and minorities. Our cohort meets every month to plan. At the meetings, we build awareness of equity issues – discussing the importance of making sure that girls have opportunities for leadership and that students are made aware of various career options in STEM. If a site coordinator isn't available, he or she sends a representative, which gives line staff a chance to participate. This, too, is a form of professional development. Looking back, I would say that our first year was smooth and methodical. In our second year, the STEM cohort really took off! The afterschool community is excited about this initiative. Now, when new staff is hired we seek out people who have some background or are passionate about STEM and its importance for students.

Our goal is to build curriculum that relates to areas in the daily lives of the students. Well, in San Francisco, every school was under construction, so naturally our theme for the year was construction! We used found materials and built mini-cities, connecting the work to the engineering that was going on all around us. Activities grew out of After-School Science PLUS, but afterschool personnel took ownership and added their own innovations. Group leaders are also encouraged to do online research to build their portfolios of activities. We build our staff capacity whenever and however we can.

Parents are excited about the STEM initiative. Site coordinators send out letters to parents, asking them to donate found materials or to come and participate. It has been wonderful for parents to see the learning involved – it dispels the idea that afterschool is "just babysitting."

Karen Polk has a wonderful quote that says so much about the importance of engagement in promoting learning.

Students were working with Oobleck, that mysterious substance that has the properties of both a solid and a liquid. In the words of one Latino boy who was letting the stuff flow through his fingers, "Oh, this is the best day ever!

Strategies for Professional Development:

- Build on the skills that staff members bring to professional development around STEM: being bi-lingual in English and Spanish; access to school-day staff; trust and rapport with students and families; and understanding of the need to build students' 21st century skills.
- Infuse STEM training with your enthusiasm for the topic.
- Remove high stakes fears – build staff's comfort level and confidence, encourage team building, make the training FUN!
- Open up what STEM learning means – focus on process and co-inquiry, not right answers.
- Identify yourself as a learner as well as a teacher; use a "How can we find out together?" approach.
- Emphasize the career and role model aspects of GSG in all professional development, and revisit this aspect of the program during site visits, technical assistance calls, and any other contact you have with sites.
- Create a cohort of like-minded people who understand the importance of STEM education for future careers. Provide opportunities for ongoing discussion and professional development.
- Use the local environment and culture as a catalyst for building STEM curriculum.
- Conduct site visits, observe STEM activities, provide feedback, and engage participants in self-reflection so that their implementation of STEM activities keeps improving.

Community Outreach

The GSG Unified Program of Change puts forth a vision of extensive outreach to the larger community as a partner in promoting STEM equity for girls and other underrepresented groups. There are many aspects to Community Outreach, so you will find stories and strategies for:

Engaging the Media

Finding Role Models and Mentors

Creating Community Partnerships

Developing Afterschool/In-School Connections

Involving Families

Staff at GSG Intermediary agencies and afterschool centers devised many ways to carry out these goals.

Engaging the Media

Peter Guttmacher, Director of Programming & Curricula at the DC Children and Youth Investment Trust, a Washington, DC Intermediary, has found a terrific outreach venue for spreading the word about GSG and equity issues in STEM. He utilizes his local educational channel.

> *I host a bi-monthly show called "School's Out" that is shown on DCTV, our local cable youth channel. DCTV is a well-watched channel and many youth leaders in the area contribute information that is of great value to out of school time educators. For my shows, I pick a topic related to youth development, highlight what's going on in the centers that are part of the DC Investment Trust, and invite guest speakers to share their expertise. Some of my recent shows have been on summer learning loss, evaluation, student engagement, and the one I want to share with you, "School's Out: STEM Programming." I had multi-purpose reasons for devoting a show to STEM. I wanted to:*
>
> - *Demystify STEM – demonstrating to youth workers that they can lead kids in inquiry-based STEM activities without being experts.*
> - *Stress that STEM learning is a process of inquiry – that learning to ask questions and pursue answers is an essential 21st century skill for all students.*
> - *Highlight Great Science for Girls and other programs that are specifically designed for afterschool learning.*
> - *Show afterschool youth workers that STEM training can be fun – I featured a GSG training where participants were learning about liquids and solids by messing about with "Oobleck" and discovering why oil and water don't mix by making "Mystery Bottles."*
> - *Make my audience aware of the equity issues in STEM – the underrepresentation of girls, students of color and students from low-income families in who are pursuing higher education and careers in STEM.*
> - *Stress the fact that as our young people enter the workforce, 85 percent of jobs will require knowledge of STEM.*

My guests on "School's Out – STEM Programming" were a physicist and the director of a summer youth program – and each of them had important things to say: From the physicist – "Science is organized curiosity." From the program director – "Give kids opportunities to do science and they will be engaged." All of these essential points were made in a 22-minute broadcast that is widely watched by the education community in the DC area, and its message will continue to resonate on the DC Trust's website, www.cyitc.org.

Helena Yordan, a Site Coordinator for The Committee for Hispanic Children and Families, Inc. in New York City has her own unique ways to bring media attention to GSG. Helena has used her afterschool center community of parents and students to spread the word. It is an exuberant strategy that gives importance to the struggle for equity in STEM. Helena's program serves diverse low-income, urban students, from groups that are the most under-represented in STEM education and careers.

I mobilize everyone to get out the word about the importance of STEM in afterschool. I ask parents who work in media to promote our GSG program through their work-related contacts. If parents publish information, it brings other parents in. If they mention GSG on a local radio or cable TV show, many community members get the message. I also contact local newspapers and magazines and invite them to come in and do stories. They are always looking for human interest material to publish. Best of all, I mobilize the kids to go into the neighborhood and talk about science. We make placards and we parade around the neighborhood with our message! The kids have a great time, and it empowers them to stand up for what is important. In short, I use everything at my disposal to get the word out about the work our center is doing to promote STEM for under-represented groups.

Strategies for Engaging the Media:

Utilize your local educational channel. Most cities or towns have a channel and they welcome content to fill the time! The audience for these cable programs is teachers, school administrators, staff from community-based organizations, local politicians, and parents – the very people who need to know about the importance of STEM and your GSG program. Here are some ideas:

- Host a program on GSG or gender equity in STEM.
- Moderate a show of afterschool staff who are implementing GSG.
- Videotape GSG in action with students.
- Videotape a GSG hands-on staff development session.
- Feature a guest speaker who will highlight the importance of gender equity in STEM.
- Create a Public Service announcement (PSA) about gender equity in STEM to be shown on the channel.
- Teach students to be advocates for more STEM programming in afterschool.
- Use parent connections to spread the word.
- Send information to local radio and cable stations.
- Invite local media to visit your program; it serves their needs for content as well as yours for exposure.

Additional Strategies for Engaging the Media:

- In rural communities send press releases and photos to local cable channels and newspapers. In a small community it is easier to get coverage, and it spreads the word.
- Add a GSG spokesperson to the agency's board of directors; someone who has business and media connections and can push for coverage and attention to STEM equity.
- Plan events that showcase student work. Parents and community members are very responsive when the kids are the stars.
- Encourage older students to videotape STEM activities they are conducting with younger students and post them on YouTube. Send announcements out to parents and the media with viewing information.
- Use your agency/center website as an ongoing outreach tool. Post pictures, notices on GSG events, keep updating information.
- Convey pride in the fact that your site is part of GSG, a national effort to increase access to the STEM pipeline that is supported by the National Science Foundation.

Finding Role Models and Mentors

Research has shown that, in addition to inquiry-based activities, role models, mentors, internships, and career exploration have improved girls' self-confidence and interest in STEM careers and courses and also helped to reduce sexist attitudes about STEM.[14] GSG sites have embraced this research by providing students with exposure to role models, mentors and job site visits in a variety of ways that fit well within their locales whether urban or rural.

Rebekah Lin, formerly the Communication and Technical Assistance Specialist at The After-School Institute (TASI) in Baltimore, Maryland was successful in recruiting GSG role models and mentors through a process of "Speed Dating." Her story illustrates how to take an idea and run with it. By paying attention to lessons learned, she transformed a neat idea into a successful strategy.

> *From the beginning, TASI's GSG sites made it clear that they wanted the youth in their programs to meet adult role models in the STEM fields. They wanted their youth to learn first-hand about opportunities and options in STEM, and wanted them to realize that these opportunities and options absolutely were open to them. To meet this need, I worked to recruit "STEM Mentors" – defining a "STEM Mentor" as either a professional in a STEM job/career, or an undergraduate or graduate student pursuing a STEM degree. I used personal connections as well as a great local website, Business Volunteers United of Maryland, to post volunteer opportunities. Many area professionals know about this site and use it to find volunteer opportunities.*

[14] Campbell, P. & Steinbrueck, K. (1996). *Striving for gender equity: National programs to Increase student engagement with math and science.* Washington, DC: American Association for the Advancement of Science.

Since we had a small number of sites in our first GSG year, I attempted to match sites and mentors up individually, taking into account personalities, geography, and schedules. This was only moderately successful. However, one great pairing emerged, among the Village Learning Place (VLP) and a professor from Johns Hopkins. The professor helped lead After-School Science PLUS activities, brought in some of his own activities, and took the girls on a field trip to the Hopkins physics lab where his wife worked.

In GSG's second year, the desire for STEM Mentors remained strong and GSG had expanded to 20 sites. I had recently attended a "speed volunteering" event hosted by Business Volunteers Unlimited, and thought it was a great idea. However, at that event, organizations made brief presentations about what types of volunteers they needed, and everyone else in attendance mainly listened. I decided to take this idea and make it more of a "speed dating" situation, where both sides – organizations and potential volunteers – shared information about their interests, needs, and resources. I invited all of the GSG sites and all of the potential STEM Mentors on my list to attend the event at our office. I gave a brief overview of GSG, and conducted an equity activity using startling statements about the underrepresentation of women and girls in STEM. Then, representatives from the sites spread out, and every few minutes the volunteers were instructed to rotate and talk to a new site.

The event was a terrific success. Of course, not everyone came out of it with a pairing, but several sites/volunteers did. Interestingly, the pairings were not necessarily what I would have expected. For example, the pairing of a graduate student group from Johns Hopkins University with two centers was one I wouldn't have expected, but one that really enriched everyone involved. Also, as a result of the "speed dating" event, After-School AKAdemy made a decision to invite several different volunteers to come to the center to talk about their jobs because they got along well with so many of the volunteers.

I think there is something really invaluable about having the opportunity for sites and volunteers to meet face to face, and I think that's why this event worked so well. The sites were still talking about the "speed-dating" event long after the fact. Personality and human relationships really matter, and it's hard to judge those things over phone or email. I also think the event inspired sites who didn't think they could find a volunteer to keep looking because they saw how many people were eager to get involved, and saw that it could be as easy as a brief conversation. One site didn't find anyone at our event, but used it as motivation to find a mentor on their own. I think the event also helped me stay motivated to keep recruiting volunteers.

I obviously wish I could have paired more sites with volunteers, but I've also learned that 100 percent success is unrealistic to expect. I think the relationships that did come out of the event were incredibly strong and meaningful, and that's more important than 100 percent.

Strategies for Finding Role Models and Mentors:

- Tap into your local resources and adapt their strategies to fit the needs of your clients.
- Listen and respond to your constituents' needs and requests.
- Try, revise and refine your strategies, using your own creativity.
- Be realistic about your goals.
- Know that your passion and commitment inspire others.

Additional Strategies for Finding Role Models and Mentors:

- Lisa Regalla, Manager of Science Content and Outreach at Twin Cities Public Television/ SciGirls, recruits scientists as role models and/or mentors, and then she employs a *storyteller* to coach scientists on how to deliver their stories to students. Delivery makes all the difference. A story well-told can go a long way toward engaging students in STEM.

- At MHC After 3 in Martinsville, Virginia, Shanna Francisco-King, Program Coordinator, uses role models extensively. Her best strategy is "personal contact," reaching out personally by calling manufacturers, universities, and colleges to have them share their stories and invite the students visit their varied job sites."

- A strategy shared by several GSG sites is to train older youth to conduct STEM activities with younger students. Elementary school students are inspired by a "cool" teen who likes science. It takes coaching to turn teenagers into role models for younger students, but it is a win/win, empowering situation for all. Younger students are more comfortable asking questions if their STEM role model is an older student, and older youth learn how to be "teachers."

- Many GSG sites have access to college students and report that they make wonderful role models and mentors. These STEM students are enthusiastic about working with kids, and love messing around with hands-on science activities. Their enthusiasm translates to the kids. An added value is that college-age STEM students are up on the latest technology and information, and often make contributions to the curriculum – another GSG win/win strategy.

Creating Community Partnerships

Partnership-building is a key factor in bringing community resources that enhance afterschool education. Local businesses, school systems, local funders, museums, colleges and universities all can be enlisted to provide knowledge and skills for the important work that goes on in the afterschool arena.

Claire Tate and Kathy Vinson at POST bring a wealth of experience in community networking to their implementation and expansion of GSG. As they explained:

> *Our definition at POST is to build 21st Century skills in the students who attend our programs and, of course, STEM skills are at the top of the list. POST is a large Intermediary organization serving 150 afterschool programs. So recruiting specific program partners is an essential part of our strategy. Our program partners have included the largest organizations that serve children and youth, including the YMCA, the YWCA, and our local school system. Before we signed on to become a GSG site, our Leaf and STEM program had a steering committee that included representatives from the school system, university, science museum, 4-H, and corporate funders. We have nurtured that network for several years, and it has been a source of support for our work as a GSG site. For example, when we wanted to expand GSG to new sites, we were able to turn to one of our funders to support an additional GSG Institute.*

Strategies for Creating Community Partnerships:

- Bring all interested partners to the table from the beginning.
- Highlight the work that afterschool education accomplishes—developing 21st Century skills.
- Take full advantage of the resources that your partnerships provide.
- Nurture the partnerships over time.
- Leverage relationships developed for one project for the benefit of those that follow.

Developing Afterschool/In-School Connections

One of the areas of community outreach that the GSG Unified Program of Change strongly encourages is articulation between the school day and out-of-school time. Joshua Livingston, Manager of Extended Learning Opportunities (ELO) at Abyssinian Development Corporation calls this articulation between the school day and afterschool enrichment, "the seamless day." Josh oversees this integration of school and afterschool, known as Extended Learning Time (ELT) for four schools ranging from Kindergarten through high school. The model for ELT was developed by The After-School Corporation (TASC) a GSG Intermediary, and the Thurgood Marshall School (K-5) was one of their original pilot sites. As Josh describes it:

> *I see the seamless day as a dual benefit – kids benefit and teachers benefit. It works this way. Our day school teachers teach our afterschool enrichment classes, with assistance from our AmeriCorps personnel who also assist in regular class hours. In the seamless day, every teacher has that vital "extra pair of hands." Teachers welcome the opportunity to work with students in the informal part of the day – they earn extra pay and, since the afterschool students come from several classes, they have the opportunity to work with a broader group of children, and they can engage kids in FUN activities in an environment that is non-competitive, and that also develops critical-thinking skills.*

According to Josh, the instructional coordinator plays a key role in bridging the school day and afterschool enrichment. She is a familiar and respected person in the school – a peer – who provides professional development about the important skills that children develop during the enrichment part of the day. She is the person who helps teachers learn that engaging activities are essential to keep attendance up in afterschool, when it is not mandatory. And, one key to engagement is hands-on science.

Josh tells a wonderful "story from the field" about how doing inquiry-based, hands-on science in afterschool has had a positive effect on school-day academics:

> *One of our 3rd grade teachers, who did After-School Science PLUS activities with students in her afterschool class, brought some of the hands-on techniques to her classroom unit on butterflies. These changes increased children's engagement in the unit and they also scored higher on the next round of standardized tests.*

Strategies for Developing Afterschool/In-School Connections:

- Approach the school/afterschool as extended learning time (ELT), even if children are not in the same building all day.
- Try to engage school-day teachers in the afterschool program.
- Explore the possibility of bringing the ELT model to your site.
- Provide professional development for teachers around informal education techniques.
- Share the research on engagement with teachers.
- Explore the possibility of having an AmeriCorps program at your site.

Involving Families

It's a given that a parent's involvement is an essential part of children's success in school. When it comes to generating an interest in STEM, parent involvement is key. Research has shown that when families are engaged in their children's education, regardless of income or background, children are more likely to earn higher grades , enroll in higher-level programs, have better attendance, and graduate and go on to college.[15] Fathers play a particularly important role in encouraging their daughters in math. Buying math toys and games and spending time pursuing math and science activities can *really* make a difference in a girl's interest in STEM.[16]

In the afterschool arena, family involvement is a challenge. Most students are enrolled in afterschool programs because their parents are at work, and if parents have to take time off from work, they often prioritize school-related events. Also, pick up is usually at a hurried time of day. But despite the obstacles, afterschool programs do reach out to involve parents in creative ways.

Rachel Chase, Program Director of the Hunter FUSE program, has a successful parent involvement strategy. One of the GSG afterschool programs that Rachel works with wrote and received a grant to create a *SciGirls en Familia* afterschool club for girls. As part of the grant, workshops for parents and girls together were held every other Friday afternoon.

> *Mothers loved coming to the center to work on STEM activities with their daughters. Since most of the girls and their mothers in that center are Latina, many of them recent immigrants, Spanish is their first language. So, it was a huge plus that the program was conducted bilingually, and all of the activity instructions were written in Spanish and English. Most of the mothers came to every session and all were interested in seeing that their daughters got an education that would lead to future careers. A little extra snack food and an engaging program delivered in the language that was most familiar led to a highly successful strategy for parent involvement.*

Joy Hernandez, Logistics and Contracts Manager at the Chicago Area Project has another strategy for involving parents*:*

[15] Henderson, A. T. & Mapp, K. (2002). *A New Wave of Evidence: The Impact of School, Family, and Community Connections on Student Achievement.* Austin, Texas: Southwest Educational Development Laboratory.
[16] University of Michigan (2007, June 25). How Dad's Influence Their Daughters' Interest in Math. *ScienceDaily*. Retrieved September 20,2010 from http://www.sciencedaily.com/releases/2007/06/070624143002

I ask parents to donate items for our GSG activities. We use After-School Science PLUS as our curriculum, so I'm asking for clean items from the recycling bin, or empty water or soda bottles, or plastic deli containers. That makes parents curious so they start to ask questions about the curriculum, and they want to see what the kids are doing. We use their curiosity to bring them in to see the kids at work and we talk about the importance of STEM in the curriculum while we have their attention.

Claire Tate, Executive Director of Partners in Out-of-School Time (POST), tells a wonderful story about parents who have a unique strategy of bringing STEM enrichment into their daughter's school day. She realizes that having parents doing STEM activities with students during the school day is an unusual strategy, but one that schools might welcome, since it provides extra resources for the children in these times when schools are economically stressed.

Two mothers, a school board member and an elementary school principal, have worked with their daughters' school to provide STEM activities during the school day. The school has made time in the daily schedule when the mothers can conduct activities with students.

Joshua Livingston says:

Family members are asked to commit to 20 hours of volunteering over the school year – that can be a combination of family members – parents, grandparents, cousins, etc. Family members are particularly asked to volunteer during Extended Learning Time. In addition, families are offered workshops, invited to open houses, and an end-of-the-year showcase where children demonstrate what they have learned.

Strategies for Involving Families:

- Send students home with questions to ask their family members. Students can write their questions in the form of surveys, and then analyze and graph the results. Or, they can ask their questions in the form of a letter to parents/families, and combine literacy and science. Younger students can develop a checklist, and ask questions that can be answered in a Yes/No/Maybe format.
- Pick-up time, as hurried as it often is, is still a window of opportunity to chat briefly about the STEM activities that are going on in the center. Even a brief chat can keep the importance of STEM education in the forefront.
- A time-honored strategy is to stage a GSG event at pick-up time, and provide pizza or a light meal. Food is a winner for the students, for younger siblings who come along or for older siblings who sometimes have "pick-up" duty, and for tired and harried parents who have been at work all day. After everyone has had a chance to eat and relax, the GSG event can be brief – one quick equity awareness activity followed by a fun hands-on activity.
- Nothing engages parents more than seeing photos or videos of their children at work. One GSG site invited film students from surrounding colleges to come and video kids doing STEM in an afterschool program. The college students not only filmed, they taught the kids about video production.
- Since parents often work two jobs, extend the request for volunteers to family members as well as parents.

Great Science for Girls Website as a Resource

The GSG Website: http://www.greatscienceforgirls.org

The website is a major resource for starting a new GSG program or for sustaining one that is currently active. Over the course of the initiative, Intermediary and afterschool personnel have been active participants in its development. As a result, the website offers virtually everything needed to become a GSG site. Here's what you will find as you browse this valuable resource.

Main sections include:

- **Home**
- **About GSG**
- **Curriculum**
- **Take Action**
- **Resources & Research**

(Pictured above.) Here you will find a brief history of the GSG Initiative and featured resources, a button to sign up for the GSG Community of Practice – a national network of colleagues interested in gender equity and science, a place to sign up for GSG updates, and a button designed for families that highlights the importance of their role in engaging their children (especially girls) in science. It also has links to useful resources to support their efforts.

Here's where you can find out about the GSG Team, Intermediary partners and the Advisory Committee for this initiative. Also, you can download project newsletters, listen to webcasts, see photos, read testimonials and find answers to FAQs.

Throughout the five years of the GSG initiative, the research team has reviewed and recommended curricula that have been evaluated and show positive outcomes in relationship to girls and STEM. Here you will find the GSG recommended curricula which span grades K-12 and address physical science, engineering, earth science, space exploration, geology, and many other topics, with links to sample activities.

The Take Action section of the website provides all the tools you need to activate GSG at your site. Here's a brief overview of the clickable sections:

Starter Kit for Intermediaries

A Starter Kit for Intermediaries was the first GSG tool. The idea for the Kit came from the first GSG cohort of Intermediaries at the initial GSG planning meeting. Participants said, "We need something to take back to our agencies to explain this project and help us plan for implementation." The Starter Kit for Intermediaries includes:

- **Outreach materials** – A GSG flyer, Talking Points, and FAQs to provide information to colleagues and the larger community.
- **Management tools** – A "readiness" checklist, partnership expectations, and a sheet that describes the GSG Unified Program of Change.
- **Funding resource** – A proposal template to help raise support for GSG, information on GSG's role in Workforce Development, funding resources, and tips for how to do local outreach for funding.

Starter Kit for After-School Centers

The Starter Kit for Intermediaries was so useful that another one was created tailored to the needs of afterschool programs that were joining GSG. The Starter Kit for After School Centers also includes the outreach and management tools described above, and has additional sections on:

- **Supporting GSG** – How to conduct local outreach and tap into community resources for funding to support GSG in your center.

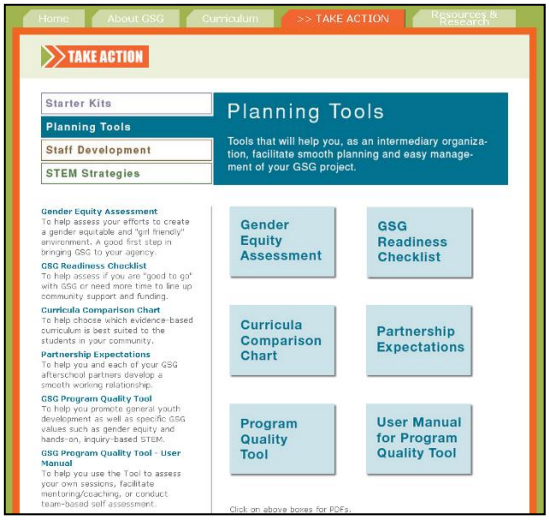
- **Family Outreach** – A sample letter to families about GSG in your center, and inviting their involvement, and information about the importance of science in afterschool, and why it is especially critical for girls.

In each year of GSG, the Starter Kits have been revised to incorporate updated information and new tools to serve the needs of GSG participants.

Planning Tools

This section features some quick and easy ways to help you prepare to take on GSG at your site. You will find the:

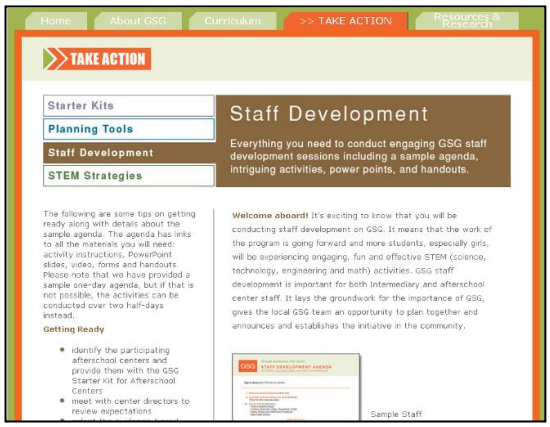
- **Gender Equity Assessment Tool**
- **GSG Readiness Checklist**
- **Curricula Comparison Chart**
- **List of Partnership Expectations**
- **Program Quality Tool**
- **User Manual for Program Quality Tool**



The GSG Program Quality Tool is a unique low-stakes assessment tool that was developed specifically to help programs implement GSG in a way that promotes general youth development as well as specific GSG values such as gender equity and hands-on, inquiry-based informal STEM education. The tool is a collaborative effort between the Forum for Youth Investment and the Educational Equity Center at FHI 360.

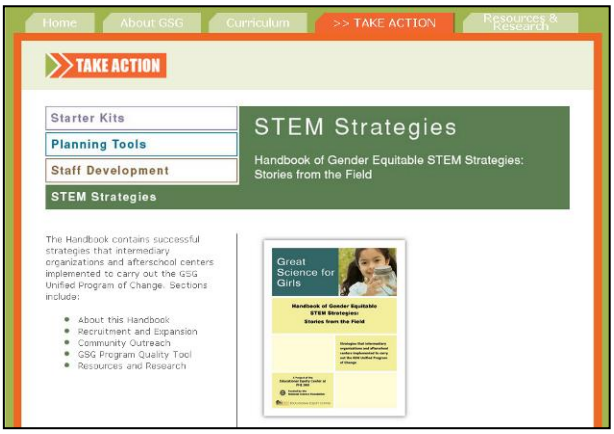
Staff Development

This section has a clickable, annotated agenda for providing staff development sessions on all aspects of GSG. You will find a GSG overview, gender equity activities, instructions for conducting inquiry-based, hands-on STEM activities, family involvement activities, session handouts, planning forms and a session evaluation. In other words, everything you need to train staff to conduct GSG at your site.



STEM Strategies

This is where you will find a downloadable copy of *Gender Equitable STEM Strategies: Stories from the Field*.



An important function of the website is to provide information about the latest research on gender equity in STEM and resources that promote gender equitable STEM for girls, afterschool staff, and parents. In the Resource Section, you will find: websites for girls; staff development guides; information for families; resources for role models; and links to other equity/STEM-related organizations. The Research Section provides links to studies on girls and STEM; effective practices; and afterschool education.

Great Science for Girls Program Quality Tool

Does your program provide STEM programming that equally engages girls and boys? Do you have a goal to be gender equitable? Are you meeting that goal? Does staff realize how subtle gender stereotyping can sometimes be? The GSG Program Quality Tool is custom designed to help programs identify and address gender equity.

What is the GSG Program Quality Tool?

The GSG Program Quality Tool is a low-stakes assessment tool accompanied by a User Manual to help afterschool programs and the organizations that operate them ensure high quality programming in order to achieve the outcomes intended by GSG. Through observation and interviews, programs using the tool can learn about the strengths of their offerings, as well as identify areas to improve. The tool, which is accompanied by a User Manual, was created with the goal of facilitating understanding and awareness of best practices, as well as providing a vehicle for staff to share ideas, learn from each other, and plan for program improvement. The tool is not exhaustive in terms of afterschool program quality. The indicators in this tool focus most closely on those that align with the goals of GSG to provide high-quality, gender-equitable science in afterschool settings. There are many other indicators of program quality that may be relevant to your programs.

What areas are assessed through the GSG Program Quality Tool?

Four areas from the Youth Program Quality Assessment[17] tool and an additional area focused on GSG best practices are assessed using the GSG Program Quality Tool.

- Safe Environment
  - Psychological and emotional safety
  - Activities support active engagement
- Supportive Environment
  - Staff support youth in building new skills
  - Staff support youth with encouragement
- Interaction
  - Youth have opportunities to participate in small groups
- Engagement
  - Youth have opportunities to set goals and make plans
  - Youth have opportunities to reflect GSG Best Practices Scales
- Great Science for Girls Best Practices
  - Activities support scientific inquiry

[17] The Youth Program Quality Assessment (YPQA) is a tool created by the David P. Weikart Center for Youth Program Quality, a division of the Forum for Youth Investment. AED teamed with the Weikart Center to create the GSG Program Quality Tool, which includes some items from the existing YPQA and some new items created specifically to address the goals of Great Science for Girls.

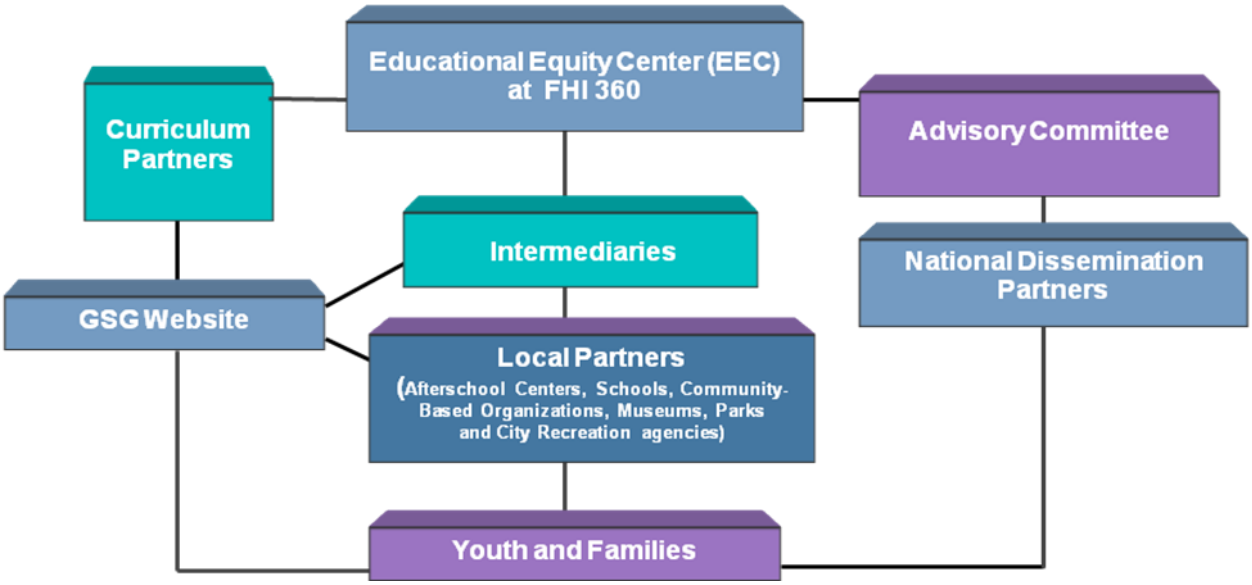
- Staff interactions support gender equity
- Program Activities Expose Youth to STEM Careers
- Organization Policies Promote Gender Equity
- Organization Builds Connections with Families

How do I use the GSG Program Quality Tool?

The GSG Program Quality tool was designed to offer flexibility in the way it is implemented. Rather than prescribing a specific process for using the tool, we offer several suggestions for use, believing that, while programs differ in their needs and capacity to conduct self assessment, the assess-plan-improve process is advantageous for all programs. Suggested uses include:

- Frontline staff can review the GSG scale items and assess their own sessions
- Pairs of frontline staff can use the tool to observe each other and guide activity facilitation/teaching
- An administrator can use the tool to facilitate observations and guide ongoing mentoring/coaching
- An administrator/director can train a team to use the tool to observe and collect data from a representative sample of sessions, and then conduct a team scoring meeting and develop an improvement plan.

Great Science for Girls: Project Structure



Located in New York City, the Educational Equity Center (EEC) at FHI 360 is an outgrowth of Educational Equity Concepts, a national nonprofit organization with a 22-year history of addressing educational excellence for all children regardless of gender, race/ethnicity, disability, or level of family income. EEC's goal is to ensure that equity is a key focus within education reform efforts, eliminating inequities that often limit student potential. STEM equity has been a core issue of EEC since 1982.

EEC received a grant from the National Science Foundation for Great Science for Girls (GSG) –a five-year initiative to enhance the capacity of after-school programs to provide quality gender equitable STEM opportunities. EEC partnered with curriculum developers, advisory committee members and intermediaries organizations to reach the largest number of afterschool centers, students and families. The total number of students reached by GSG sites is estimated at almost 17,000 and the number of girls, estimated at 10,000.

The GSG website has been designed to continue the work of the project by creating a community of practice and providing a wealth of tools and resources to help build the capacity of afterschool centers to deliver programming that will broaden and sustains girls' interest in STEM.

For questions regarding GSG you can visit www.greatscienceforgirls.org, or e-mail lcolon@fhi360.org

For information on EEC at FHI 360 visit the EEC website at www.edequity.org or call 212-367-4572.

For information on FHI 360 visit www.fhi360.org

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