

Role Model Strategies

Encouraging Girls to Consider STEM Careers



Watch Mentor Moment & Science Profile videos online.

Produced for PBS by



Made possible by



Additional funding by



& PPG Industries Foundation



SciGirls Role Model Strategies

The bold aim of **SciGirls** is to change how millions of girls think about science, technology, engineering and math—aka STEM. Using gender equitable evidence-based practices in STEM education, **SciGirls** produces a television series, online resources and hands-on activities to address this vital goal. We also offer professional development opportunities for educators to promote our mission. We want to inspire, enable and maximize STEM learning and participation for all girls, ultimately encouraging greater interest in STEM careers.

This is where you come in. As a STEM professional, you are in a position to make a real difference in girls' lives by becoming a role model. By simply hosting a field trip to your site, visiting a classroom, or working with an after-school program or summer camp, you can encourage the youth in your community to explore STEM. This booklet offers basic training for role models, introducing you to best practices for your volunteer efforts and answering questions you might have.

For example, you might be wondering, *Why should I be a role model?* Experienced role models say helping girls connect to STEM re-energizes them, gives them a chance to collaborate with others in their work places, and helps them develop their leadership skills. *Why are role models important?* Seeing women who have succeeded in STEM helps inspire and motivate girls. *The SciGirls Seven: Strategies for Engaging Girls in STEM* (scigirlsconnect.org/page/scigirls-seven) are research-based, gender equitable strategies for engaging girls in STEM that address the importance of connecting girls with role models and mentors. *How do I become a role model?* Check into the opportunities your company already offers, work through your professional organizations, or sign up through girl-serving groups. (Check out FabFems on page 9 of this booklet for information on joining their directory.)

No doubt you will grow your own role model know-how as you progress in your volunteer work. We hope you will share your story by contributing to the **SciGirls** Role Model Forum at www.scigirlsconnect.org/page/role-models.



For more information, go to scigirlsconnect.org

SciGirls



Table of Contents

SciGirls Role Model Strategies: Encouraging Girls to Consider STEM Careers	3
---	---

Tips for Using SciGirls Role Model Strategies	5
---	---

Role Model FAQ	9
----------------	---

References	10
------------	----

Credits: Linda Kekelis, Jen Joyce, Techbridge, writers | Joan Freese, Sarah Carter, Rita Karl, editors | Elsa Angvall, design | Susan Buechler, copy editor | Special Thanks: Karen Peterson, National Girls Collaborative Project



Our Techbridge Partners

Organizations that

promote gender equity in STEM are noted for being highly collaborative. SciGirls Role Model Strategies are an example of this in practice. Our colleagues at Techbridge were instrumental in helping us put together this material. Through hands-on learning, Techbridge inspires girls to discover a passion for technology, science and engineering. Their Role Model Toolkit provides training and resources for STEM professionals to get started and is the basis for the content in this booklet. For additional information, visit techbridgegirls.org.

techbridge

Supported by:



& PPG Industries
Foundation

©2013 Twin Cities Public Television, Inc. All Rights Reserved. SciGirls, Izzie, associated characters and related logos and indicia are copyright and trademarks/service marks of Twin Cities Public Television, Inc.

SciGirls Role Model Strategies

Encouraging Girls to Consider STEM Careers

What do you most love about your job in science, technology, engineering, or mathematics (STEM)? Even though the rewards of STEM careers are many, youth often describe these fields as nerdy, boring, or difficult. When you visit a classroom or after-school program as a role model, you can have a lasting impact on girls, affecting their futures by creating positive images of careers in STEM fields. Use the research-based strategies listed here to make the most of your role model experience—for the girls you meet and for yourself.

- 1. Make a personal connection to dispel stereotypes.** (*Brickhouse, Lowery, & Schultz, 2000; Daniels & Perry, 2003; Extraordinary Women Engineers Project, 2005*)

As a role model, you need to build rapport. When girls personally connect with you, they'll be more interested and invested in the experience. Share personal stories about family, friends, and hobbies. This connection works both ways; invite the girls to share information about themselves and draw on their interests in your discussions and activities.

- 2. Use positive messaging to show how STEM makes the world a better place.**

(*Buck, Plano Clark, Leslie-Pelecky, & Cerda-Lizarraga, 2008; Frome, Alfred, Eccles, & Barber, 2006; Marlino & Wilson, 2006; National Academy of Engineering, 2008; Plant, Baylor, Doerr, & Rosenberg-Kima, 2009*)

Most youth, especially girls, want to make a difference. Girls are eager to know how your work impacts people and the world. Describe what you do in positive ways that girls can relate to, connecting your work to issues that young people find compelling, such as improving the environment. Highlighting the inspiring and collaborative aspects of your job dispels the idea that STEM careers aren't for everyone and can build interest in your field.

- 3. Share your passion.** (*Gibson, 2006; Kekelis & Gomes, 2009; Wolsky, 2011*)

Share what most inspires you in your studies or career. This may have changed over time. Think back to your early interests in elementary school, important turning points in your STEM studies, or a recent work project that excited you. Reflecting on pivotal moments and sharing what motivates you will resonate with girls. Remember to have fun and be enthusiastic; when you get excited about your work, girls do too.

4. Make it hands-on and keep it interactive. *(Bruning, Bystydzienski, & Eisenhart, 2011; Christidou, 2011; Girl Scout Research Institute, 2012; SciGirls Seven, 2010)*

Help girls see themselves in STEM by engaging them in a hands-on activity that offers a snapshot of your work. While the activity may not be exactly what you do on the job, active engagement is a way for girls to experience how to design projects and conduct investigations as well as to satisfy their curiosity about how things work in general. During the activity offer girls the chance to explain what they are doing and learning. Be sure to highlight how creativity and teamwork are needed for success in the project and in STEM careers overall.

5. Foster a growth mindset and promote perseverance. *(Correll, 2004; Dweck, 2006; National Center for Women and Information Technology, 2011; Tough, 2012; Wentzel, 1997)*

Not all girls are comfortable with science or technical activities. You can help everyone succeed and enjoy a challenging activity by offering constructive feedback. As part of the activity, describe challenges you've faced in your work, and how you've come to see setbacks as a chance to learn something new. Some girls think you have to be super smart to be in STEM; let them know that what is important is learning from mistakes and knowing when to ask for help from a classmate, teacher, or coworker.

6. Show the way: offer resources and academic guidance for right here, right now. *(Girl Scout Research Council, 2012; Milgram, 2011)*

Offer ideas about how girls can access STEM learning opportunities at school and in their community. Describe your personal experiences with math and science classes, but also how you learned important things outside of school time. Leave them with websites and local programs for exploring studies and careers in your field.

7. Follow-up and invite feedback. *(Kekelis & Baggs, 2010; Sevo, 2009)*

Ask the girls for feedback to better understand the results of your efforts. Check-in with the teacher or event coordinator to learn ways that you can improve your next outreach effort. You'll also hear what worked, so you can build on your successes!

Supported by:




& PPG Industries
Foundation

Tips for Using the SciGirls Role Model Strategies




These tips offer detailed suggestions for how to use the **SciGirls Role Model Strategies**. The tips are based on research and lessons learned from role models who have worked with a variety of girls in diverse settings. As with most things, becoming an effective role model is a process. To be successful, you can start with just a few tips, incorporating others as you become more confident.

1. Make a personal connection to dispel stereotypes.


 **Share personal stories.** By sharing stories and talking about hobbies, family, friends, and pets as well as your work, you can break down stereotypes about STEM. For instance, you might share that you played soccer in middle school, or enjoy taking your dog to work.

★ Invite the group to share information about themselves, in advance or during your talk, so that you can relate your discussion to their interests.

 **Share photos.** Images or videos from your personal and professional experiences can make your story come alive. Use them to highlight your work, outside interests, favorite places you've traveled, and projects you've worked on. Photos are especially helpful for illustrating what you do, especially for younger girls and for girls who are learning English.

 **Talk about family and friends.** Let girls know it's possible to have a rewarding career and a personal life.



★ Hearing about how you are supported by family and friends is important for many girls. Share how your support network helps you work toward goals and overcome challenges.

 **Share your journey.** Talk with girls about the choices you made along the way. Describe how you discovered your interests and found your career. It is reassuring for girls to learn that there are many different paths to a STEM career.




★ Who are your role models? Talk about who has inspired you in your studies or career.

★ Let girls know that participating in after-school STEM clubs or volunteering at a science museum can broaden interests and advance skills.




2. Use positive messaging to show how STEM makes the world a better place.

-  **Describe how your career improves the world.** Help girls see how STEM professionals make a positive impact and alleviate social or environmental problems. Be sure to share examples of how a STEM career will benefit their communities and families.
-  **Communicate the creative and collaborative nature of your work.** When you share these aspects of your job, you can create a new picture of STEM professionals to counter the stereotypical image of the lone genius in his lab.

3. Share your passion.

-  **Recall what first inspired you in STEM.** Your enthusiasm will shine through when you talk about a favorite class, a role model, an experiment at home, a paper you wrote as a student or a field trip.
-  **Describe how your job is rewarding both personally and professionally.** Share a story about a recent experience, discovery or opportunity that excited or surprised you.
-  **Talk about what the future holds for you and your career.** What are you looking forward to learning? What new research or project do you hope to be part of? Seeing how you continue to be excited about your work will inspire girls.

4. Make it hands-on and keep it interactive.

-  **Start with an icebreaker.** Icebreakers should be fun and brief. They are an opportunity to set the tone and get everyone energized and comfortable with each other.
-  **Introduce a collaborative activity that gives a snapshot of your work,** explaining to girls how, just as they are working in groups, teamwork is essential to your job.
-  **Encourage participation with open-ended questions.**
 - ★ Start by finding out what the group knows about the concepts you plan to introduce.
 - ★ Encourage girls to make predictions *before* they jump into an activity.
 - ★ Don't save questions for the end. Invite discussion throughout your visit!

Supported by:





& PPG Industries
Foundation



Tips for Using the SciGirls Role Model Strategies:




5. Foster a growth mindset and promote perseverance.


-  **Share a story of facing a challenge, failing, and the lesson(s) you learned.** Your experience will help girls understand how important effort and interest are to success.
 - ★ Describe the value of effort and perseverance. Give an example of how practice and perseverance helped you in school and on the job.
 - ★ Encourage girls on how to keep a positive attitude about failure. Emphasize that in real life, setbacks are opportunities for learning.
-  **Constructive feedback can motivate girls and help them persist.** Provide specific feedback to help girls think about their work. Praise girls for their effort and process not just their end results. Offer comments such as, "That's great the way you and Kate worked together to solve that problem," or "I can see how hard you worked on that design."

6. Show the way: offer resources and academic guidance for right here, right now.

-  **Share ideas for resources that could help girls prepare for STEM fields.** Explain why math and science classes matter. Regardless of the field of study they pursue, math and science skills will keep their options open and help in their studies, careers, and everyday lives.
 - ★ Encourage girls to make the most of STEM opportunities in their community, such as participating in after-school clubs or volunteering at a local science center.
-  **Share resources for navigating STEM careers.** Not all girls will relate to your chosen profession. Offer avenues for investigating STEM careers: **SciGirls**, Engineer Your Life, Engineer Girl, *Design Squad*, FabFems, and Dot Diva are just a few online resources for girls that are available. They offer a variety of options relating to the inspirational aspects of the STEM fields.

7. Follow-up and invite feedback.


 **Ask girls for their input** on what they liked about the day and how you can improve. Girls feel empowered when they have a voice in shaping future events.


 **Schedule a call with the organizers of the event** to find out what you did well. Sometimes role models aren't aware of the positive impact that they had on girls. Just as important is to ask for ways that you can improve.


★ Let your organizers know what was helpful and how they can improve their support for role models.

Celebrate your success!

Take a moment to reflect on the importance of your role model accomplishments. Here are some ideas for making the most of your experience by acknowledging your own efforts.

 Share the experience with coworkers. You may find colleagues who would like to get involved. Having others participate makes it easier to plan events and field trips. It also expands the pool of role models; each person's story will connect with different girls.

 Place a thank you card or photo from the event on your desk or office bulletin board to remind you of the importance of your effort. As a role model you can inspire a girl and support her on the path to a rewarding future in STEM.

 Let your manager and others at your organization know the value of their support for your outreach efforts. If they allow you to volunteer during the work day or provide resources to support the effort, provide access to the results. It's not self-promotion; it's sharing the return on their investment in outreach.



Supported by:



& PPG Industries
Foundation

Role Model FAQ

? What about the reluctant girls?

With your help, every girl can be a SciGirl. Our efforts are for both girls who “get” STEM, as well as for those who are reluctant to dive in. Your work can help foster STEM identity in all girls.

? How can I help girls who might not think college is for them?

Providing information about scholarships, financial aid, student loans, and work study helps girls understand that college is not beyond their reach. This information is especially important for girls who will be the first in their families to pursue higher education. Don't be shy. If you were the first generation in your family to attend college, be sure to share your experience.

? What other needs are there in the girl-serving STEM community?

¿Hablas español? Talk about how knowing a second language is an asset in your travels and your work. For girls who are English language learners, this can boost their confidence and help them see that being bilingual is an asset.

? What about the boys?

The role model strategies that are highly beneficial to girls work with all youth, including those from underrepresented communities. Everyone benefits from an equitable approach to STEM learning—including working with role models and mentors.

? I am interested in being more involved. What else can I do?

Consider becoming a mentor. If appropriate, you can expand your role model work to assist a girl who is working on a class project related to your work, looking for an internship, writing a resume, or selecting a college.

Become a FabFem!—The FabFems directory is a national database of women in STEM professions who are inspiring role models for young women. The FabFems directory is accessible to young women, girl-serving STEM programs, and other organizations that are working to increase career awareness and interest in STEM. Become a FabFems role model, or search for role models, by visiting fabfems.org.





References

Assessing Women and Men in Engineering (AWE) Project.
<https://www.engr.psu.edu/awe/misc/about.aspx>.

Brickhouse, N. W., Lowery, P., & Schultz, K. (2000). What kind of a girl does science? The construction of school science identities. *Journal of Research in Science Teaching*, 37(5), 421-458.

Bruning, M., Bystydzinski, J., & Eisenhart, M. (2011, April). *Transformative outreach: The FREE (Female Recruits Explore Engineering) project*. Paper presented at the Women Engineering Program Advocates Network (WEPAN) Conference, Seattle, WA.

Buck, G. A., Plano Clark, V. L., Leslie-Pelecky, D. L., Lu, Y., & Cerda-Lizarraga, P. (2008). Examining the cognitive processes used by adolescent girls and women scientists in identifying science role models: A feminist approach. *Science Education*, 92(4), 688-707.

Christidou, V. (2011). Interest, attitudes and images related to science: Combining students' voices of school science, teachers, and popular science. *International Journal of Environmental & Science Education*, 6(2), 141-159.

Correll, S. J. (2004). Constraints into preferences: Gender, status, and emerging career aspirations. *American Sociological Review*, 69(1), 93-113.

Daniels, D. H., & Perry, K. E. (2003). "Learner-centered" according to children. *Theory into Practice*, 42(2), 102-108.

Dweck, C. S. (2006). *Mindset: The new psychology of success*. New York: Random House.

Extraordinary Women Engineers Final Report. (2005)
http://www.eweek.org/site/news/eweek/ewe_needs.

Frome, P.M., Alfeld, C. J., Eccles, J. S., & Barber, B. L. (2006). Why don't they want a male-dominated job? An investigation of young women who changed their occupational aspirations. *Educational Research and Evaluation*, 12(4), 359-372.

Gibson, D. E., (2006). Role models. In J. H. Greenhaus & G. A. Callanan (Eds.), *Encyclopedia of Career Development* (pp. 701-703). Thousand Oaks, CA: Sage.

Girl Scout Research Institute. (2012). *Generation STEM: What girls say about science, technology, engineering, and math*. New York: Girl Scouts of the USA.

Good, C., Aronson, J., & Inzlicht, M. (2003). Improving adolescents' standardized test performance: An intervention to reduce the effects of stereotype threat. *Applied*

Developmental Psychology, 24, 645-62.

Kekelis, L., & Baggs, J. (2010). Girls, cupcakes, and geology: Outreach that inspires. *Gaea, Association for Women Geoscientists*, 33(4), 1, 8-10.

Kekelis, L., & Gomes, L. (2009). Bridging the engineering workforce gap through community outreach. *American Water Works Association Journal*, 101(8), 52-59.

Marlino, D., & Wilson, F. (2006). Career expectations and goals of Latina adolescents. In J. Denner & B. L. Guzman (Eds.) *Latina girls: Voices of adolescent strength in the United States* (pp. 123-37). New York: New York University Press.

Milgram, D. (2011). How to recruit women and girls to the science, technology, engineering, and math (STEM) classroom. *Technology and Engineering Teacher*, 71(30), 4-11.

National Academy of Engineering. (2008). *Changing the conversation: Messages for improving public understanding of engineering*. Washington, DC: National Academies Press.

National Center for Women and Information Technology. (2011). *How can encouragement increase persistence in computing? Encouragement works in academic settings (case study 1 & 2)*. Retrieved from <http://www.ncwit.org/resources/how-can-encouragement-increase-persistence-computing-encouragement-effective-work-settings>.

Plant, E. A., Baylor, A. L., Doerr, C. E., & Rosenberg-Kima, R. B. (2009). Changing middle-school students' attitudes and performance regarding engineering with computer-based social models. *Computers and Education*, 53(2), 209-15.

SciGirls Seven Strategies. Retrieved from http://www.pbs.org/teachers/includes/content/scigirls/activities/engineering/scigirls_engineering_sg7.pdf.

Sevo, R. (2009). Literature overview: The talent crisis in science and engineering. In B. Bogue & E. Cady (Eds.), *Apply Research to Practice (ARP) Resources*. Retrieved from <http://www.engr.psu.edu/AWE/ARPResources.aspx>.

Tough, P. (2012). *How children succeed: Grit, curiosity, and the hidden power of character*. New York: Houghton Mifflin Harcourt.

Wentzel, K. R. (1997). Student motivation in middle school: The role of perceived pedagogical caring. *Journal of Educational Psychology*, 89(3), 411-419.

Wolsky, M. (2011). Engineering a change in perception: Engineer Your Life and Design Squad. *The Bridge Linking Engineering and Society*, 41(2), 30-36.

Supported by:



& PPG Industries Foundation

Every girl can be a SciGirl!

Join the
Party Online!

Kids

pbskids.org/scigirls

Watch Videos. Play games.
Share projects. Make
friends.



Educators

scigirlsconnect.org

Find educational resources:
videos, hands-on activities,
and the best in gender equi-
table STEM teaching
and learning!

Parents

pbs.org/parents/scigirls

Learn more about how
to encourage your
daughter in STEM!



Download Activity Guides
at scigirlsconnect.org



Produced for PBS by



Made possible by



Additional funding by



NORTHROP GRUMMAN
Foundation



& PPG Industries
Foundation