



Family Guide for Engaging Girls in STEM



Izzie

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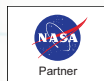
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Welcome to SciGirls!

SciGirls programs are designed to spark curiosity in science, technology, engineering, and math (STEM) through activities that promote knowledge and discovery. *SciGirls* is all about hands-on STEM inquiry. Youth learn the science and engineering processes, work collaboratively to investigate meaningful questions, are introduced to women STEM role models and see how STEM helps people solve problems, achieve goals, and help others.

SciGirls believes that families are partners in helping youth to pursue STEM studies. This guide contains strategies and practical tips to help you encourage them to be STEMsational!

SciGirls welcomes girls from all experiences. We do not discriminate based on gender identity, gender expression, or sex assigned at birth. *SciGirls* resources can advance gender sensitivity among educators. With this awareness, they can recognize and avoid the unconscious behaviors that often contribute to climates unfavorable for youth in STEM classrooms or in STEM activities.



WHAT IS STEM?

STEM describes an approach to teaching and learning that combines scientific inquiry and engineering design in hands-on personally relevant learning experiences that are grounded in real world applications and integrate technology and mathematics into all aspects of the investigation. STEM learning opportunities are active. Such opportunities foster skills such as critical thinking, creativity, problem solving, communication, and collaboration. STEM is an important topic in education today because these fields are important growth areas for the U.S. economy.

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Why is STEM education so important?

STEM has a lot to offer young people:

Careers

Women represent a minority in the STEM workforce. Encouraging women and others who are underrepresented to enter these fields will ultimately improve these professions, maximizing innovation to create products and services that are better representative of all users. In addition, jobs in these areas offer higher than average salaries, and employment in STEM occupations are expected to increase much faster than the overall growth rate for occupations.

Life Skills

At the most basic level, STEM attempts to answer how things work. The scientific and engineering processes offer a framework for understanding important ideas, big and small. In addition, while using these processes, young people learn how to plan, cooperate, communicate, problem solve, and apply their creativity.

Science Literacy

In today's society, it's important for everyone to have basic scientific knowledge to continue to learn and to make informed decisions. Even if youth choose to go into another field, a foundation in STEM studies will serve them well in the future. Science literacy gives us a sense of empowerment to make a difference in our community and the world!

Springboard for Opportunities

New technologies are being invented every day; it's impossible to anticipate what inventions may drive our culture in the next five or ten years. A strong foundation in STEM topics will open doors for career opportunities we don't even know about yet. The workforce is changing quickly and new jobs that don't even exist will be available to youth. Being confident in STEM will help prepare them for possible opportunities.

Fun Times!

While pursuing their own interests in STEM topics, young people can try new things, meet engaging people, and go to interesting places. Programs like *SciGirls* can provide fun, engaging STEM activities that differ from the formal classroom setting. Activities such as designing a scientific investigation, creating a solution to a technical problem or visiting with a woman scientist or engineer can inspire youth and allow them to see STEM in a different light.

How can you support youth in STEM?

Invite Questions

Encourage youth's natural curiosity about the world. Scientists and engineers are professional question askers and problem solvers. Let youth know that it's perfectly acceptable not to have all the answers, and encourage them to explore and discover! Celebrate all attempts at trying new things. Even if you aren't comfortable with STEM, be positive.

Encourage Youth to Pursue STEM in School

Expect youth to do well in STEM and communicate your expectations clearly. With the growing importance of science and technological literacy, it is important to spark and strengthen young people's engagement, interest, and confidence in STEM subjects in elementary and middle school. Once in high school, youth will make choices that will either open or close doors to STEM studies and career choices. Having a strong knowledge base in STEM topics will give them the opportunity to access any career path they choose, with confidence. Help them see the connections between STEM classes and future career options. Start early!

Help Access STEM Opportunities

Great STEM learning opportunities can be found outside the classroom. Learning opportunities for youth can be found at science museums, zoos, scouting organizations, and STEM clubs during after-school hours, weekends, and summer breaks. These programs often provide youth with introductions to working women mentors who can help youth navigate the course of becoming a scientist or engineer.

Connect them to a Role Model/Mentor

Seeing women who have succeeded in STEM helps inspire and motivate youth, especially when they can relate to these role models as people with lives outside of work. Role models and mentors not only broaden youths' views of who does science, but expand youths' vision of what's possible in their own lives. You can share role models with youth by reading biographies, looking at video and text profiles online and watching TV shows (fictional and documentary) that feature women STEM role models. Talk with family, neighbors, friends and community members that work in STEM fields and ask them questions about what they do and how they got there.

Check out *SciGirls* role model videos at scigirlsconnect.org/resource_topic/role-model-profiles to learn about women in STEM careers.



How can you offer a STEM-Friendly Home?

STEM is about asking questions and exploring. Youth can start by being curious about how everyday things work. “What happens when you flip a light switch on? What happens when you use different ingredients when making cookies?” Encourage safe experimentation and discovery in the kitchen and backyard, where youth can practice predicting, measuring, observing, and analyzing. Offer basic supplies, Internet access, a library card, and a space where they can make a mess. Talk to them about math and science. Ask about what they’re learning in school. Encourage them to share their struggles and successes!

Citizen Science Adventures

Public participation in scientific research, also known as citizen science, engages ordinary people (youth and adults) in the collection of data for use by research scientists.

Citizen science projects come in all shapes and sizes and cover a wide variety of topics like data collection, data classification, and community based collaborative projects - and they can be done at home!



Participating in citizen science can help connect youth to the outdoors and create greater interest in environmental issues. When youth participate in citizen science they actively engage in hands-on science, collect data on local, personally relevant topics, and work in collaborative settings that provide room for their creativity.



Explore Citizen Science projects at scistarter.org, zooniverse.org, science.nasa.gov/citizenscience, and birds.cornell.edu/home/get-involved to engage youth in STEM!



Carnation Chromatography

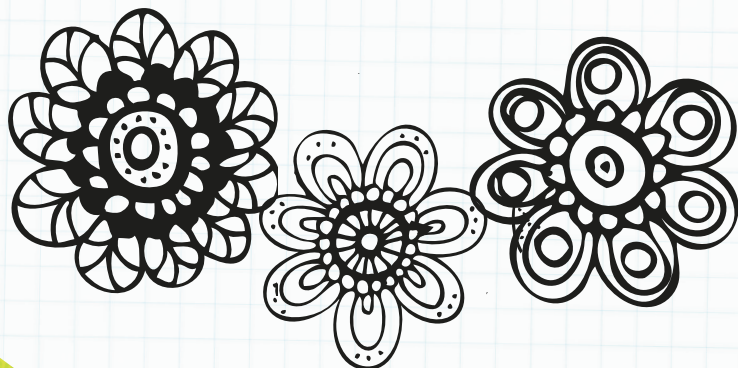
Discover how water changes the color of markers!

You'll Need:

- facial tissues
- washable markers
- pipe cleaners

Here's How:

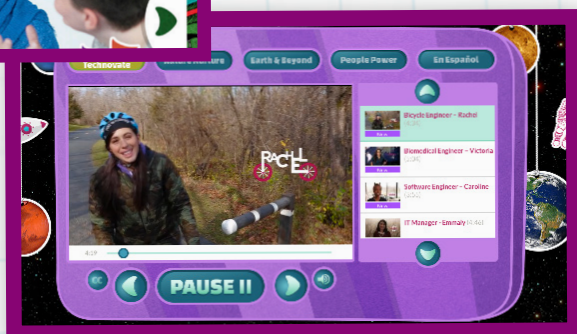
1. Create a tissue paper flower:
Fold facial tissue on the short side accordion style.
Wrap top 2 inches of pipe cleaner in the middle of the folded facial tissue to hold it in place. Cut the folded end of the facial tissue. Peel apart the layers of the facial tissue until it resembles a flower.
2. Color the flower with markers as much as desired.
3. Lightly spray the flower with water.
4. What happened to the marker colors? Did you notice any patterns?
5. Create multiple flowers and test out different colors of markers. Test out different marker brands. Do the same colors in different brands respond the same way?



Additional resources

PBS Kids Videos:

You can watch *SciGirls* full episodes, clips, and role model videos at pbskids.org/scigirls/videos.



PBS Kids Games:

Play fun STEM games like Code Quest and Creature Features at pbskids.org/scigirls/games!



Additional resources

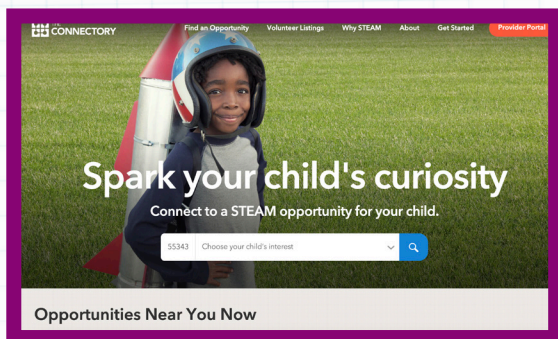
PBS Parents:

Head to pbsparents.org/scigirls for more great family STEM activities!



The Connectory:

Search The Connectory (theconnectory.org), an online database of STEM opportunities for youth, to find STEM opportunities.



FabFems:

Find women STEM professionals to inspire youth in STEM at fabfems.org.

