



# SciGirls

SciGirls Strategies:

How to Engage Girls in STEM

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Produced By:



Made Possible By:





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Twin Cities PBS | SciGirls

ST. Paul, Minnesota



# SciGirls Strategies Training

## Agenda

- Welcome!
- SciGirls Overview
- Activity!
- SciGirls Strategies
- Questions





Let's Do An Activity!  
Mission Patch Party



SciGirls

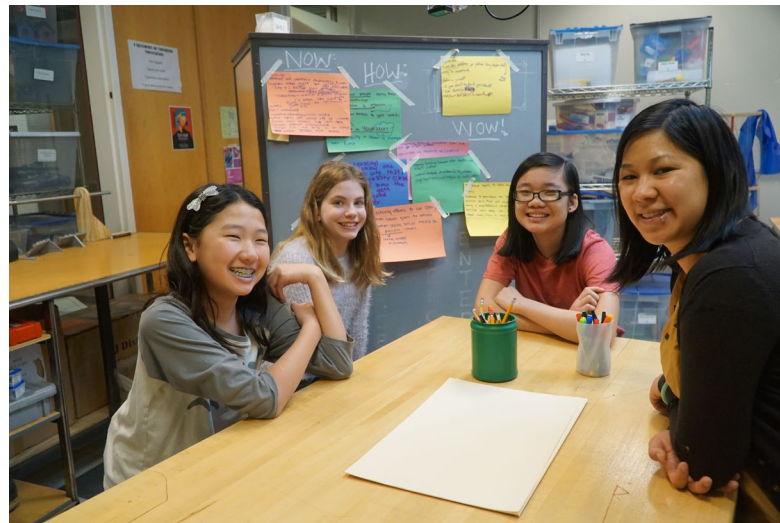


TWIN  
CITIES  
PBS

# Mission Patch Party

## Design a Mission Patch for Your Group!

- Materials:
  - Paper
  - Pencils, markers
  - Internet access for researching
  - Digital tools for design (optional)





# The Big Idea



Media and education  
that changes the way  
girls see STEM and  
the world sees girls.

# Our Approach

- On TV
  - national PBS Kids series
- Online
  - PBS Kids website
- On the Ground
  - activities and professional development



## On TV

- Check your local PBS listings OR watch full episodes online
  - Features *real* girls doing STEM investigations they're passionate about
  - Highlights the science and engineering processes
  - Features *real* women STEM professionals



PBS LearningMedia

SciGirls



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# Online

[pbskids.org/scigirls](https://pbskids.org/scigirls)



Mobile friendly  
website for kids!

# Online







## SciGirls Strategies: How to Engage Girls in STEM!

Learn about the latest strategies to engage girls in STEM!

FEATURED VIDEOS

FEATURED ACTIVITIES

RESOURCES EN ESPAÑOL







# Let's look at the data!

## Research/Rationale

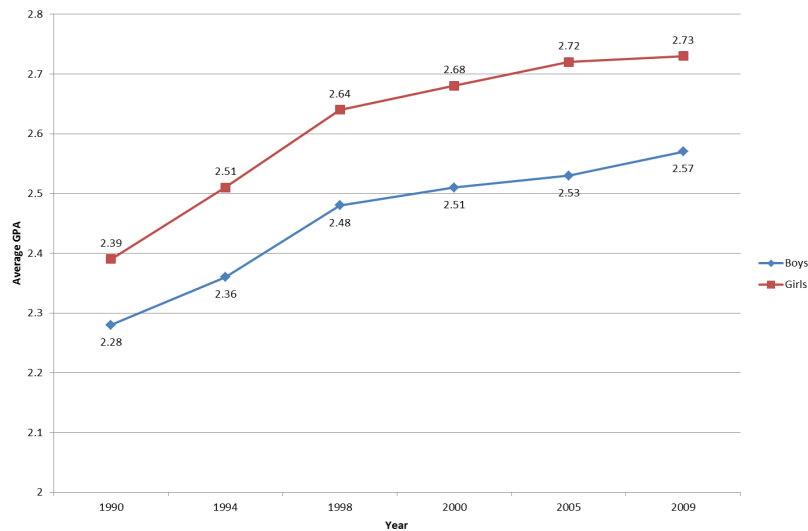
Let's review and discuss the following graphs.



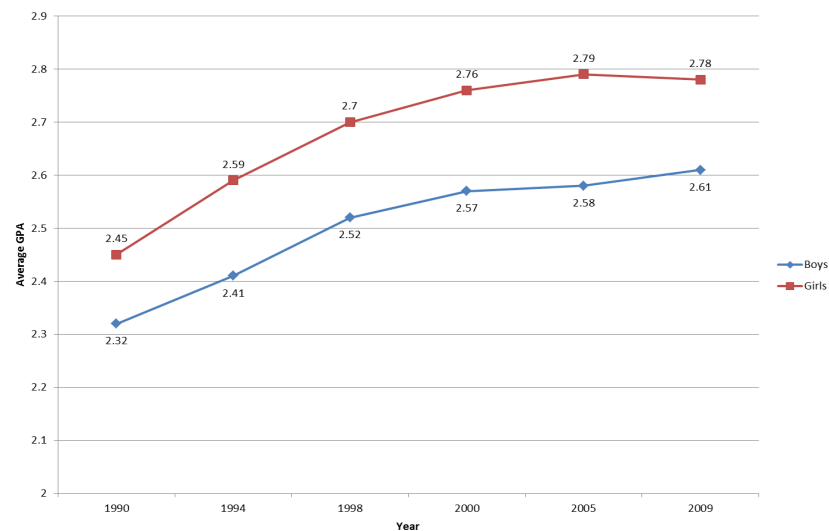
# Rationale

## GPA's in Math and Science

Grade Point Average in Mathematics, by Gender, 1990-2009

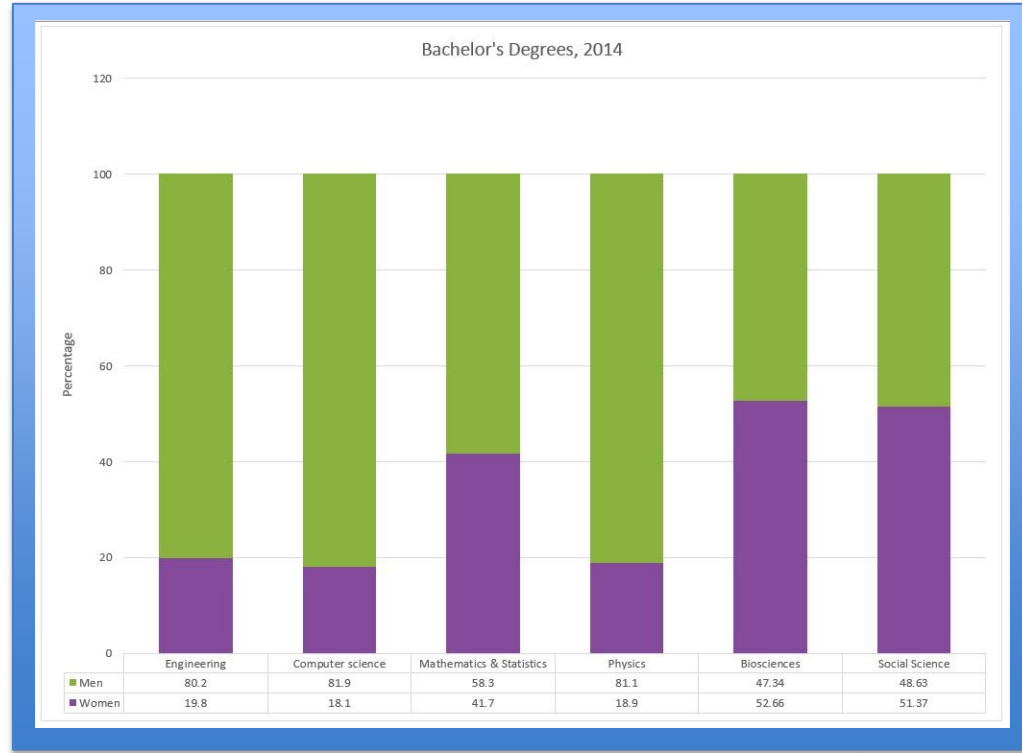


Grade Point Average in Science, by Gender, 1990-2009



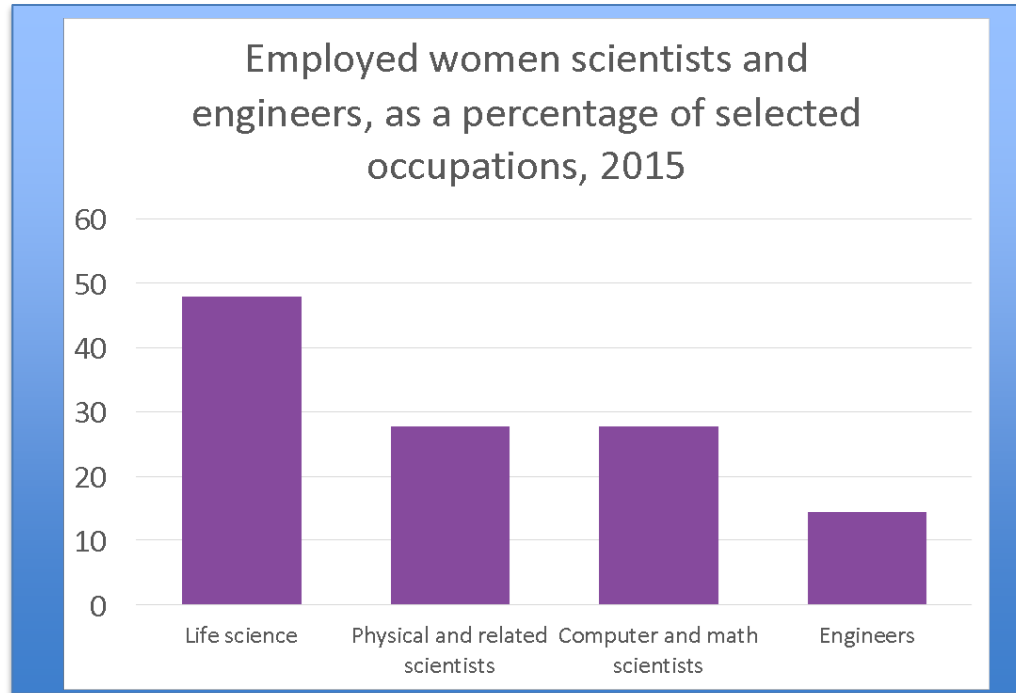
SOURCE: U.S. Department of Education, Institute of Education Sciences, National Center for Education Statistics, High School Transcript Study (HSTS), various years, 1990-2009.

# Rationale



Bachelor's  
Degrees

# Rationale



SOURCE: U.S. Department of Education, Institute of Education Sciences, National Center for Education Statistics, 2014.



# Rationale

- Boys and girls do not display a significant difference in their **abilities** in STEM. The cause is social and environmental.
- Differences consistently appear in girls' **interest** and **confidence** in STEM subjects, starting at a very young age.
- These differences can be linked to a **negative self-perception**, enhanced by stereotypes.





The SciGirls  
Strategies:  
How to Engage Girls in  
STEM



# Framing the SciGirls Strategies

STEM for all learning environment and culturally responsive teaching practices frame all of the *SciGirls Strategies*.





# STEM for All Learning Environment

Brainstorm:

What creates the least welcoming STEM learning environment?

- Physical space
- Behaviors/interactions of people





# STEM for All Learning Environment

- Create a warm and well decorated space that fosters cooperation and acceptance
- Learn about youth's needs
- Practice and encourage active listening
- Use icebreakers
- Create an atmosphere of mutual respect
- Provide opportunities for youth to voice their opinions and feel accepted



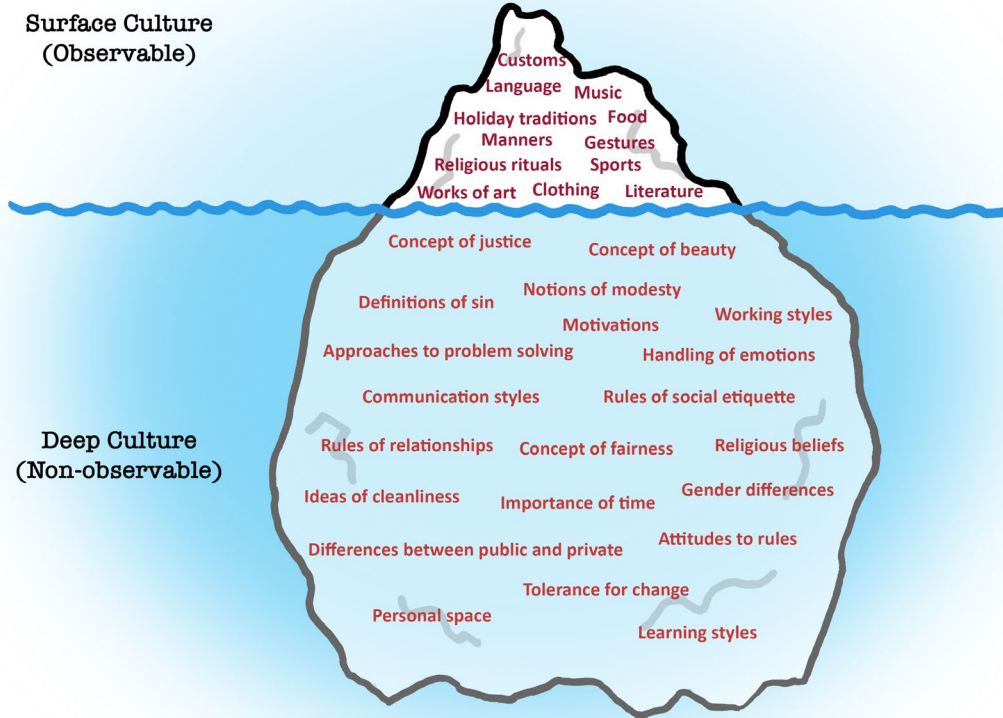
# Culturally Responsive Teaching

*Lifelong* process of using *cultural knowledge, prior experiences, and performance styles* of diverse students to make learning more appropriate and effective for students.



# Culturally Responsive Teaching

Surface Culture  
(Observable)



Deep Culture  
(Non-observable)



## SciGirls Strategies: How to Engage Girls in STEM

The *SciGirls* approach is rooted in research about how to engage girls in STEM. A quarter of a century of studies have converged on a set of strategies that work, and they have become the framework for *SciGirls*.

- 1 **Connect STEM experiences to girls' lives.**
- 2 **Support girls using STEM practices.**
- 3 **Empower girls to embrace struggles.**
- 4 **Encourage girls to challenge STEM stereotypes.**
- 5 **Emphasize that STEM is collaborative and community-oriented.**
- 6 **Interact with diverse STEM role models & mentors.**

# Small Group Discussion

1. Take a look at the SciGirls Strategies Postcard.
2. Choose 1 – 2 strategies that catch your attention.
3. Discuss your strategy(s): do you agree with it? Have you used it in your space? How could it affect youth in your programs or in your life?



# 1. Connect STEM Experiences to their lives

- Allow youth to explore issues or topics they care about and that impact their lives, families, or communities to help them see the relevancy of STEM.
- Include posters, materials, and examples that reference girls' communities and experiences; for instance, posters of STEM professionals who mirror the girls.
- Allow time for reflection. You might ask them to write in a journal or talk with each other about connections to their lives.





## 2. Support girls using STEM practices.

- Engage girls in hands-on, inquiry-based STEM experiences that incorporate practices used by STEM professionals
- STEM Practices: asking questions and identifying problems, planning investigations, making predictions, building and testing models or prototypes, analyzing data and constructing explanations, and sharing results and solutions



### 3. Empower girls to embrace struggle.

- Working through problems and having experiments fail is a normal part of the scientific and engineering process.
- Provide time and space for to grapple with and process ideas before stepping in to provide support and direction.
- Ask questions that get at the process of learning rather than a finished product
- Provide feedback on things they can control—such as *process, strategy, behavior*



# 4. Encourage girls to challenge stereotypes

- Provide examples of what STEM looks like for professionals. Help girls understand the stereotypical STEM professional is not what many people experience in their own work lives.
- Incorporate materials, images, and content that counter stereotypes about who does STEM.
- Provide opportunities for girls to work together, support each other, and connect with STEM-minded peers.
- Point out that doing STEM and being a STEM person does not contradict how girls see themselves or their aspirations for the future.





## 5. Emphasize that STEM is collaborative, social, and community-oriented.

- Provide opportunities for girls to collaborate successfully and help them understand the benefits of collaboration.
- Give girls ownership in the process by designing meaningful team roles that are intellectually engaging and provide opportunities for each girl to contribute to the learning process.
- Help girls get to know each other, make connections, and feel comfortable sharing their ideas.
- Share examples of how STEM offers opportunities to work with others, help others, and give back to the community.



## 6. Interact with diverse STEM role models and mentors

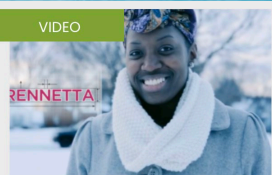
- Incorporate role models who are supportive, engaging, and relatable who mirror the diversity in your population.
- Encourage role models to describe their career path, what their work looks like and how their work benefits others. Ask them to talk about their personal lives as well, including their hobbies, interests, pets, and families.
- Provide opportunities for girls to engage with different types of role models like STEM professionals, educators, parents, and near peers (high school or college students).



# Role Model Videos

## The SciGirls Collection

VIDEO



### Architectural Estimator: Brennetta Harris

ROLE MODEL PROFILES

Meet Brennetta Harris, an architectural estimator at CMI Architectural Products.

VIDEO



### Learning Experience Designer: Shakiyla Huggins

ROLE MODEL PROFILES

Graduate student and math teacher, Shakiyla strives to make online learning easy.

VIDEO



### Space Station Explorer: Abby

ROLE MODEL PROFILES

Abby seeks adventure, from doing math to exploring Chicago to sending bacteria to space!

VIDEO



### Park Ranger: Claudia Santiago

ROLE MODEL PROFILES

As a Citizen Science coordinator at Congaree National Park, Claudia shares her love of science and the outdoors with the community.

VIDEO



### Bicycle Engineer: Rachel Gitajn

ROLE MODEL PROFILES

Meet Rachel Gitajn, a design engineer at Quality Bicycle Products.

VIDEO



### Web Developer / Project Manager: Emmaly Manchanthasouk

ROLE MODEL PROFILES

Meet Emmaly Manchanthasouk, a business analyst at Land O' Lakes.

VIDEO



### Bióloga | Biologist: Amelia Merced

ROLE MODEL PROFILES

Dr. Amelia is a microscopist in Puerto Rico researching plant development and diversity.

VIDEO



### Gameplay Engineer: Aubrey Scott

ROLE MODEL PROFILES

VIDEO



### Welder / Instructor: Seven Bailey

ROLE MODEL PROFILES

VIDEO



### Medicinal Chemist: Becca Cuellar

ROLE MODEL PROFILES

VIDEO



### Firefighter: Kate Heckaman

ROLE MODEL PROFILES

Meet Kate Heckaman, a firefighter in the St. Paul Fire Department.

Find more role model videos at: [scigirlsconnect.org/resource\\_topic/role-model-profiles](https://scigirlsconnect.org/resource_topic/role-model-profiles)



# SciGirls Strategies Debrief

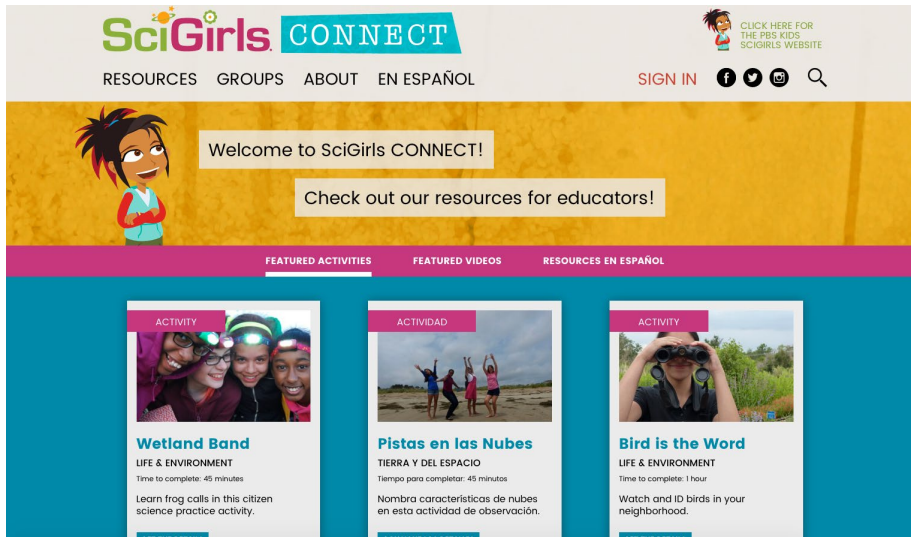
- ★ Think about the activity we did today.
- ★ Each table will take one of the *SciGirls Strategies* and discuss how they were used in today's activity.
- ★ Be prepared to share with the rest of the group.
  - Which strategies did you see in the activity?
  - Which strategies will be hardest to implement?
- ★ How can you apply the *SciGirls Strategies* to activities that you already use?



## SciGirls Strategies: How to Engage Girls in STEM

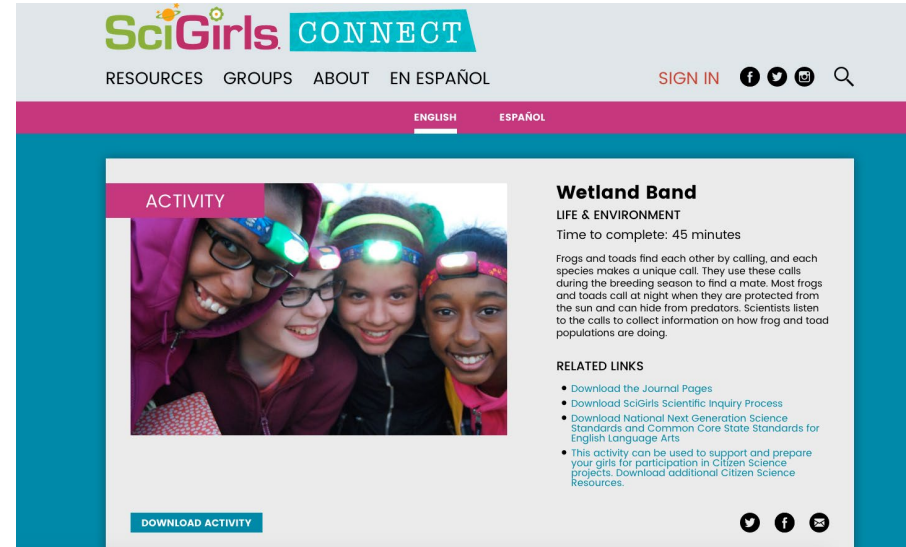
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Download videos, activities, and other resources to enhance your program!

# Educator resources on scigirlsconnect.org



Questions?