girl museum

Educational Guide

By Girl Museum
www.girlmuseum.org

Inside:

STEM Girls explores the history of and contemporary issues facing women and girls in STEM fields. We travel back in time to uncover the first women to engage in Science, Technology, Engineering, and Math. Along the way, we showcase the impact that women have had on these fields and on our everyday lives. *STEM Girls* also highlights modern-day girls and women whose research and inventions are working to improve lives as well as solve social and environmental issues across the globe.

As part of our *Girls in the World* series, *STEM Girls* explores the contemporary social issue of the lack of girls in STEM fields. We also aim to inspire the next generation of women in STEM through role models; encouraging STEM exploration through play, school, and community activities; and other resources accessible to girls across the globe.

This educational guide is designed for classroom use with students in elementary and secondary school and university settings. There are also activities that are aligned to the Common Core State Standards.

Discussion Questions

Students can answer the following questions on their own or discuss in groups.

1. Cause and Effect: Did one girl's invention pave the way for another later invention? Find these girls on the timeline in the exhibit and discuss how their STEM contributions are related.
    - Ada Byron, Countess of Lovelace
    - Grace Murray Hopper
    - Karen Sparke Jones

    CCSS. ELA-LITERACY.RH.9-10.3 Analyze in detail a series of events described in a text; determine whether earlier events caused later ones or simply preceded them.

2. What opportunities have you had to participate in STEM throughout school? Have you noticed that these opportunities have been different from those offered to male classmates?

3. When were you most interested in STEM fields? Think about what sparked your interest and if anything hindered your pursuit of STEM.

Activity: Create A Map

Explore the "Inspire" section in the *STEM Girls* exhibit. Choose 6 of your favorite girls, past or present. Label where each girl lived on the world map below and answer the questions to the right.

CCSS.ELA-Literacy.RH.6-8.7: Integrate visual information (e.g., in charts, graphs, photographs, videos, or maps) with other information in print and digital texts.

1. Why did you choose the girls you put on your map?

_____

_____

2. How do you think their lives were similar or different from one another?

_____

_____

3. Do you have anything in common with the girls you picked?

_____

_____

Activities

Find a STEM Role Model by completing one or more of the activities below.

Activity #1: *Cecilia Payne*

Make a map of the stars! Head outside on a clear, starry night. Spend some time looking up at the sky. What do the stars look like? Are they different colors and sizes? Are some brighter than others? Are you familiar with any of the constellations and can you find them?

On a black piece of paper, use a white crayon or colored pencil to draw what you can see in the night sky. Take a picture of your map and send it to us at share@girlmuseum.org.

Activity #2: *Florence Bascom*

Learn how mountains are made. Florence Bascom's work helped us to understand how the Appalachian Mountains were formed. Use this fun (and yummy) activity to learn about plate tectonics and make your own mini mountain range!

Supplies: 2 graham crackers, whipped cream, a plate, and a bowl of water.

Directions: Spread the whipped cream on your plate. Dip each graham cracker in the water for a second, you don't want them too mushy! Lay the graham crackers on the whipped cream with wet sides facing each other. Push the graham crackers together to see how they form a mountain.

Unique STEM Careers

Thinking about working in a STEM field? Check out these careers!

- Anthropologist - studies humans past and present.
- Food science technician - includes being a professional taste tester!
- Automotive performance engineer - test drive cars in extreme conditions.

Common Core State Standards for activities:

CCSS.ELA-LITERACY.RST.6-8.3 Follow precisely a multistep procedure when carrying out experiments, taking measurements, or performing technical tasks.

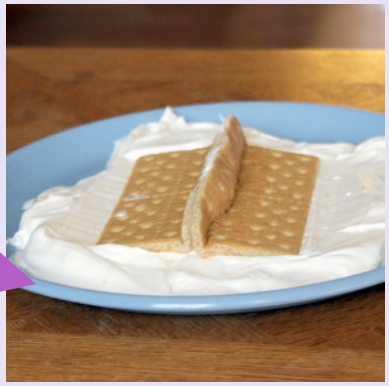


Photo and instructions from we-made-that.com

Activity #3: *Lily Born*

Many girls, such as Lily Born (inventor of the unspillable cup), invented things that would help their loved ones. Think about yourself, your family, and your friends. Do any of these people face challenges when doing certain tasks? What is something that could help them?

Draw, create, or write about what you would invent to help solve this problem. Send us your idea to share on Facebook! E-mail us at share@girlmuseum.org.

Activity #4:

Rosalind Franklin

Rosalind Franklin studied DNA and helped to discover its double helix shape. Complete this fun experiment to extract real DNA from a strawberry!

Materials:

- measuring cup and measuring spoons
- rubbing alcohol
- funnel
- pipette
- 1/2 teaspoon salt
- 1/3 cup water
- 1 tablespoon dish soap
- small bowl
- coffee filters
- tall drinking glass
- strawberries (green tops removed)
- micro centrifuge tube or another small container
- Ziploc sandwich bags

Instructions

1. Chill the rubbing alcohol in the freezer. (You'll need it later.)
2. Mix the salt, water, and dish soap in the small bowl. Set the mixture aside. This is your extraction liquid.
3. Line the funnel with the coffee filter, and put the funnel's tube into the tall drinking glass.
4. Put the strawberry in the plastic bag and push out all the extra air. Seal it tightly.
5. With your fingers, squeeze and smash the strawberry for 2 minutes.
6. Add 3 tablespoons of the extraction liquid you made in Step 2 to the strawberry in the bag. Push out all the extra air and reseal the bag.
7. Squeeze the strawberry mixture with your fingers for 1 minute.
8. Pour the strawberry mixture from the bag into the funnel. Let it drip into the glass until there is no liquid left in the funnel.
9. Throw away the coffee filter and the strawberry pulp inside.
10. Give each student a microcentrifuge tube/small container. Have students use a pipette to suck up some strawberry mixture and squirt it into a tube.
11. Squirt alcohol on top of the strawberry mixture in the tube.
12. Shake the tubes vigorously for 30 seconds. Look at the white slimy stuff floating in the tube – that's the strawberry DNA!

Girl Museum

We are the first and only online museum about girlhood.

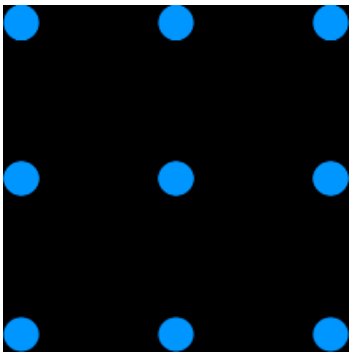
We exhibit, educate, and raise awareness about the unique experience of being born and growing up female around the world in the past and present.

As a community of passionate and creative individuals, we acknowledge and advocate for girls as forces for collective responsibility and change in the global context, not as victims and consumers.

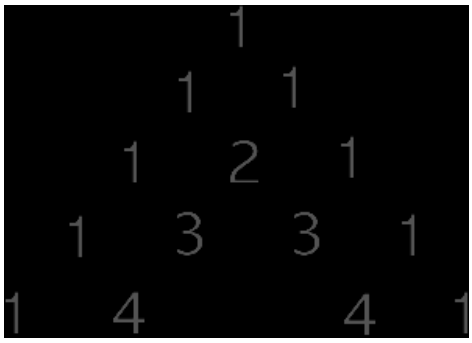
We are a 501(c)3 non-profit educational organization.

Learn more and get involved at www.*GirlMuseum.org*

Math Challenge



Without lifting your pencil, connect all of the dots with 4 straight lines.



What number goes in the blank space on the bottom line?
Hint: the answer is not 4!

A cat is at the bottom of a 20-foot well. Each day, he climbs up 5 feet...And each night, he slides down 4 feet.
How many days will it take him to reach the top of the well?