

STEM-TASTIC PROGRAM PATCH

The **STEM-tastic Program Patch** is a brief introduction into STEM: the fun; the facts; and the fantastic! Girls will **discover** what each letter means, **connect** with how it impacts them, and **take action** by imagining how they can use STEM to make the world a better place!



Did you know that STEM (Science, Technology, Engineering, and Math) is integral to your everyday life? You are surrounded by the works of scientists, technologists, engineers and mathematicians... and you are more like them than you know! If you like to discover, go exploring, ask questions, create new things, use your imagination, or want to make the world a better place, you already are STEM-tastic!

To earn the STEM-tastic Patch:

Daisies: Complete at least 1 activity from EACH Discover and Connect section, and the 3 activities from Take Action. (Total of 11 activities)

Brownies and Juniors: Complete at least 2 activities from EACH Discover and Connect section, and the 3 activities from Take Action. (Total of 19 activities)

Cadettes, Seniors and Ambassadors: Complete at least 3 activities from EACH Discover and Connect section, and the 3 activities from Take Action. (Total of 27 Activities)

**Make sure to follow GSUSA Safety Activity Checkpoints.
If you do not have access to a computer at home, visit your local library!**

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S is for Science!

Discover...by learning!

- A. Look up the definition of science. How would you explain it in your own words?
- B. There are many types of scientists. Learn about three different types of scientists, how their work may impact you, and what type of tools they use.
- C. What are the steps of the Scientific Method?
- D. Interview a female scientist or learn about a famous female scientist. Make sure to learn why she became a scientist!
- E. Take a trip to a Science Museum or laboratory.
- F. Look around you, can you spot three different things that a scientist may have helped create?

Connect...by being a scientist!

- A. Use the scientific method, and do two science experiments. Hint: Use a science journal to record your experiments! Find science experiment ideas here: <http://www.sciencebuddies.org/> and how to journal here: <http://www.kcedventures.com/blog/science-projects-for-kids-notebooks-and-journals>.
- B. Use a microscope, magnifying glass, or telescope to look at three different things.
- C. Be an astronomer by identifying different constellations, or creating a model solar system.
- D. Be a botanist by learning about and identifying plants. Why do plants come in so many different shapes and sizes? You can use a scientific Journal to make sketches of what you find and write down you're your ideas about why it has a certain shape.
- E. Be a biologist by learning about how animals use their skin or fur for camouflage or defense. Identify three different animals that use camouflage to hide, and three different animals that use color to warn other animals that they are dangerous.
- F. Create your own scientific exploration activity.

T is for Technology!

Discover...what technology really is!

- A. Technology isn't just computers and smart phones. Look up the definition of technology. Is it different than what you thought it was? Come up with three different examples of technology that people may not think are technology.
- B. Interview a woman who works in a technology field, or learn about a famous woman inventor.
- C. Study the history of technology by learning about three major technological advances. Can you imagine what life would be like if those advances didn't happen? (i.e. camera/photography)
- D. Look around you, can you spot three different examples of technology?

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- E. Compare a modern cell phone to three different phones in the past. Do they look different? What problems do modern phones solve that old phones didn't? What do you think phones will look like in the future?
- F. Interview someone, preferably older than 50, about their experiences with changing technology.

Connect... by trying technology!

- A. Be a product designer! Pick an item that you use everyday and imagine how you would make it better. Draw out your design and write what features/improvements it has.
- B. Try your hand at coding! Hint: Check out <https://studio.code.org/> for coding options for K-12.
- C. Research three different emerging, or innovative technologies. How could these impact your life in the future? Do you think they will make the world a better place? Hint: Research self-driving cars, or artificial intelligence.
- D. Review Internet Safety and take the Girl Scout Internet Safety Pledge: <http://www.girlscouts.org/en/help/help/internet-safety-pledge.html>
Other resource: <http://www.netsmartz.org/NetSmartzKids>
- E. Create your own animation sequence, or video game. Hint: Try one of these websites: <http://forgirls.girlscouts.org/makeagame/> or <http://www.abcya.com/animate.htm> or <https://www.techrocket.com/>
- F. Create your own technological exploration activity.

E is Engineering!

Discover... what engineers do!

- A. Explore the *Engineer Girl* website. Make sure to look at an interview, and read some of the fun facts: <http://www.engineergirl.org/9311.aspx>
- B. There are many types of engineers. Learn about three different ones, and what type careers those engineers do. (Hint: try the website from above!)
- C. Learn how someone becomes an engineer. What type of schooling do you need?
- D. Interview a female engineer, or research a famous female engineer and learn why she became an engineer.
- E. Define the Engineering Design Process. Have you done this process before without even realizing you were doing it?
- F. Look around you, can you spot three different things that an engineer may have helped create?

Connect... by trying it out for yourself!

- A. Be an Aerospace Engineer by creating a rocket, airplane or designing a space vehicle.
- B. Be a Chemical Engineer by making your own silly putty, crystals, lip balm, etc.
- C. Be a Civil Engineer by building a bridge with popsicle sticks, or with whatever you can find around the house! How much weight can it hold?

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- D. Be an Environmental Engineer by making a pinwheel and learning about wind energy or make a cardboard/aluminum foil solar oven. Can you cook a s'more in it?
- E. Take a trip to a Science Museum that has engineering activities.
- F. Create your own engineering exploration activity, but use the Engineering Design Process.

M is for Mathematics!

Discover...the importance of math!

- A. Interview an adult to identify 10 ways that person uses math in their lives.
- B. Interview a female mathematician or research a famous female mathematician. What is one interesting fact about why they chose to a career in math?
- C. Learn the answer to this question: How is math the "language of science"?
- D. Learn about the difference between the imperial and metric systems. Which system is more popular around the world?
- E. Look through some magazines or newspapers. What kind of different graphs can you find?
- F. Look around you, can you find three things that are related to math?

Connect...by using it in real life!

- A. Are you a square or a rectangle? Measure your arm span (fingertip to fingertip), and compare that to your height. Are they same? Measure two other people as well.
- B. Practice math by improving your money handling skills. You can set up and operate a pretend store, practice selling cookies and counting change, or come up with your own money-handling practice idea!
- C. Learn about measurements by baking a cake, some cookies, etc. Pay close attention to the baking directions!
- D. Explore outside to find math in nature! Look for symmetry, or patterns like a tessellation. Bonus: find examples of a Fibonacci spiral.
- E. Create your own secret code using mathematical cryptography.
- F. Create your own mathematical exploration activity.

Now to put it all together... STEM!

Take Action...by using STEM!

1. Discuss how Science, Technology, Engineering and Math all work together. How are they different or the same? HINT: One way to organize your ideas is to make a Venn Diagram.
2. How would you use STEM to make the world a better place? Write out your ideas. HINT: They could be words, or designs for a product.
3. Talk to another girl about what you learned about STEM! HINT: Maybe tell them about your favorite experiment, or favorite woman in STEM.

Optional: Take it one step further and shadow a woman who works in a STEM field!

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Web Resources

General STEM

Brain Pop and Brain Pop JR have animated movies for K-12 for a variety of topics, including STEM.

<https://www.brainpop.com/>

<https://jr.brainpop.com/>

Create a free account with Curiosity Machine to have access to design challenges created by scientists and engineers.

<https://www.curiositymachine.org/>

Have a Girl Scout who is full of questions? Try Ask Dr. Universe!

<https://askdruniverse.wsu.edu/>

Have a taste of STEM by finding Science Snacks (experiments/projects) on Exploratorium.

<https://www.exploratorium.edu/snacks>

NASA Kid's Club is great resource to explore space and what NASA does.

<https://www.nasa.gov/kidsclub/index.html>

PBS Kids has a variety of STEM projects and experiments.

<http://pbskids.org/zoom/activities/sci/>

Science Buddies has great experiments, science projects and information about STEM Careers.

<http://www.sciencebuddies.org/>

Engineering

Engineer Girl has great information about different engineering careers, and stories of real life women in engineering.

<http://www.engineergirl.org/>

eGFI is a great resource about different engineering careers.

<http://www.egfi-k12.org/about/>

PBS Kids Design Squad can help with learning about the Engineering Design Process.

<http://pbskids.org/designsquad>

Technology

Code.org has great lessons on coding for all ages.

<https://code.org/learn>

Create a free account on Tech Rocket to have access to lessons about coding, game design, and graphic design.

<https://www.techrocket.com/>

Internet Safety Websites

<https://archives.fbi.gov/archives/fun-games/kids/kids-safety>

<https://kids.usa.gov/online-safety/index.shtml>

<http://www.netismartz.org/InternetSafety>