

STEM Career Exploration

Imagine time-traveling. You're in the future! What do you look like? What are you doing? Are you doing the same things you enjoy today? Are you playing games? Exploring the outdoors? Working with animals?

In this badge, find out how the things you love can become a part of your future. What you decide to do as a grown-up can start today!

Steps:

1. Discover STEM
2. Explore your future
3. Learn about a STEM career

Purpose

When I've earned this badge, I'll know what STEM is. I'll also know how I can use STEM to help other people, animals, and the planet.





What is STEM?

STEM stands for **science, technology, engineering, and math.**

Science is learning about all different things. We can help nature and animals. We can look at the human body. We can study life on earth and explore outer space.

Technology is machines like cars, computers, and microwaves. We build technology to help us. It can be fun. It can solve problems, too.

Engineering is designing and building things. Engineers build bridges, cars, roads, and other objects.

Math is using numbers and shapes. It helps us understand the world. It helps us count and measure.

Step 1: Discover STEM

What's around you? What does each thing do? How do they help you? Cars help us travel. Toys help us have fun. Food gives us energy.

People create many of these things. They're made using science, technology, engineering, and math, or **STEM**.

STEM is how we understand and build our world. How do you use STEM today? How can you use it in the future? Search for STEM around you. Imagine yourself in STEM. Explore how you can change the world.



Choices—do one:

Go on a scavenger hunt. Can you find STEM around you? Discover it at home. Go outdoors. Search your neighborhood. Find STEM with your troop or family. Can you find machines? What animals and plants are there? Can you find objects with numbers? STEM is everywhere—you just have to search for it! Which is your favorite part?

Try it out! Have you ever used STEM? Maybe you've made a birdhouse? Played a video game? Baked a cake? STEM is used in everything we do! Try each challenge on the next page. Find out what STEM is all about. Ask questions like a scientist. Play a game about computers. Build a tower like an engineer. Use math to count money. Which part of STEM do you like and why?

STEM All Around Us!

Find out more about science, technology, engineering, and math.

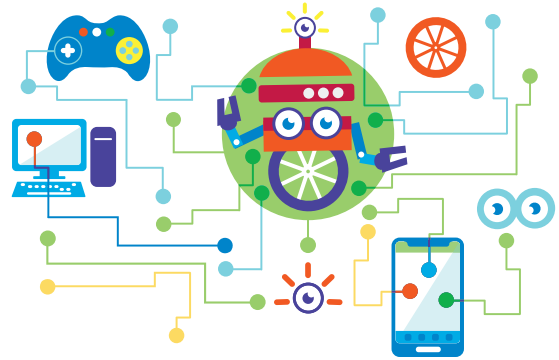
Science

Do you like nature or space?

- Veterinarians care for animals.
- Meteorologists track the weather.
- Nurses help people who are sick.

Challenge: Become a plant expert. Botanists are scientists. They study plants.

Find a plant. Draw it. What do you want to learn about it?
What questions do you have?



Technology

Do you like computers?

- Roboticists build robots.
- Graphic designers make digital art.
- Cryptographers keep people safe online.

Challenge: Play “Programmer Says.” Programmers make apps. They make websites and video games, too. They do this with code. Code tells computers what to do. Pretend you’re a programmer. Have a friend be your computer. What will they do? Tell them step-by-step. Have them follow your code!

Engineering

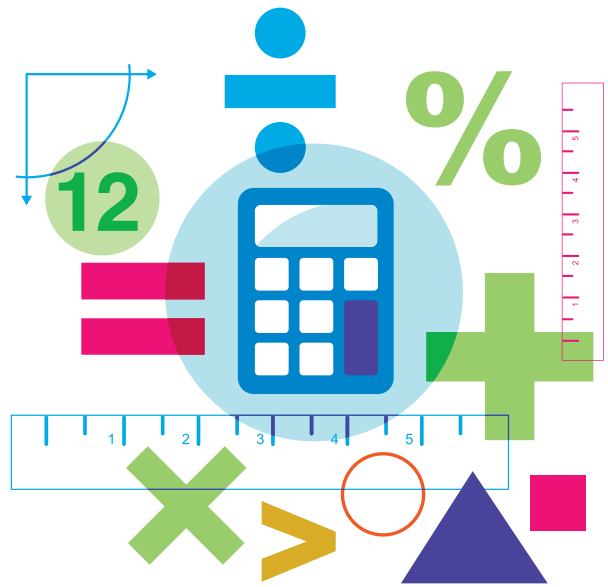
Do you like to build things?

- Mechanical engineers design spacecraft and cars.
- Electrical engineers light up homes and cities.
- Chemical engineers create new medicines and materials.

Challenge: Engineer a building.

Civil engineers design and build bridges. They build roads. They build buildings, too. What would you build?

Imagine you're building a tower. What would it look like? Build it with toothpicks and clay.



Math

Do you like numbers?

- Food scientists measure ingredients for new recipes.
- Cardiologists look for heart patterns.
- Ecologists count plants and animals.

Challenge: Count like a banker.

Bankers count bills and coins. They keep your money safe.

Count 5 pennies.
That's equal to one nickel.

Count 10 pennies.
That's equal to one dime.

► For more fun:

Count 25 pennies.
That's equal to one quarter.

Step 2: Explore your future

You can change the world. You can grow food. You can make medicine. You can help find clean water. STEM can help you do it!

When you grow up, you might work with animals. You might take care of children. You might explore outer space. This is called your job, or **career**. Many careers use STEM, and so do you! What would you like to do when you grow up? What career would you like to have?

Choices—do one:

Act out jobs in STEM. Choose a STEM career. Who would you like to be? Imagine yourself in the job. Are you a scientist or nurse? An engineer or vet? Act it out for your friends to guess! What would you do? Would you use a tool, like a measuring cup, telescope, or computer? Take turns and play again!

► **For more fun:** Runways usually share new fashions, but you can show off careers! Act out STEM jobs on a career path runway.

Make a vision frame. What do you like to do? Do you like animals or nature? Computers or video games? What is your favorite part of STEM? Draw or cut out pictures of things you like from magazines. You can use the collage cutouts on page 11, too. Make a frame with your favorite things. Then draw a “future you” in the middle! What’s your job? What are you doing? How are you dressed? Are you using a tool, like a ruler, computer, or hammer? How are you using STEM?

► **For more fun:** Tape your frame on a mirror. Imagine your future!

Make Your Favorite Things Your Future

Match each thing with a possible career.

If you like...



1. Computers



2. Animals



3. Building



4. Food

You can be a...

A. **Zoologist**

They study and care for large animals like tigers and elephants.

B. **Baker** or **chef**

They measure ingredients and cook delicious food.

C. **Game Designer**

They use computers to make fun video games and apps.

D. **Carpenter**

They use tools to build objects out of wood.

Answer Key:

- 1. Computers and C. Game designer*
- 2. Animals and A. Zoologist*
- 3. Building and D. Carpenter*
- 4. Food and B. Baker or chef*

Change the World with STEM



Dental hygienists help keep teeth clean and healthy.



Automotive engineers make cars safer for people and the planet.



Digital sculptors create computer models of game characters, cars, and other objects.



Marine biologists help animals that live in water, like fish and dolphins.

Step 3: Explore your future

Now that you have some ideas, choose a job to explore. How can you learn more? You might talk to someone in that job. You might take a trip or go to an event. You might search for a video or book.

Then find out more about the job. How does it use STEM? What would you be doing? Would you work in an office or lab? Would you work outdoors? Would you use tools like computers or other machines, or use your hands? Do you work on your own or with a team?

Choices—do one:

Talk to someone in STEM. Learn about their career. You can go on a field trip or chat virtually. Explore how they use STEM. Find out what they like and don't like about their job. What do you want to know more about? What questions will you ask? How do you feel about the job after talking to them?

Explore a STEM career. You can learn about a job in so many different ways. You can find books. You can search for videos. You can tour an office or job site. You can go to a STEM event. So, what will you do? How can you learn more? Pick one way and do it! Like what you learned? What else can you do to find out more? Your future in STEM starts here!



Words to Know



Career: Another word for a job. Your job might be to care for animals or people. You might bake or build things. You might explore nature. You might discover new planets or medicines.

Engineering: Designing and building things like bridges, cars, roads, and other objects.

Math: Using numbers, shapes, and patterns to understand the world.

Science: Studying our world, like nature, animals, the human body, and space.

STEM: A short way of listing science, technology, engineering, and math. Any job that uses these skills is called a STEM career.

Technology: Machines and tools like cars, computers, and microwaves. They help us solve problems and do things.

What's your favorite part of STEM?



Collage Cutouts



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Volunteer's Guide to the Daisy STEM Career Exploration Badge*

Tips and ideas to help you guide your troop through this badge.

Step 1: Discover STEM • 30–40 minutes

Ask: Look around the room. What are some things you see?

Share: Everything around us helps us in some way. People create things to make life easier and more enjoyable. Buildings protect us from the weather. Toys are fun and can help us learn. Foods give us energy. Most things, from buildings and toys to meals, are made using STEM. STEM is all around you in the things you see, do, and use!

Do: Write “STEM” vertically on a whiteboard or a large sheet of paper. Ask Daisies if they know what the letters of STEM stand for by taking some guesses, one letter at a time. Then go over each area of STEM using the information in “What’s STEM?” on page 3 of the Daisy Booklet (also found below):

Science is learning about all different things. We can help nature and animals. We can look at the human body. We can study life on earth and explore outer space.

Technology is machines like cars, computers, and microwaves. We build technology to help us. It can be fun. It can solve problems, too.

Engineering is designing and building things. Engineers build bridges, cars, roads, or other objects.

Math is using numbers and shapes. It helps us to understand the world. It helps us count and measure.

Begin to gauge if there are any areas or careers Daisies mention or seem especially interested in to help you prepare for Step 3. If you’ve already planned something for the badge, like meeting with a guest speaker or going to an event, let Daisies know and tailor your activities accordingly.

Tips: Remind Daisies that the goals of the badge are to learn about what STEM is, connect it to their lives today, and explore how they can use STEM in their future. Check out the “STEM Careers List” at the end of this Volunteer

Guide for ideas of jobs to share with Daisies throughout the badge. You can also find additional resources as part of the badge meeting plans in the Volunteer Toolkit.

Activity Choices—do one:

- **Go on a scavenger hunt.** Invite Daisies to look for STEM in their home, around their neighborhood, or in your meeting area. If you’re meeting in an online space, reach out to families ahead of time to help Daisies find items in their home (or wherever they are) to show others through their screen. If you’re meeting in person, you can plan for the troop to travel around the neighborhood or explore the meeting area together. It may save time and help move the scavenger hunt along if you survey the space, make a list of items Daisies may point out, and classify them into the four fields of STEM before the meeting. For example, plants, animals, and food are examples of science; computers, thermostats, and microwaves are examples of technology; pencil sharpeners, light bulbs, and toasters are examples of engineering; shapes found in furniture, patterns in flooring or rugs, and numbers on a clock are related to math. At the meeting, give Daisies about 10 minutes to search for STEM. With each item found, encourage Daisies to share how it belongs to science, technology, engineering, or math. Let them know that items can be a part of more than one area of STEM, too. For example, clocks use numbers to keep track of time (math), but analog clocks use machines (engineering), and digital clocks use programs (technology). Then, in an open area, provide four large pieces of paper (or space on the whiteboard), each labeled with an area of STEM, and ask Daisies to draw pictures of the items they found on the scavenger hunt or other things that come to mind when they think about each area of STEM. If meeting virtually, create a slide show with a slide for each area of STEM. Ask parents to help their Daisy add pictures to the slides. Finally, ask Daisies, “Which area of STEM excites you the most?”

Materials: Whiteboard or large pieces of paper; markers; drawing and coloring supplies

*Detailed choice activities, meeting tools, and additional resources and materials can be found within the Volunteer Toolkit on my.girlscouts.org.

- **Try it out!** Before the meeting, gather materials and review “STEM All Around Us!” on pages 4–5 of the Daisy Booklet. It may even help to try each challenge on your own and make any adjustments so the challenges will work better for your troop. Depending on your troop size, you might work through each challenge together as one group, doing one challenge at a time, or choose to split up the troop into smaller groups, having them rotate through the stations with the help of other volunteers. Each challenge should take 5–10 minutes or longer if Daisies are especially enjoying the activity. If you use smaller, rotating groups, explain each STEM challenge before you start. Daisies may need help carrying out each challenge. If needed, reach out to families ahead of time to ask for additional volunteers. After, ask Daisies, “Which challenge did you like best and why? What’s the most exciting career you learned about?”

Materials: *Live plant; paper; drawing and coloring supplies; toothpicks; clay; pennies, nickels, dimes, quarters; additional adult volunteers (optional)*

Step 2: Explore your future • 20–30 minutes

Ask: What are some things that you like to do? How can you still do those things as an adult?

Share: When you grow up, you might work with animals and be a veterinarian. You might be a fashion designer and create art people can wear. You might explore outer space like an astronaut. This is called your job, or **career**. Many careers use STEM, and so do you! You can change the world with STEM. You can grow food. You can make medicine. You can help find clean water.

Tip: Continue to note any areas or careers Daisies mention or seem especially interested in to help you prepare for Step 3. You can also share jobs with Daisies to inspire new ideas from the STEM Careers List at the end of this Volunteer Guide.

Activity Choices—do one:

- **Act out jobs in STEM.** Before the meeting, reach out to your troop network for career items and accessories that relate to STEM careers, like lab coats, rulers, hard hats, reflector vests, stethoscopes, calculators, and field guides. Prepare a makeshift wardrobe or accessory trunk for Daisies to pick through at the meeting. Then, at the meeting, ask Daisies, “What are some different careers that use STEM?” Make a list of their ideas before assigning Daisies different careers to role-play, like being a nurse, scientist, chef, road builder, or banker, or having them choose their own career. As they look through the options of clothing and accessories, ask Daisies questions like, “What kinds of things do you do in this career? What tools do you use? Why did you choose this career (if they chose it)?” to help foster conversations and

role-play. **For more fun:** Play some runway music, use a hallway as a catwalk, and use a pretend microphone to narrate their fashions and relevance in the world of STEM. For example, you might say, “Here comes Ella in her protective white coat and goggles. Scientists like Ella work in labs with different tools to measure chemicals. They make medicines to help sick people get better. Let’s give Ella a STEM square of applause!” Have everyone clap in a square, one corner for each area of STEM!

Materials: *Various clothing items and career accessories*

- **Make a vision frame.** Before the meeting, create your own vision frame. As a role model for the troop, be sure to not only include areas that will be explored in this badge, but also areas that do not reinforce stereotypes about what girls and women can aspire to become. At the meeting, share your frame with Daisies and explain how some of your childhood interests are still with you as an adult and how they relate to STEM. Then invite Daisies to organize the materials so they see what they have available to them to create their vision frame (scissors, collage cutouts, magazines, etc.). Ask Daisies, “How can you turn what you like to do today into a career in the future?” Explain that they’re going to create a vision frame that reflects their interests and how they can become a part of the Daisies’ future careers. Guide Daisies to create their frames by drawing their own pictures of things they enjoy, cutting them out of magazines and catalogs, or using the clip art on page 11 of the Daisy Booklet. Then, encourage Daisies to draw their future selves in the middle of their frame. Ask, “What’s your job? What are you doing? How are you dressed? Are you using a tool, like a ruler, computer, or hammer?” If Daisies are unsure about their future, that’s okay! Encourage them to draw a picture as they see themselves, surrounded by their favorite things in their frame. When everyone is done, invite Daisies to share some favorite things on their frame or their vision for their future, if they’d like. Ask questions to encourage discussion, such as “What are some things you like most? How do you use STEM? What’s your favorite part of STEM?”

Materials: *Magazines, newspapers, or catalogs; drawing and coloring supplies; safety scissors; glue sticks*

Step 3: Learn about a STEM career • 20–30 minutes

Ask: Imagine you’re grown up: What’s your career? What are you doing?

Share: Now that you have ideas about what you want to do when you grow up, it’s time to find out more! The best way to learn more is talking to someone in that job or seeing it for yourself. You can take a trip, talk to others, watch a video, or look at books. So, what’s a job in STEM you’d like to explore more? What kinds of things would you do in this job? Will you use different tools like computers or

machines? Are you working with a team or are you leading it? How can STEM be used to help people, animals, and the planet? Let's find out together!

Tip: Learning more about a STEM career can happen in many ways and anywhere. You might bring in a guest, visit a job site, watch videos, or learn more at the library. Find an opportunity or activity that fits with your troop's interests and resources.

Activity Choices—do one:

- **Talk to someone in STEM.** Before the meeting, organize a way for Daisies to connect with someone who works in STEM. You can go on a field trip, invite a guest speaker to your meeting, set up a virtual meeting or tour, or have Daisies talk to a family member. Reach out to your network to connect the troop with someone in a STEM field that most closely matches an interest of your Daisies. For example, if the troop is interested in creating tasty new recipes, reach out to a baker or chef. If the troop is interested in outer space, connect with experts at a planetarium or observatory. If your Daisies are drawn to helping injured animals, reach out to an animal care expert at a wildlife rehabilitation center or local animal shelter. If possible, connect the troop to people of all social identities so that any Girl Scout can say, "I see myself doing this job just like them." Diverse role models also help to break down stereotypes related to who can do a particular career. Before and during the activity, help foster discussions with the following questions: What do you want to know more about? What do you like most about the job? How do you feel about the job after learning about it? What other questions do you have?

Materials: *Varies depending on how the troop chooses to connect with someone in STEM*

- **Explore a STEM career.** Before the meeting, find resources to help Daisies learn more about a career in STEM. You might consider meeting at the library or bringing books about a STEM career to your troop meeting. You can also review the compiled resources in the Volunteer Toolkit. Other options for exploring a STEM career include taking a field trip to a job site or attending a local or virtual event through your community or Girl Scout council. As Daisies explore and learn more about a career, ask them if this is a career that they want to learn more about. Ask questions like, "What's your favorite part of the job? What are you most excited to have learned?"

Materials: *Varies depending on how the troop plans to explore the career*

STEM Careers List for Volunteers

CAREERS WITH SCIENCE

- **Care for animals:** Veterinarians help household animals like cats and dogs. Zoologists study larger animals like elephants. Marine biologists study animals that live in water, such as fish and dolphins. Animal technicians of all kinds help care for injured animals until they are better.
- **Track the weather:** Meteorologists predict weather and how it affects the earth and people.
- **Help people stay healthy:** Pediatricians are doctors who treat children and help prevent them from getting sick. Nurses work with doctors to monitor patients who are sick. Dental hygienists work with dentists to help people keep their teeth clean and healthy.
- **Study nature:** Botanists study plants and can help develop new medicines.

CAREERS WITH TECHNOLOGY

- **Build robots:** Roboticists build machines that complete tasks programmed by humans.
- **Make digital art:** Digital sculptors create 3D computer models of game characters, vehicles, and other objects. These computer models can be used in video games and movies, or 3D printed to help make the object become a reality.
- **Keep people safe online:** Cryptographers write code, or instructions, to hide our online data and protect us from hackers.
- **Create digital products:** Programmers write code to design things that are both useful and fun, like apps, video games, and websites.

CAREERS WITH ENGINEERING

- **Make batteries, spacecraft, and cars:** Mechanical engineers create all types of machines, from batteries to refrigerators. For example, automotive engineers design and test vehicle engines, brakes, and other systems to make sure cars are safe for people and the environment.
- **Build systems that help others:** Agricultural engineers find new ways for farmers to grow food and feed more people, like using drones or vertical farming.

- **Create new medicines and materials:** Chemical engineers work in laboratories to make new foods, medicines, and materials to make things like toys, clothing, or fuels for cars.
- **Design cities from the ground up:** Civil engineers design structures like bridges, buildings, and roads.

CAREERS WITH MATH

- **Measure ingredients for new recipes:** Food scientists create new flavors and food combinations to make a new dish or product.
- **Design buildings, furniture, and clothing:** Carpenters and construction workers measure their materials to make sure all the parts fit just right. Architects use computers to sketch their plans and make sure of their measurements. Fashion and costume designers create clothing designs and patterns that fit all shapes and sizes.
- **Count plants and animals:** Population ecologists and conservation technicians study groups of plants and animals to understand why their numbers go up or down and help keep nature balanced.
- **Look for patterns in the human body:** Doctors and other medical professionals focus on specific parts of the human body. For example, cardiologists are doctors who study the patterns of heartbeats to help people stay healthy.

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