

Riveting Robots

Learn

1. Engineer Extravaganza!
2. Brilliant Bots
3. Jazzy Jeopardy
4. FRC Fantasy

Do

1. Handy Hand Tools
2. The Drawing Board
3. Tenacious Tinkerer
4. The Path to Programming

Share

Purpose

To learn about robotics in everyday life, as well as doing activities to learn about different aspects of robotics, and sharing the knowledge learned with others.

Intro

Think about what robotics is and how we use it every day in daily activities.

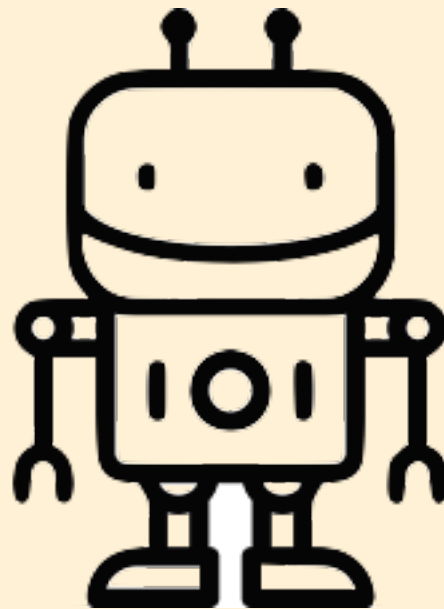
Discuss these questions with your troop before starting the badge:

What is robotics? What is it used for?

Why is robotics important?

Who does robotics?

Who are some famous women who have developed robots?



robotics (n.) - technology that is used to design, build, and operate robotics (Merriam Webster Online).

Areas of Robotics

- Prototyping
- Pneumatics
- Electrical
- Programming
- Fabricating
- Assembly

Learn

Robo Research

Option 1: Engineer Extravaganza!

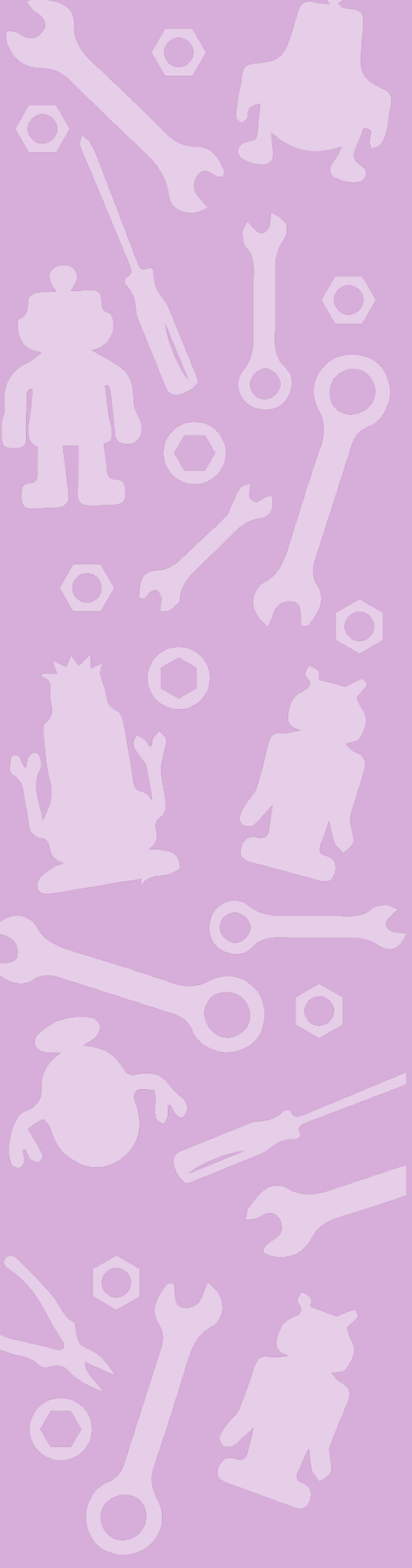
What is robotics? Who designs and builds robots? Have you heard of famous robot developers and engineers such as Ada Lovelace, Melonee Wise, and Cynthia Breazeal? Since robotics is all about engineering, who better to explain it than an engineer? If you or any of your troop mates know an engineer, ask if you can interview them. Ask questions about engineering basics, what it means to be an engineer, and anything else you are curious about! If no engineer is available, listen to a TED Talk instead!

<https://www.ted.com/topics/robots>

Option 2: Brilliant Bots

A great way to learn is to look at what others have done. Have you ever heard of the MARS Pathfinder or Roomba robot from iRobot? There are robots that cut grass, iron shirts or wake you up in the morning. Research famous robots, and look at online articles about the newest tech in the robot world. Find out what makes them unique, and why they're considered breakthroughs in technology. Remember that a robot doesn't have to look like a human, a machine that folds your laundry is also a robot!





Learn

Option 3: Jazzy Jeopardy!

Everybody loves a little fun! Play our jeopardy game to learn the basics of robotics. Go to this url <https://www.jeopardy.rocks/jazzyjeopardy> to play. May the best engineers win!

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Option 4: FRC Fantasy

Let's take a closer look at robotics. Attend a local FIRST robotics competition to see real robots in action. Watch the FRC robots, and note some of the strategies and mechanisms that work better than others. You can ask the teams what it is like to create robots and the strategies they're using for theirs.

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Conceptual Connoisseur

Option 1: Handy Hand Tools

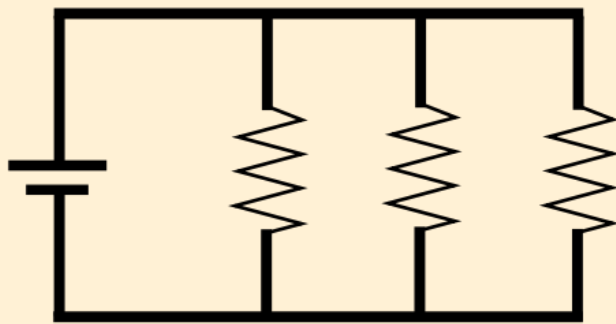
How are robots built in the first place? All engineers start off by using the most basic, non-electric tools, and it's time for you to learn how to use them too! Research different types of hand tools, such as screwdrivers, pliers, wire cutters, etc. and see if you can find similar tools at home, or in your community. Discuss the different types of tools and how to use them safely.

Do

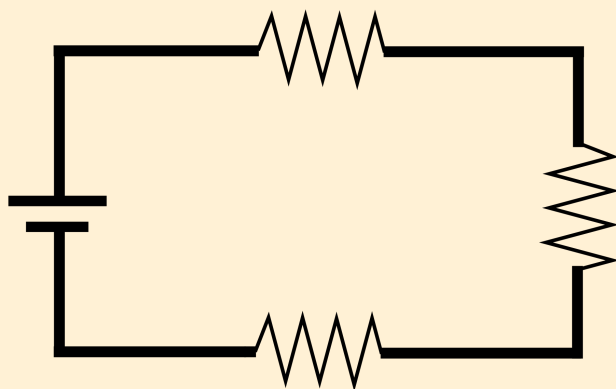
Option 1: Cont.

Don't be afraid to get creative! When building robots from scratch, you use tools to wire components together. Wiring is the basis of the robot, as the connections between parts transmit electricity so the robot can run. Try to do some wiring yourself. Get some small LED lights in various colors from your local hardware store and find some index cards. Poke small holes into the index cards in any pattern to insert the lights into. Solder copper wires between your LEDs to make a circuit. Figure out what type of circuit (parallel or series) will work best to accommodate the pattern you would like for your lights. When you finish wiring, watch your final product light up your day!

Parallel
Circuit



Series
Circuit

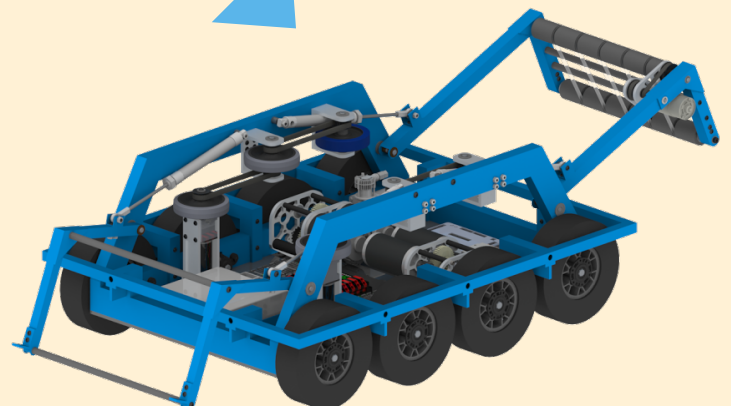
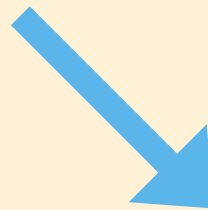
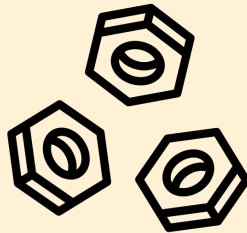


Do

Option 2: The Drawing Board

A good engineer always verifies her design by testing her ideas on a computer before she starts building. Use a computer software to design a 3D model of anything you and your troop members dream of! The sky is the limit and by using free software such as Tinkercad, Google Sketchup, or Onshape Modeling you can bring your ideas to life!

Every robot has to start with a design. Prototyping is when you build a preliminary model of the parts you want in your robot design to test their effectiveness. Prototypes are made out of materials found around the house like straws, rubber bands, and tape. Brainstorm some ideas for your robot and build a prototype. They don't need to be perfect!



Do

Option 3: Tenacious Tinkerer

Many things around us are built using basic robotics concepts. With a parent's supervision, find an item around your house with moving parts (ex. fan, toaster, pinwheel, umbrella) around your house and disassemble them. Use a screwdriver to detach panels and look at the inside of the object. Look at the components of the device and try to guess what the function of each piece is and then research the function of the parts you don't know. How do the pieces work together so they don't collide? How do the pieces move? Do they retract or expand to change size? How could you improve on the current design?

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Option 3: The Path to Programming

How does a robot know when to turn, or when to move? The answer is programming! Programming supplies the instructions for the robot's movement. Browse Made W/ Code's project list. (<https://www.madewithcode.com/projects/>) Find a project that suits your liking, whether it be Yeti or Design an LED dress. Have fun with the projects and play around with the different variables and options available! Look at the code used and try to code your own project. After learning the concepts, all that is left is trial and error!





Share

Option 1: Inspire Her!

Dress up like a famous woman robotics developer and give a presentation about her to your troop. Start with a question about her that interests you. Make sure you include key information about your female scientist's achievements and how she found success. Include answers to all your research questions in your presentation. Your presentation might inspire someone!

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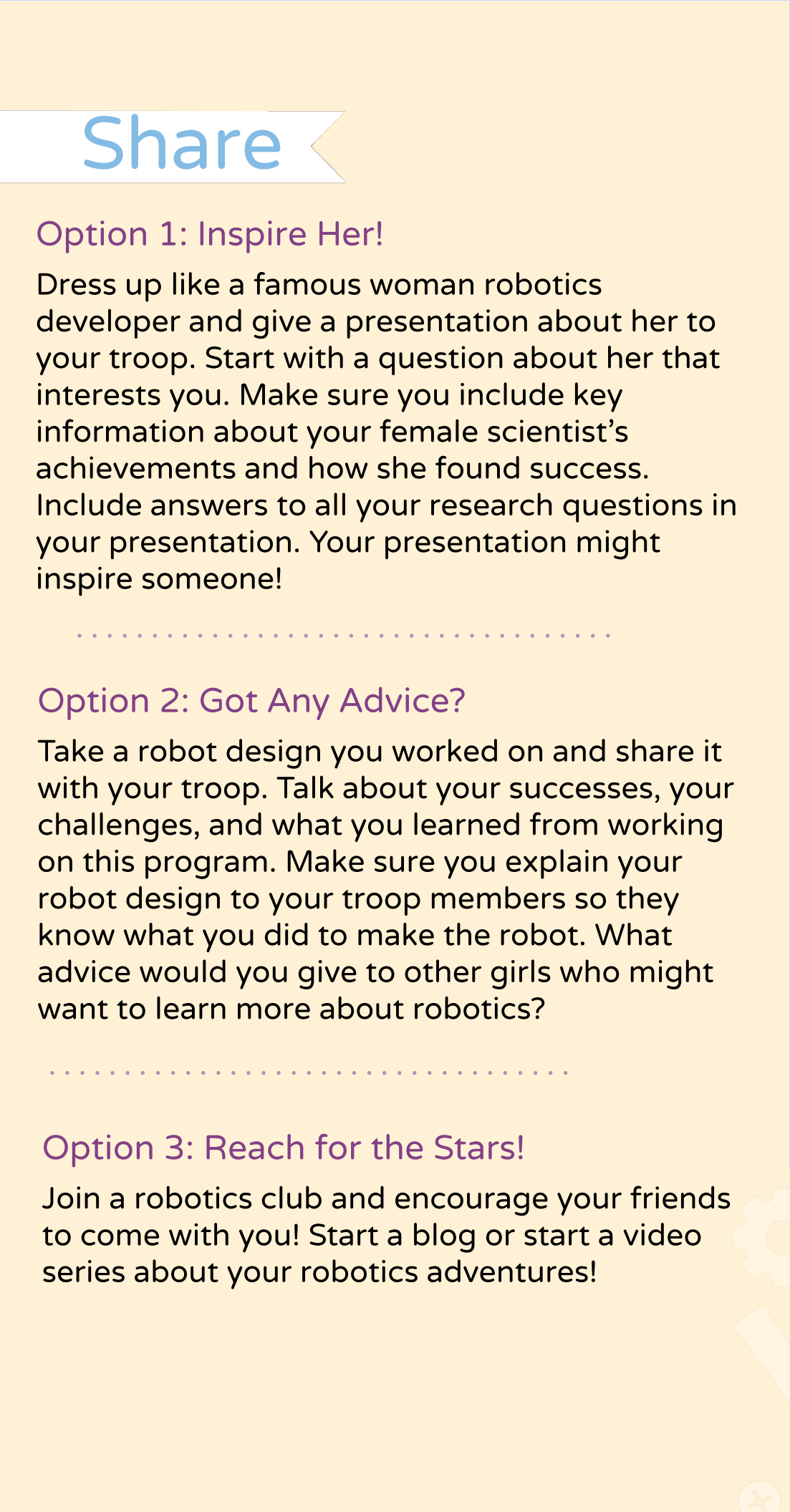
Option 2: Got Any Advice?

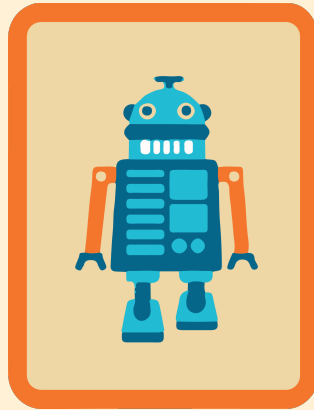
Take a robot design you worked on and share it with your troop. Talk about your successes, your challenges, and what you learned from working on this program. Make sure you explain your robot design to your troop members so they know what you did to make the robot. What advice would you give to other girls who might want to learn more about robotics?

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Option 3: Reach for the Stars!

Join a robotics club and encourage your friends to come with you! Start a blog or start a video series about your robotics adventures!





I learned about the various aspects of robotics and its importance!

I am inspired to:

Badge created by the Space Cookies,
Troop 62868//FIRST FRC Team 1868

FIRST Robotics has a formal alliance with Girl Scouts, giving girls opportunities to explore fields such as robotics and information technology. Learn more at www.firstinspires.org.

girl scouts

