girl scouts

Cadette

CADETTE
Robotics Badges

BADGE SERIES OVERVIEW:

In the Robotics badge series, Cadettes learn how robots work, how to design a robot, and how to share their robots with others. Cadettes explore the parts of a robot, build an electrical circuit that acts like a sensor, and show how a robot could use that sensor to function on its own. They write a computer program to control a robot using basic coding concepts. They use the Design Thinking Process to build and test a working model of a robot that solves an everyday problem. And they explore how to get involved with robotics for fun and as a future career.

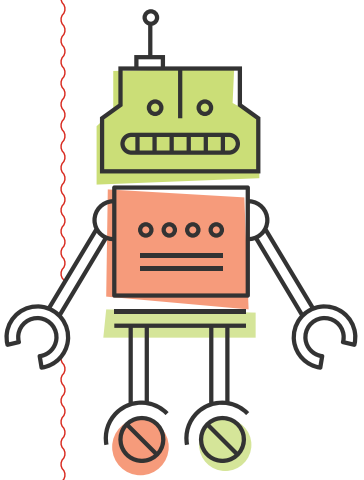
About the Badges:

Follow the Program Progression: The new STEM program has been designed to give girls a progressive learning experience. For that reason, it's highly recommended that girls begin their engineering program with the *Think Like an Engineer Journey*. On that Journey, girls will learn design thinking (how engineers solve problems and invent new things). The design thinking skills they develop will come in handy as they do activities to earn their robotics badges.

In addition, the robotics badges were designed to be done in a specific order. For Cadettes, the badge progression is:

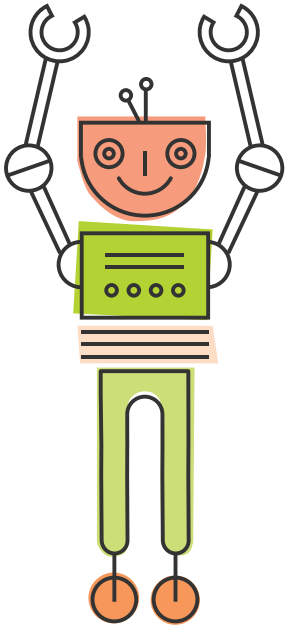
1. **Programming Robots**
2. **Designing Robots**
3. **Showcasing Robots**

Enhance the Experience: The robotics badges were designed to be "unplugged"—in other words, you don't need to buy robotics kits for girls to earn these badges. This was done intentionally. We want *every* girl to have the opportunity to earn these badges, even if she (or her troop) doesn't have the resources to buy kits. However, if you have access to kits, feel free to have girls use them to complete the badge steps where appropriate.



Girl Leaders: At this point, your girls might be ready to lead the meetings, and that's fantastic! To help, you might decide as a troop on girl leaders for each of the badge meetings. Share the meeting plan and meeting aids with your girl leaders with plenty of time before the meeting to give time to prepare to lead. If they have any ideas or ways to improve the activities for their Girl Scout sisters, give them the opportunity to try it out!

Use the Talking Points (But Make Them Your Own): In each session, you'll find suggested talking points under the heading "Things to Know." Some volunteers, especially new ones, find it helpful to follow the script. Others use the talking points as a guide and deliver the information in their own words. Either way is just fine.



Be Prepared (It's What Girl Scouts Do!): Each meeting includes a "Prepare Ahead" section that includes a materials list and what kind of set-up is required. Read it in advance so you have enough time to gather supplies and enlist help, if needed.

Use Girl Scouts' Three Processes: Girl-led, learning by doing, cooperative learning—these three processes are the key to making sure Cadettes have fun in Girl Scouts and keep coming back. "Learning by doing" and "cooperative learning" are built into the robotics badges, thanks to the hands-on activities and tips. You can look for ways to keep the badges "girl-led", whether it's helping to prepare or lead a meeting, having girls lead the discussion or sharing what they know about robotics, engineering, and computer programming. They'll help you create an experience where Cadettes know they can make choices and have their voices heard.

Invent the Future—with Imagination: Every day, there's another news story about robots that have been invented to do jobs that are too dirty, dangerous or dull for humans. Robots can now do everything from vacuuming your rug to exploring Mars to herding cattle to performing surgery. Encourage Cadettes to think about problems in the real world that they can solve and then use their imaginations when they design their own robots. No job is too small or too big for a robot to take on!

Leave Time for the Closing Ceremony: If Cadettes are having fun doing a Design Challenge, you may be tempted to skip the Closing Ceremony so they can keep going—but the Closing Ceremony is absolutely key to their learning.

Here's why: When Cadettes leave a meeting, they'll remember how much fun it was to create a robotic prototype. However, they may not realize how well they were using engineering and programming skills—unless you tell them.

That's why the Closing Ceremony is so important. It's where you can connect the dots for Cadettes by:

- *Pointing out how they acted as engineers when they designed their robot and acted as programmers when they decided what the robot would do.*
- *Telling Cadettes that they already have the imagination and problem-solving skills to build robots.*
- *Letting them know that they have what it takes to continue exploring STEM.*

These simple messages can boost Cadettes' confidence and interest in STEM—and end the meeting on an upbeat note!

Tell Your Troop Story: As a Girl Scout leader, you're designing experiences that Cadettes will remember their whole lives. Try to capture those memories with photos or videos. Cadettes love remembering all they did—and it's a great way for parents to see how Girl Scouting helps their Cadettes!

And please do share your photos and videos with GSUSA by emailing them to STEM@girlscouts.org (with photo releases if at all possible!).

To Prepare for the Meetings:

Before each meeting, you'll find an Overview, notes to Prepare Ahead, and a Materials List, all specific to that meeting.

Go over new words Cadettes can learn. In the Prepare Ahead section for each meeting, you'll see a list of words Cadettes may or may not know and how to define them. These words appear in context throughout the Meeting Plan and Meeting Aids, but if you need a reminder, refer back to this list. You can find a full list of vocabulary for the robotics badges in the meeting aid **"Cadette Robotics Badges—Glossary".**

Read through the Meeting Plan and its Meeting Aids. This will help you become familiar with the flow of the meeting. As you prepare, it's important to understand the activity steps and Things to Know, but feel free to adapt the activities to fit your troop, meeting time allotment, and available materials.

Handouts specific to the meetings are listed in the Prepare Ahead section of each meeting. **In addition, the following handouts are available in the Meeting Aids for every meeting:**

- **Cadette Robotics Badges – Notes to Volunteers**
- **Cadette Robotics Badges – Materials List:** Each meeting has its own materials list. However, if you like to do all of your supply shopping at one time, use this handout. It includes the materials needed for all three robotics badges.
- **Cadette Robotics Badges – Glossary:** This is a list of words introduced in the robotics badges with definitions.
- **Think, Pair, Share:** These facilitation tips will help you to make sure that every girl's voice is heard during brainstorming activities.

Handouts specific to the meetings are listed in the Prepare Ahead section of each meeting.

Gather materials for the meeting.

- *Before the meeting, review the materials list and see what you already have or if there are items you can ask girls to bring to the meeting.*
- *If you're having trouble finding a certain item, don't worry. Engineers often have to deal with material constraints and tight budgets. If they don't have everything they way, they work with what they have. Brainstorm alternatives that might work in a similar way or do the same job.*
- *Remember, if you like to do all your supply shopping at one time, use the* ***Cadette Robotics Badges—Materials List****. It includes the materials needed for all three robotics badges.*

Robotics BADGE BREAKDOWN

PROGRAMMING ROBOTS 1

1: **As Everyone Arrives**
Is this a Robot?

2: **Opening Ceremony**
How Robots Work

3: Learn About Robots

4: Build a Robot Part: Simple Sensors

5: Make a Box Robot Model With Sensors Learn About Robots

6: **Closing Ceremony**
Flash Chat

- Cadettes learn about Sense-Think-Act and the parts of a robot to see what makes them different from other machines.
- They build an electrical circuit that acts like a sensor.
- They build a box model robot to test how a robot could use that sensor to function on its own.

PROGRAMMING ROBOTS 2

1: **As Everyone Arrives**
Robot Card Game

2: **Opening Ceremony**
Robot Control

3: Learn about Programming

4: Write a Program for a Robot

5: **Closing Ceremony**
Awards

- Cadettes discover how to control a robot using basic computer programming concepts.
- They write and test an algorithm to tell someone how to complete a familiar task.
- They write simulated computer code that tells a robovac how to vacuum a room and return to its charging station.
- They earn their Programming Robots badge at the end of this meeting.

DESIGNING ROBOTS 1

1: **As Everyone Arrives**
Fold an Origami Boat

2: **Opening Ceremony**
Design a New Kind of Robot

3: Pick a Challenge

4. Explore Possible Solutions

5. Plan Your Prototype

6: **Closing Ceremony**
Flash Chat

- Cadettes use the Design Thinking Process to plan to build a working model of a robot that solves an everyday problem.
- They learn how robots can help people in their daily lives and choose a problem for their robot to solve.
- They generate ideas for a robot to meet their challenge, acting out possible solutions.
- They add details to their Robot Build Plan.

DESIGNING ROBOTS 2

1: **As Everyone Arrives**
Refine Your Robot Design

2: **Opening Ceremony**
Review the Design Thinking Process

3: Build a Prototype

4: Get Feedback on Your Robot

5: **Closing Ceremony**
Awards

- Cadettes use the Design Thinking Process to build and test their robot prototype that solves an everyday problem.
- They work in teams to make a prototype that shows how their robot works.
- They test their prototypes and look at the results to see where they could improve their robot.
- They earn their Designing Robots badge at the end of this meeting.

SHOWCASING ROBOTS 1

1: **As Everyone Arrives**
Make an Info Sheet for Your Robot

2: **Opening Ceremony**
Showcasing Robots

3: Learn About Robotics Events and Organizations

4: Create a Presentation about Your Robot

5: Present Your Robot Pitch to Others for Feedback

6: **Closing Ceremony**
Thinking about Robots

- Cadettes explore opportunities to showcase robots and create a presentation for their robot design.
- They learn about robotics competitions and practice giving a presentation.
- They create a presentation about their robot.
- They share their robot presentations.

SHOWCASING ROBOTS 2

1: **As Everyone Arrives**
What Do You Want to Know?

2: **Opening Ceremony**
Women in Robotics

3: Find Out About Robotics Opportunities for Teens

4: See Robot Makers and Robots in Action

5: **Closing Ceremony**
Awards

- Cadettes explore opportunities for teens to learn more about robotics.
- They learn about robots and robot makers through in-person visits, virtual visits or videos.
- They earn their Showcasing Robots badge at the end of this meeting.

Badge Series and Meeting Length

- This series of badges has been designed to fit into six 90-minute troop meetings.
- The times given for each activity may be different depending on how many girls are in your troop. Prior to each meeting, review the activities and time allotment to determine how much time your troop will need to complete the activities. You can adjust times for each activity as needed.
- Give girls 10- and 5-minute warnings before they need to wrap up the last activity so you'll have time for the Closing Ceremony.

Get Help from Your Family and Friends Network

Your Friends and Family Network can include:

- Girls' parents, aunts, uncles, older siblings, etc.
- Other volunteers who have offered to help with the meeting.

Ask your Network to help:

- Bring supplies or other materials for the meetings.
- Share their knowledge on robotics, engineering, or programming.

Award Connection

Girls earn three badges:

- Programming Robots
- Designing Robots
- Showcasing Robots

Note to Volunteers: *You can purchase the awards from the Girl Scouts Shop or from your council.*