

# AMBASSADOR

## Robotics Badges

### BADGE SERIES OVERVIEW:


***In the Robotics badge series,*** Ambassadors learn how robots work, how to design a robot, and how to share their robots with others. They explore the systems that make up a robot and how they work together as they build a simple motorized robot. Then, 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 Ambassadors, 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!

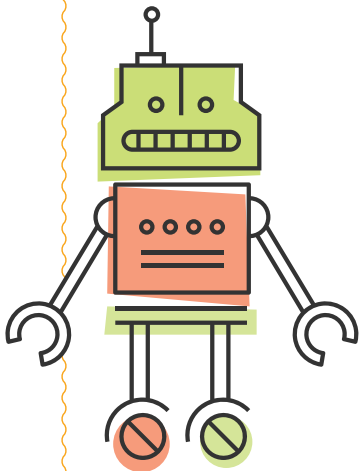
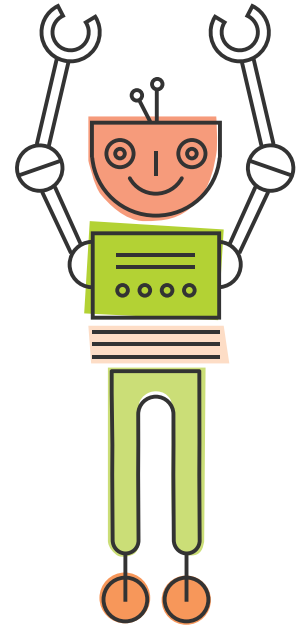
**Use the Talking Points (But Make Them Your Own):** In each session, you'll find suggested talking points under the heading “Things to Know.” Some volunteers, especially new ones, find it helpful to follow the script. Others use the talking points as a guide and deliver the information in their own 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 Ambassadors 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 Ambassadors 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 Ambassadors 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 Ambassadors 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 Ambassadors 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 Ambassadors 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 Ambassadors 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 Ambassadors' 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 Ambassadors will remember their whole lives. Try to capture those memories with photos or videos. Ambassadors love remembering all they did—and it's a great way for parents to see how Girl Scouting helps their Ambassadors!

And please do share your photos and videos with GSUSA by emailing them to [STEM@girlscouts.org](mailto: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 Ambassadors can learn.** In the Prepare Ahead section for each meeting, you'll see a list of words Ambassadors 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:**

- **Ambassadors Robotics Badges – Notes to Volunteers**
- **Ambassadors 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.
- **Ambassadors 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 **Ambassadors Robotics Badges—Materials List**. It includes the materials needed for all three robotics badges.*

## Robotics BADGE BREAKDOWN

### PROGRAMMING ROBOTS 1

#### 1: As Everyone Arrives

Try to Beat the Robot

#### 2: Opening Ceremony

How Robots Work

#### 3: Learn About Robots

#### 4: Build a Robot Model: Motorized Robot

#### 5: Explore the Way Robotics Systems Work Together

#### 6: Closing Ceremony Flash Chat

- Ambassadors learn about Sense-Think-Act and the parts of a robot.
- They use small motors or recycled motorized devices to create a simple robot.
- They give their robot a “programmable body” to learn how robotic systems work together.

### PROGRAMMING ROBOTS 2

#### 1: As Everyone Arrives

Input/Output

#### 2: Opening Ceremony

Robot Control and Coding

#### 3: Learn about Programming

#### 4: Write a Program for a Robot

#### 5: Closing Ceremony Awards

- Ambassadors find out how inputs and outputs are used by controllers to tell robots how to act.
- They write an algorithm to steer a robot through a maze in the shortest time possible.
- They write a program in pseudocode that tells a robot how to solve any simple maze.
- They earn their Programming Robots badge at the end of this meeting.

### DESIGNING ROBOTS 1

#### 1: As Everyone Arrives

Program a Poetry Generator

#### 2: Opening Ceremony

Design a Social Robot

#### 3: Pick a Challenge

#### 4: Explore Possible Solutions

#### 5: Plan Your Prototype

#### 6: Closing Ceremony Flash Chat

- Ambassadors use the Design Thinking Process to plan to build a working model of a social robot.
- They learn how social robots interact with people to make their lives better 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

- Ambassadors use the Design Thinking Process to build and test their social robot prototype.
- They work in teams to make a prototype that shows how their robot works.
- They test their prototypes then 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

Places to Showcase Your Robot

#### 2: Opening Ceremony

Showcasing Robots

#### 3: Learn About Robotics Events

#### 4: Hold a Mini Robotics Event

#### 5: Give a Presentation About Your Robotics Activities

#### 6: Closing Ceremony Thinking about Robots

- Ambassadors explore opportunities to showcase robots and create a presentation for their robot design.
- Organize a mini robotics competition using their motorized robots from Programming Robots 1.
- They create and share a presentation about their robot.

### SHOWCASING ROBOTS 2

#### 1: As Everyone Arrives

What Do You Want to Know?

#### 2: Opening Ceremony

Women in Robotics

#### 3: Find Out About Robotics

Career Opportunities

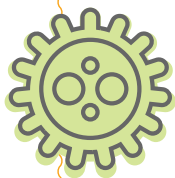
#### 4: See Robot Makers and Robots in Action

#### 5: Closing Ceremony Awards

- Ambassadors explore opportunities to get involved with robotics for fun and as a career.
- 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.

