

## Robotics Badges: *Programming Robots 1*

# Materials List for Cadettes

### ACTIVITY 1: AS EVERYONE ARRIVES: Is This a Robot?

- Two different types of stickers (different colors or shapes)
- Cut out **Machines and Devices Cards**. Feel free to make cards with additional items if you'd like.
- **Optional:** Robotic and non-robotic toys, kits, and devices

### ACTIVITY 2: OPENING CEREMONY: How Robots Work

- **Machines and Devices Cards** with stickers from As Everyone Arrives: Is This a Robot?
- Flag
- Optional: Poster Board with the Girl Scout Promise and Law

### ACTIVITY 3: Learn About Robots

- **Mystery Robot Design Template**, precut into five pieces
- Pencils
- Scrap paper

### ACTIVITY 4: Build a Robot Part: Simple Sensors

- Ruler
- Scissors
- Clear tape
- **Optional:** jewelry needle-nose pliers for bending wires (available in the beading supply section of craft stores)

*For each girl to build a sensor:*

- **Pressure Sensor Template** (copied onto cardstock or stiff paper if possible)
- **Pressure Sensor Instructions** handout
- **Optional:** 1 index card, stiff paper, or cardstock
- 1 foot long, ¼ inch wide strip of aluminum foil tape (available in duct-tape-sized rolls in the heating duct section of hardware stores) OR roughly ¼-inch-wide copper foil tape (available from electronics websites); in a pinch, glue regular aluminum foil to sheets of paper, cut into strips, and glue the strips to the template
- 1 3V coin battery (such as CR2032)
- 1 LED (preferably red 5mm size, with wire leads at least 1/2 inch long. Available online—search for “LED 5mm”—or at stores that carry electronics components for robotics hobbyists.)
- 1 medium paperclip (must be metal, with no plastic or paint covering it)

### Safety Note:

- The battery used in this project is too small to give you a shock. However, if the positive and negative sides are connected accidentally, the battery may get hot or cause a fire. This is called a short circuit. Do not connect the positive and negative sides of the battery. The positive and negative sides will touch either side of the LED while in the circuit.
- **Caution: Coin batteries are dangerous if swallowed!** Do not leave them where small children and pets can get to them.

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**ACTIVITY 5: Make a Box Robot Model With Sensors**

- Paper for each girl
- Pencils for each girl
- **Optional:** markers, decorations (googly eyes, pipe cleaners, etc.), glue

*For each robot (per group of 2–3 girls):*

- 1 or more Pressure Sensors from Activity 4: Build a Robot Part: Simple Sensors (or extra foil tape, clear tape, LEDs, batteries, paperclips, and blank paper or cardstock)
- 1 small cardboard box (such as a tissue box or shipping box)

## Robotics Badges: *Programming Robots 2*

# Materials List for Cadettes

### ACTIVITY 1: AS EVERYONE ARRIVES: Robot Card Game

- Print and cut out the **Robot Parts Cards**, one for each group of 3–4 girls.
- Print and cut out the **Robot Design Challenge Cards**, one for each group of 3–4 girls.

### ACTIVITY 2: OPENING CEREMONY: Robot Control and Coding

- Flag
- **Optional:** Poster Board with the Girl Scout Promise and Law

### ACTIVITY 3: Learn About Programming

- Pen or pencil, for each girl
- Paper, for each girl

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

*Each group of 3–4 girls will need:*

- 1 checkerboard to use as a map of the room to be vacuumed (Alternatively, print out or draw a checkerboard grid for each group.)
- Red and black checkers
- Sticky notes
- Scissors
- Pen or pencil, for each girl
- Paper, for each girl
- **Programming Challenge** handout

### ACTIVITY 5: CLOSING CEREMONY: Awards

- Programming Robots award, one for each girl

**(Note to Volunteers:** You can buy these awards from your council shop or the Girl Scouts' website.)

**Robotics Badges: *Designing Robots 1*****Materials List for Cadettes****ACTIVITY 1: Fold an Origami Boat**

- **Optional Prepare Ahead:** Before the meeting, make a sample origami boat as a model for everyone to follow
- **Origami Boat Instructions**, one for every 2–3 girls to share
- Letter-sized copy paper or origami paper in one or more sizes, enough for each girl
- **Optional:** Scissors

**ACTIVITY 2: OPENING CEREMONY: Design a New Kind of Robot**

- Flag
- **Optional:** Poster Board with the Girl Scout Promise and Law

**ACTIVITY 3: Pick a Challenge**

- **Robot Build Plan**, one for each girl or team of 3–4
- Pens or pencils, enough for each girl
- Paper, enough for each girl

**ACTIVITY 4: Explore Possible Solutions**

- In progress **Robot Build Plans**
- Pen or pencils, enough for each girl
- Paper, enough for each girl

**ACTIVITY 5: Plan Your Prototype**

- In progress **Robot Build Plans**
- Pen or pencils, enough for each girl
- Paper, enough for each girl
- **Prepare Ahead:** Create a list of materials you'll have available for teams to use in their prototype in *Designing Robots 2* to share with the group. This will help teams to know what resources are available and help guide them as they plan their robots. If you can, bring sample materials to get ideas flowing.

*Suggested materials include:*

- **Crafts materials:** Construction paper/cardstock, tape (duct, electrical, foam), glue (hot glue, glue dots), zip ties, twist ties, pipe cleaners, craft sticks
- **Household supplies:** Drinking straws, bamboo skewers, balloons, batteries, rubber tubes and oral syringes, foil tape, wire

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- **Recycled materials:** Cardboard boxes and canisters, bottle caps (for wheels), electric toothbrushes (for motors)
- **Electronics parts:** Motors, LEDs, wires, test leads/alligator clip wires
- **Old toys:** RC car, dolls or action figures, stuffed animals
- **Building sets:** LEGO®, K'Nex
- **Electronics or robotics kits:** LittleBits, LEGO® Mindstorms, VEX
- **Microcontrollers:** Adafruit Circuit Playground Express, micro:bit
- **Tools:** Scissors, box cutter (or kid-safe plastic cardboard knife), screw drivers, wire cutters, safety goggles (if necessary)

## Robotics Badges: *Designing Robots 2*

# Materials List for Cadettes

### ACTIVITY 1: AS EVERYONE ARRIVES: Refine Your Robot Design

- **Robot Build Plans** from Designing Robots 1
- Pens or pencils for each girl
- Paper for each girl

### ACTIVITY 2: OPENING CEREMONY: Review the Design Thinking Process

- Flag
- **Optional:** Poster Board with the Girl Scout Promise and Law

### ACTIVITY 3: Build a Prototype ●

Present a selection of materials based on the **Robot Build Plans** created in Designing Robots 1.

*Suggested materials include:*

- **Crafts materials:** Construction paper/cardstock, tape (duct, electrical, foam), glue (hot glue, glue dots), zip ties, twist ties, pipe cleaners, craft sticks
- **Household supplies:** Drinking straws, bamboo skewers, balloons, batteries, rubber tubes and oral syringes, foil tape, wire
- **Recycled materials:** Cardboard boxes and canisters, bottle caps (for wheels), electric toothbrushes (for motors)
- **Electronics parts:** Motors, LEDs, wires, test leads/alligator clip wires
- **Old toys:** RC car, dolls or action figures, stuffed animals
- **Building sets:** LEGO®, K'Nex
- **Electronics or robotics kits:** LittleBits, LEGO® Mindstorms, VEX
- **Microcontrollers:** Adafruit Circuit Playground Express, micro:bit
- **Tools:** Scissors, box cutter (or kid-safe plastic cardboard knife), screw drivers, wire cutters, safety goggles (if necessary)

*Other materials you will need for the activity:*

- **Robot Build Plans** from As Everyone Arrives: Refine Your Robot Design
- Pens or pencils for each girl
- Paper for each girl
- Camera (phone)

### Safety Note:

- Girls should use care handling cutting tools, the hot glue gun and batteries.
- Girls should ask for adult help if they are unsure how to use a tool.

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**ACTIVITY 4: Get Feedback on Your Robot**

- **Robot Build Plans** from As Everyone Arrives: Refine Your Robot Design
- Pens or pencils for each girl
- Paper for each girl
- Camera (phone)
- **Optional:** Materials for girls to continue building and improving their robots.
- **Optional Prepare Ahead:** If anyone in the group knows people who might actually use the kind of robot any of the teams are designing, ask if they would be willing to come in to give their feedback on the teams' prototype. Alternatively, you could bring in Girl Scouts from other troops, friends, or family to give feedback.

**ACTIVITY 5: CLOSING CEREMONY: Awards**

- Designing Robots award, one for each girl

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## Robotics Badges: *Showcasing Robots 1*

# Materials List for Cadettes

### ACTIVITY 1: AS EVERYONE ARRIVES: Make an Info Sheet for Your Robot

- **Robot Presentation Info Sheet**, one for each girl
- Robots from Designing Robots 2
- Pens or pencils for each girl
- Paper for each girl

### ACTIVITY 2: OPENING CEREMONY: Showcasing Robots

- Flag
- **Optional:** Poster Board with the Girl Scout Promise and Law

### ACTIVITY 3: Learn About Robotics Events and Organizations

- Paper, enough for each team
- Pencils, enough for each team
- **Optional:** Robot toys, models, or dolls, enough for each team

### ACTIVITY 4: Create a Presentation about Your Robot

- Filled out **Robot Presentation Info Sheets** from Activity 1: As Everyone Arrives: Make an Info Sheet for Your Robot
- Pen or pencil for each girl
- Paper for each girl
- **Optional:** Phones, tablets, or computers to allow girls to create a video or slideshow
- **Optional:** Art supplies, such as poster board and markers to allow girls to create visual aids

### ACTIVITY 5: Present Your Robot Pitch to Others for Feedback

- Presentations created in Activity 4: Create a Presentation about Your Robot

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## Robotics Badges: *Showcasing Robots 2*

# Materials List for Cadettes

### ACTIVITY 1: AS EVERYONE ARRIVES: What Do You Want to Know?

- Pens or pencils for each girl
- Paper for each girl

### ACTIVITY 2: OPENING CEREMONY: Women in Robotics

- Flag
- **Optional:** Poster Board with the Girl Scout Promise and Law

### ACTIVITY 3: Find Out About Robotics Opportunities for Teens

- Pen or pencil for each girl
- Paper for each girl
- Timer

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

- If you are going on a field trip, bring anything you need for the trip.
- If you are doing a video call or watching videos of interviews or talks, bring computers or other equipment.

### ACTIVITY 5: CLOSING CEREMONY: Awards

- Showcasing Robots award, one for each girl

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