



ROBOTICS



RATIONALE FOR ADVENTURE

Advances in science and technology have created a world of possibilities. Robots of many shapes and sizes can now perform tasks traditionally done by humans—from sensing the speed of a vehicle to sorting items based on color. In this elective adventure, Bear Scouts will learn how different types of robots are used and then create their own simple robotic figures.

TAKEAWAYS FOR CUB SCOUTS

- Developing their creativity and imagination
- Becoming more aware of the role robotics plays in our daily lives
- Having fun as they learn new things

ADVENTURE REQUIREMENTS

Bear Handbook, page 238

Complete at least four of the following:

1. Identify six tasks performed by robots.
2. Learn about some instances where a robot could be used in place of a human for work. Research one robot that does this type of work, and present what you learn to your den.
3. Build a robot hand. Show how it works like a human hand and how it is different from a human hand.
4. Build your own robot.
5. Visit a place that uses robots.

NOTES TO DEN LEADER

This adventure has several choices based on which activities you choose to do with your den. These den meeting plans, when followed as written, meet the requirements to earn this adventure. If you choose to make adjustments, be sure you complete at least the minimum requirements.

Meeting 3 in this adventure will be an outing to a place where robots are part of the daily routine. Besides businesses or factories that use robotics in their processes, you may also consider a local college or medical facility. If traveling to the site is not an option, look into the possibility of a virtual visit by checking out the institution's website. If the den does go to the location, make sure the staff knows the visitors will be Bear Scouts so they can plan an age-appropriate tour.

In advance of the outing, the leader will need to make arrangements with the outing location and confirm the outing plan with families, including transportation and any additional items they need to bring. Make sure activity consent forms are distributed, signed, and collected.

See the appendix for optional den meeting activities, including openings, gatherings, and closings.

MEETING 1 PLAN

PREPARATION AND MATERIALS NEEDED

- U.S. and den flags
- Building blocks or other building objects for gathering activity
- Collect pictures of six types of robots from magazines and the internet to share during Talk Time.
- If you have access to an actual robot, that would be great to show as well.
- Materials for the If I Were a Robot activity (brooms, boxes, books, etc.)
- Materials for the Build a Robot Hand activity (see Meeting 1 Resources)

GATHERING

- As Scouts arrive, have building blocks or other objects on hand so they can get creative, constructing what they think a robot should look like.

OPENING

- Conduct a flag ceremony of your choosing that includes the Pledge of Allegiance and the Scout Oath and Scout Law.
- Have each Scout answer the roll call by saying the name of a robot they know from movies, TV shows, books, or video games.

TALK TIME (REQUIREMENT 1)

- Carry out business items for the den.
- Allow time for sharing among Cub Scouts.
- Have each Scout write down six tasks that can be performed by robots and show the pictures you collected to give them some ideas (requirement 1).
- To get the Scouts thinking about requirement 2, review the four categories into which jobs for robots usually fall (dangerous, dirty, dull, and difficult). You can find more information on these categories in the *Bear Handbook*.
- Ask Bears which of those four categories best fits the following types of robot technology.
 - **Industrial:** robots that do welding, painting, or packaging of materials
 - **Household:** vacuum cleaners, pool cleaners, sweepers, gutter cleaners, etc.
 - **Medical:** robots that are built much smaller than a human hand to assist with delicate medical procedures
 - **Research:** robots used for gathering data
 - **Military:** drones, as well as robots made for bomb disposal, transportation, or search-and-rescue operations
 - **Space:** robots used on the International Space Station, Mars rovers, etc.
- Finally, just for fun, lead a conversation about “entertainment robots” that are built as toys or for animatronics at amusement parks.

ACTIVITIES

◆ Activity 1: If I Were a Robot (Optional)

Help Bear Scouts see what life would be like if they were robots, designed for dull, repetitive tasks. Have at least two or three activity stations for them to rotate through. For example, in one area they can carry boxes or stacks of books across a room from one place to another. In another area, one Scout can sweep with a broom while a second Scout picks up the dust and a third Scout disposes of it. A large set of silverware could be laid out, and each Scout takes a turn counting the number of forks, knives, and spoons. When everyone has done each task, ask these questions:

1. Was it fun to do the same thing over and over?
2. Would they enjoy a job where they performed the same task every day, all day long?
3. Did they use mental skills (e.g., problem solving, math) while doing these repetitive tasks?

◆ Activity 2: Build a Robot Hand (Requirement 3)

Have Scouts build a robot hand from cardboard, drinking straws, nylon cord, and rubber bands (see instructions in the *Bear Handbook*). Once the activity is completed, ask these questions:

1. What items can you pick up with your robotic hand?
2. Why is it easier to pick up some items than it is to pick up others?
3. What would happen if you added more fingers?
4. How about if you added a thumb?

CLOSING

- **Akela's Minute:** *The use of robots in our world is a wonderful thing. Robots can keep us safe, obtain information from places we may not be able to get to, provide us with a fun hobby, and so much more. We should always remember, though, to take care of ourselves and those around us, and not let the use of robots make us lazy or too dependent. Now let's say the Scout Oath, and think about the words and what they mean.* (Lead Bears in reciting the oath.)
- Tell the Scouts to look for examples of robotics before the next meeting, whether they are out with their families, at school, or watching television. Possibilities can include common services like ATMs and automatic car washes, or anything that relies mainly on machines to accomplish the task. Which of the four categories they learned about—dangerous, dirty, dull, or difficult—do those tasks fall under?

AFTER THE MEETING

- Serve refreshments, if desired.
- Record completion of requirements 1 and 3.
- Work together to clean up the meeting place.
- Prepare thank-you notes for the Bears to sign at the next meeting. The notes should be given to anyone who helps with the outing.

MEETING 2 PLAN

PREPARATION AND MATERIALS NEEDED

- U.S. and den flags
- Items for the Scoutbot game (see Gathering)
- Materials for the Build a Robot activity. Whether the Scouts are using purchased kits or making their robots from household items, be sure to build a sample by yourself before the meeting so you know how much time and work it will involve. NOTE: You may need to schedule a longer meeting to allow enough time for the activity, or plan for Bears to do some of the building at home. In some kits, soldering wires onto motors is required; each Scout's parent or guardian should assist with this before the construction starts, or they can order pre-soldered kits from many companies.

GATHERING: SCOUTBOTS

Tell Scouts as they arrive to pretend they are "Scoutbots," built for repetitive activities. The idea is to see how many times they can repeat a particular motion without error. Tell everyone to keep up with their totals, and remind them: A "Scoutbot" is trustworthy. Possible activities include dribbling a basketball, performing yo-yo tricks, hopping on one foot, rotating a hula hoop, or tossing a small ball from one hand to the other.

OPENING

- Conduct a flag ceremony of your choosing that includes the Pledge of Allegiance and the Scout Oath and Scout Law.
- Have the Scouts sing "There Was a Scout Who Had a Bot" (see Meeting 2 Resources)

TALK TIME (REQUIREMENT 2)

- Carry out business items for the den.
- Allow time for sharing among Cub Scouts.
- Review the robot hand construction from the last meeting and the repetitiveness of robot tasks.
- Have Bears talk about the different types of robots they've seen since the last meeting. (Requirement 2)
- Review plans for Meeting 3, an outing to a business or institution where robots are a part of daily operations.

ACTIVITIES

◆ Activity 1: Build a Robot (Requirement 4)

See suggestions in Meeting 2 Resources, and read the tips on safety for this activity in the *Bear Handbook*.

CLOSING

Recite the Scout Law. Then ask each Scout to answer: *If you had a robot friend, which one of the 12 points in the Scout Law would you most want the robot to follow, and why?*

AFTER THE MEETING

- Serve refreshments, if desired.
- Record completion of requirements 2 and 4.
- Work together to clean up the meeting place.
- Pass out activity consent forms for Scouts to have signed by a parent or guardian before Meeting 3, the den outing to a business or other institution where robots are used. Confirm the location and transportation plans.
- Have the Scouts sign thank-you notes for anyone helping with the outing.

MEETING 2 RESOURCES

OPENING:

Song: There Was a Scout Who Had a Bot

"There Was a Scout Who Had a Bot" (Tune: "Bingo")

There was a Scout who had a bot,

And Robbo was his name-o.

R-O-B-B-O

R-O-B-B-O

R-O-B-B-O, and Robbo was his name-o.

Repeat the verse five times, each time omitting one more letter from the end and replacing it by having everyone clap their hands (like the original song) or snap their fingers.

◆ Activity 1: Build a Robot (Requirement 4)

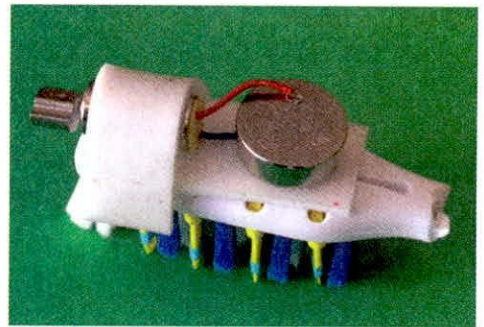
For Scouts who make their robots from purchased kits, here are some good sources.

Kits from *Bristlebots.org* come with everything needed to build a bristlebot, with no soldering required.

EvilMadScientist.com offers directions with a supply list for building a "brushbot" from a standard toothbrush head (www.evilmadscientist.com/2007/bristlebot-a-tiny-directional-vibrobot/). You can purchase pre-soldered pager motors from Evil Mad Scientist, gather the remaining items on your own, and construct the brushbot using their directions.

Other robotics kits can be found in your local Scout shop or from *DiscoverThis.com*, *ScientificsOnline.com/*, *LEGO.com*, and many other internet sources. You might also find the kits at a local hobby store, toy store, or bookstore.

The most important thing to remember is safety first! Prep work may need to be completed ahead of time, and all Scouts should wear eye protection when constructing their robot.



MEETING 3 PLAN (Den Outing)

PREPARATION AND MATERIALS NEEDED

- Be sure all arrangements are made for the den to visit a business or institution that uses robots. Contact the location well in advance and confirm all plans with the staff member in charge.
- Confirm that transportation to and from the site is in place. Secure signed activity consent forms.

GATHERING

- Remind everyone of the importance of staying together and being on their best behavior.
- Use the buddy system.
- Review any questions the Scouts want to ask to make certain all are appropriate.
- If the members of your den are coming separately, play the Follow the Robot game (based on Follow the Leader) to keep them busy until everyone has arrived. First, select a leader—the den chief or an adult. The leader silently performs a repetitive action such as hopping on one foot, and the Scouts then imitate that action. The leader still doesn't say anything, but changes to a different repetitive action several times to keep the Scouts watching and playing the game. There is no winning or losing in this one—just having a good time!

OPENING

- Assemble the group, and review any conduct rules and the buddy system.
- Say the Pledge of Allegiance.
- Ask Scouts to name points of the Scout Law they will demonstrate during the outing (friendly, courteous, etc.).

TALK TIME

- Carry out business items for the den.

ACTIVITIES

◆ Activity 1 (Requirement 5)

- During the den's visit to the facility, have the Scouts ask the questions they prepared.
- Ask the professional guiding the tour to share about the different jobs available in the field of robotics. Perhaps the guide can tell the Scouts about educational requirements for those jobs and what classes in school might help prepare them for studying robotics.
- Ask the guide if he or she knows of a robotics club for young people in the area.
- After the visit, reflect with the Scouts on these questions:
 - What did they like most about the robots they saw?
 - If they saw more than one robot, which was their favorite?
 - How were these robots useful in doing jobs that could be dangerous, dirty, dull, or difficult for people?
 - Can the Scouts imagine how those jobs might have been accomplished before robotics technology?

CLOSING

- Plan a cheer in advance to give to helpers at the facility, including the tour guide.
- Have Scouts give the thank-you notes prepared in advance.

AFTER THE MEETING

- Serve refreshments, if desired.
- Record completion of requirement 5.
- Ensure cleanup takes place, if needed.

Upon completion of the Robotics adventure, your Bears will have earned the adventure loop shown here. Make sure they are recognized for their completion by presenting the adventure loops, to be worn on their belts, as soon as possible according to your pack's tradition.

