

Robotics

A Bear Rank Elective Adventure

Video Summary:

1. An Introduction by Cubmaster Patrick - <https://youtu.be/gTG55l8tZCo>
2. How to Build a Robotic Hand - <https://youtu.be/ndNXDtpRod8>
3. How to Build a Robotic Toothbrush - <https://youtu.be/yNXsCPiPH1Y>
4. Dr Mike talks about Robots and Autonomous (Robotic) Cars - <https://youtu.be/NVfsUHhSKDA>

Robotics Adventure – Supply List

- ☐ Toothbrush with flat bristles
- ☐ 3-volt coin battery
- ☐ 10 mm cell phone motor
- ☐ Two 3mm LED bulbs
- ☐ Double sided adhesive foam circles
- ☐ Hand print-out on cardstock
- ☐ drinking straws (skinny)
- ☐ smoothie straws (wide)
- ☐ 1/8" wide ribbon – five pieces, each 18 inches long

Supplies from home:

- ☐ Masking or painters tape (for toothbrush robot)
- ☐ Tape (for robot hand)
- ☐ Scissors
- ☐ Ruler (not required, but may be helpful for robotic hand project)

See following pages for written directions for the Robotic Hand and Robotic Toothbrush.

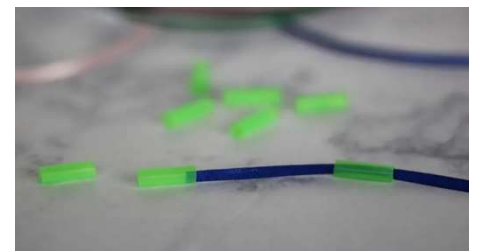
Directions for robotic hand

<https://cubscoutideas.com/7825/how-to-make-an-easy-cub-scout-robot-hand/>

1. Cut out the hand printout
2. Fold the fingers along the joint lines
3. **Cut the (skinny) drinking straws** into 14 pieces, matching the 14 different segments on the fingers. The straw pieces should be a little shorter than the finger segment. You should have plenty of extra straws!
 - 11 pieces should be approximately $\frac{5}{8}$ " long.
 - Cut 3 pieces should be approximately $\frac{3}{8}$ " long.



4. **Cut the (wide) Smoothie straw** in to two $\frac{1}{2}$ " pieces.
5. **Line up 3 pieces** of the $\frac{5}{8}$ " straw on the table. This will be for one finger.
6. **Thread the ribbon** through each straw piece. The Scouts should push the straw until it's near the middle of the ribbon.



7. Carefully put the ribbon on one of the fingers. **Tape one straw piece onto each section of the finger.** Make sure that the pieces aren't too close together, or the finger won't be able to bend well. Be generous with the tape, it is best if the tape wraps all the way around the finger.
8. When the pieces are taped onto one finger, fold about $1 \frac{1}{2}$ " of the ribbon over the end of the finger and tape the ribbon end to the end of the finger.
9. Repeat steps 6 through 10 for the other finger, except for the pinkie where you'll use the $\frac{3}{8}$ " pieces of the straw.

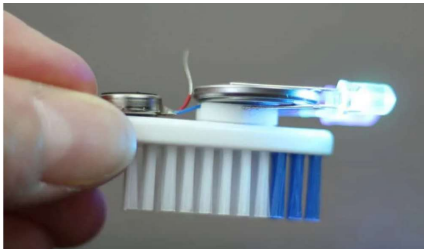


10. When all of the pieces have been taped on, thread all 5 ribbons through the smoothie straw piece. You can do this one at a time or all at once. Tape the smoothie straw piece onto the palm of the hand.
11. **Your Cub Scout robot hand is ready to use!** Simply pull on the ribbon of the finger that you want to move.

Directions for toothbrush robot

<https://cubscoutideas.com/7856/how-to-make-cub-scout-robots/>

1. Peel the backing from one side of adhesive foam pad and stick it onto toothbrush. It should be toward the end of toothbrush back opposite of where the handle was.
2. Peel the backing from the motor and stick it onto the back of toothbrush (where the handle was) with the wires facing the foam pad.
3. Separate the wires. Bend the positive (red) wire up and gently press the negative (blue) wire onto the top of the adhesive pad.
4. Place the battery on top of the adhesive pad with the positive side up. Depending on how close the red wire is to the top of the battery, some of the Cubs will feel their robots vibrating.
5. To add the “eyes”, slide the LED bulbs onto the sides of the battery with the bulbs at the front of the toothbrush (the opposite side from the motor). The short “legs” (negative side) should be on the bottom.



6. Using painter's or masking tape, tape the positive wire down onto the battery, and watch the robot go!
7. When the kids are finished playing with their robots, remove the LED bulbs. Remove the tape, and bend the red wire up.
8. Place the tape back onto the battery so that the red wire can't touch it. This will keep the battery from running down.

