

## **BC SRC 2018: Motion Commotion**

### **Program (Ages 5-8), Theme 4: Go Go Gadget! – Inventions and Creativity**

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#### **CARDBOARD CYBORGS**

Description: Come to the library for some cardboard robot fun! Challenge your friends, and yourself, to robot hand contests! Learn about robots, the body, and more!

#### **ICEBREAKER**

Zip, Zap, Zop (<http://dbp.theatredance.utexas.edu/node/29>) is a good one to get each child involved without singling them out too much (and you can play it up as robot noises).

#### **STORY/SONG**

Start with a robot themed story, song, or activity. Some examples are:

##### ***Building a Bot Draw-and-tell***

<http://meusenotes.blogspot.ca/2014/05/building-bot.html>

***Oh No! (or, How My Science Project Destroyed the World)*** by Mac Barnett (ill. Dan Santat)

#### **ROBOT ARENA! (CHALLENGES)**

***To be run as a demonstration of robot hands. Build robot hands in advance! 2-4 pairs, or more, depending on expected numbers (directions below). Children can be sent home with directions for making their own robot hands.***

First, talk about how robot hands are different from human hands. You can discuss tendons and muscles, robotics, hydraulics, or anything you deem interesting. Have some non-fiction books on hand. Divide children into groups and take turns completing the following challenges:

**Challenge 1: Feats of Skill and Strength!** See who can pick up the smallest object. Can anyone crush an empty aluminum can? Tear a tissue?

**Challenge 2: Build the tallest tower!** Using blocks or other materials, see who can build the tallest tower with their robot hands. Work in teams?

**Challenge 3: Sign your name!** Have a large ASL alphabet chart or several smaller handouts. Get kids to practice signing their names, first without their robot hands, and then while wearing them.

##### **American Sign Language Alphabet**

<http://www.startasl.com/wp-content/uploads/startasl/startasl-sign-language-alphabet.pdf>

**Challenge 4: Write Your Name!** Can you write your name with a marker? A pencil?

This activity may be adapted to become a relay race type of activity with children each being responsible for one station, passing off the robot hands like a relay baton.

## **Building Robot Hands**

**Materials:** Cardboard or poster board, yarn or string, scissors, hot glue or packing tape

**Instructions:** There are two ways to build robot hands; you will have to decide which is best for you in terms of time and materials (or you could opt to try something creative like a robot claw!). You may want to wait to tie the finger loops until the children arrive. You can always use a knot to adjust the string for different sized hands.

### **First Method**

- **How to Make the Giant Robot Finger** <https://sciencetoymaker.org/robot-hand/how-to-make-a-robot-hand/> \*note that the directions indicate you only need one string on each finger when creating a full hand.

**Second Method** (faster and less involved, though likely less sturdy)

- **How to Make a Robotic Arm at Home out of Cardboard** <https://www.youtube.com/watch?v=c9FuPdI3xCE>

If you would like to add a crafty activity, have children decorate the hands using markers and crayons, stickers, tinfoil, leftover string etc.

**Additional Methods** (some using mostly straws):

- **How to Make a Mini Robotic Arm at Home out of Drinking Straws and Cardboard** <https://www.youtube.com/watch?v=N5A965XOOI>
- **How to Make a Robotic Arm Out of Cardboard** <https://www.youtube.com/watch?v=Ounop4LS5Cc>
- **How to make a Robotic Arm at Home (Easy and Simple) How to build a Robotic Arm at home DIY** <https://www.youtube.com/watch?v=NEK7jQLeXDM>
- **Robotic Hand Science Project** <http://www.instructables.com/id/Robotic-Hand-Science-Project/>

## **ROBOT HANDS TRUE OR FALSE**

You may choose to do this with kids still in teams, coming up with answers together and holding up paddles with the robot hands, or individually. Alternatively, try having kids hold up papers or step forwards or backwards to indicate their answers.

Come up with some True or False questions about robots. These could be realistic or based on robots in pop culture: For example:

- Robots can only be made of metal: F (<https://news.stanford.edu/2017/07/19/stanford-researchers-develop-new-type-soft-growing-robot/> )
- R2D2 is a robot in Star Trek: F [He's a robot in Star Wars])
- Robots need blood to live: F

- For a robots hands to work, they must look just like human hands: F (there are lots of designs, come up with your own!)
- Humans need tendons to open and close their hands: T
- Humans have two sets of tendons in their hands - one for bending fingers and one for straightening them: T (extensor and flexor tendons)
- Tendons can stretch: F
- Most robots look like people: F (most do not, even though many people think they do).

\*Sources: *Encyclopedia Britannica Kids* and *Encyclopedia Britannica Young Adult*, *American Society for Surgery of the Hand* <http://www.assh.org/handcare/Anatomy/Tendons>

### **SUPPLEMENTARY ACTIVITIES (TIME EXTENDERS)**

Group: Figure out how to turn a cardboard box into a robot head with a moving jaw using string.

Group: Gather some boxes that would fit a child in advance (cut arm and head holes in a large one, eye holes in a smaller box) and have kids use their robot arms to dress (or “create”) a robot. Take turns.

Teach the children how to do the robot. Have a robot dance party!

Time and age permitting, each child could make their own robot hand. By pre-cutting straws for one of the links above, like this one: <http://www.instructables.com/id/Robotic-Hand-Science-Project/> each child could make and go home with their own robot hand.

Make a robot craft with recycled materials! Gather clean cardboard, bottle caps, cups, old DVDs, pipe cleaners and other materials, and allow children to glue and tape them together to make a robot.

Add in a few more robot songs/activities, and have some word searches or other materials available for early finishers.

### **MORE BOOKS AND SONGS:**

*And the Robot Went* by Michelle Robinson

*Bitty Bot* by Tim McCanna

*Can You Find My Robot’s Arm?* By Chihiro Takeuchi

*If You’re a Robot and You Know It* by David Carter

<https://www.youtube.com/watch?v=IcnZXxdgzhg>

*Norton and Alpha* by Kristyna Litten

*Robot Zot!* By Jon Scieszka