Robotic Arm Challenge

On the International Space Station robotic arms are very important extensions of the astronaut's arms! Robotic arms are used to help attach huge modules of the station, put satellites in orbit, provide a platform for astronauts to work on – and move around - the station. Robotic arms helped secure the Hubble Space Telescope so it could be repaired!

Humans pick things up without thinking about the steps involved. In order for a robotic arm to pick up or move something, it needs to perform in several steps—moving the arm, rotating the "wrist," opening and closing the "hand" or "fingers."

This activity will demonstrate the challenge of maneuvering a robotic arm, which is what the astronauts aboard the ISS use when attaching station modules, solar panels, or other new components.

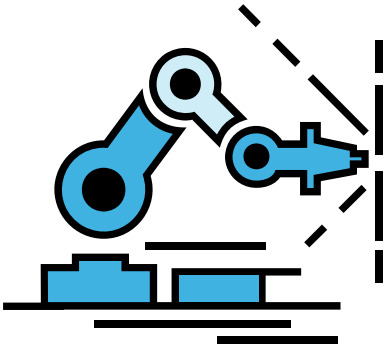
Note: this activity was written for the Armatron / Radio Shack Robot Mechanical Arm, which is no longer for sale. Products, such as the Lynx 5 Programmable Robotic Arm Kit by Hobitron (http://www.hobbytron.com/lynx-arm.html?AID=10289758&PID=2224652) or a remotely controlled toy can be used with modifications.

What You Need:

- A robotic arm
- Closed module
- 2 canisters, 2 cones, 2 spheres
- Flat module

OR

- Any items that can be maneuvered with the robotic arm, such as candy or blocks and small cups.



LPI Contribution Number 1451
http://www.lpi.usra.edu/education/space_days

What to Do:

- Have your child test each of the motions on the Robotic Arms by moving the knobs and sticks, one at a time.

Challenge your child to move the robotic arm so that it performs the following operation:

- Pick up the canisters from the flat module, one at a time, and place them into the module
- Close the lid on the module containing the canisters
- Pick up the 2 cones, one at a time, and place them on top of the canisters
- Pick up the 2 spheres, one at a time, and balance them on top of the 2 cones

OR

- Determine a task, such as selecting candy and placing it into a cup or container and undertake the needed operations to make it happen.

Parent Prompts:

How many steps did it take you to pick up and move the object to the closed module?

Would it be easier or more difficult to pick up a larger object? Why?

If you practiced a lot with this robotic arm, do you think you would be able to do it faster?

How easy or difficult would it be to use a robotic arm to unscrew a screw, or to tie something together?

Why might astronauts or scientists use a robotic arm in space?