



BUILDING A SPACE TOOL

Courtesy of: Engineers Nova Scotia

The goal of this project is to show the kids how with a few simple objects, they can make a tool, a tool that mimics something that could be very helpful in space! It doesn't take long to make but the fun will be trying to pick up things as well as putting their own theme on their space tool.

Materials you will need:

- Wrapping paper tubes
- Plastic forks
- Elastics
- Masking tape
- String
- Something to pick up with the tool
- Wheels
- Markers
- Graph paper

Instructions

Show the video (<https://www.curiositymachine.org/challenges/31/>) on a laptop.

Discuss the following:

“In outer space, picking up objects from the ground is very difficult. A space suit limits an astronaut's mobility significantly due to its bulk and weight. For astronauts to collect rock and soil samples from the places they visit, special tools must be created. Also, on the moon (like in this video) the gravity is weaker, which means that the force to pull an object towards the ground is smaller. That's why the rock bounces around easily, unlike what would happen on earth. Imagine trying to pick up a bouncing ball. Is that hard?”

“In order to be useful, a space tool has to be specially designed with handles and triggers for the astronaut. Think of the different ways tools can pick objects up – a space tool might be a compound lever (like barbeque tongs), or even have a suction cup! Be sure your space tool can be used easily while wearing gloves and without having to bend over.”

Start the activity:

There will be multiple stations in the room with supplies. Each Guide is given pencils, paper, a wrapping paper tube and two plastic forks.





Have each Guide draw a design for their space tool that includes labels of each part. Then encourage the Guides to build a prototype of their design using the materials in the room. Have them test their design by trying to pick up the items in the bag provided to you. Have them modify their design on the paper and on the prototype. Finally, encourage them to decorate the tool.

Here are some basic instructions (they don't need to do this but it is a guide for you):

1. Two forks are taped together facing each other. The forks are then taped to the bottom of the wrapping paper tubes with the pronged ends protruding at the end of the tube. The forks will be used as a lever that will open and close to pick up objects.
2. An elastic is looped around the center spring of the fork. A string or cut elastic is then looped through this elastic. When pulled, it controls the opening of the forks. The space tool is essentially done at this point.
3. The girls can test their tool and adjust the length of string and the distance the prongs are from the end.
4. Wheels can be added to the bottom of the tube, so the space tool could "crawl" along the floor.
5. Space tools can be decorated as desired!

