

MAKE YOUR OWN GRABBER

Have you ever tried to reach for something that was too far away? What tool could help you reach an object? Try inventing your own grabber to use at home. At Idaho National Laboratory, nuclear technicians at the Advanced Test Reactor facility must use long grabbers and other specialized equipment to replace fuel rods and work in the canal where spent fuel is stored. The nuclear technicians use grabbers as tools to accomplish far away tasks for safety measures. Creating your own grabber will be a resourceful tool you can use at home, just like an INL nuclear technician. This engineering challenge will require family assistance to make sure materials are used safely.



GRADE LEVELS: K-6

VOCABULARY

Tool – a handheld device that helps accomplish or assist in a task.

Test Reactor – a reactor designed and used to test nuclear fuels and materials to be used in power plants, naval propulsion, research or advanced reactors.

Fuel rods – a rod-shaped fuel part in a nuclear reactor.

Nuclear Technician – A person who assists physicists, engineers, and other nuclear research professionals while working in a structured environment, operating specialized equipment.

Engineer - a person who designs, constructs, or maintains engines, machines, or public works.

MATERIALS

- Popsicle sticks
- Drill
- Small screws and bolts
- 2 bottle caps
- A small cutter
- Hot glue gun
- Scissors
- Engineer journal

PROCEDURE



- 1) Gather some Popsicle sticks.

How long will your grabber be?

- 2) Determine the length of your grabber. The length of your grabber will depend on how many popsicle sticks you use.
- 3) With the help of a family member, drill three holes (evenly spaced) on each popsicle stick. There should be a hole drilled on the top, in the middle, and at the bottom of each popsicle stick.

Why should you drill 3 holes in each popsicle stick?

- 4) Construct your grabber. When you want to connect the popsicle sticks together, use your screws and bolts to lock them into place. Screws and bolts will help keep your popsicle sticks together and will allow you to maneuver your popsicle sticks for your grabber.
- 5) Continue placing popsicle sticks, screws and bolts together until you have reached the desired length of your grabber.

Why does your grabber's length matter?

- 6) With family supervision or assistance, use a cutter to cut the middle of two bottle caps out. These bottle caps will become your finger holders and what you use to control the movement of your grabber.
- 7) With assistance or supervision, hot glue the bottle caps at the end of your grabber.
- 8) Cut an extra popsicle stick's top and bottom ends off. Hot glue the ends (one on each side) to the top of your grabber.

Why do you need the top and bottom ends of another popsicle stick glued to the top of your grabber? What will their purpose be for your tool?

- 9) Allow hot glue to dry and then find objects to grab around your house. Test your tool.

Does your grabber work? Are there needed improvements to be done to your tool?

- 10) Record the objects that you can grab with your grabber versus objects you may not be able to grab using your tool.

Why can you grab some objects with your grabber but not others?

- 11) Draw pictures of your observations in your journal.

THE SCIENCE BEHIND IT

Grabbers work like an extension of your arm. They are a handheld mechanical tool which allow you to reach down and pick things off the ground without bending over. Grabbers may be used to increase the range of a person's reach when grabbing various objects. Grabbers are tools used for various tasks and for several types of jobs throughout your community. For example, you may see grabbers used in waste management, assistive technology, gardening and outdoor work. For scientists at INL, grabbers allow them to complete work tasks from a safe distance.

EXTENSIONS

- Print the PDF's under resources to create a grabber using different materials relating to diverse animal species and how they use specific body parts as tools to help them survive.
 - Have another family member create a grabber. Compare your data, drawings and observations in your engineer journal and compare them with your family member's recordings. How is their data similar or different from yours?
 - Create an arcade game using your grabber out of materials from home and have a family member play your arcade game.
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RESOURCES

- Overview of another way to invent a grabber at home- http://teachergeek.org/grab_lab_build.pdf
 - Engineer Notebook Printable- http://teachergeek.org/grab_lab_notebook.pdf
 - Grabber Engineer Challenges in relation to animals- http://teachergeek.org/grab_lab_challenge.pdf
 - Video on Grabber engineer challenge for a visual- <https://youtu.be/QkJ4zyrjGMY>
 - Video about INL's Advanced Test Reactor Facility- https://youtu.be/RM_Pjp2FzLU
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