

Design a Grabbing Tool

Sometimes, things are out of our reach, and having a tool that can pick up and put down objects that are too far for us to reach can be very helpful. Other times it's not safe to touch things with our hands, so we use a grabbing tool instead. With this activity, learners will engineer a mechanical hand (grabber device) that can be used to pick up and put down different objects that are at least 12 inches away.



Recommended Age: 6+

Time needed: 20+ minutes

What You Need

- Recycled materials, such as paper towel rolls, cereal boxes, yogurt containers, etc.
- Assorted attachment materials, such as string or yarn, rubber bands, paper clips, brass fasteners, etc.
- Assorted craft materials, such as craft sticks, straws, pipe cleaners, index cards, etc.
- Scissors
- Tape and/or glue
- 2-3 objects to pick up, such as a small ball, cup or yogurt container, small toy, etc.
- Ruler or measuring tape



What You Do

- Put out the objects you choose to use for this challenge. Pick up and put down the objects multiple times.
 - What do you notice about how you pick up and put down the objects?
 - What parts of your hand do you use?
 - How much pressure do you need to pick up or put down different objects?
 - How heavy are the various objects, and how does that change the way you pick them up?



- Look at the materials you have to make your own grabber device.
- Use the materials to engineer your grabber device.
- The challenge is to be able to pick up something 12 inches away from you.
- Test out picking up and putting down the materials with the device. Improve your design as you test, making it easier to use or able to use with many different objects.



Tips for Adults

- Your child may need a second pair of hands, or someone to brainstorm with. It's OK to help, but be sure to let your child take the lead.
- If your child is having trouble getting started, here are a couple of online resources that might provide some inspiration.
 - <https://inventorsof tomorrow.com/2017/04/08/build-a-cardboard-finger/>
 - <https://mass.pbslearningmedia.org/resource/adptech12.sci.engin.design.ds205/designing-swimming-prosthetics-for-a-dancer/>
- Need more challenges?
 - Update your design so your grabber device can scoop water.
 - Test your grabber device with different materials. Some heavier, some lighter, some smaller, and some bigger. How does your design need to change?
 - New challenge: Now your objects are up to 24 inches. Change your design to be able to pick up and put down objects from further away.

Learning and Skills Connection

- **Thinking creatively and imaginatively:** Envisioning possibilities, solutions, and forms of expression; having hunches; thinking outside the box; problem finding and solving
- **Working flexibly:** Incorporating and revising ideas based on new information, employing objectivity and acknowledging subjectivity
- **Persistence:** Focusing, sticking to it, learning from mistakes

Doing STEAM with Kids

STEAM stands for Science, Technology, Engineering, Art, and Math. There are lots of ways you can explore these letters, apart or together. Ask your child to make predictions, describe what they see, and to imagine possibilities and solutions. Don't worry so much about the "right" answer. Developing curiosity, and problem-solving skills are important first steps to doing STEAM!

