

“In the Human Body”

EXPLORE IT

Module 16, Adventure 1

Prompt:

Engineer a mechanical hand (grabber device) that can be used to pick up and put down different objects that are at least 12 inches / 30 centimeters away from you.

Materials:

- 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
- *Optional: Explorer Notebook*

Instructions:

1. Hands can help people do many things! Picking things up, putting things down, holding things, scooping things, and more.
2. 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.

3. Put out the objects you choose to use for this challenge. Pick up and put down the objects multiple times.
 - a. What do you notice about how you pick up and put down the objects?
 - b. What parts of your hand do you use?
 - c. How much pressure do you need to pick up or put down different objects?
 - d. How heavy are the various objects, and how does that change the way you pick them up?
4. Look at the materials you have available to make your own hand/grabber device.
5. Use the materials to engineer your hand/grabber device.
6. 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.

For explorers using an Explorer Notebook:

1. Make a plan for your creation in your notebook before you start building it.
2. Keep track of the test objects and how your design is able to pick up and put down each one.

Check out the last page for a page design idea. You can use this or set up your page however you want!

Resources:

1. For some inspiration, here are some designs to look at:



2. You can also see more examples and ideas on the [Inventors of Tomorrow website](#).

3. Check out [this video](#) from PBS' Design Squad to see them engineer prosthetic devices based on sea creatures for a dancer and performance artist.

Extensions:

The following are optional steps you can take if you want to extend this adventure:

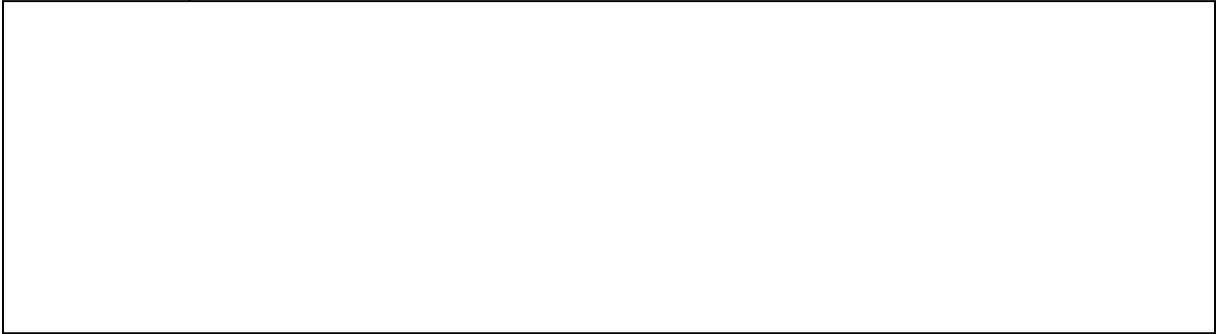
1. Update your design so your hand/grabber can scoop water.
2. Test your hand/grabber with different materials. Some heavier, some lighter, some smaller, and some bigger. How does your design need to change to pick up the different objects?
3. New challenge: Now your objects are up to 24 inches / 60 centimeters away. Change your design to be able to pick up and put down the objects from further away.
4. Go to the "In the Human Body" topic on Flipgrid and share your creation!

Explorer Notebook

You can use this to help you set up your Explorer Notebook!

Engineer a Hand Grabber Tool Module 16, Adventure 1

Sketch of my creation:



Testing:

| Object | Pick up? Yes/No | Put down? Yes/No | Notes for things that work and things to change |
|--------|--------------------|---------------------|---|
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