

TAKE & MAKE KIT

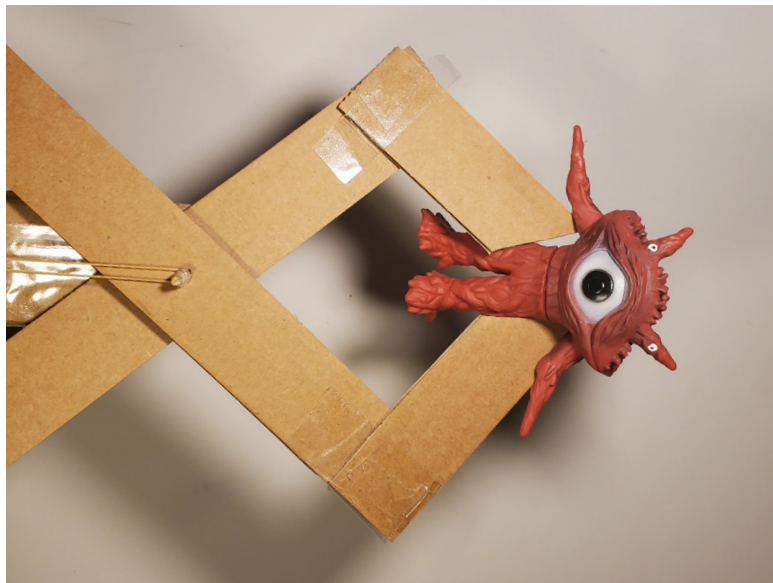
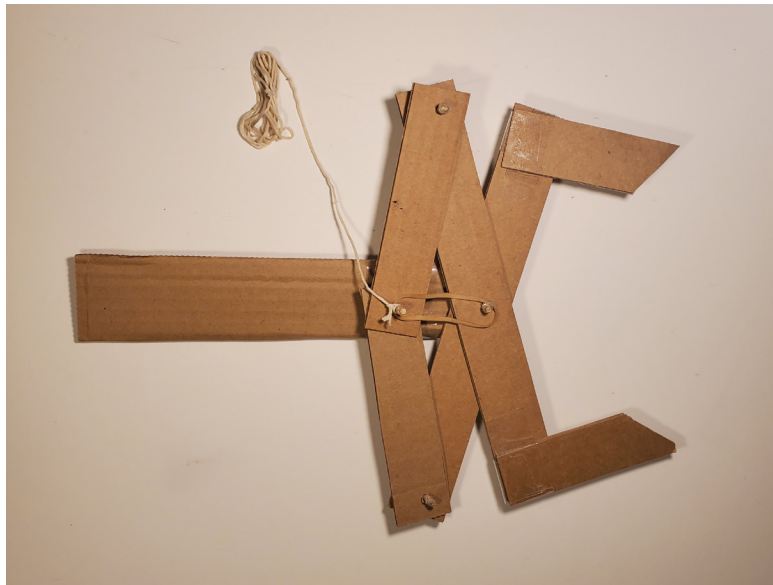
Mobility Grabber

TIME: 45 min - 1 hr
CONTAINS SMALL PIECES

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What's in this kit?

Learn about prosthetic hands and design your very own mobility grabber!

You will learn:

- How tension can be used in mechanisms
- How friction affects force
- Mechanical engineering

Let's Get Started!

Materials

- 4 wooden pieces
(chopstick pieces)
- Precut cardboard pieces:
 - 1 large base piece
 - 2 long pieces with holes
 - 2 medium
 - 2 small
- 8 small rubber bands
- 1 large rubber bands
- Piece of string
- 2 pieces of tape

Tools

- Glue
- Tape

Vocabulary

Ergonomics: An applied science concerned with designing and arranging things people use so that the people and things interact most efficiently and safely

Prosthetics: An artificial device that replaces a missing body part which may be lost through trauma, disease, or a condition present at birth (congenital disorder)

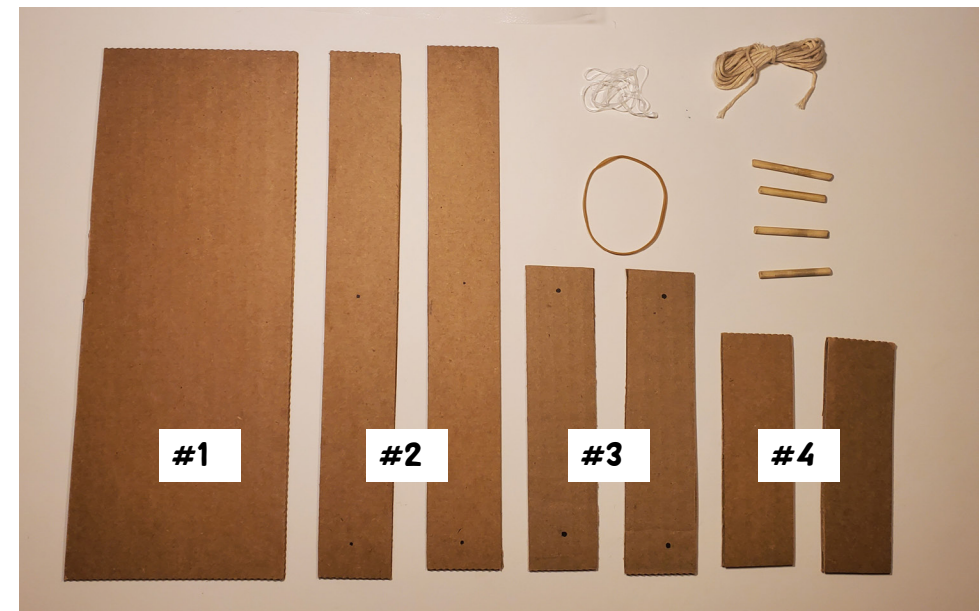
Predictions

The Grabber will be able to pick up some items, and not others. What will you be able to pick up with the initial design? More importantly, what will the grabber not be able to pick up?

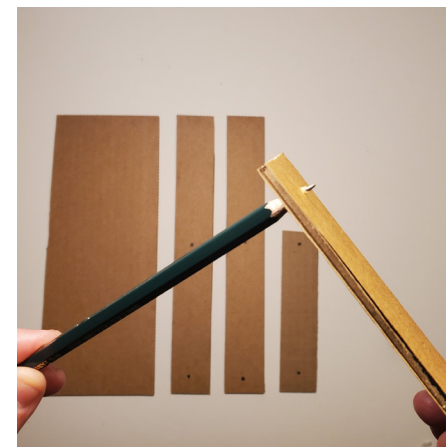
How will you modify the grabber to be able to pick up different items?

Step 1 - Organize your pieces. fold Piece #1 in half lengthwise and poke holes

Separate your 7 pieces of cardboard into groups. You should see 1 large piece, 2 long pieces with a hole indicated in the middle and a hole on one end, 2 medium pieces with holes on both ends, and 2 smaller pieces with no holes. (See picture to refer to the names of the pieces.)



Take a sharp pencil or pen through the holes of pieces #2 and #3, making them slightly larger, allowing the wooden pieces to pass through

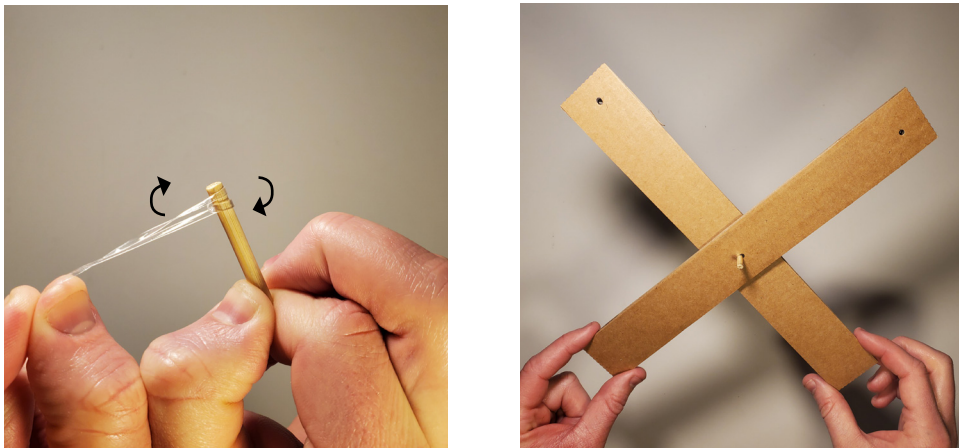


Take the largest cardboard piece and fold it in half lengthwise (hot dog style), doubling up the piece and making it thicker. This will be the handle of the grabber. When folded over lengthwise, poke a hole through both layers, 1 inch from the top. Wrap a small piece of tape around this to secure it in place.



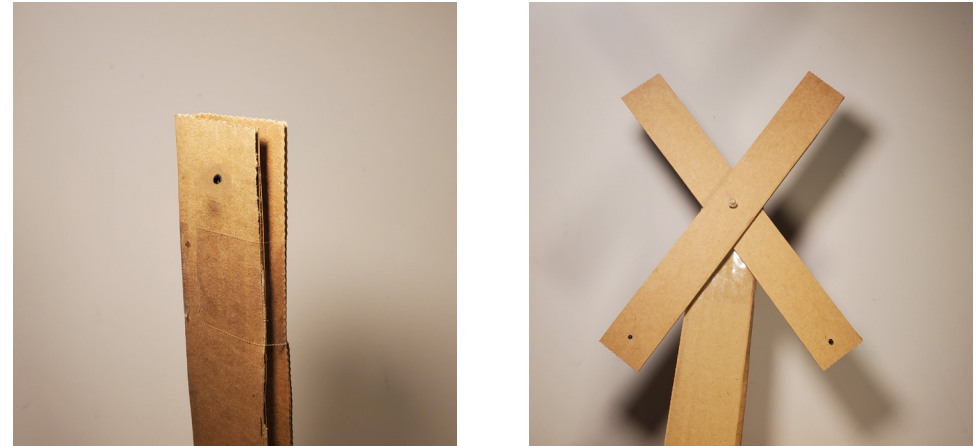
Step 2 - Make an 'X' with #2 Pieces

Take one of the pieces of the chopstick and wrap a small rubber band around the end, this will function like a stopper. Try to wrap the rubber band around the chopstick piece four or more times. Take both the #2 cardboard pieces and wiggle them onto the chop stick through the center hole. This should secure the two pieces into place, making a movable 'X' shape. At this point there should be one end of the chopstick with a rubber band, one end without.



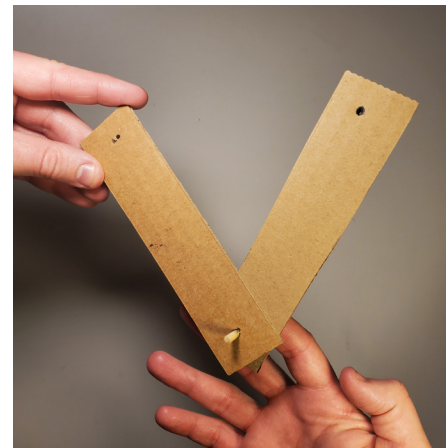
Step 3 - Connect #2 Pieces to Piece #1

Stick the end of the chopstick that doesn't have a rubber band through the hole you made in piece #1. Secure the base piece to the two #2 pieces with a rubber band.



Step 4 - Make a "V" shape with the #3 pieces.

Join the two #3 pieces with a chopstick and a rubber band on opposite ends. This should look like a "V" shape that's able to pivot. We'll refer to this as the "V."



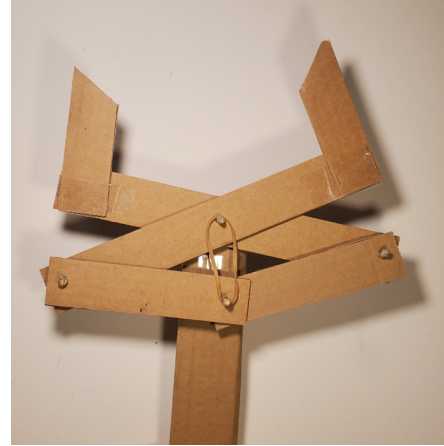
(Step 4 Continued)

Now connect the edges of the "V" to the remaining holes in the long number #2 pieces. Secure them with the remaining rubber bands and the remaining chopstick pieces.



Step 6 - Add Tensioning System, the Rubber Band!

Put a rubber band around the intersection of the 3 pieces, and the intersection of the 2 pieces. The rubber band will make your grabber into a closed position.



Step 5 - Attach the Claws! (Or Paws)

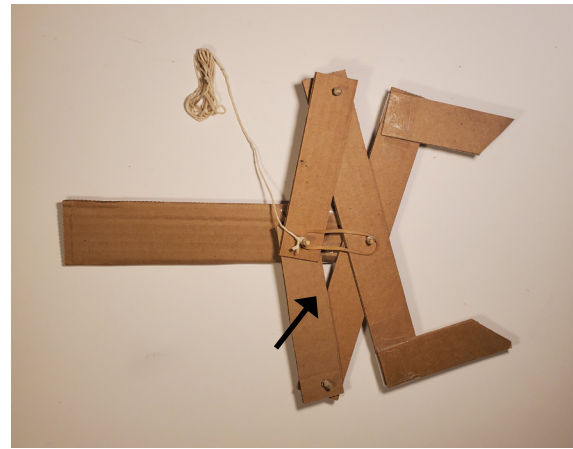
Attach the smallest pieces to the ends of the grabber. Use the tape included in the kit. You can experiment with cutting the claws at different angles to make them grip different objects better.



Step 7 - Attach the string and pull!

Tie a string around the chopstick holding together the #2 pieces. Pull on the string to open the grabber.

You did it! Start testing your grabber by picking up objects around the house.



Go Beyond

Real world: What is the use of this grabber?

It's important when designing for people with different physical abilities to be listening to their needs and limitations. This grabber you have designed has certain capabilities, but also limitations. The limitations are going to be so much more important to focus on and improve than the strengths of the mechanism.

Lay out several items on your table and experiment with what you're able to pick up.

What's the biggest thing you can pick up? How will you pick something up that's even larger?

What's the smallest thing you can pick up?

How can you increase grip strength? What is the importance of friction in the grabber?

HANG OUT,
MESS
AROUND,
GEEK OUT.



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