STEM Event Module:
Articulated Grabbers

Developed by Siena Moyer, CoEng Student Ambassador, March 2019

UAA College of Engineering
University of Alaska Anchorage

Grade: All

Volunteers: 1-2

Space: 1-2 tables for materials and building

Time Commitment:

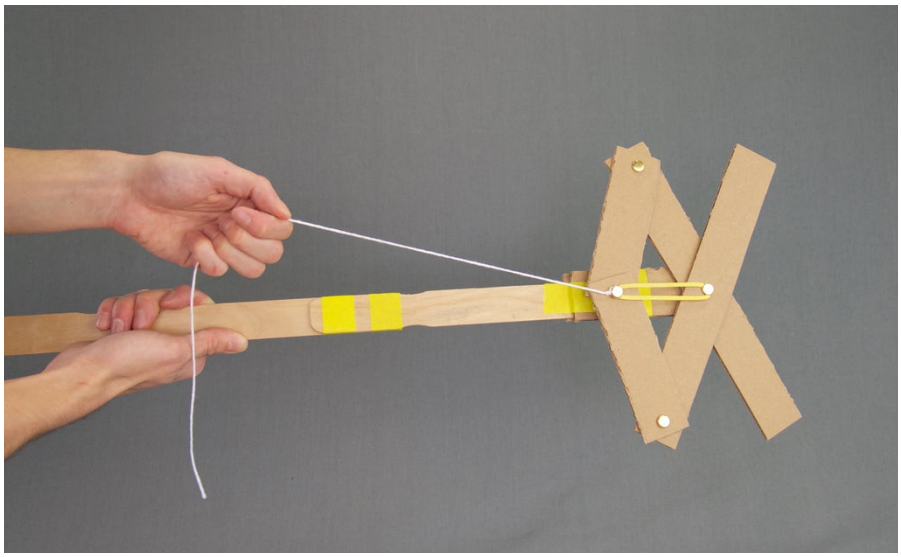
- 1-2 hours of out of class prep
- 10-15 minutes per child to complete the activity

Objective:

Students use provided materials to build an articulated grabber.

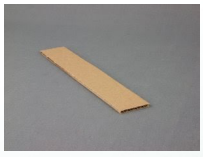
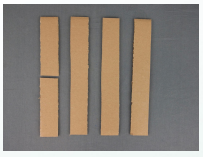
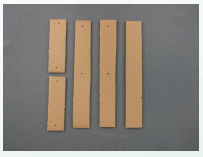
Materials Needed:

- Clean and unbent Cardboard
- Rulers
- Scissors
- Pencils(or something sharp to poke a hole in the cardboard)
- Masking tape
- 1.5" metal fasteners
- ⅛"x3.5' rubber bands
- string
- Paint Stirrers (2 per student)
- Craft sticks, foam, paperclips, or other materials for improving the grabber's grip
- Assorted objects to pick up



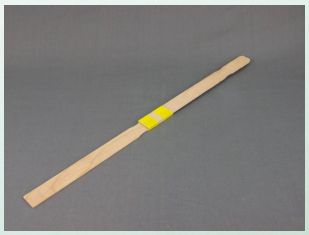
Material Preparation:

Cut many 10 inch pieces of cardboard and many 1.5 inch pieces of cardboard. Each grabber requires 2 of each size cardboard. Also poke the necessary holes in each of the pieces of cardboard.

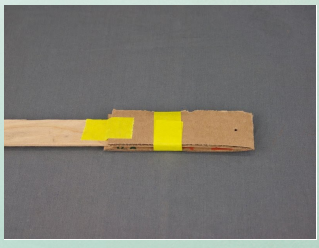





Build Instructions:

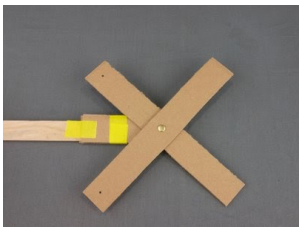
Step 1: Build the handle- Overlap the paint stirrers and wrap tightly with masking tape in at least two places



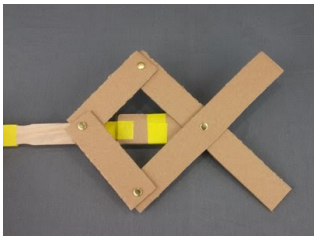
Step 2: Take the piece that doesn't have holes, bend it in half, and tape it to the end of the handle as shown. Overlap most of it with the handle, but leave about 1" (2.5cm) of the folded side not overlapped with the wood. Poke a hole through that part of the cardboard.



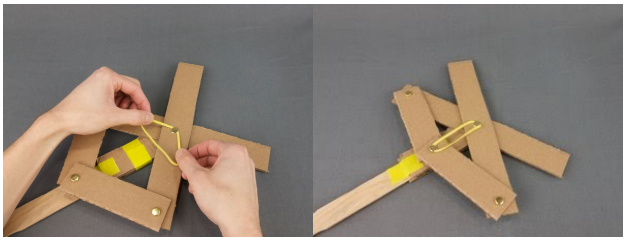
Step 3: Assemble the cardboard as shown using a metal fastener. On the other side, fold the fastener tabs completely flat, and secure in place with a piece of tape. This step is important! If the fastener tabs are not folded and taped, the grabber will come undone!



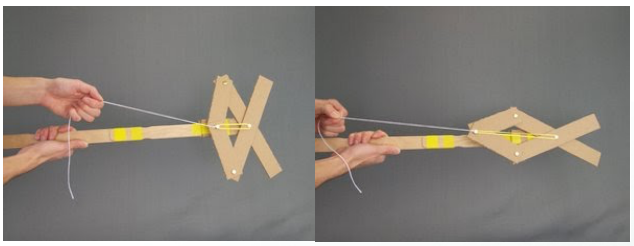
Step 4: Attach the two 5" (12.5cm) pieces as shown. Remember to fold and tape the fastener tabs.



Step 5: Attach the rubber band! This will help automatically open up the grabber. Start by stretching the rubber band with both hands, and slipping it under the middle fastener as shown, then repeat with the other middle fastener.

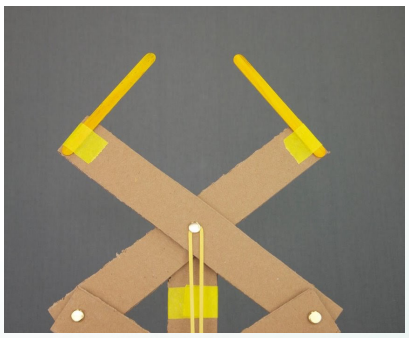


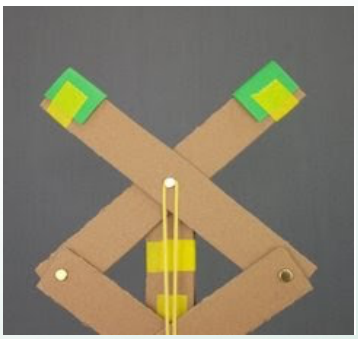
Step 6: Tie a piece of string to the fastener as shown. The grabber is ready to test! Give the string a tug, and your grabber should close.

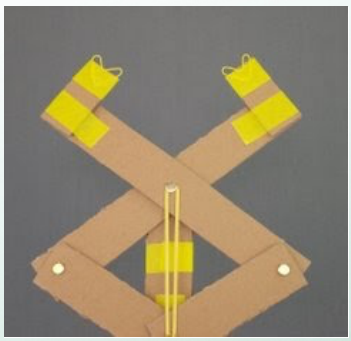


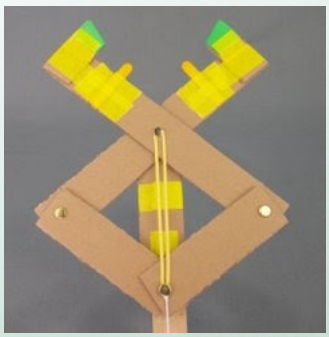
Extensions/Extra Challenges:

Use the extra materials to improve the grabber. Examples are shown below.









Have materials at the table that students can practice picking up with their grabber (IE: cups, balls, marbles, toys, etc.)

Follow Up:

If facilitating this activity in a classroom, or in an event structure that allows follow up to the activity, use these discussion questions to guide students through reflection and learning:

- Can you explain how this articulated grabber works?
- Why materials worked bets at the end of the grabber claw?
- How could you improve this design?