



# Project Try-It Activity

## Illinois 4-H Youth Development Program

### Junk Drawer Robotics

#### MARSHMALLOW CATAPULTS

Make a catapult out of “junk drawer” materials, then use your creation to send mini-marshmallows flying!

Activity Time: 15 minutes | Recommended Ages: 5 to 18

#### SUPPLY LIST

- Crafts Sticks (9 per youth)
- Rubber Bands (5 per youth)
- Plastic Spoon (1 per youth)
- Washable Markers (1 per youth)
- Mini-Marshmallows (at least 1 per youth)

#### WATCH IT!

View a video tutorial of this activity by using the qr code (right) or visiting:  
<https://youtu.be/fm3m2oddpzw>

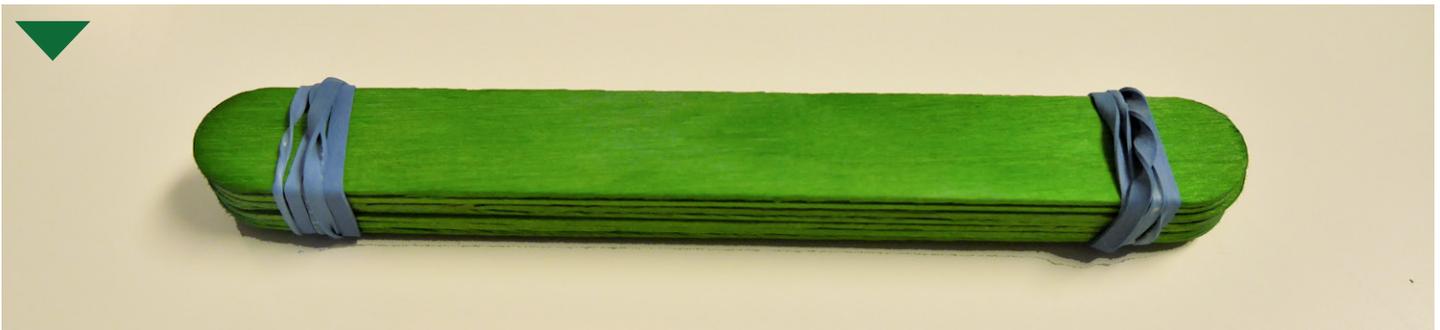


#### ACTIVITY DIRECTIONS

1. Stack 7 craft sticks on top of each other and fasten them together tightly with a rubber band on the end like shown below.



2. Fasten the opposite side with another rubber band, tightly securing the craft sticks together.



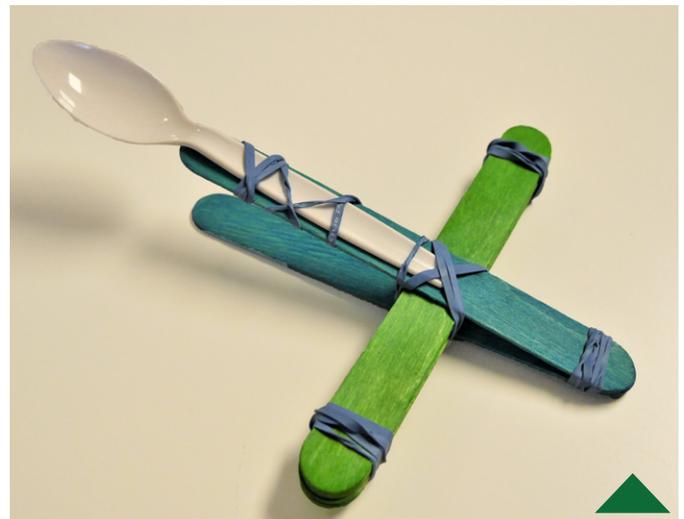


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3. Grab 2 more craft sticks and fasten those together with a rubber band at one end creating a "V-like" shape (below left).



4. Place the craft stick stack from step 2 in between the craft stick "V" from step 3. In the example photos, the green craft stick stack is placed between the blue craft stick "V". Adjust the 2 "V" sticks that wrap around the stick stack to be roughly on top of each other. The cross shape you create in this step helps provide stability for the catapult (above right).
5. Secure the 2 parts together with a rubber band in the middle where the sticks meet. To do this you'll wrap around one side of the stick stack and the center sticks, then cross over and do the same for the other side of the stack. Keep alternating sides and wrapping until the rubber bands are tightly secured (below left).



6. Use a rubber band to attach the plastic spoon to the top stick in the "V". The end of the spoon should just come under the center rubber bands from the previous step, and the bowl of the spoon should be just off the surface of the stick. The spoon serves as your bucket for holding and launching your marshmallows (above right).



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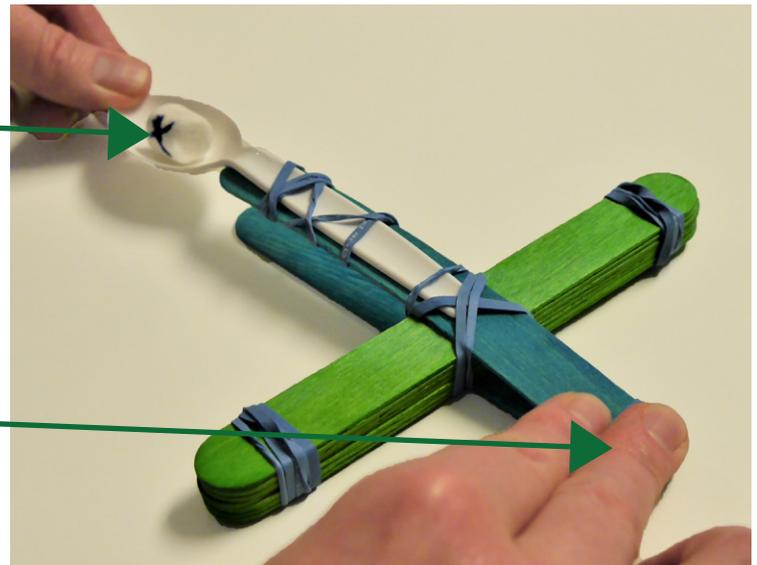
7. If more than one person is launching at the same time, use a marker to mark each mini-marshmallow with a shape, letter or other identifying mark so that each person can identify their marshmallow. At this time, you also can decorate the catapult using markers or stickers.



8. Place mini-marshmallow into the spoon's bowl. Use one hand to hold the bottom of the catapult down while using one finger from your other hand to gently pull back on the spoon. Release the finger on the spoon to launch the marshmallow in the air.

**Load marshmallow here, then pull back (push down) gently on the back of the spoon to launch the marshmallow.**

**Hold down here with your other hand to provide stability when launching.**



## ACTIVITY TIPS

- Try to find a medium weight spoon to decrease the likelihood of the spoon breaking during use.
- While narrow craft sticks will work for this activity, the wide or jumbo crafts sticks result in a more stable catapult.
- You can use whatever rubber bands you have at your house as long as they are at least 2 inches long when laid out, but if you purchase them, then consider buying size 33.
- If you don't have mini-marshmallows on hand, you can launch any small lightweight object you have around the house.



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## APPLY IT

Engineers learn by using the engineering design process, which involves planning, designing, then testing an idea, troubleshooting problems with that idea, then improving the idea and repeating the process. You can apply these steps to learn how to operate your catapult for greatest success.

Try these tasks to apply “learn by doing” and the engineering design process:

- Try applying different levels of force to your catapult launcher (being careful not to break the wood or spoon). What do you notice about pushing lightly versus pushing with more force? Which worked better?
- First, try launching with your catapult placed on the floor. Then try launching from an elevated surface (chair or table). What happened with each method? Which marshmallow went further? Why do you think it went further?
- Have a launch contest with a group! Have everyone involved create their own catapult, then line the group up shoulder-to-shoulder. Next have them kneel and put their catapults in a line on the floor. Countdown to launch and see who can launch their marshmallow the furthest. Be sure that everyone has marked their marshmallow with different colors and shapes so that you can identify whose went the furthest.

## PROJECT CONNECTION

Did you have fun making this marshmallow catapult? If you like to tinker, plan, build and troubleshoot, Junk Drawer Robotics is for you. In this project, you build catapults, hydraulic arms, can-can robots and more using items you can find in your family’s junk drawer!

## REFERENCES

- The Engineering Design Process (Museum of Science) at <https://www.eie.org/overview/engineering-design-process>
- How Catapults Work (How Stuff Works) at <https://science.howstuffworks.com/transport/engines-equipment/question127.htm>

Activity modified from:

- Living Well Mom at <https://livingwellmom.com/2015/05/catapult-for-kids>

Originally produced by Amy Henschen, Extension Educator, DuPage, Kane & Kendall County 4-H.

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