

# POPSICLE STICK CATAPULT

## Learning Goal

Explore Newton's 3 Laws of Motion in action by building a homemade catapult, observing how changes in its design affect its launch.

The first catapults were recorded in ancient Greece around 399, B.C. These catapults were used in battle to take down barriers and attack settlements! Nowadays, we can use them to observe Newton's 3 Laws of Motion:

1. An object at rest stays at rest unless acted upon by an outside force.
2. If you put the same force on two objects of different size, you will get different changes in motion (acceleration).
3. For every action, there is an equal and opposite reaction.

Consider Newton's 3 Laws of Motion as you go. How can you see some of these laws in action with the catapult?



*Replica of a Medieval Catapult*

# INSTRUCTIONS

## Materials:

5 Popsicle Sticks, 6 Rubberbands, 1 Plastic Spoon or Fork

Don't have these materials available? No problem! MOSH activities are designed to be versatile. Think of it as a challenge and change it up to suit yourself. Be sure to take a pic and show us your customization.



1. Stack 3 popsicle sticks together, tie rubberbands at either end.

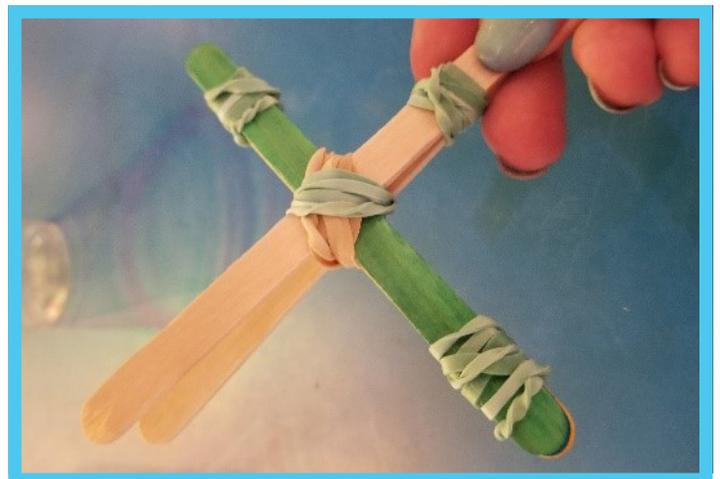
2. Stack 2 sticks together, tie 1 rubberband at one end.



3. Open the 2-stack, wedging the 3-stack in between them.



4. Secure your sticks with 2 rubber bands. Wrap the second rubber band in the opposite direction of the first so that your bands make an "X" where the sticks intersect.



5. Secure a plastic utensil (spoons work best!) to the top stick with a rubber band.



6. Load a small, fairly light object (ex: crumpled-up paper ball) onto the utensil, gently pull the utensil down, then let it rip! For more of a challenge, see how well you can learn to aim your catapult. Can you catapult something into a cup that's 1 foot away? How about 3 feet away?
7. Now that you've mastered MOSH's DIY catapult, why not make it even better? If you stacked 4 popsicle sticks in the middle, does the catapult fling objects further, or higher than before? What if you only stacked 2 popsicle sticks in the middle, what happens to your catapult then?

**You've done all the work -- time to show it off! Post your catapult using #MOSHConnect so we can see what you've been up to. Extra credit for posting a video of your catapult in action!**