

# Make a Catapult

**Discover the mechanics of levers and how they can be used as tools!**

**Materials Needed:** Paint stir stick or wooden ruler, plastic bottle cap, glue gun, cardstock or thick paper, pom-poms, tape, cups. *Optional:* Paint or markers.

## Instructions:

**Step 1:** Use a glue gun to glue a plastic bottle cap on one end of the paint stir stick or wooden ruler. You can also decorate the stick with paint or markers.



**Step 2:** Fold a piece of cardstock or thick paper in half, and then fold the half into thirds to create a sturdy triangle shape. Tape together to secure.



**Step 3:** Place the stick on top of the triangle stand. Place a pom-pom inside the bottle cap. Push down on the opposite end of the stick and the pom-pom will fly into the air!

**Experiment:** Mark the stick at 1-inch intervals. Try placing the stick at different points and see how it changes how far the pom-pom flies. Does it change how hard you have to push down? What is the best spot to place the stick so the pom-pom flies the farthest distance?



Try throwing the pom-pom with your hand. Then use the stick to throw it. Which method sends the pom-pom further? The *atlatl*, a hunting tool, uses a similar lever mechanism to throw a dart.

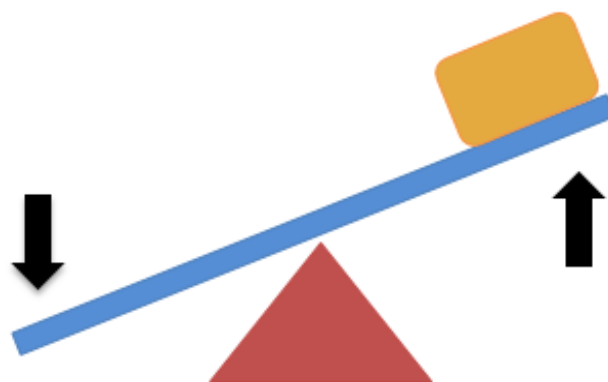
**Play:** Place empty cups a certain distance away from the catapult. Mark each cup with a number of points you can earn. Try to aim for the cups! Challenge yourself or play with friends.

Activity adapted from *The Kids' Book of Simple Machines* by Kelly Doudna.

# Levers Are Simple Machines

When we push or pull on something, this is called a *force*. In science, a *machine* is anything that helps make a force bigger. Levers, wheels and axles, pulleys, ramps, wedges, and screws are all simple machines that increase the force we can put into our tools. These tools allow us to be stronger!

A lever is a solid rod or beam that pivots on a fixed point, called a fulcrum. With a lever, the force applied on one side of a rod or beam creates a force on the other side, similar to a playground seesaw. By moving the pivot point, a small force on one side can turn in to a much bigger force on the other.



Levers are simple machines used in many everyday tools, including spoons and forks, scissors, hammers, pliers, bottle openers, shovels, wheelbarrows, door handles, brooms, bike brakes, nail clippers, canoe paddles, and catapults. People across the world have used levers for thousands of years. In the construction of ancient Egyptian monuments, levers helped workers lift objects as heavy as 100 tons!

At the UA Museum of the North, you can find many levers. Both ancient and contemporary tools are on display in the galleries and stored in the collections. Researchers also use many kinds of levers as tools in the lab and during fieldwork.



Top: Yup'ik throwing board (*nuqaq*), used for hunting seals.

Image: [alaska.si.edu](http://alaska.si.edu).



Bottom: Diagram showing how to use a throwing board.

Image: *Inua: Spirit World of the Bering Sea Eskimo* by Fitzhugh and Kaplan, 1982.



Canoe paddles are one type of lever. Archaeologists and other scientists use them while doing fieldwork.

Image: Sam Coffman, 2021.