

Catapults!

Primary Audience: Elementary School

Adapted from [Fleet Science Center](#)

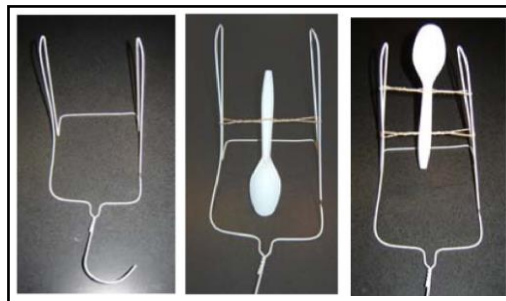
Description: For this challenge, learners will build their own catapults to launch small objects into the air. First, use the basic catapult instructions to build a catapult out of a wire hanger, a plastic spoon, and rubber bands. Then, make it your own by improving the catapult design! Can you make the catapult throw something even further?

Materials will vary. Recommended:

- Wire coat hanger to make a base
- Plastic spoons or a cleaned-out, used Keurig cup glued to a craft stick
- Rubber bands
- Things to fling: cotton balls, play-dough shaped into balls, packing peanuts, a small wad of duct tape, marshmallows, etc.
- Optional: Miscellaneous craft supplies

Basic Catapult Instructions:

1. To create your catapult base, hold your hand in the center of the hanger and pull up both sides around it.
2. Set the hanger on the table and straighten as needed so that it sits on the table.
3. Take one rubber band and put it around the sides that are sticking up. Then take the spoon and put it in between the rubber band and twist several times so that the rubber band is tight around the spoon.
4. Put the second rubber band over the top of the sides that are sticking up. Use your fingers to twist this rubber band several times. Put the top of the spoon through this rubber band so that it stands upright on its own.
5. To launch your catapult, place the object you would like to launch into the spoon. Holding the base with one hand, use your other hand to pull back the top of the spoon. Then let go of the spoon and see what happens!



Science Challenge: Once you have the basic catapult under your belt, try designing and building a better catapult! Here are a few things to try:

- Pick one variable to change and see how this affects your catapult. What would happen if you used something other than a spoon? Or, what would happen if you used thicker or thinner rubber bands?
- Can you make a larger catapult? What supplies do you have at home to make one that is larger?
- Can you make a catapult that flings items *further* than your basic catapult? Use measuring tape to measure how far your catapult can throw something.
- Can you decorate your catapult?

Extension: How is your accuracy? See if you can shoot something into a cup on the other side of the room!

What's going on? When you push on a spring or pull on a rubber band, it will store what is called *elastic potential energy*. When you release that spring or rubber band, the elastic potential energy will begin to turn into *kinetic energy* – the energy of motion! On a catapult, the force of the rubber band is enough to overcome the force of gravity pulling the object down and its container down, causing the object to fly into the air.

The basic catapult design also depends on a simple machine called a lever. The spoon here acts as a lever with a pivot point created by the rubber bands. What would happen if your lever was longer or shorter?

Additional Resources: Reach out the [COSI Department of Science Content](#) if you have any questions or comments.

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