

# Student Worksheet for Ep. 21:

## Clothespin Catapult

**Overview:** Ancient people teach us a thing or two about energy when they laid siege to an enemy town. Although we won't do this today, we will explore some of the important physics concepts about energy that they have to teach us by making a simple catapult.

All the different forms of energy (heat, electrical, nuclear, sound etc.) can be broken down into two categories, potential and kinetic energy.

Think of potential energy the “could” energy. The battery “could” power the flashlight. The light “could” turn on. I “could” make a sound. That ball “could” fall off the wall. That candy bar “could” give me energy. Potential energy is the energy that something has that can be released. For example, the battery has the potential energy to light the bulb of the flashlight if the flashlight is turned on and the energy is released from the battery. Your legs have the potential energy to make you hop up and down if you want to release that energy (like you do whenever it's time to do science!). The fuel in a gas tank has the potential energy to make the car move.

Kinetic energy is the energy of motion. Kinetic energy is an expression of the fact that a moving object can do work on anything it hits; it describes the amount of work the object could do as a result of its motion. Whether something is zooming, racing, spinning, rotating, speeding, flying, or diving... if it's moving, it has kinetic energy. How much energy it has depends on two important things: how fast it's going and how much it weighs.

We're utilizing the “springy-ness” in the popsicle stick, spoon, and the torsion spring to fling the ball around the room. By moving the fulcrum as far from the ball launch pad as possible (on the catapult), you get a greater distance to press down and release the projectile.

### Materials

- tongue-depressor size popsicle stick
- clothespin
- plastic spoon
- scrap of cardboard of wood
- ping pong ball or wadded-up ball of aluminum foil (or something lightweight to toss, like a marshmallow)
- hot glue gun with glue sticks

### Observations:

1. What part of the catapult stores the most potential energy? Why is this?
2. Where is the kinetic energy transferred to in this catapult?
3. How would you make a catapult's projectile travel farther?

