



SPOON CATAPULT

OVERVIEW

In this activity, the campers will make a mini spoon catapult, while learning about the history of this structure, as well as kinetic energy and parabolic flight.

TOPIC AREA(S)

- Flight
- Forces acting on structures/mechanisms
- History
- Forces causing movement

GRADE LEVEL

3-4 (circuits) or 5-6 (gizmos): might be more suitable for circuits as assembly is quite simple

QUESTIONS PRIOR TO THE LESSON/GETTING EXCITED

- Who has seen a catapult before?
- Who knows what it is used for?
- What is kinetic energy?
- Why do things fly in a predictable pattern (not randomly up and down)?
- Has anyone ever heard the term parabola before?

BACKGROUND INFORMATION FOR INSTRUCTORS (INCLUDE QUESTIONS W/ ANSWERS)

A **catapult** is a ballistic device used to launch a projectile a great distance without the aid of gunpowder or other propellants – particularly various types of ancient and medieval siege engines. A catapult uses the sudden release of stored potential energy to propel its payload. Most convert tension or torsion energy that was more slowly and manually built up within the device before release, via springs, bows, twisted rope, elastic, or any of numerous other materials and mechanisms.

The counterweight trebuchet is a type of catapult that uses gravity.

In use since ancient times, the catapult has proven to be one of the most persistently effective mechanisms in warfare. In modern times the term can apply to devices ranging from a simple hand-held implement (also called a "slingshot") to a mechanism for launching aircraft from a ship.

The earliest catapults date to at least the 4th century BC with the advent of the mangonel in ancient China, a type of traction trebuchet and catapult. Early uses were also attributed to Ajatashatru of Magadha in his war against the Licchavis. Early Greek catapults emerged around the 1st century BC



Catapults function by way of kinetic energy, which is the type of energy displayed when an object is in motion. This made them function well as projectile tools/weapons as it is easier to transfer a greater amount of energy when something is launched/thrown rather than dropped. This energy is first stored as potential elastic energy (like a spring) and then transferred to kinetic energy as the arm of the catapult has launched.

In terms of flight, whatever is launched out of a traditional catapult flies in a route known as parabolic flight (looks like an upside down smiley face.) This pattern of flight is seen in all launched objects, from throwing a football/basketball to launching something in a catapult. This pattern happens because gravity exerts a downward force on the flying object (which is why launched objects don't fly in a random zig-zag pattern). Birds or airplanes however have special adaptations that allow them to control their flight patterns (wings, engines etc)

RELEVANCE TO THE CURRICULUM

Grade 1 and 2	Grade 3 and 4	Grade 5 and 6	Grade 7 and 8
Needs & Characteristics of Living Things Growth and Changes in Animals Materials, Objects and Everyday Structures Movement Energy in Our Lives	Growth and Changes in Plants Habitats and Communities Strong and Stable Structures Pulleys and Gears Forces Causing Movement	Human Organ Systems Biodiversity Forces Acting on Structures and Mechanisms Flight Properties of and Changes in Matter	Interactions in the Environment Cells Form and Function Systems in Action Pure Substances and Mixtures Fluids Heat in the



Properties of Liquids and Solids	Light and Sound	Electricity and Electrical Devices	Environment
Daily and Seasonal Changes	Soils in the Environment	Conservation of Energy and Resources	Water Systems
Air and Water in the Environment	Rocks and Minerals	Space	

MATERIALS (SPECIFY WHETHER PER CAMPER, GROUP OR CLASS)

PER CAMPER:

- 1 plastic spoon
- 1 hard cardboard tube (like an empty bounty roll or any paper towel roll etc)
- Tape (optional to secure catapult)
- 2 or 3 rubber bands
- Anything to fire that will fit in the spoon

SAFETY CONSIDERATIONS

If you hurt yourself in this activity you are beyond my help

PROCEDURE

- 1) Secure the plastic spoon to the center of the cardboard tube with the rubber bands**



2) Optional: use tape to secure either end of the catapult to a flat surface



3) Fire!



REFERENCES

<https://littlebinsforlittlehands.com/angry-birds-plastic-spoon-catapult-stem-activity/>

<https://en.wikipedia.org/wiki/Catapult>