

# Catapults

## OBJECTIVE:

The goal of the project is to increase your understanding of force and motion by building a catapult to launch an object of your choice and by collecting/analyzing the data from your catapult.

## BACKGROUND:

A catapult is a mechanism used to throw objects in ancient and medieval warfare. At first, catapults were specifically designed to shoot spears or other objects at a low trajectory. They were originally created from ballistae and trebuchets, both of which were large military engines used to hurl stones and other missiles, but these distinctions later blurred. Soon after, larger catapults mounted on a single arm also hurled stones, pots of boiling oil, and incendiaries (chemicals that create fire) at a high trajectory. They were used to attack or defend fortifications. Catapults were widely employed in siege warfare, but with the introduction of artillery they passed from use. In the 20th century catapults using hydraulic pressure were reintroduced to launch aircraft from warships.

## CHALLENGE:

Construct a catapult that will launch a mini marshmallow at least a distance of 2 meters under its own power and launch the mini marshmallow closet to a target.

## RULES:

Pre-made models or kits are NOT allowed. Your catapult must be created and assembled by you. A sling-shot, cross bow (ballistae) design, or mouse trap are not permitted. The catapult must have its own potential energy without you or another person holding the arm or the object back before release. In other words, you should be able to let go of the catapult's arm and it is not set off. You are not allowed to apply a force in a forward direction to get the object to begin its forward motion. However, you are allowed to apply a pressing, pulling, or cutting force to get the catapult to launch the object.

**The base of the catapult must be no smaller than half a sheet of paper or no larger than full sheet ( $8 \frac{1}{2} \times 11$ ). Height including spoon cannot exceed 12 inches**

**Students will bring in their own materials to build catapult\***

### Classroom Materials Provided

- 2 Mini Marshmallows
- Rubber bands
- One Plastic Spoon
- Masking Tap/Ruler/Scissors

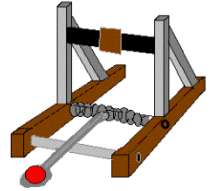
**\*Catapults are to be built in class**

**\*No Mouse Traps**

Group Members (3)

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Hour \_\_\_\_\_



**Drawing of Catapult:**

**ALL SKETCHES OF THE CATAPULT MUST HAVE A SIDE-VIEW AND FRONT OR BACK VIEW WITH MATERIALS IDENTIFIED USED IN CONSTRUCTION**

**Data (Create a data table to organize your information):**

**Conclusion Questions:**

1. What was your group attempting to achieve with its catapult design? \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_
2. How did the catapult set the marshmallow in motion? \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_
3. Which challenge did your catapult meet best, accuracy or distance? \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_
4. What could you have done to make the catapult better? \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_
5. What helped the catapult work as well as it did? \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_
6. What did this activity teach you about motion and forces? \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_