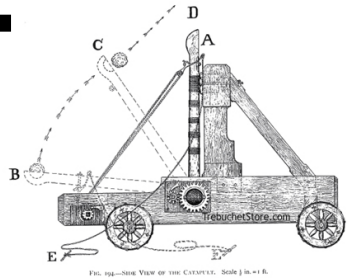
CATAPULT/TREBUCHET PROJECT



A catapult is a mechanism used to throw missiles in ancient and medieval warfare.

At first, catapults were specifically designed to shoot spears or other missiles at a low trajectory. They were originally distinguished 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 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.

Objective:

The goal of the project is to increase your understanding of motion in two dimensions by building a catapult to launch tennis balls, then collecting data and analyzing that data. Then you will present your results to the class using Keynote or PowerPoint.

Assignment:

Each person must construct a catapult that can launch a tennis ball on a consistent basis. The catapult must be a gravity style catapult that uses weight as its source of energy. Catapults based on tension as the source of energy are **NOT** allowed.

The catapult must be made from regular hardware store materials.

You may **NOT** use kits or specially designed materials in your catapult. The final design must be yours but you may use the design of others as an example or guide.

The catapult should have a base of about 30.0 cm by 60.0 cm but the arm CANNOT stand taller than 122.0 cm. Your catapult must have a release mechanism that allows you to fire away from the device.

Prohibited Materials:

- bungee cords
- slingshots or rubber bands of any type
- springs or coils
- No tension devices whatsoever
- No explosives or pressure devices

Contest

Each person will be allowed three launches and your best launch will be used. The longest launch wins.

POWER POINT PRESENTATION:

- Your PPT should explain the purpose of your project
- Describe how you did it.
- Your PPT should contain a minimum of 20 slides including title and ending slide.
- It should contain clipart, **drawings** and **pictures**.
- It should have **pictures** of your project.
- For internet bibliography give annotated links.

Analyze your projectile's motion:

- How far did your projectile travel horizontally?
- How long was your projectile in the air?
- What was your projectile's horizontal velocity?
- How long did it take your projectile to reach its maximum height?
- What was your projectile's initial vertical velocity?
- What was your projectile's total initial velocity?
- What was your projectile's launch angle?

Think It Through:

- How did undertaking this project improve your understanding of projectile motion?
- How did you feel about this project when it was first assigned?
- How do you feel about this project now that it has concluded?
- What would you have done differently as you worked through this project?

Grade

The catapult itself will be a test grade and the PowerPoint presentation will be a test grade. A working catapult will get you a minimum of 70%. A completed PowerPoint will get you a minimum of 70%. How much higher you go depends how well YOU design your project and presentation.

Due date: _____

"The foundation of scientific knowledge is experimentation."