

RAFT IDEAS

Topics: Potential and Kinetic Energy, Trajectories

Materials List

- ✓ Core holder (used to support the ends of large rolls of material) or equal, 2
- ✓ Binder clip, large, 2
- ✓ Cardboard tube having a diameter slightly larger than core holder's post
- ✓ Flexible plastic or wooden strip, about 60 cm (24") long
- ✓ Items that can be safely used as a projectile (e.g., cotton ball, foam block)
- ✓ Portion cup or equal to hold the projectile
- ✓ Tape or equal
- ✓ Eye protection is **highly recommended**

This activity can be used to teach:

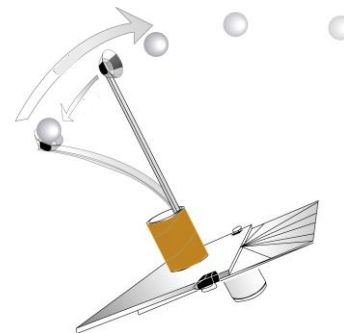
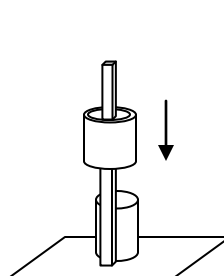
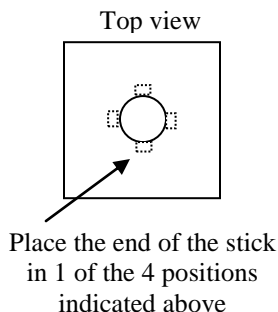
Next Generation Science:

- Forces & Motion (Physical Science, Grade 3, 2-1, 2-2; Middle School, 2-2)
- Energy (Physical Science, Grade 4, 3-1, Middle School, 3-5)
- Gravity (Grade 5, Physical Science 2-1)



The Flingy Thingy

Catapult student interest in changing potential energy into kinetic!



Study the physics of launching a projectile at a target with a small scale catapult.

Assembly

1. Place a thin flexible plastic or wooden strip parallel to the post of a core holder, positioned so the strip's width is parallel to one of the core holder's square sides.
2. Slip a close fitting cardboard tube over the strip and post. Push down on the tube to jam the strip tightly to the post. If the strip is not held tightly then wrap tape around the base of the strip and try again. **A very tight fit must be created!**
3. Tape a portion cup to the top of the strip on the **correct side** as shown above. **Note:** the device can be used at this point as a catapult.
4. To make the launch angle adjustable invert a second core holder and place under the first core holder. Connect the 2 core holders together with 2 binder clips as shown above. The launch angle can be adjusted by decreasing or increasing the overlap of the core holders' bases before clipping them together.

To Do and Notice

1. Address the following safety issues each time the catapult is used:
 - Wearing eye protection is highly recommended.
 - The flexible strip is firmly attached to the core holder and portion cup.
 - Projectile flight path is clear of hazards, people, animals, & valuables?
2. Place a safe projectile into the portion cup, bend the flexible strip back a set distance, and release. The flexible strip must not be bent to the breaking point!
3. Measure the distance between the catapult and the projectile landing point.
4. How is the distance to the landing point affected by adjusting variables (angle of launch, amount of bending, weight of the projectile, aerodynamics of the projectile, position of the portion cup on the flexible strip)?

The Science Behind the Activity

Ancient siege warfare used catapults of different types to attack fortified city walls. Each catapult transformed the potential energy that could be stored in twisted ropes, bent wood, or raised weights into the kinetic energy of a moving stone or other projectile. When gun powder was invented catapults were replaced by cannons.

Taking it Further

Design a way to make the launch angle adjustable over a greater range. Design a more true-to-form catapult using a sling rather than a container to hold the projectile.

Web Resources (Visit www.raft.net/raft-idea?isid=503 for more resources!)

Information and links on catapults and related devices - <http://www.catapults.info/>