



Curiosity Guide #202

Levers

Accompanies Curious Crew, Season 2, Episode 2 (#202)

Paint Paddle Catapult

STEM Challenge

Description

Are you up for a distance challenge? Design and test a Class 1 lever to send objects as far as you can!

Materials

- Wooden paint stirrers in both standard 12-inch and 21-inch length (for 5-gallon paint buckets)
- Plastic film canisters or wooden spools
- Plastic spoons
- Paper cups
- Rubber bands
- Duct tape
- Objects to launch, such as corks, small pompons, or marshmallows
- Measuring tape
- Rulers
- Markers or pencils

Procedure

- 1) Use a ruler and marker or pencil. Measure and draw hash marks for every inch on the blank sides of the two lengths of paint stirrers.
- 2) The paint stirrer will serve as the beam on this Class 1 lever catapult. The marks will be used to keep track of the position of the fulcrum for different launch trials.
- 3) Make a fulcrum out of one or more film canisters or wooden spools. These items can be linked together with rubber bands.
- 4) Strap the fulcrum to the underside of the beam with additional rubber bands looped over the beam. In each trial, be sure to note the inch mark where the fulcrum is located.
- 5) Place a marshmallow, pompon, or cork on the load end.
- 6) Strike the force end with a flat hand to launch the load.
- 7) Measure and record the distance the object traveled.
- 8) Experiment with different fulcrum positions and compare the launch distances.
- 9) What combination of type of fulcrum, length of beam, and fulcrum position sends the objects the greatest distance?

My Results

Explanation

This is a Class 1 lever because the fulcrum is centered between the load arm and the force arm. Lengthening the distance between the force arm and the fulcrum increases the mechanical advantage of the effort or force. This is not the only way to increase the distance a catapulted object travels. Many variables effect trajectory and distance of a launched catapult load. This includes fulcrum size, its position, beam length, amount of force applied, and the mass of the load.

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