Curiosity Guide #210
Mechanical Energy

Accompanies Curious Crew, Season 2, Episode 10 (#210)

Cup Rocket

Investigation #4

Description

Make a crazy cup rocket and learn more about mechanical energy.

Materials

- 2 plastic cups
- 2 rubber bands
- Hole punch
- 4 paper clips
- Tape

Procedure

1) Begin by stretching a rubber band. Can you feel the force trying to shrink the band? Holding the rubber band in place creates elastic potential energy, but when the band is released, it can cause objects to move.
2) Use the hole punch and punch 4 equidistant holes around the circumference of the cup and $\frac{3}{4}$ of an inch down from the rim.
3) String one end of a rubber band onto a paper clip. Fish the other end of the band through one of the holes and across the inside of the cup, exiting the hole opposite.
4) Slide another paper clip on the free end of the band.
5) Adjust the clips so that they lie flat across the holes. Tape the clips down to the cup.
6) Repeat with a new band, going through the other pair of holes.

7) Place the second cup upside down on the floor to serve as the launch base.
8) Stack the cup with the rubber bands on the base cup and force it down.
9) Release the cup. Did the cup launch?
10) You may want to decorate the Cup Rocket to look like a rocket.

My Results

Explanation

When the rubber bands on the top cup are forced down and held in place, they have **elastic potential energy**. When the cup is released, the stretched bands quickly shrink. This movement transfers the energy away from the base cup and changes the energy into **kinetic or motion energy**, which launches the cup. As the rubber bands propel the attached cup, this is an example of **mechanical energy**. Mechanical energy happens when potential and/or kinetic energy of an object applies a **force** to another object.

Something more to think about: Your cup rocket used stretched rubber bands to launch. You see, when materials are stretched, they have elastic potential energy and are ready to work with mechanical energy.

Imagine an archer getting ready to shoot an arrow from a bow. When the archer pulls back on the bowstring, it also stretches. The elastic potential energy increases until the string is released. Then the energy moves through the string to the arrow and launches the arrow toward the target. What is happening then? Mechanical energy! We take part in mechanical energy all the time!

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