



Curiosity Guide #403

Kinetic Energy

Accompanies Curious Crew, Season 4, Episode 3 (#403)

Stubborn Can

Investigation #1

Description

Your friends will think this can is magic!

Materials

- Coffee can with a plastic lid, or other similar can
- Large rubber band
- 9-volt battery or heavy bolt
- Tape
- 2 paper clips
- Drill
- $\frac{1}{4}$ -inch drill bit
- Ruler
- Marker

Procedure

1. Place the lid on the coffee can.
2. Use a ruler to find the center in the plastic lid and the center of the bottom of the can.
3. Mark the center points with a marker.
4. Using the drill and $\frac{1}{4}$ -inch drill bit, carefully drill a hole in both the lid and the bottom of the can. The two holes should line up.
5. Stand the 9-volt battery on end.
6. Attach the rubber band to the battery so that a loop sticks out on either side of the top of the battery. Here's how:

Place the rubber band around the top edge of the battery. Flatten the rubber band along the wide sides of the battery so that there's a small loop of rubber band on either side of the battery. Hold in place with your fingers.

7. Tape the rubber band in place by placing the tape over the flattened rubber band on one wide side, up over the battery poles on the top, and down across the rubber band on the other wide side.
8. Take the lid off the can.
9. On the inside of the can, feed one loop of the rubber band through the bottom.
10. On the outside, place a paperclip in the rubber-band loop to hold the end of the rubber band in place on the bottom of the can.
11. On the inside, grab the loose loop of the rubber band. Stretch and pull the second loop up through the can until you can push the loop through the inside of the lid.
12. Use the second paper clip to secure the second loop in place on the outside of the lid.
13. Put the lid back on the can.
14. Lay the can on its side and give it a push.
15. Did the can return to you? Why?

My Results

Explanation

When you push on the can, it begins to rotate and to roll away. The two loops of rubber band start to rotate as well. The battery doesn't rotate or flip over because it is so dense, so any small heavy object could work. As the can rolls, the rubber-band loops begin to twist on either side of the weighted battery.

The kinetic energy from the push is transferred to potential energy in the winding rubber-band loops. When the can finally stops, the potential energy in the rubber band turns into kinetic energy as the band loops unwind. The can returns!

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