



Curiosity Guide #401

Center of Gravity

Accompanies Curious Crew, Season 4, Episode 1 (#401)

Rolling Uphill

Investigation #1

Description

Can you fool gravity into letting an object roll uphill?

Materials

- A V-shaped wooden ramp that travels at least 12 inches
- A wooden cylinder that is wider than the widest point on the V-ramp
- Double wooden cone attached at their bases and just narrower than the ramp's widest point

OR substitute 2 long, flat pieces of wood; 3 bricks; and 2 funnels with a dowel in the center.

- Ruler for checking results

Procedure

1. Place the cylinder at the top of the ramp. Demonstrate that the cylinder rolls down the ramp.
2. Place the double cone at the bottom of the ramp. Demonstrate that the double cone rolls upward.
3. How can that be?

My Results

Explanation

The cylinder's center of mass is in its center. When the cylinder rolls down the ramp, we can see that the cylinder's center is closer to the table top at the end of the ramp. However, the double cone or double funnel-shaped object appears to roll uphill! The center of gravity on the double-funnel shape is at the intersection between the center of the ends and the center of the base planes where the cones meet. Although the double cone appears to be rolling uphill, the center point of this object is closer to the table at the top of the ramp than at the bottom of the ramp.

Prove the illusion: Using a ruler, measure the height from the center of the cylinder and the double cone at both the top and bottom of the ramp to show that both objects are rolling downhill.

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