



Curiosity Guide #401

Center of Gravity

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

Stick Balancing

Investigation #5

Description

Challenge some friends to balance a stick on their fingers. Then find out how changing the center of gravity can help you do this trick.

Materials

- 3-foot dowel, $\frac{1}{2}$ inch thick
- Playdoh or a small C-clamp
- Measuring tape
- Friends

Procedure

1. Form a Playdoh ball about the size of a tennis ball.
2. Challenge your friends to place the shaped ball somewhere on the stick so that the dowel sticks out on both sides of the ball. See who can balance the stick the longest on his or her finger.
3. After some experimentation, place the ball around the dowel so that its center is about eight inches from the end of the stick.
4. Try to balance the stick on the end of your finger so that the Playdoh ball is near your hand.
5. Turn the stick over so that the Playdoh ball is far away from your hand, and try again. Was having the ball further from your hand easier or harder? Why? How does the Playdoh ball help balance the stick?

My Results

Explanation

Even though the total mass remains the same, the change in position of the Playdoh ball changes how quickly the top of the stick rotates or moves. When the Playdoh is at the top and further away from your hand, more mass is at the top. There is greater difference between the top of the stick and your hand, giving you more time to react and balance the stick.

The law of inertia describes that the more mass an object has, the more resistant the object is to change in position. Because the stick rotates more slowly with the ball at the top, you can adjust your finger more easily to try to keep the stick balanced. As the ball moves closer to your hand, you have less time to react and adjust your hand to balance the stick.

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