Curiosity Guide #401
Center of Gravity

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

Make a Balanced Sculpture

STEM Challenge

Description

Can you create your own balanced sculpture? Sure, you can!

Materials for each student or team

- 2-liter bottle with cap
- Water
- Food coloring
- Small potato
- Tooth pick
- Wooden skewers of assorted lengths
- Objects that could act as weights, such as
    - Large marshmallows
    - Plastic milk caps
    - Gummy candies
    - Balloons
    - Other interesting materials

Procedure

1. Fill a 2-liter bottle with water, add food coloring, and cap.
2. Pierce a toothpick in the small potato and try to balance it on the top of the bottle.
3. Is balancing the potato difficult?
4. Begin to add different skewers into the potato, with different objects used as weights.

5. Add numerous skewers to make a sculpture that will remain balanced on the top of the bottle.
6. Is your sculpture stable enough that the creation can be tapped or spun and remain on the bottle?

NOTE: One interesting way to use the My Results section would be to keep track of each addition to your sculpture and what happens to the sculpture's balance when each skewer with weight is added.

My Results

Explanation

When you first tried the potato, the center of gravity was above the point where the toothpick touched the cap, so the potato was very unstable. Adding the skewers with a variety of weights increases the mass and changes the center of gravity, moving the center of gravity below the point of contact. When the center of gravity is below the point of contact, the object is much more stable.

Think about this: Making a balancing structure is a great challenge you can try. Imagine someone walking on a tightrope or riding a bike on a tightrope. Those stunts are impressive, but the tricks can be done much more safely when the performer carries a long, weighted pole or if weights are suspended below the tightrope. Both additions help the performer keep his or her center of gravity directly over the tightrope itself, *and* make the performer more stable.

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Curious Crew is a production of Michigan State University.
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