Curiosity Guide #803
Balance and Stability

Accompanies Curious Crew, Season 8, Episode 3 (#803)

Stages of Equilibrium

Investigation #3

Description

Tall and thin, or short and wide? You decide!

Materials

- Funnels
- Wood cylinders of different heights
- Weeble or another toy with rounded base
- Rolling pin

Procedure

1) Balance a funnel on its small end beside a tall, slender wood cylinder.
2) Stand a second funnel on its wide end beside a short cylinder with a large base.
3) What happens if you gently push on the first pair?
4) What happens if you gently push on the second pair?

My Results

Explanation

First pair: Tipping over the funnel balanced on the small end or the tall slender cylinder doesn't take a very big disturbance. These objects would be described as objects with unstable equilibrium because the objects are not able to regain their original position after the disturbance. Because the base of support of each of these objects is so narrow, a slight disturbance moves the center of gravity outside the base of support, and the object falls over.

Second pair: The second group doesn't fall over with a similar disturbance. The funnel standing on its wide end and the short wide cylinder would be described as objects with stable equilibrium because the objects can maintain their original position after the disturbance. Both the funnel and the cylinder in the second pair have a wider base of support and a lower center of gravity, which make these objects more stable.

Explore further: Examine a rolling pin or a funnel on its side. These are examples of neutral equilibrium. The objects may roll, but they don't tip over, and the center of gravity is continually supported. And what about that toy? Can you tip a Weeble over? Why or why not?

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