



Bottle "Tops"

Primary Audience: 9th – 10th

Description: Make a top out of a bottle cap to learn about rotation and energy.

Key Words: Rotation, Wobble

Materials:

- Crown cap, like from a glass soda bottle, like IBC root beer
- Thin nail
- Hammer
- Permanent markers of different colors

Instructions:

1. Place the crown cap, bottom side up, on a piece of wood.
2. Take the thin nail and place the point in the center of the cap. Tap the nail with a hammer so that just the point of the nail is through the cap. DO NOT hammer the nail all the way through the cap.
3. Placing the nail into the hole, give the nail a quick twist with your fingers to spin the cap. What happens? Does the cap wobble? What makes the cap wobble? Try to see who's cap can spin the longest, or with the least spin.

What's going on?

When you give the nail a twist, you give the cap a spin, just like a top. The indentation provides an axis of rotation. The wobble is due to the hole actually being off center. This puts more weight to one side of the axis of rotation than on the other making the top no longer balanced. Maybe you notice that the more unbalanced the cap, the shorter the "spin time". This is due to the wasting of energy on the wobble that could have been used to make the top spin longer.

Further Exploration:

Use markers to draw designs in the cap. What happens to those designs or the colors when you spin the cap?

Relevant Ohio Science Content Standards:

Mechanics

Physical Science: 9.20