



Curiosity Guide #609

Waves

Accompanies Curious Crew, Season 6, Episode 9 (#609)

Falling Slinky

Investigation #1

Description

A spring, a spring, a marvelous thing!

Materials

- Slinky
- Video recorder, digital camera, or phone
- A friend

Procedure

- 1) Hold one end of the slinky in one hand and let the rest uncoil and hang down.
- 2) Predict what will happen when the slinky is released.
- 3) Will the bottom fall first? Will the top fall first? Will the ends recoil to the middle? Will the entire thing fall to the ground in its stretched formation?
- 4) Try the action several times and watch closely.
- 5) Try video recording the action to play back in slow motion.
- 6) What did you notice?

My Results

Explanation

Amazingly, the bottom part of the slinky stays in place and the top of the slinky collapses down. Not until the entire spring collapses does the bottom start falling to the floor. The compression wave travels through the slinky. Before the wave arrives, the bottom position of the slinky holds still. Gravity is acting on the center of mass of the extended coil. That center of mass continues to move down as the slinky gets shorter, but the center of mass is still above the bottom of the slinky.

What if you have a softer slinky, or one with less tension? Then the compression wave will take longer to move through the coil and collapse the slinky.

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