Curiosity Guide #609
Waves

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

Space Phone Energy

Investigation #4

Description

How do sound waves travel? Find out!

Materials

- Space Phones toy (similar to two cans connected with a string)
- A friend

Procedure

1) Hold one end of the Space Phones.
2) Have a friend hold the other end.
3) Stretch the phones out so the coil is not sagging.
4) Strike one end of the coils from the top to send a single pulse.
5) What did you notice?
6) Try sending repeated pulses by repeatedly striking one end of the Space Phones.
7) What did you notice?
8) Try having both friends strike their end.
9) What happens when the waves meet?
10) Now pull several coils toward you from one end and let them go.
11) What did you notice?

My Results

Explanation

Slinkys are great toys to demonstrate the motion of energy traveling in different kinds of waves. In this experiment, we observed both transvers and longitudinal or compression waves. When we strike one end with a single pulse of energy, the disturbance is perpendicular to the stretched slinky and the movement of the wave. The disturbance causes the slinky to bounce down and then up. This up-and-down movement is a transverse wave. A transverse wave can also move side-to-side if we strike the slinky on the side instead of the top. The wave moves down to the end and then reflects on the return.

The other kind of wave we saw was when the slinks or coils were pulled back and released. This is called a longitudinal or compression wave. Logitudinal or compression waves move in the same direction as the slinky and the wave. We are able to see the slinks move close together and then apart as the energy travels through the wire.

When both friends caused a pulse, sometimes the two transverse waves would collide and get bigger, and other times the waves would be out of sync. A peak and a valley would combine and cancel each other out.

The waves got smaller due to the friction they encountered, and the energy spread out to the surroundings, like to the air particles. Those air particles and the cones on the ends of the Space Phones vibrate and form compression waves, which we can hear as sound energy.

Visualize this. Have you ever done the Wave with friends at a sporting event? That's a good visual example of a transverse wave because the disturbance is perpendicular to the movement of the wave. People stand and sit up and down, but the movement goes side to side.

Water waves also travel in transverse waves. The water moves up and down as it forms waves, but the waves still travel horizontally toward the beach.

We could see the longitudinal waves in the slinky and Space Phones when the energy moved in the same direction of the wave. This is also how sound energy moves as particles compress together and collide from the source of the sound vibration. Whoa! I'm hearing waves!

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