



## Curiosity Guide #609

### Waves

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

### Wiggly Water

Investigation #2

#### Description

You can't SEE sound waves. Or can you?

#### Materials

- Water spigot
- Soft rubber hose or flexible plastic tubing
- Large speaker
- Computer with tone software
- High speed camera, at least 24 fps
- Short step ladder
- Optional: Children's pool if you are setting up inside

#### Procedure

- 1) Set the ladder outdoors.
- 2) Place and secure the speaker on top of the ladder so that the front of the speaker faces to the right or left of the ladder steps.
- 3) For better effects, remove the speaker cover and hang the front of the speaker off the edge of the top step.
- 4) Hang the hose over the top of the speaker so that the hose contacts the surface of the speaker, while the bottom of the hose hangs about two inches below the speaker and doesn't hit the ladder.
- 5) Run tape across the hose to the speaker housing.
- 6) Connect the computer to the speaker.

- 7) Open the tone-generating software.
- 8) Hook up the hose to the water spigot and turn the spigot on.
- 9) Play a 24-hertz tone on the computer.
- 10) What do you notice?
- 11) What happens when you change the tone?
- 12) Record the action with the high-speed camera.
- 13) Play the recording back in slow motion.
- 14) What do you notice?

My Results

## Explanation

Because the hose is contacting the surface of the speaker, the hose vibrates along with the speaker. The energy causes the hose to wiggle and move the water in similar transverse wave patterns. The transverse wave patterns become visible as the water falls to the ground or in the pool. Transverse waves happen when there is a disturbance that is perpendicular to a medium. In this case, the medium is the water-filled hose, and the disturbance is caused by the in-and-out speaker movement. The hose vibration happens so quickly that we can't easily see the hose move. We can, however, see the effect of the movement by capturing the water wave pattern with the high-speed camera.

**Think about this.** When someone says the word "wave" to you, you might think of a friend waving hello or swells of water at the beach. But did you know we are surrounded by waves every day? It's true! Both sound and light can travel in waves. When objects experience a vibration or disturbance, that energy can travel in a wave motion through a medium, like air or water. Just like when you drop a pebble into calm water, that disturbance makes a ripple wave pattern that moves away from the disturbance through the water. Ahh, the wonder of waves!

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