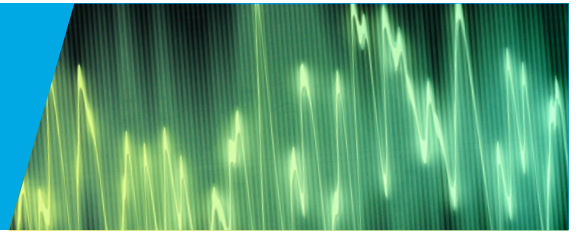


CURIOSITY AT HOME

BOUNCING SOUND WAVES



Have you ever heard an echo in a canyon or large, empty room? Sound travels in waves that can bounce, or reflect off of some surfaces. In this activity, use two cardboard tubes to aim sound waves at a wall and bounce them back into your ears.

MATERIALS

- Small portable speaker (substitute radio, or speaker function on a tablet or phone)
- Cardboard tubes (substitute a rolled-up magazine or papers)
- Bare wall space
- At least 2 people to do the activity
- Science notebook or paper to record findings (optional)
- Something to write with (optional)

PROCEDURE

- Begin playing music through your speaker at a low volume and place it near a wall with speaker facing the wall. You might also experiment with playing a podcast or a video instead of music.
- Each partner should have a cardboard tube. Partner A should place one end of their tube against the speaker and point the other end toward the wall, leaving about 2–4 cm (1–2 inches) of space between the tube and the wall. The tube should be pointing to the wall at an angle, rather than straight on.
- Partner B should put one end of their tube up to one ear and point the other end toward the wall at an angle, leaving 2–4 cm (1–2 inches) of space between the tube and the wall.
- The open ends of the two partners' tubes should be fairly close together, only 2–4 cm apart (1–2 inches).
- If both tubes are aimed just right, the music or voices from the speaker will sound louder to the partner holding the tube to their ear. If the sound is not louder, try changing the direction the tubes are pointed a little until a difference is noticed.
- Repeat the activity, this time trading jobs so that both partners get a chance to hear the difference in loudness.

Experiment continued on next page...



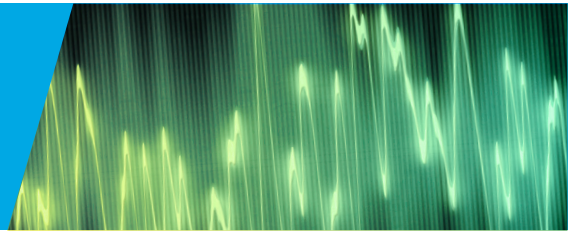
Show us how you're being curious! Share your results with us.

PACIFIC
SCIENCE
CENTER



CURIOSITY AT HOME

BOUNCING SOUND WAVES

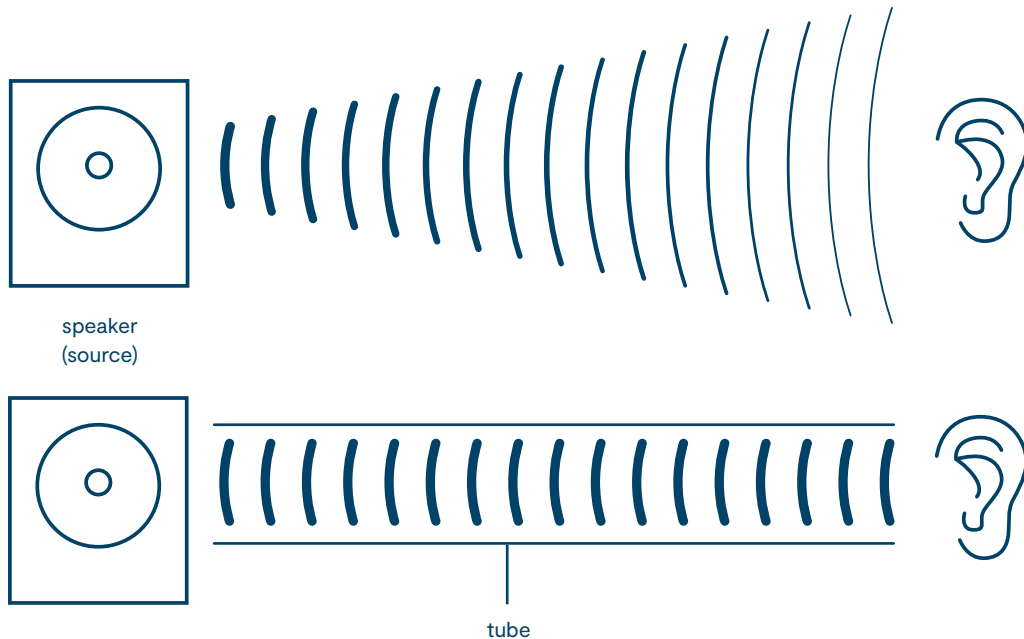


EXPLORE MORE

- Try replacing the cardboard tubes with a glass or a different tube-shaped object.
 - › Does it make the sound louder or softer? Does it sound clearer or muddier?
- Try placing the speaker from the activity fully inside a large glass or vase.
 - › How does that affect the sound? Can you feel the vibrations by touching the glass or vase?
- Try changing how far the speaker and tubes are from the wall. How far back from the wall can you get and still hear the louder sound waves in the listening partner's tube?

WHAT'S HAPPENING?

Normally, sound waves spread out as they travel from the object that made them to your ear. The more they spread out, the fainter they sound. In this experiment, the sound waves coming from the speaker travel straight down the first tube and bounce off the wall into the second tube. The sound is directed by the second tube right to your ear, and therefore sounds louder. The sound waves do not have a chance to spread out as much as normal because they are being captured and aimed by the tubes.



Experiment continued on next page...



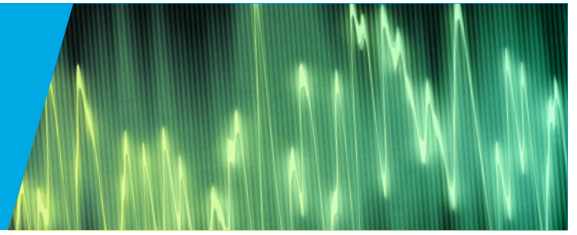
Show us how you're being curious! Share your results with us.

PACIFIC
SCIENCE
CENTER



CURIOSITY AT HOME

BOUNCING SOUND WAVES



K-2 GRADE EXPLORATION

- Try making a paper cone to replace a cardboard tube.
 - › Bend a piece of paper into a tube so that one end of the tube is very narrow and the other end is wider. Secure the cone with a piece of tape
 - › Try the activity again using the cone next to the listener's ear instead of the cardboard tube. What happened? Is it louder or softer? Clearer or less clear? What if you stacked multiple tubes on top of each other? Or multiple cones?



Show us how you're being curious! Share your results with us.

PACIFIC
SCIENCE
CENTER

