

# Aiming and Catching Sound Waves

Sound travels in waves. Waves of sound push along the air molecules around us until they reach our ears. Sound waves can be bounced or reflected off of some surfaces. When this happens in a large space, like a canyon, we hear an echo. The sound bounces off the canyon walls and into our ears. In the following activity you will use two cardboard tubes to aim sound waves at a wall and bounce them back into your ears.

## Materials

- At least one partner to help handle materials
- Radio
- 2 cardboard tubes
- Bare wall space

## Procedure

- Turn your radio on low and place it near a wall with the speaker facing the wall.
- Each partner should have a cardboard tube. Partner A should place one end of his or her tube against one of the radio speakers and point the other end toward the wall. The tube should be pointing to the wall at an angle, rather than straight on.
- Partner B should put one end of his or her tube up to one ear and point the other end toward the wall at an angle.
- 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 radio will sound louder to the partner holding the tube to his or her 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.

## What's Going On?

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 radio 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.

### Explore More...

- Need to turn up the volume on your music... try a glass.
- Place a cell phone in a glass. Does the volume of the music change?
- Can you change the direction of the sound by changing the angle and placement of the phone?
- Try glasses and vases of various sizes and shapes. Which one works best?