

# CURIOSITY AT HOME

## AMP IT UP



*The speakers on a radio or stereo help to make sound louder, or amplify it. They carry the vibrations of the music or voices so that they are easier for you to hear. Discover what types of common objects make the best amplifiers!*

### MATERIALS

- A fine-toothed comb
- A variety of non-breakable objects around your home (suggested items: a chair, a table, a door, a window, a book, a cup, a box, a wall, your head, your knee, your stomach, a pillow, the floor, get creative!)
- Science notebook or paper
- Something to write with

### PROCEDURE

- First hold the comb in one hand, and run your fingernails along the teeth of the comb. What do you hear? Is the sound loud or quiet?
- Now try holding the back side of the comb against a table top as you run your fingernails along the teeth of the comb. Does it sound the same or different? Is it amplified to make the sound louder, is it quieter, or is it the same as before?
- Continue to hold the comb against different objects as you run your fingernail on them. Try to predict how good of an amplifier each object will be before you test it. Write or draw in your science notebook each object you try, what it is made out of, and how it affects the sound of your comb.



*Experiment continued on next page...*



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### EXPLORE MORE

You can use amplification to listen through walls and doors! Place a cup with the rim flat against a wall or closed door, and put your ear to the glass. See if you can hear what's happening on the other side! You may need to experiment with different kinds of cups to find the one that works best.

Being careful not to spill the water, try holding your comb against a cup or a bowl with water in it. What do you see happening to the water? Why do you think that is? Want to talk to a friend across the room without anyone else hearing you? You can make a telephone from two plastic cups or empty cans, and a long piece of string. Carefully poke a hole in the bottom of the cups or cans. Then put the string through the holes and tie a large knot so the string does not slip back through the hole. Now hold onto one cup while your friend holds the other end, and walk apart until the string is tight. Whisper into your cup while your friend holds their cup to their ear, then trade. Can you hear your friend whispering? How?

### WHAT'S HAPPENING?

All sound is caused by vibrations. Objects, like a comb, a drum, or a person's vocal cords, all vibrate to make sound. Those vibrating objects in turn vibrate the air around them. The vibrating air bumps into more air, making it vibrate, and the sound travels through the air through these vibrating bits of air. We hear sounds when the air vibrates tiny bones inside our ears, which sends a signal to our brain, and our brain interprets those signals as sound. When you held the comb against a table top, it spread the vibrations from the small comb directly to the larger surface it touched. Larger objects touch more air, and so they make more air vibrate when they do, and the result is a louder, amplified sound. Different materials vibrate more or less than the comb, so different kinds of objects amplify the sound more than others.

*Experiment continued on next page...*



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### K-2 GRADE EXPLORATION

- Without holding your comb against different objects, can you change the sound that your comb makes? How?
- What kinds of objects that you tested amplified the sound the most? Were there any similarities between them?
- Did any objects you tested make the comb sound quieter? Why do you think they did that?



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