LESSON 16:
SOUND SHAKERS

SUPPLIES

TEACHER BRINGS

- 1 box dry penne pasta
- 1 bag dry white beans or lima beans

MAIN BIN

- Paperclips (50)
- Rubber bands (40)
- Cardboard tubes (20)
- Cling wrap
- Beads (25)
- Cotton balls (25)

OBJECTIVES

- ☑ Students will be able to explain how sound is produced
- ☑ Students will recognize how different materials produce different sounds
- ☑ Students will become familiar with scientific vocabulary relating to sound

HOOK 3-5 min

(Knock 3 times on a desk or surface)

Did you hear that? That little sound came from tiny vibrations traveling through the air!

Have you ever wondered why some things make loud, crunchy sounds while others make soft, quiet ones? Or why shaking something fast makes it sound different than shaking it slowly?

Let's investigate like sound scientists and discover what's really happening

INTRODUCTION 2-3 min

Today's experiment will require you to be both a musician and a scientist! Together, we are going to explore the science of sound and discover how it works all around us. Sound is made when something vibrates, and those vibrations travel through the air as sound waves that our ears can hear. We will experiment with different objects and materials to see how each one creates its own unique sound. You'll notice that some sounds are loud or quiet, some are high or low, and some change depending on how fast or slow you move the materials. By shaking, tapping, and listening carefully, we'll see how vibrations, material type, and movement all work together to create everyday sounds!

SOUND SHAKERS

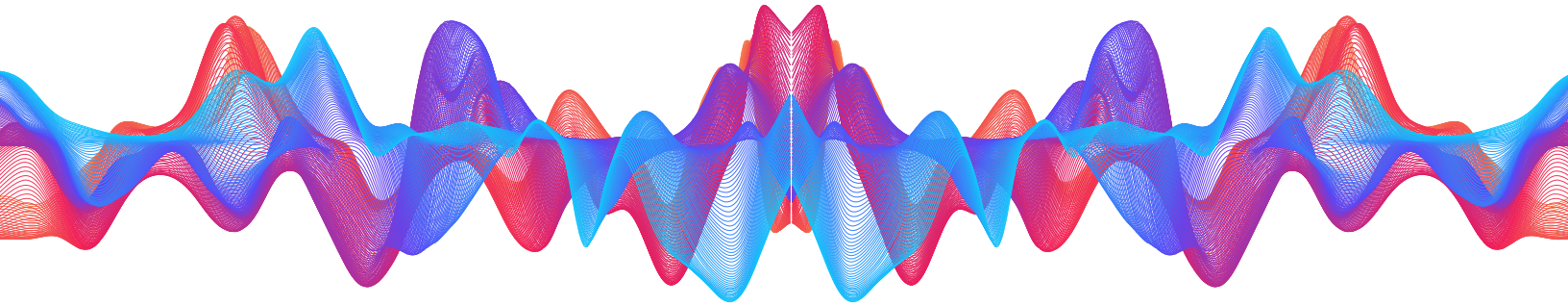
DISCUSSION:

5-10 mins

Discuss with the class:

- What do you think makes the sound change when you use different materials?
- Can you describe the sound your shaker makes? How would you compare it to other sounds you know?
- What other items or materials from your house do you think could be used to make unique sounds in the shaker?
- What do you think would happen if we changed the material of the shaker (instead of cardboard, we used metal.)

When you shake the shaker, the items inside start to move, creating a **vibration**. When items vibrate, they push and pull the air around them. This creates **sound waves**. These sound waves travel to our ears, and that's what we hear! The items in the shakers can change the **pitch** of the sound it makes. If you add a lot of items to the shaker, it might make the sound lower, like a big drum. If you put in just a few items, it may make the pitch higher and sound like a little bell. The speed at which you shake the shaker can also change the pitch.



VOCABULARY

Sound: Sound is energy we hear. It is made when something vibrates and sends waves through the air to our ears.
Vibration: A vibration is a fast back-and-forth movement. All sounds start with vibrations.
Sound Waves: Sound waves are invisible waves that travel through the air (or water, or solids) from the vibrating object to our ears.
Pitch: Pitch tells us how high or low a sound is. A whistle has a high pitch, and a drum has a low pitch.
Volume: Volume is how loud or quiet a sound is. Turning the volume up makes the sound louder.
Frequency: Frequency is how fast something vibrates. Faster vibrations = higher pitch; slower vibrations = lower pitch.
Amplitude: Amplitude is how big the vibration is. Bigger vibrations make louder sounds; smaller vibrations make quieter sounds.

SOUND SHAKERS

ACTIVITY: 25-30 mins

1. Divide students into small groups and assign a sound shaker material to each group. Distribute materials. Instruct students to cover one end of each cardboard tube with a piece of cling wrap and secure it with a rubber band.

2. Choose which material will go inside each tube. To ensure an accurate experiment, only put one type of material in each tube. Materials will include dried pasta, beans, paperclips, beads and cotton balls.

3. Cover the other end of each tube with cling wrap and secure it with a rubber band.

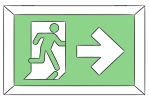
4. Shake each tube and observe the sound. Ask yourself:
    - Is it loud or quiet?
    - How does the sound change if you shake the tube faster?
    - How does the sound change if you shake it slower?

5. After testing each tube, discuss with the class:
    - What is vibrating in the tube to make the sound?
    - How are the vibrations traveling to your ears? (These are called sound waves.)
    - How does the type of material change the vibrations and the sound you hear?
    - How does the speed of shaking affect the pitch or volume of the sound?

- If time allows, allow students to decorate their sound shaker with markers!

CONCLUSION 5 min

Today, we learned that sound is made when objects vibrate, and those vibrations travel to our ears. By filling each cardboard tube with a different material and sealing them with cling wrap, we created our own sound makers and compared how each one behaves. We discovered that different materials produce different sounds, and that shaking the tubes faster or slower changes what we hear. Now you can listen to the world around you in a whole new way!



Exit Ticket

Ask students the following question as they walk out the door.

- Q: What are sound waves?
    - A: Sound waves are invisible waves that travel through the air (or water, or solids) from the vibrating object to our ears.