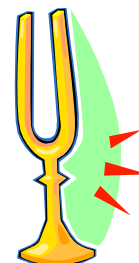


SOUNDS ON THE MOVE

BENCHMARK AND TASKS

SC.C.2.1.2 The student knows that sound is caused by vibrations (pushing and pulling) to cause waves.

- The student produces sound by vibrating objects.
- The student hears sound travel through solids, liquids, and gases.



KEY QUESTION

Can sound travel through wood (solid), water (liquid), and air (gas)?

BACKGROUND INFORMATION

All sounds are caused by vibrations. A **vibration** is a back and forth movement. When there is no movement, there is no sound to be heard.

Sound is a form of energy. Energy is needed to make a sound, such as striking a drum or blowing a flute. Vibrations make sound waves that are sent in all directions. Vibrations can also cause other things, which are nearby or touching, to vibrate. Sound waves move best through solids, like the earth, metals or wood. Sound waves also move through liquids, such as water. Sound waves travel through a gas, such as air, yet not as well as through solids or liquids. Materials that absorb sound waves often have air pockets. Air pockets trap sound waves. Some building materials are designed to catch and absorb sounds.

MATERIALS

Teacher

bell

Sounds (Benchmark Education Co.)

Per student

1 animal name card

Per group

1 tuning fork

1 zipper-type bag of water

1 ping pong ball or
cork with a 10" piece of
thread attached with tape
table or desk

TEACHING TIPS

1. Write the names of animals on individual cards. (The number of times an animal's name is written will be determined by the number of students in a group. If you want five students in a group, write each animal name five times.) Place the cards in a bag, so each student can select a card.
2. The first activity is to help students form their small groups by using auditory discrimination.
3. The **Explore** part of the lesson may take more than one class session to complete.

ENGAGE

1. Have each student select an animal name card from a bag. Tell students to keep the animal card a secret for this game. Students should try to locate the other members of their group who are making the same sound (e.g., Cows "moo" and move toward other

cows that are mooing.). Ask students to sit with their groups once all members are together.

- Using a piece of tape, hang the ping-pong ball from the table. Strike a tuning fork with a rubber mallet or against your palm or a plastic bottle of glue and hold it next to the ping-pong ball.

What happens to the ball?

What do you think is causing this?

EXPLORE

- Encourage groups to explore the following questions about sound and to record their predictions and their observations in their science journals:

A. Does sound travel through air?

Send a student to one side of the room with a bell to ring (or any object with a sound that can easily be heard by the group).

After the student rings the bell, ask:

What made the sound?

The sound was made on the other side of the room. Why can we hear the sound on this side of the room? (Sound can travel through air.)

B. Does sound travel through wood?

Try this. Tap the table with a finger. Listen to the sound. Now place your ear on the table and tap again. Listen to the sound. Discuss with your group:

What is the sound traveling through in order for you to hear it?

Which tap was easier to hear: sound traveling through air or sound traveling through wood?

C. Does sound travel through water?

Place the sealed bag of water to your ear. Have a group member strike the tuning fork and place it close to the water bag and then move the fork away from the bag.

Can you hear the sound through water?

- Discuss with your group:

Does sound travel through air? water? wood?

What type of matter is air? Water? Wood?

Which material was the best conductor of sound? Why do you think so?

Record your responses in your science journals.

EXPLAIN

- Ask:

Through what different materials can sound travel?

When was the sound the easiest to hear?

When was the sound the most difficult to hear?

Why do you think the sound is louder when you hear it through wood than through air?

- Listen to see if you can hear sounds coming from another room.

What sounds do you hear?

What are the sources and what is the sound traveling through to reach your ears?

EXTEND/APPLY

1. Have your students put their ears to the floor. Walk across the floor or bounce a ball at a distance from the students. Ask the students if they can hear you. Explain that the Native Americans used this method to hear approaching people and herds. They could feel the vibrations through the earth before they could hear them through the air. Just as the Native Americans used “sound” messages in their day-to-day living, people today still rely on sounds to convey messages. Ask if they can think of any examples (e.g., police, fire and other emergency sirens, phone ringing, doorbell, knocking on the door).
2. Read and discuss *Sounds*.

EXTENSIONS

Make a string telephone:

Materials

Per student

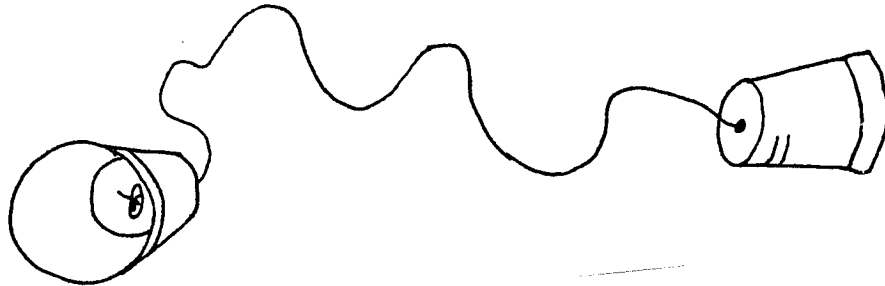
paper clip

kite string (2-6 m long)

assorted containers, such as: paper cups, tin cans, plastic cups, styrofoam cups

assorted connectors, such as wire, yarn, rope, thick string (2m – 8m long)

1. Have students poke a small hole in the bottom of their cups with a pencil. Ask them to work with a partner. One partner puts one end of the string through the hole in his or her cup. The string must go from the outside bottom of the cup to the inside. Once it is inside, that student can pull it through further and tie a paper clip to that end. Then the other partner pulls the other end through the hole in his cup in the same manner and attaches a paper clip to that end. Once that is done, the string can be pulled taut between the two cups.



2. Let one student talk into the open end of the cup while the partner places the other cup's open end at his ear. Ask:
What happens when the string is stretched taut as you speak? What happens if the string is not stretched taut?
3. Students should trade telephones with others that have different length strings.
Ask:
Did the telephones sound the same?
Did they sound different? Why or why not?

4. Discuss the variables that affect the telephone's clearness and loudness. Make a list of the variables on the board: different containers for speaking and listening and differences in connectors (different materials or length).
5. Have the same pairs of two students decide what materials they will use to construct another telephone. From the assorted materials, the pair must choose 2 containers and 1 connector.
6. Allow various pairs to tell what materials they used to make their telephone and describe the sounds they heard (e.g., loud, soft, high, low, clear). Ask:
What causes the sounds you heard? (The connector vibrates and the container helps to amplify the sound in the container.)

ASSESSMENT

Teacher assessment through observation should include the following criteria:

- tasks have been completed by the student.
- student demonstrates the ability to identify the source of a sound and to recognize that sound travels through many different materials.