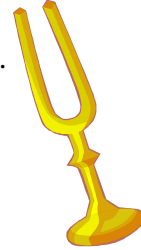


GOOD VIBRATIONS

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 recognizes that vibrating is a rapid back-and-forth movement.
- The student produces sound by vibrating objects.



KEY QUESTION

How are sounds made?

BACKGROUND INFORMATION

All sounds are caused by vibrations. A vibration is a rapid 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. To hear a sound, the vibrating material must move back and forth at least 16 times per second.

MATERIALS

Teacher

plastic ruler

Per group

container (shoe box, resealable bag or basket)
rubber bands of various sizes
tuning fork
rubber mallet
craft sticks (one for each group member)
raw rice
empty coffee can with a plastic lid
pie pan of water
paper towels
Good Vibrations record sheet

TEACHING TIPS

1. This activity would require fewer materials if each experiment were placed in a center and students rotated to each area.
2. Demonstrate how to strike a tuning fork. Hold the single rod and quickly strike the double prongs with a rubber mallet. If a rubber mallet is not available, hold the single rod and quickly strike the palm of your hand or a plastic bottle of glue with the double prongs. (Never strike something hard, like a table, with a tuning fork.)

ENGAGE

1. Extend the plastic ruler over the edge of a table. As students observe, hold one end of the ruler on the table with your hand and “pluck” the extended edge with your thumb. The ruler will make a sound.

2. Ask:
What happens to the ruler when it makes a sound?
(The ruler moves back and forth very fast. This kind of very fast back-and-forth movement is called a vibration.)
3. Do **not** take the **Engage** any further as it is expanded in *The Highs and Lows of Sound* activity.

EXPLORE

1. Divide students into groups. Distribute a set of the listed materials to each group. Ask students to explore these materials to help them answer the three questions at the bottom of the *Good Vibrations* worksheet.

RUBBER BAND STRETCH

Pluck a stretched rubber band.

What do you see?

Can the rubber band make a sound when it is not vibrating?

Try rubber bands of various sizes.

RICE EXPERIMENT

Place a few grains of rice on top of the coffee can drum (or butter tub drum). Strike the top of the can with a spoon.

What happens to the rice? What causes the rice to bounce?

CRAFT STICK EXPERIMENT

Hold a craft stick with your teeth. Pluck the end of the stick.

What do you feel? What do you see?

TUNING FORK SPLASH

Without striking it on anything, hold the tuning fork near your ear.

Can you hear a sound?

While the tuning fork is not making a sound, place a tip of the fork in the pan of water.

Observe what happens in the water. Draw what you see.

Strike the tuning fork with the rubber mallet or strike the tuning fork against the palm of your hand or a plastic bottle of glue so that it will vibrate. Hold it near your ear while it is vibrating. *Can you hear a sound?*

While it is vibrating, place a tip of the fork into the water. Observe what happens. Draw what you see.

Note: Have paper towels handy in case of a splash.

2. After students have completed the four activities, encourage them to discuss the three questions on the response sheet and record their answers.

EXPLAIN

Gather students together with their response sheets. Have a student from each group share the group's observations.

Discuss:

What causes the water to splash when the vibrating tuning fork touches it?

How do we know the tuning fork is vibrating when it makes a sound?

What has to happen to the tuning fork for it to make sound?

Why can we see the rice bouncing on the coffee can lid?

How did you make sound with the rubber band?

What have you learned about sound?

How are sounds made?

What do all sounds have in common?

Can we see things vibrate?

What does the word vibrate mean?

EXTEND/APPLY

Tell the students:

You make sounds when you hum or talk. What part of you is vibrating? How do people make sounds?

Have students place their fingertips on their throats while being quiet.

Ask: *What do you feel?*

Ask the students to hum: softly, loudly, with a high pitch and with a low pitch. Have them describe what they feel. Then have them turn to a partner and feel the other person's throat while each talks or hums and while each one is quiet.

Ask: *What differences do you feel?*

Do you feel vibrations?

What causes vibrations?

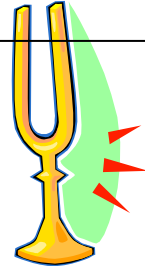
EXTENSIONS

1. Read, *How We Talk*, a *Let's Read and Find Out About Science* book by Franklyn Branley.
2. Ask: *What kind of instrument can you create that makes sound by striking, plucking or blowing?* Have available shoe boxes, rubber bands, empty cans, cups, cardboard tubes, wax paper, beans, rice, straws, wood scraps, etc. Ask students to select materials and create an instrument.
3. Bring in real musical instruments or borrow them from the music teacher. Discuss how the sound is produced with each.
4. Play, "What is Vibrating?" A student creates a common sound and calls on another student to tell exactly what vibrates to cause that sound (e.g., a door slamming, a whistle).

ASSESSMENT

Teacher assessment through observation should include the following criteria:

- tasks have been completed by the student.
- level of detail and specificity found in the *Good Vibrations* worksheet.
- students demonstrate understanding by appropriately using acquired vocabulary.



GOOD VIBRATIONS

Try these activities to help you learn more about sound:

RUBBER BAND STRETCH: Pluck a stretched rubber band. Listen and observe. Try different sizes of rubber bands.

VIBRATING RICE: Place a few grains of rice on top of a coffee can drum (or butter tub drum). Strike the top of the can with a spoon. Watch what happens to the rice.

CRAFT STICK PLUCK: Hold a craft stick with your teeth. Pluck the end of the stick. What do you see? What do you feel?

TUNING FORK SPLASH: Without striking it on anything, hold the tuning fork near your ear. Can you hear a sound?

Fill the pie pan with water. While the tuning fork is not making a sound, place a tip of the fork in the pan of water. Observe what happens in the water. Draw what you see on the back of this sheet.

Strike the tuning fork with the rubber mallet or strike the tuning fork against the palm of your hand or a plastic bottle of glue so that it will vibrate. Hold it near your ear while it is vibrating. Can you hear a sound? While it is still vibrating, place a tip of the tuning fork into the water. Observe what happens. Draw what you see on the back of this sheet.

Think about these questions:

1. Can we see things vibrate? Give an example.

2. How are sounds made? _____

3. What do all sounds have in common? _____