

Sound Unit

Pacing: 7 days

Unit EQ: How is sound affected by the vibration of an object?

Unit Standard

Standard 3-5: The student will demonstrate an understanding of how motion and sound are affected by a push or pull on an object and the vibration of an object.

Indicators:

- 3-5.5 Recall that vibrating objects produce sound and that vibrations can transfer from one material to another.
- 3-5.6 Compare pitch and volume of different sounds.
- 3-5.7 Recognize ways to change the volume of sounds.
- 3-5.8 Explain how the vibration of an object affects pitch.

Literature:

Sound Science by Etta Katner
Sound by Andrew Haslam
The Super Science Book of Sound by David Glover
Sound by Jenny Karpelenia
The Remarkable Farkle McBride by John Lithgow
Amazing Bats by Frank Greenaway
Science Magic with Sound by Chris Oxlade
The Magic School Bus in the Haunted Museum by Joanna Cole
Sound by Darlene Stille

Vocabulary		
Sound	Vibration	Pitch
Volume	Tuning fork	amplify

Unit Activating Strategy

Do a brainstorming session of "Sounds We Have Heard," "Ways to Make Sounds," and "Questions We Have About Sound," in a chart. Watch, "The Magic School Bus: In the Haunted Museum," or read the book. Use a guitar or a sound box to demonstrate how sound is vibration. When vibrations stop, sound stops. Also demonstrate this with the vibration of your voice box.

Unit Culminating Strategy

As a class, use the Marcia Daft template to write a poem for sound.

EQ: What is sound?

Standard: 3-5.5

AS: Give students the following items: paper, a ruler, and a rubber band. Have them observe and touch their items. Ask them what they must do to make a sound with each object?

TS: Guide students in conducting the following investigation: 1) Hold a piece of paper by one corner. Wave it around and observe and record what happens in the chart. 2) Place a ruler on a desk. Extend half of it over the edge of the desk. Hold one end of the ruler down, and tap the other end. Observe and record what happens in the chart. 3) Wrap a rubber band around a box. Pluck the rubber band. Observe and record what happens in the chart. 4) In their groups, have students discuss what happened when they moved each item.

SS: Answer the Drawing Conclusions questions: Can you make a sound with the paper, ruler, or rubber band without making it move? Explain. What is sound?

*This lesson is on page 355 in the science books.

EQ: How is sound produced?

Standard: 3-5.5

AS: Recall how sound is made from Day 1. Show students a tuning fork. Ask if they know what it is. Explain that they are used to help tune musical instruments. Demonstrate the proper way to strike the tuning fork.

TS: Distribute one small and one large tuning fork to each group of four students. Have each group explore their

tuning forks for a few minutes taking turns with each. Ask students to discuss with their groups the sounds they made with the tuning forks. (How were the sounds of the tuning forks alike and different? How would you describe the sound of the small tuning fork? The large one? What did they feel like when they were making a sound?)

SS: Revisit "The Sounds We Have Heard" chart and ask them to think about sounds that are similar and identify a way to classify and describe these sounds. For ex. "Which sounds do you think go together?" Students conclude in their journals how some sounds are similar and why?

EQ: What is pitch and volume?

Standard 3-5.6

AS: Play 5-6 different sounds and have students write down a word or two to describe the sounds they hear. (There is a flipchart with sounds on the T-drive.) Define pitch and volume. Discuss the sounds and the differences they observed in pitch and volume.

TS: Before you start, show students the three nails and have them predict what sounds the nails will make and record in the chart under sound predicted. (Will they make high/low sounds? Soft/loud? Will they be different or the same?)

Distribute materials. (nails, tray, unsharpened pencil to tap nails, foam rubber sponge)

<Insert safety discussion about nails here>

Procedure:

- 1) Students will place the largest nail on the sponge (makes the sound last longer) and test their predictions by tapping each nail with a pencil. One student should tap while the other one listens, then swap roles and repeat the activity so that all students participate. Make sure students know to tap the nail quickly but not too hard. Model how to do this for the class first.
- 2) Students should discuss words with their group to describe the sound each nail makes.
- 3) Record words in the chart under the sounds produced column.
- 4) Repeat the procedure with the medium and small nails.

SS: Revisit predictions and discuss which nail actually had the highest pitch/lowest pitch. Also compare the sounds made by the nails to the sounds of the tuning forks from the last lesson. Discuss the differences in pitch each nail produced.

EQ: How does the vibration of an object affect pitch?

Standard: 3-5.6

AS: View, "Sound – A First Look" <http://player.discoveryeducation.com/index.cfm?guidAssetId=4477F10D-7862-4C30-AA8D-598370F0770C&blnFromSearch=1&productcode=US>

TS: Read page 359 as a class. Demonstrate how pitch can be affected by thickness, length, and tension with a guitar. Also use a xylophone to demonstrate how pitch is affected. Ask students to recall the different sounds they made with the nails. Give each group two plastic rulers. Demonstrate how to make pluck the ruler to make sounds at different lengths. Have students explore until they find four lengths that allow them to hear at least four different pitches. Have each group decide on a way to describe the four pitches and fill in their charts. Then have them pluck two rulers at different lengths next to each other and listen to the different pitches.

SS: Have students draw conclusions about the activity. How does length affect pitch?

EQ: How can you change the volume of sounds?

Standard: 3-5.7

AS: Play some different sounds and have students talk with their group about the volume of the sounds they hear and share as a class. Have students brainstorm with their groups some ways that we could change the volume of sound.

TS: Use a poster board megaphone and ask students what they think will happen to my voice when I speak into it.

Demonstrate speaking with and without the megaphone. As a class, brainstorm some other things that can amplify sound. (microphones, megaphones, speakers, whispers, etc.) Play the "Whisper Game" by having students stand in a line with their backs to one child with the megaphone. Repeat a phrase without the megaphone in a whisper voice. Ask students in the line if they could understand and repeat the phrase. If no, use the megaphone to repeat the phrase. Ask who can identify the phrase. Compare phrases to determine if the megaphone amplified the sound enough to be heard at a distance. Use this as a discussion about how the megaphone amplified the sound enough to be heard.

SS: List three ways to change the volume of sound.