

WHAT'S YOUR PITCH?

GRADES 3–6

CLYDETTE RISPONE

OVERVIEW:

This lesson explores how sound can be made with various objects, including our own vocal cords, and how sound can be changed (pitch). Students will use a balloon to help them understand how their vocal cords work. Students will also simulate a sound wave.

ITV SERIES:

Dr. Dad's Ph³: Sound/Radio Broadcasting

LEARNING OBJECTIVES:

THE STUDENTS WILL BE ABLE TO

- ❖ define the term pitch
- ❖ manipulate materials to produce sound with different pitches
- ❖ produce different sounds using a variety of materials
- ❖ be able to explain how sound is produced by the vocal cords
- ❖ simulate or draw a diagram of a sound wave
- ❖ demonstrate how sound can be carried and controlled over distance

VOCABULARY

vibrate
pitch
larynx

MATERIALS:

FOR THE CLASSROOM:

- xylophone
- slinky

FOR EACH STUDENT:

- one of the following:
 - chop sticks
 - jingle bells
 - rubber bands
 - party horn
 - whistles
 - straws with the tips cut in a v-shape
- balloon
- pencil
- drawing paper

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BACKGROUND

All sounds have one thing in common. They are produced by vibrating matter. Sound can be high or low. We refer to the difference between highness or lowness of sound as pitch. Pitch is determined by the speed of the vibrating object. If the speed at which an object vibrates is fast, the pitch will be high. If the speed at which an object vibrates is slow, the pitch will be low.

The larynx or voice box is made up of side by side muscles called vocal cords. Air from the lungs passes between the cords causing them to vibrate. This vibration produces a sound. When you completely rest your vocal cords air can go in and out with no vibration. If there is no vibration there can be no sound. When we tighten our vocal cords, air which is pushed from our lungs with a greater force causes a vibration and sounds can be heard. If we tighten our vocal cords our voice will have a higher pitch.

By placing your hands on your Adam's apple you can find your larynx. When you hum or talk the vibrations can be felt.

PRE-VIEWING ACTIVITIES:

Pass out to each student one of the six items collected (chop sticks, jingle bell, rubber band, party horn, straw, whistle). Ask the students to see if they can make a sound with their object. Discuss how/what caused the sound to be produced. Encourage students to come up with a definition for the term vibration.

Next show the students a toy xylophone and ask them to describe it. (Direct students to the idea that keys are different lengths.) Ask if they think that each key will make the same sound when struck. Why/why not?

Hit the keys and have the students listen for the differences in sound. Describe pitch as the highness or lowness of a sound. Explain that the smaller key vibrates faster than the larger key.

Have the students hum and place their hands on their throats. Ask them to describe what they feel. Discuss where the sound is coming from. (vocal cords) How are your vocal cords able to make sound? (they vibrate) Pass a balloon out to each student. Have them blow up the balloons. Ask them to grasp the mouth of their balloon and allow the air to slowly escape. What happens as the mouth of the balloon vibrates? (a sound is made) Have students stretch the mouth of the balloon tighter - what happens? (higher sound) Explain that you can make voice sounds by breathing out. Ask a volunteer to make a sound. Ask the volunteer to make the same sound while breathing in. What happened? What part of the human throat did the mouth of the balloon represent? (vocal cords) What part does the air in the balloon represent? (lungs)

FOCUS FOR VIEWING:

Ask the students if they could see their voice to describe what the **sound** of their voices would look like. Accept all responses. Explain that in the video they will see an instrument that can electronically record voice sounds. Tell them they will see that loud and soft sounds look different from each other but to pay close attention to how high and low sounds look.

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VIEWING ACTIVITIES:

Start the video where Dr. Dad says, “We can show you how your voice looks electronically.” **Pause** the video before Natalie sings. Discuss with the students how the machine recorded differently for loud and soft sounds. Have students recall the definition of pitch. Then ask, “What do you think different pitches would look like?” **Resume** viewing. **Stop** after Olivia says, “They get closer.”

POST-VIEWING ACTIVITIES:

Have students describe how the sound pattern changed when Natalie’s voice went from low to high. Ask for two volunteers to simulate with a slinky how a low sound would look (sound waves would be farther apart) and how a high sound would look (sound waves would be closer together). Call on different students to make a sound while the rest of the class draws how that sound might look.

ACTION PLAN:

Invite a guitarist in to demonstrate to the students how he or she listens for pitch to tune the instrument. Also have the guitarist demonstrate how the thickness of the strings determines the pitch.

EXTENSIONS:

LANGUAGE

Have the students generate a word wall of sound words. (crash, rumble, bang, etc.) Direct the students to write a story using as many sound words as possible.

MATH

Fill 5 identical glass bottles with different levels of water. Color the water in each bottle red, blue, or yellow. Have the students predict which bottle will have the lowest sound. Have them record their predictions on the graph. After all responses have been recorded ask the students what information they can conclude from this graph. (ex: number of students that chose each bottle, how many more chose one bottle over the next, have them add the number of bottles, etc.)

MUSIC

Have the students listen to classical music. Ask them to listen for the different instruments that have a high pitch (such as flutes and violins) and instruments with a low pitch (such as cello and bass).