

Southern Nevada Regional Professional Development Program

Sounds Like Science

3rd Grade



Introduction

Sounds are all around us. Understanding how sounds are produced makes it possible for us to manipulate it so we can decrease the number of unpleasant sounds created by things as diverse as airplanes and vacuum cleaners.

“Where’s the Science?”

Sound is caused by a movement or vibration created by **force**. Some vibrations cause air to move, to create sound waves that we can hear. The **pitch** of the sound (how high or low the sound is), depends on how fast an object vibrates. The **volume** (how loud the sound is), depends on the degree of force used to make the object vibrate. When we increase the volume of a sound we are **amplifying** the sound.

With drums, we strike the skin to create a sound. The force that causes the vibration is the blow on the drum. The harder we strike, the louder the sound. You can manipulate the pitch of a drum in 3 ways:

1. Tighten the drum’s skin to make the pitch higher
2. Put a thicker skin on the drum to lower the pitch
3. Strike the drum closer to the center to produce a slower vibration and lower pitch, which sounds more resonate.

Materials

- Different sized, wide-mouth jars without lids
- Various types of paper (tissue, letter, construction)
- Balloons

- Rubber bands large enough to fit the mouth of the jar
- Wooden sticks (chopstick are ideal) or wooden spoons
- Rice, small lentils or peppercorns
- Paints, markers and other design materials

Time

90 minutes (allow 30 minutes for design)

Introducing the Concept: Discuss how force is needed to produce vibration and how different kinds of vibrations produce a variety of sounds. Demonstrate how force is used to make drums vibrate.

Procedure

1. Design a drum. To make a drum, place a paper or a balloon over the mouth of the jar. (You might even try placing the paper down with a balloon on top of it.)
2. Place the rubber band around the mouth of the jar to secure the paper/balloon skin.
3. If you like, place some rice on the skin so you can observe the vibration as you apply force to the drum with the wooden sticks or spoons. Be sure to spend some time designing the exterior of your drum.

Discuss and do the Minds-On part of the lesson: (Have students reflect on each answer in their science notebooks as they work with their group or partner.)

- Tap on your drums to produce sound.
- Is your sound different than that of the other students' drums? (Have students in their groups listen to each others' drums.)
- Do different skins produce different sounds? What would happen if you filled the jars with something? Does it sound the same? (discuss pitch)

- Do different sizes of jars produce different sounds? What would happen if you filled the jars with something? Does it sound the same? (pitch)
- Are different sounds produced when you strike different parts of the skin? (pitch)
- What happens when rice is placed on the drum? Can you see the vibrations? Does it affect the sound?
- What causes the rice to react differently when you strike the skin harder? (force, amplify, volume)

Science Notebook

Discuss what we learned in today's lesson. Then have the students write in the science notebook what they learned in their own words. Have them use the vocabulary words: force, pitch, volume, and amplify.

Assessment/ Data Collection

The science notebooks will be collected and used as formative assessment. Students will use their knowledge to build a working drum out of recycled materials. They will provide a detailed diagram of their drum.

Science All Around Us – Extension Activity

Various cultures throughout the world use drums as a way to communicate. Drum beats can signal warnings or transmit elaborate messages, much like Morse code, as long as the person receiving the message is within earshot. Have the students design their own drumming code so they can send secret messages to their classmates.

Interconnections

Drums have been used throughout history for religious, spiritual, technical, musical, and recreational purposes. Have the students identify the types of drums used by their own

culture and share the story of these drums with their classmates. They may even want to tell their story while beating a rhythm on a drum.

Nevada State Standards

- (3) 2.1 Determine and explain that vibrations produce sound waves**
- (3) 1.5 Use science notebook entries to develop, communicate, and justify descriptions, explanations, and predictions.**

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Design a drum out of recycled materials. Label the parts. Explain how the drum produces sound.


