Sound Activities

Sounds are all around us—cars honking, phones ringing, friends talking, and dogs barking are all sounds you are probably familiar with. So, what is sound?

Sound is a type of energy made by vibrations. When any object vibrates (like the lid on this can when I tap it, or this rubber band when I flick it), it causes movement in the air molecules. These particles bump into the air molecules close to them, which makes them vibrate too, causing them to bump other air molecules. This movement is called sound waves.

Sound starts with a vibration. The vibration pushes into molecules and creates a wave of sound. The sound wave moves, but the ***medium*** remains in place. The molecules don't move very far. It is the ***wave*** that travels as the molecules bump into one another. The sound wave starts at whatever is making the sound (by vibrating) and travels all the way to your ears, where you hear it.

Introduction:

The presenter passes around 5 liter bottles, each filled with something different to introduce the concept of matter and that everything is made of matter, composed of molecules, that we can't always see with our eyes.

Good Vibrations:

This activity uses an empty coffee can with a lid. Rice is placed on the lid. A student strikes the rim of the coffee can with a spoon. The presenter leads the group in a discussion relating the ultimate production of sound to a series of energy transfers.

The Coat Hanger Church Bell:

The coat hanger hitting a solid object would ***vibrate*** and act as the ***source of the sound***. The vibrations travel through the string and the pencil to the ear drum. As the string and pencil are solids, it is much easier for the sound waves to travel through them than through the air. It is the vibrations of the pencil that are immediately transferred to the ear drum, that make the sound so audible.

Similarly, we place our ear against someone's chest, in order to hear his/her heartbeat. By placing our ear against the railroad tracks, we can hear a train approaching long before we can hear the train sounds through the air.

Percussion Frogs:

Four different sized wood frogs are used to introduce the concept of ***pitch***. Pitch depends on the frequency of vibration of the source of a sound. In this case it is the percussion frog. The larger wooded frogs make a lower pitched sound. The smaller frogs make a higher pitched noise

Sound Box:

Just as the strings inside a piano create different sounds, so too will rubber bands, when stretched around a shoe box. When the rubber bands are plucked in order, from thinnest to thickest, the sound will gradually change from a high pitch to a low pitch.

Marble Tree:

Drop the marbles at the top of the tree and watch them cascading down. The leaves will make a sound when the marbles pass the 5 levels, demonstrating ***pitch***, in that the "leaves" at each level are different sizes. Similar to the Percussion Frogs, the larger "leaves" made a lower pitched sound.

Sound Waves:

Strike a tuning fork on your shoe, on the floor, or on the edge of the table. Watch and listen. And now, MAKE A BIG SPLASH! Put the vibrating tuning fork into a glass of water. Note the generation of waves. Now, hold a ping pong ball suspended on thread in your left hand. Strike the tuning fork again. Touch the ping pong ball with the tuning fork. Watch.

Bottle Sounds:

As you blow into a bottle, you set the air in motion. As the particles of air moved back and forth, they formed a sound wave. This sound emerged from the neck of the bottle as a distinct note. The pitch of the sound varies, depending on whether the bottle is filled or empty.

Can You Make Music:

When whacked against your knee or the floor each Boomwhacker produces a particular note. The longer the tube, the lower the note. Each tube is color-coded, so you can follow the notes in the songbook and make music

Do Re Mi:

Glasses are filled with varying amounts of water. When the glass is struck by a spoon, the water and the glass began to vibrate. This back-and-forth motion is transferred to the air that fills the glass. Eventually, these air vibrations reach us as sound. As water is added to the glass, the amount of original vibrating material is increased. Since there is more matter to vibrate (water and glass), it produces a lower pitch.

Listen to the Popping Bubbles:

Open a can of soda pop or drop an Alka-Seltzer into a glass of water. Listen. Sound is formed by the bursting bubbles of carbon dioxide from the soda pop or the Alka Seltzer tablet. The bursting bubbles create waves in the liquid, which reach the can or glass container. This vibrates in turn and the air close to the ear carries the vibrations to the ear drum.

As soon as we bring the source of sound closer to the ear, we hear it better. Like the ticking of a watch or someone's heartbeat, that we like to hear, we must bring the ear closer to the source.

The Plastic Cup Telephone:

By talking into a cup, the vibrations from the vocal chords make the air in the cup vibrate. These vibrations are transferred to the bottom of the cup, which in turn vibrate. The same vibrations are traveling along the string in ***longitudinal waves***, making the bottom of the other can vibrate. The air in the receiving cup is thus reproducing the exact vibrations of the first cup, resulting in the same voice of the original sender. A whisper could not be heard through the air compared to a whisper through the "telephone". The

waves travel through the solid string in the latter case, and it is much more facilitated. ***Sounds travel faster and easier through solids than through gases.***

The Soundless Bell:

In order for humans to hear a sound, sound waves or vibrations have to reach their ear drums, whether it is through a gas, a liquid, or a solid. There has to be a ***medium*** in order for waves to travel from one place to the other. We hear sound and noises around us, because air is present everywhere. We created a partial vacuum in the flask. This is why the bell could not be heard after the water has been boiled in the flask.

Any sound sources that are located in outer space (i.e., in a vacuum), are ***not propagating any sound***. This is one of the reasons we do not hear the tremendous sun explosions and the space travel sounds from the surface of the earth.

Standards Met:

K.1.1, K.1.2, K.3.2, K.5.1

1.1.1, 1.1.2, 1.2.6, 1.2.7, 1.6.1, 1.6.2

2.1.1, 2.1.3, 2.1.4, 2.2.5, 2.5.3, 2.6.3

3.1.2, 3.1.4, 3.1.5, 3.2.6, 3.3.9, 3.5.5

4.1.3, 4.2.5, 4.6.1

5.3.12, 5.5.7

6.1.2, 6.2.2, 6.3.17, 6.3.22

7.1.4, 7.2.6, 7.3.18, 7.3.20, 7.7.2

8.2.5, 8.2.7, 8.5.9, 8.5.10, 8.7.3, 8.7.4