



Sound Waves

CONTENT STANDARD: Physical Science

CONTENT TOPIC: Sound

CONCEPT: Sound is produced by vibrations and is transmitted through matter in all directions.

CONTENT OBJECTIVE: To understand how sound is produced and transmitted

INSTRUCTIONAL OBJECTIVES: The learner will:

- Discover how sounds are produced.
- Discover how sounds travel.

OUTLINE OF CONTENT:

- I. Sound is produced by vibration
- II. Sounds move through objects

GOAL: To enable students to demonstrate ways of thinking and acting inherent on the practice of science; and to exhibit an awareness of the historical and cultural contributions to the enterprise of science.

STANDARD(S): The learner will understand that:
Science is based upon suppositions derived from observations of natural phenomena.

BENCHMARK: Careful observation can yield scientific knowledge.

The validity of an investigation cannot be accepted unless the complete investigation can be independently duplicated.

BENCHMARK: If variables remain constant an investigation can be repeated with expectations of predictable results.

CLASSROOM CONNECTORS

TIME REQUIRED : 35 minutes

MATERIALS:

Tub of water, toothpick, a paper towel (probably *many* paper towels).



SET: Listen. (Have children shut their eyes for a minute and listen for sounds). Open your eyes. Raise your hand if you heard a sound. (Share responses and list on the chalk board.) Today, you will learn how sounds are made and travel to our ears.

INSTRUCTION:

When something moves back and forth very fast, a sound is created. These back and forth movements are called *vibrations*. Sounds travel through all states of matter (solid, liquid and gas). Sound moves through some things better than others. If you throw a rock into a pool of water, waves spread out in every direction through the water. Sound waves are like the water waves, but sound waves are invisible. Sound waves are strongest close to the source of the sound. If you are close to a bell, you hear it ring loudly. As sound waves move away from the bell, they get weaker. If you move away from the bell it is harder to hear the sound.

SUPERVISED PRACTICE: Making sounds: Put your hand loosely on your throat. Hum softly, "Row, row, row your boat - - ." What do you feel? What part is vibrating? (Responses) Hum again loudly. How does it feel different? (responses)

1. Fill the pan half way with tap water.
2. Break the toothpick into 3 or 4 pieces. Put these pieces on top of the water. Be sure they are not touching the pan or each other. They will represent water molecules.
3. Get the paper towel very wet but not dripping. When the water in the pan is still, gently squeeze the paper towel so one drop falls in the middle of the pan. You should see ripples.
 - *Draw pictures of what you see happening with the waves.*
 - Which way do the ripples go?
 - Do the toothpicks move as fast as the ripples?
 - The ripples move across the water but the toothpicks do not move with them. Just like the toothpicks, the molecules in the water do not move with the ripples. What is moving?

CLOSURE: When you ride a bike you use energy. When you clap your hands, you use energy, too. The harder you clap, the more energy you use. Also, the harder you clap, the louder the sound. A sound's volume is how loud or soft it is. The more energy we put into making the sound, the louder the volume.

Sounds are created by vibrations. Vibrations are the sources of sounds. (Write this sentence on the board: Sound travels in _____ through the air.) Tell your neighbor what we have observed about sound today.