

Sound Energy

What is Sound? Sound is a wave of **vibration** that spreads from its source.

Vibration: the back and forth motion of an object

Have you ever put your hand on a loud stereo speaker and felt vibrations? Put your hands to your throat. Do you feel vibrations as you speak?

- ❖ When sound waves travel through air, the air molecules vibrate in a kind of pattern.
- ❖ When sound waves travel through a liquid, such as water, the molecules of the liquid vibrate in a kind of pattern.
- ❖ Different sounds produce different patterns.

In these patterns, some waves are closer together while others are further apart.

Let's use a slinky to illustrate this point.

The areas where particles are very close together are called **crests**. The number of crests that pass by a point each second is the wave's **frequency**.

Frequency measures how fast particles are vibrating. **The greater the frequency is, the higher the pitch of the sound.**

What makes one sound loud and another sound soft?

A sound is louder if it is vibrating more AND **it also has more energy.**

A sound's loudness can be measured in **decibels**.



How does sound behave?

Sounds can travel through **solids, liquids, and gases**.

Sound cannot travel through a vacuum? Why

When sound waves reach a new material, they can behave in one of three ways:

- 1.They can bounce back or reflect off of the material.
- 2.They can be absorbed.
- 3.They can pass through the material.

When sounds bounce off of a surface or material, it is called an **echo**.

Sound waves travel at different speeds depending upon the material through which they are traveling.

- ❖ Sound travels **faster through water** than through **air**.
- ❖ Sound travels **faster through moist air than dry air**.
- ❖ Temperature also affects the speed of sound.
- ❖ Examine the chart on page 456.

What must happen for you to hear sound?



Energy must cause an object to vibrate.



The sound waves from the vibration must move through the air. This is energy being transferred through the air.



Some of this energy, in the form of sound waves, must reach your ear.



Your eardrum absorbs some of the energy.



When the energy hits your eardrum, your eardrum will vibrate in response and send a signal to your brain.