Sound Energy

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

<u>Vibration</u>: 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 <u>different patterns</u>.

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**.

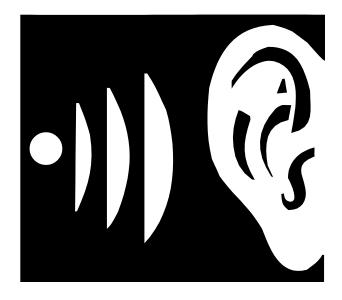
Frequency measures how fast particles are vibrating. The greater the frequency is, the higher the pitch of the sound.

What makes one sound loud and another sound soft?

A sound is louder if it is vibrating more AND <u>it also has</u>

<u>more energy.</u>

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 <u>faster through moist air than dry</u> <u>air</u>.
- 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.