Wave and Sound Notes

Wave Types and Characteristics

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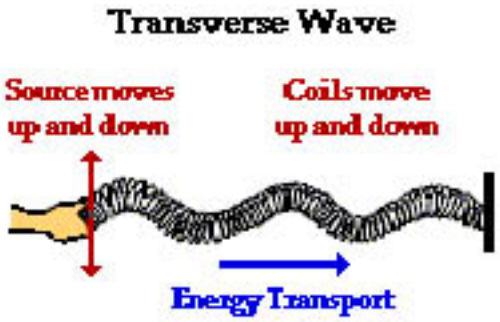
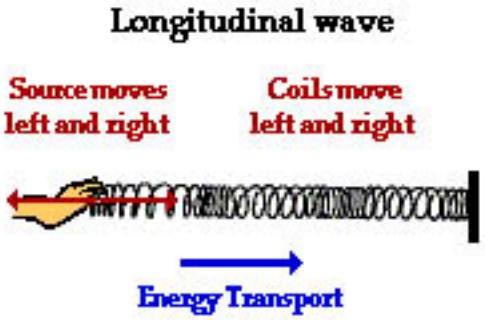
Electromagnetic Waves	Mechanical Waves
Do not need matter to transfer energy Are transverse waves Example: light, x-rays, radio waves etc...	Needs matter to transfer energy through various mediums. o Medium---substance or matter through which a wave travels Examples: sound waves, ocean waves, earthquakes

o Tranverse waves--- waves where energy causes matter to move in right angle directions (Ex. ocean waves, light waves, microwaves)



Compressional waves--- waves where the energy causes matter to move forward and backward in the wave's direction (ex. sound waves, seismic waves)



4 Properties of Waves

o Amplitude--- in a transverse wave, half the distance from crest to trough OR the distance from rest position to crest.

o Frequency--- number of wavelengths that pass a given point (reference point) in one second; measured in hertz (Hz)

o Wavelength--- in a transverse wave, the distance between the tops of two adjacent crests; for a compressional wave, the distance from the centers of adjacent compressions

o Speed---the rate at which a wave travels through a particular medium

o Medium---substance or matter through which a wave travels

SOUND NOTES

o Sound---compression wave created by vibrations received by an ear

- Must travel though matter --- Does not travel through space
- Does not travel in straight lines --- I can hear kids in the hall!
- Speed of sound at room temp. 20° C is 768 mph.
- Speed increases in higher temperatures and decreases in lower temperatures. (Why?)
- Speed is faster in a solid, slower in a gas (Why?)
- Speed of sound is significantly slower than the speed of light (700 million mph)

o Loudness---amplitude or intensity of a sound wave

o Decibel---a scale to describe the energy carried by sound waves

Common decibel levels

20 = whisper

60 = conversation

90 = sustained exposure can cause damage to ears

100 = snowmobile/motorcycle

103 = limit of MP3 players

115 = rock concert

130 = pain threshold

o Pitch---the human perception of the frequency of sound (high frequency = high pitch)

Humans can hear between 20 Hz ----> 20,000 Hz

Dogs can hear between 40 Hz ----> 60,000 Hz

Bats can hear between 40 Hz ----> 120,000 Hz