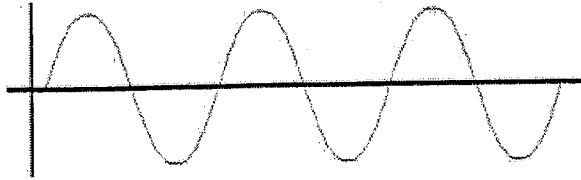


Name: _____

Characteristics of Waves Guided Notes

Waves: A disturbance or vibration that transmits energy but not _____. Examples include: light, sound, radio, etc. This means that as a wave travels through a medium, there is no transfer of matter! Imagine a bottle floating in the ocean, the waves are a disturbance in the water caused by the wind or other outside force. After the wave passes, the bottle comes back to its original position. So what causes the bottle to move from one spot to another? _____

Wave Anatomy:



Medium: _____ that a wave travels through.

Crest: high point of a wave

_____ : low point of a wave

Wavelength: _____

Amplitude: the distance from the midpoint (rest position) to the crest or from the midpoint to the trough.

Frequency: the number of complete _____ that pass a given point in a certain amount of time. Measured in hertz (Hz). You might have heard of hertz (not the car rental place) when talking about radio frequencies. An AM station such as 970 is the kilohertz number or 970,000 hertz. The required vibrations that electrons must vibrate to transmit a signal. FM stations broadcast at higher frequencies. Q106.1 needs to have electrons vibrate at 106,100,000Hz to broadcast their signal. Numerous wireless technologies operate within a specific frequency.

Period: the time it takes for one wave to pass a given point. Period symbol is (T).

Frequency and Period are inverses of each other.

$$f = \frac{1}{T} \qquad T = \frac{1}{f}$$

Wave Speed: The speed of a wave depends upon the _____ that it passes through. Sound waves move in air at 340 m/s and about 4 times faster in water, and even faster in solids. Why do you think waves travel faster in solids than liquids or gases?

Wave speed = wavelength times frequency

$$v = \lambda f$$

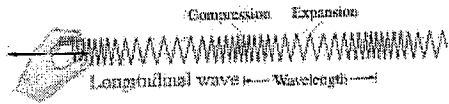
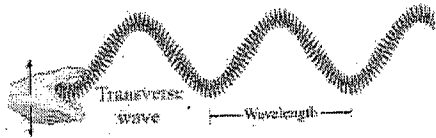
$$\lambda = \frac{v}{f}$$

$$f = \frac{v}{\lambda}$$

If a water wave vibrates up and down two times each second and the distance between wave crests is 1.5m, what is the frequency of the wave? What is its wavelength? What is its speed?

What is the wavelength of a 340 Hz sound wave when the speed of sound in air is 340 m/s?

Transverse Waves: A wave with vibrations at right angles to the direction the wave is traveling. Examples include: waves in the strings of instruments, waves on the surface of a liquid, light waves, radio waves or S waves from earthquakes.

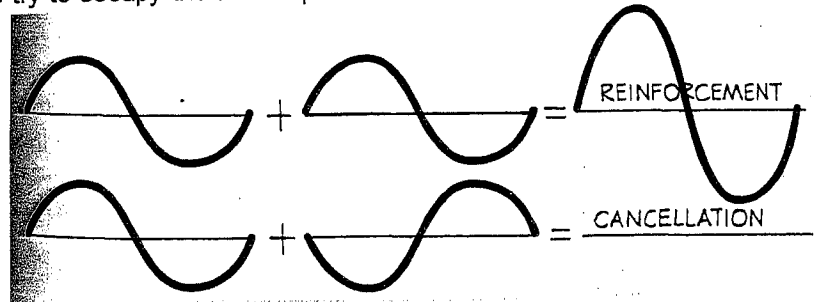
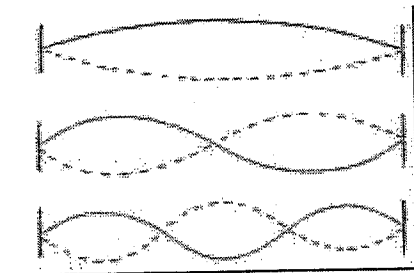


Longitudinal Waves: A wave in which the vibration is in the same direction as the wave is _____ . The medium vibrates parallel to the direction the energy is transferred. Examples include: sound waves or P waves from earthquakes.

Interference: A characteristic of all waves (sound, light, water, etc.) It can increase, decrease, or neutralize waves. Occurs when waves try to occupy the same space.

Also said to be "in phase"

Also said to be "out of phase"



Standing Waves: A wave where parts of the wave remain stationary and the wave appears not to travel. Made up of the incident (original) wave and the reflected wave _____ with each other. Nodes - any part of a standing wave that remain _____. Antinodes - the positions on a standing wave where the largest _____ occur.

Is it possible for one wave to cancel another wave so that the combined amplitude is zero? If so, what is this known as?

Referring to the last standing wave picture, if you shake the rope with twice the frequency, how many wave segments will occur in the new standing wave? How many wavelengths will there be?