



Properties of Waves



Mr. McQueary

Properties of Waves:

-Frequency

-Period

-Amplitude

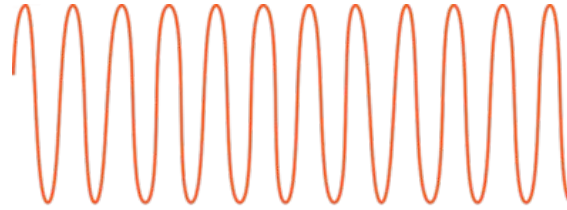
-Wavelength

-Speed

Frequency

- Frequency is a measure of how many waves pass a point in a certain amount of time.
- The higher the frequency, the closer the waves are together and the greater the energy carried by the waves will be.

$$f = \frac{\text{\# of waves}}{\text{time}}$$



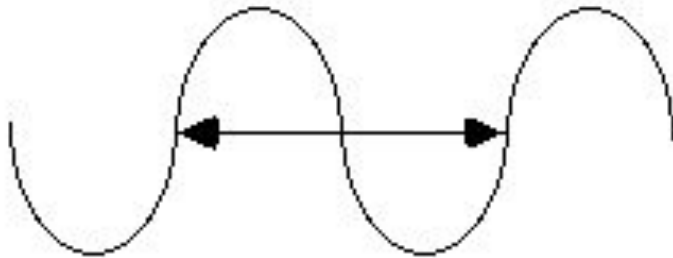
High
frequency



Low
frequency

Period

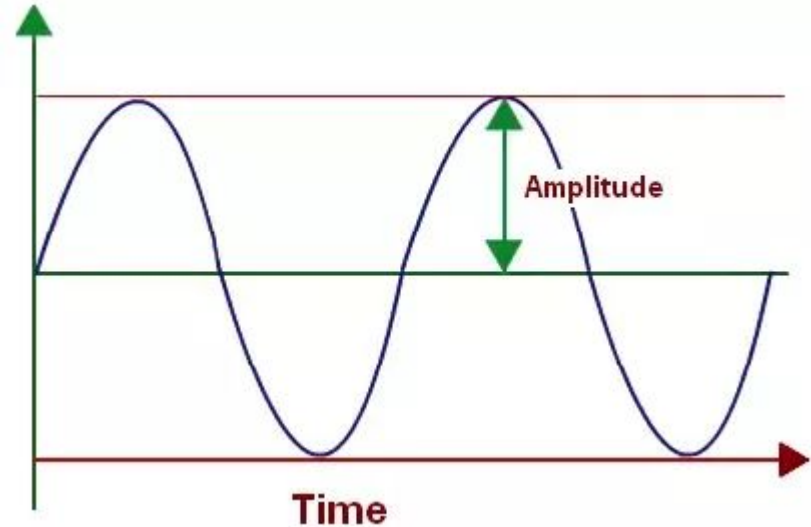
- One period is how long it takes a wave to cycle from crest to crest or trough to trough.
- Period is the inverse of frequency.



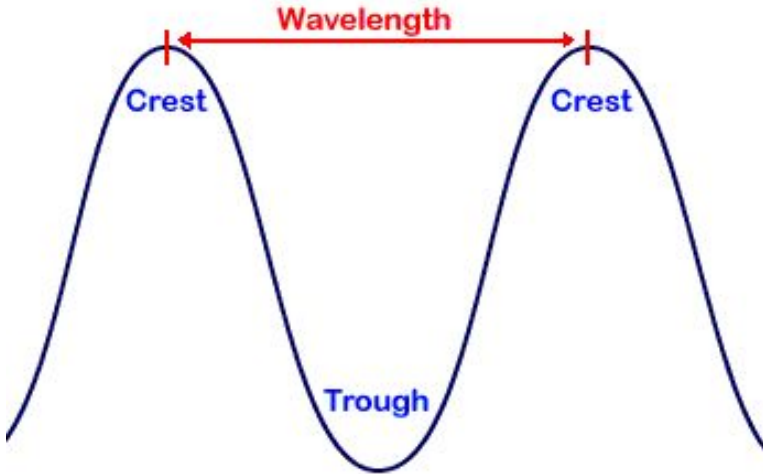
$$T = \frac{1}{f}$$

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- Amplitude is a measure of the distance between the middle of a wave and a crest or trough.
 - The greater the force that produces a wave, the greater the amplitude of the wave and the greater the energy carried by the wave.
 - The highest point of a transverse wave is the crest and the lowest point is called a trough.
 - Sounds with greater amplitude will be louder; light with greater amplitude will be brighter.
-

Amplitude



Wavelength



- Wavelength is a measure of the distance from the crest on one wave to the crest on the very next wave.
- Wavelengths are influenced by the frequency.
- A higher frequency causes a shorter wavelength and greater energy.

λ

Speed

$$v = f\lambda$$

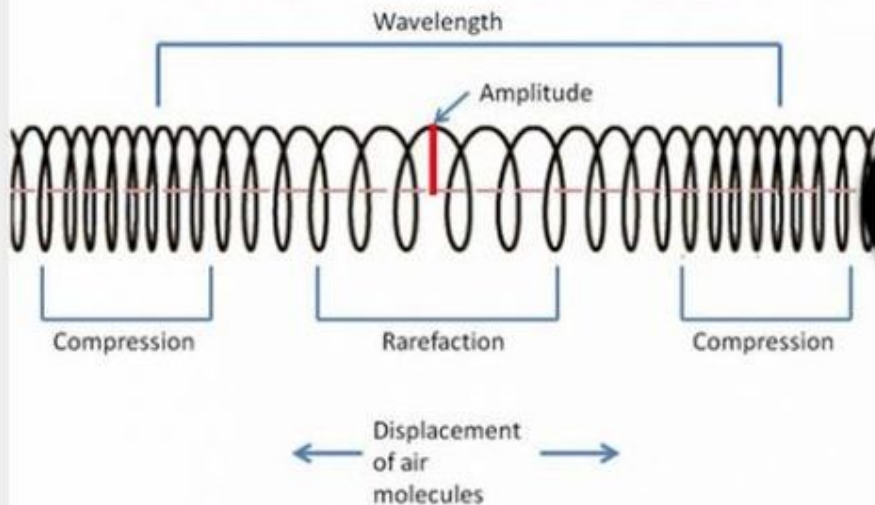
v = velocity

f = frequency

λ = wavelength

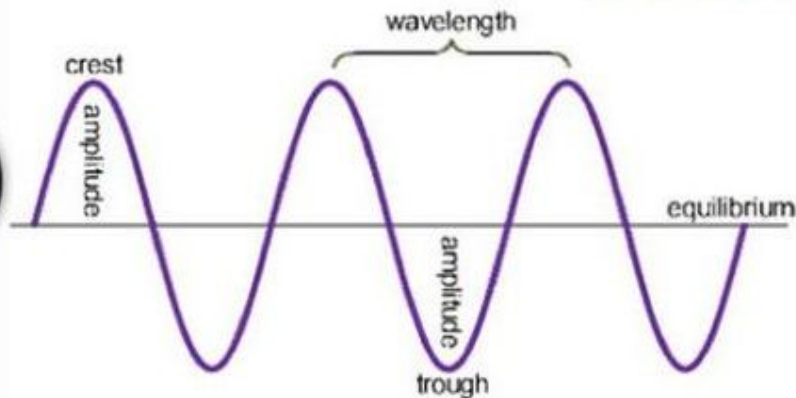
- Speed is a measure of the distance a wave travels in an amount of time.
 - The speed of a wave is determined by the type of wave and the nature of the medium.
 - As a wave enters a different medium, the wave's speed changes. Waves travel at different speeds in different media.
 - All frequencies of electromagnetic waves travel at the same speed in empty space.
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Longitudinal Wave



VS

Transverse Wave



Longitudinal Wave vs. Transverse Wave

The source of a wave is a vibration or an oscillation.

Waves transfer energy from one point to another.

Waves transfer energy without transferring the medium.

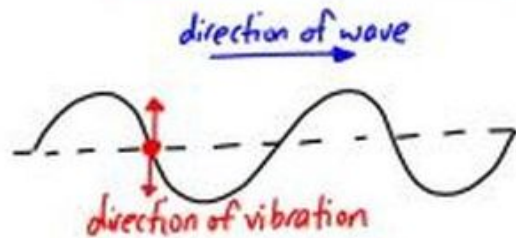
WAVES

Periodic motion is motion that repeats at regular intervals.

One complete periodic / wave motion is known as an oscillation or a vibration.

Transverse Waves

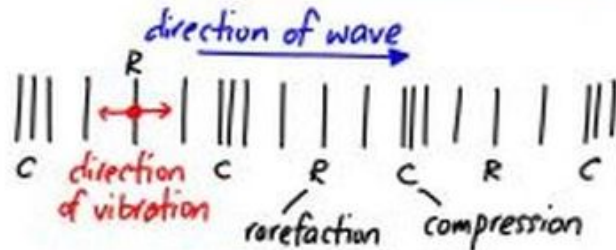
- are waves that travel perpendicular to the direction of the vibration.



eg. water waves, light waves
electromagnetic waves

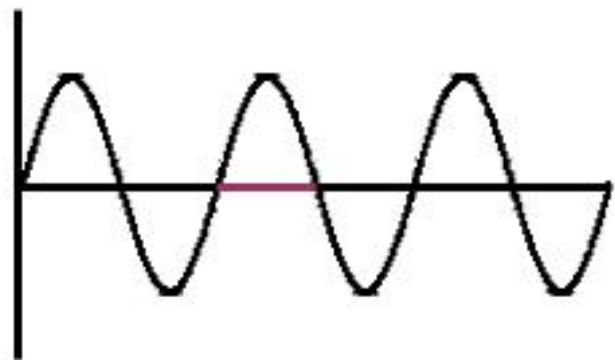
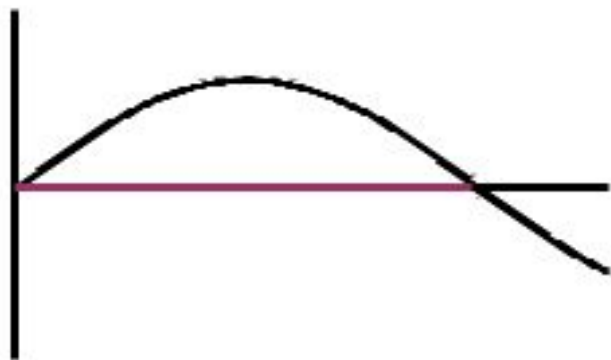
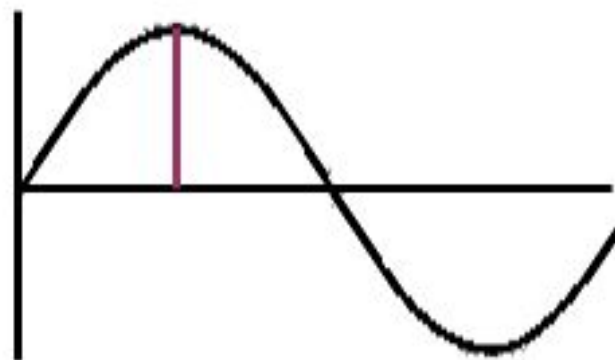
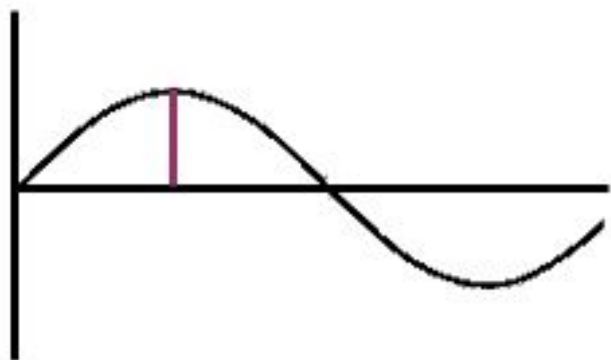
Longitudinal Waves

- are waves that travel parallel to the direction of the vibration.



eg. sound waves

– Amplitude and Frequency of Sound Waves
Determine the Pitch and Volume of Sound



Amplitude and Frequency of Sound Waves Determine the Pitch and Volume of Sound

