01 - Waves

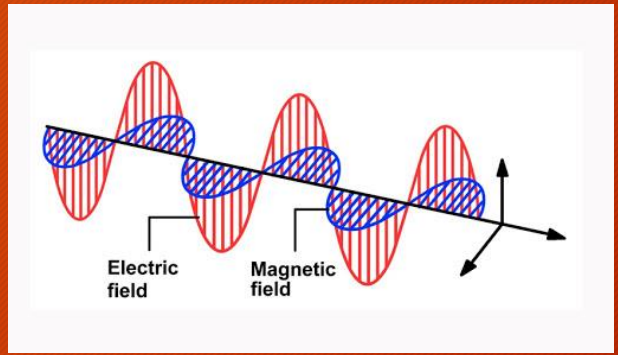
Definition, Characteristics and Classification

What is a Wave?

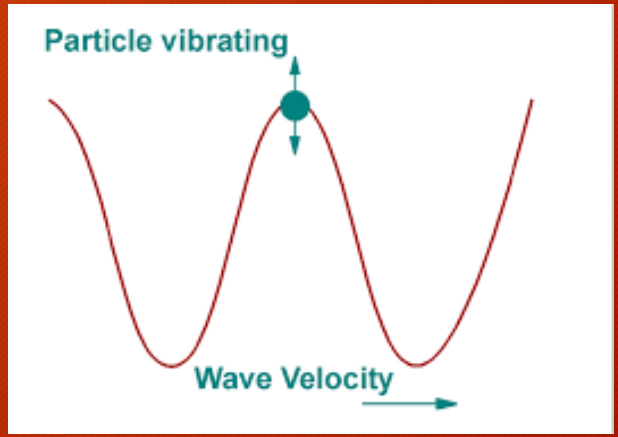
- A vibration or disturbance in space.
- A wave can be described as a disturbance that travel through a mediam.
- Wave transfer energy without transferring matter.

Classification of Waves

- Electromagnetic Waves

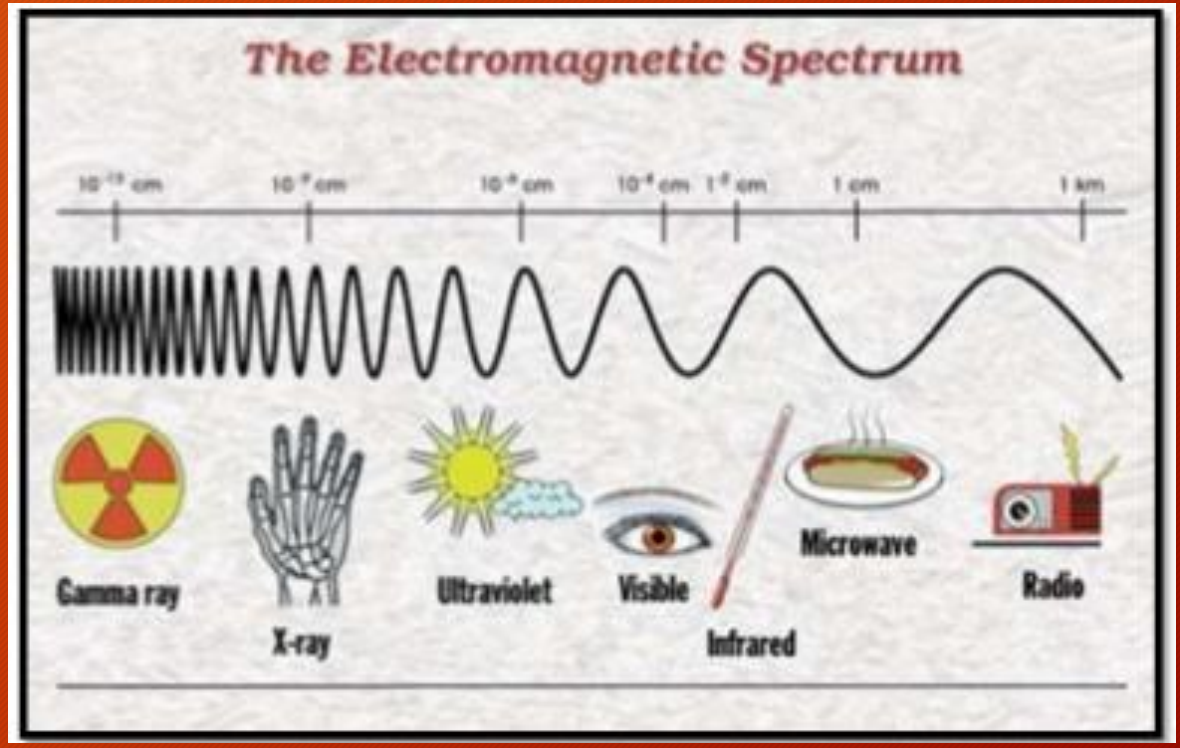


- Mechanical Waves.



Electromagnetic Waves

- Waves that can travel through matter or empty space where matter is not present.
  - Radio Waves
  - Microwaves
  - Infrared Waves
  - Visible Light
  - Ultraviolet Rays
  - X-Rays



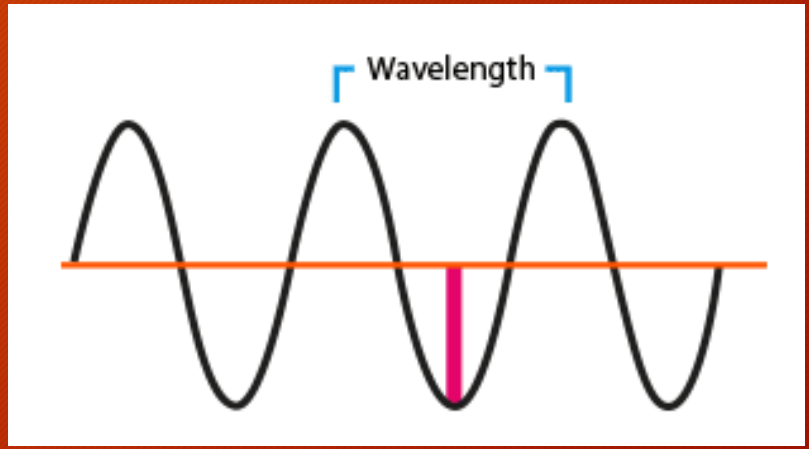
Mechanical Waves

- Needs a mediam
- Require the particles of the medium to vibrate in order for energy to be transferred.
  - Water Waves
  - Earthquake/Seismic Waves
  - Sound Waves
  - Waves that travel down a rope or spring

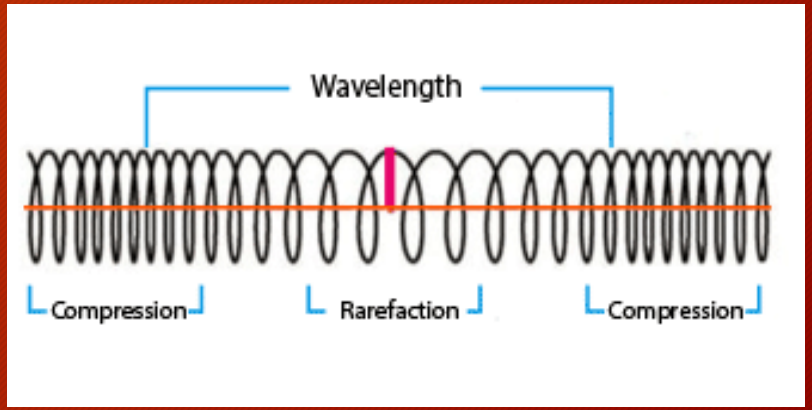
Mechanical Waves	Electromagnetic Waves
Cannot travel without a medium	Can travel without a medium
Elasticity and inertia	magnetic and electric fields
Travels with the speed of the medium	Travels at the speed of light
Transverse and Longitudinal	Only Transverse
Sound waves, surface waves	Microwaves, Radio waves, etc.

Classification of Waves

- According to how particles move through them
- Transverse Waves
  - Particles move perpendicular to the motion of the wave

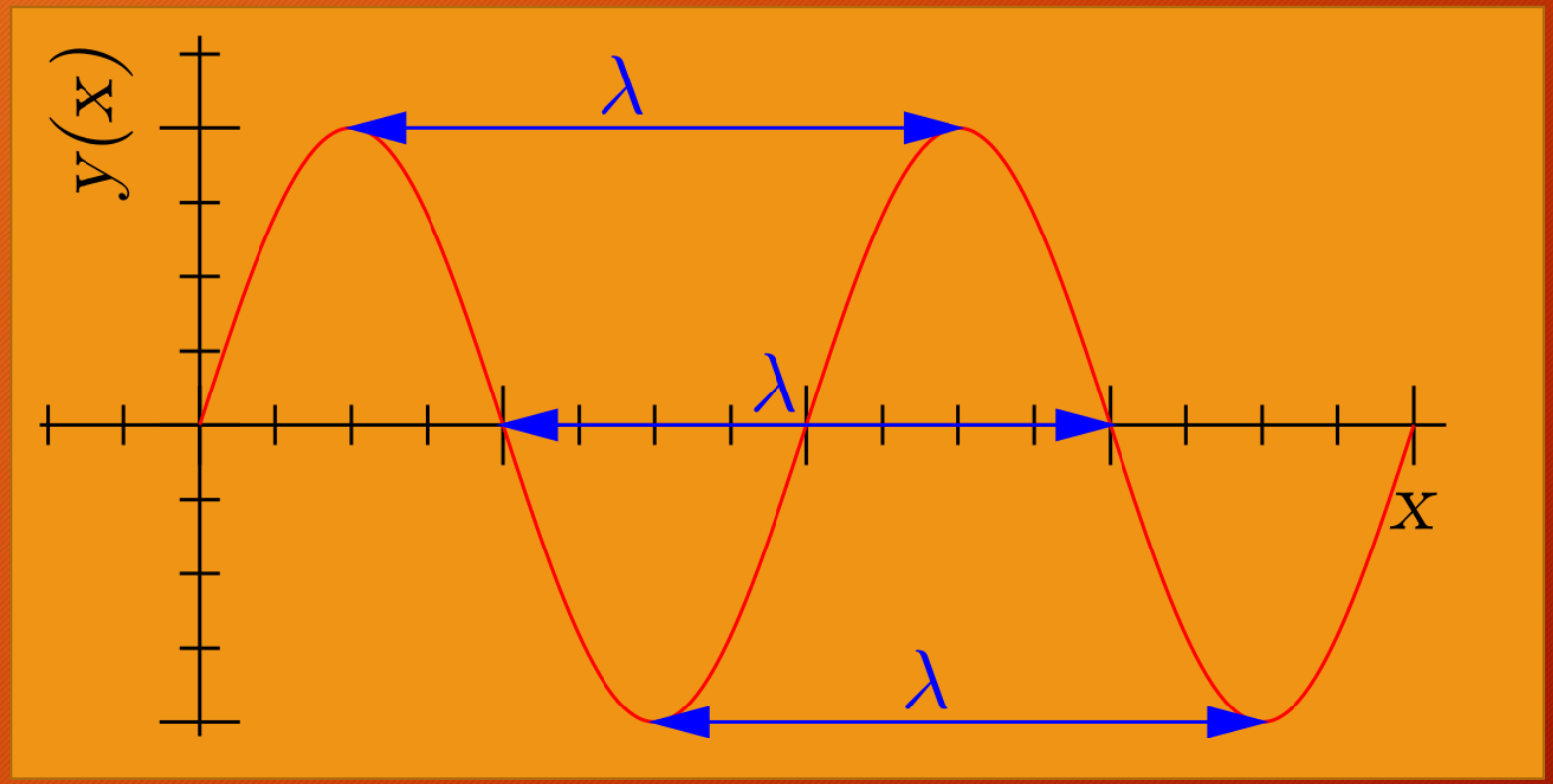


- Longitudinal Waves
  - Particles move parallel to the motion of the wave



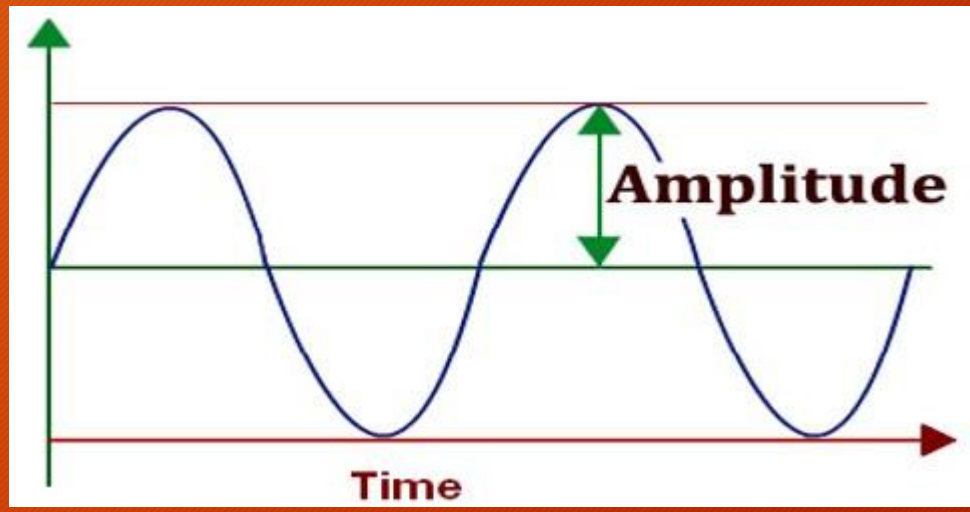
Wavelength (λ)

- The distance from crest to crest (or trough to trough)



Amplitude (A)

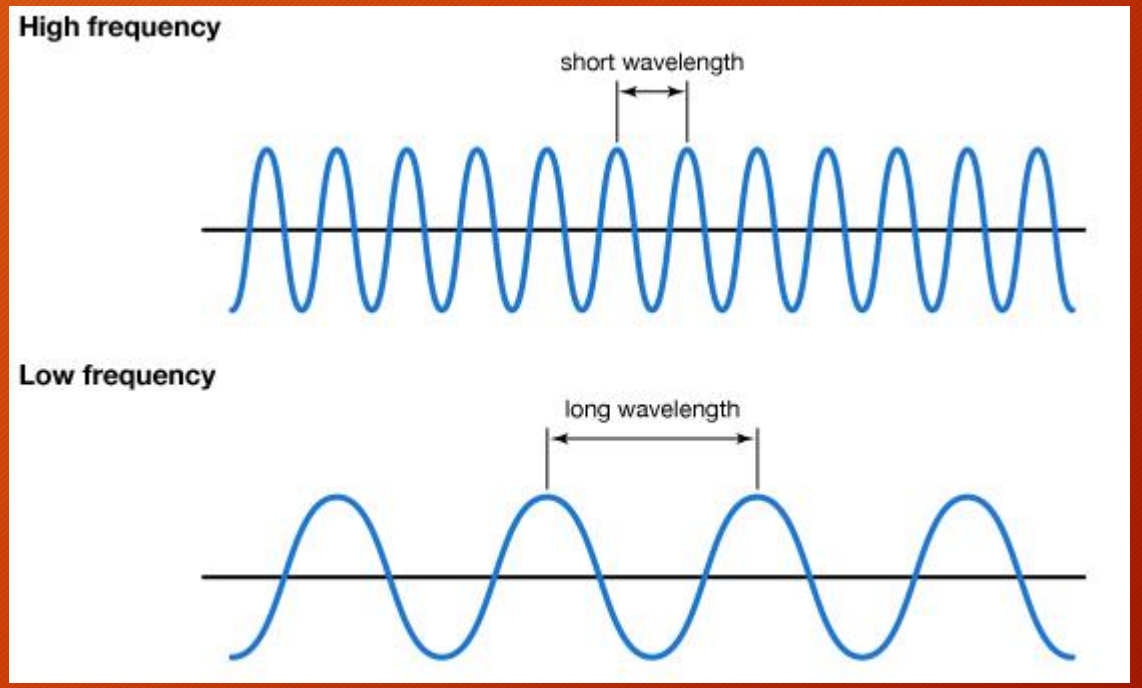
- The distance of crest (or trough) from the midpoint of the wave



Frequency (f)

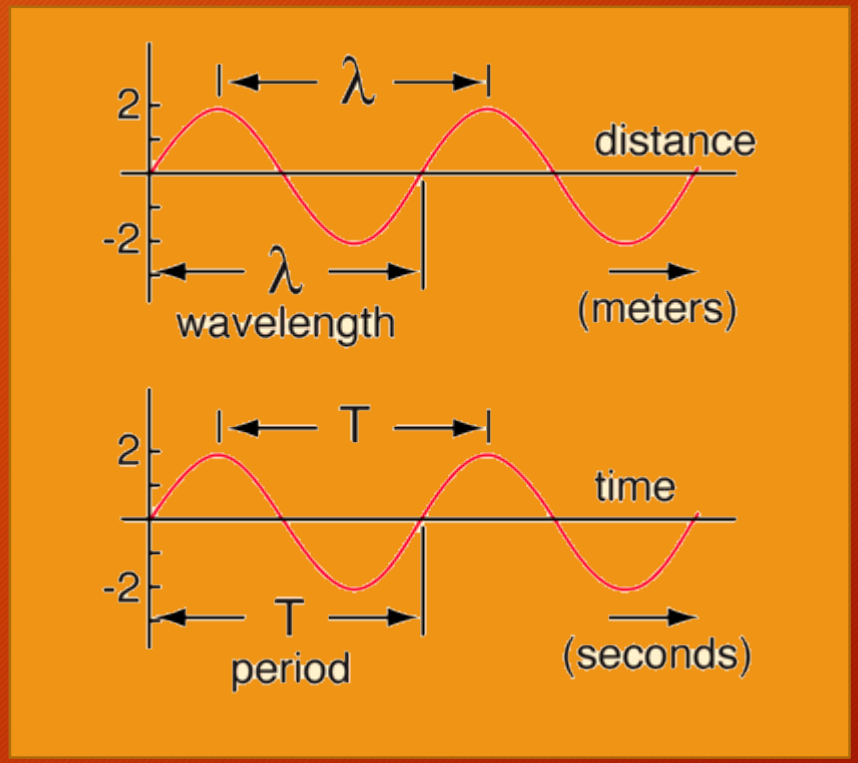
- The number of waves that passed a fixed point per second
- Unit: hertz (Hz)

- F = 1/T



Period (T)

- The time it takes a wave to travel a distance equal to a wavelength.
- Unit : Seconds
- T = 1/f



Wave Velocity (v)

- Distance travelled by a wave crest in one period.
- Unit: m/s
- V= λ/T