

Wave Energy

Wave- A disturbance that transfers energy from one place to the next.

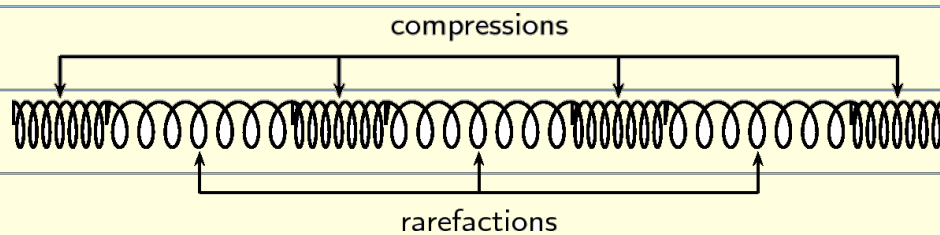
Sound- Energy that travels as a LONGITUDINAL wave, transferring energy through the molecules as they collide.

Medium- Any substance that a wave travels through.

Mechanical Waves- Waves that transfer energy through matter.

2 types of waves

Longitudinal Wave- Waves that travel in the same direction as the disturbance.



Ex) Sound

Energy- The ability to do work.
(such as causing motion or the interactions of molecules)

Magnetism- Iron (Fe), Cobalt (Co), or Nickel (Ni) in which the atoms have aligned to form positive and negative poles

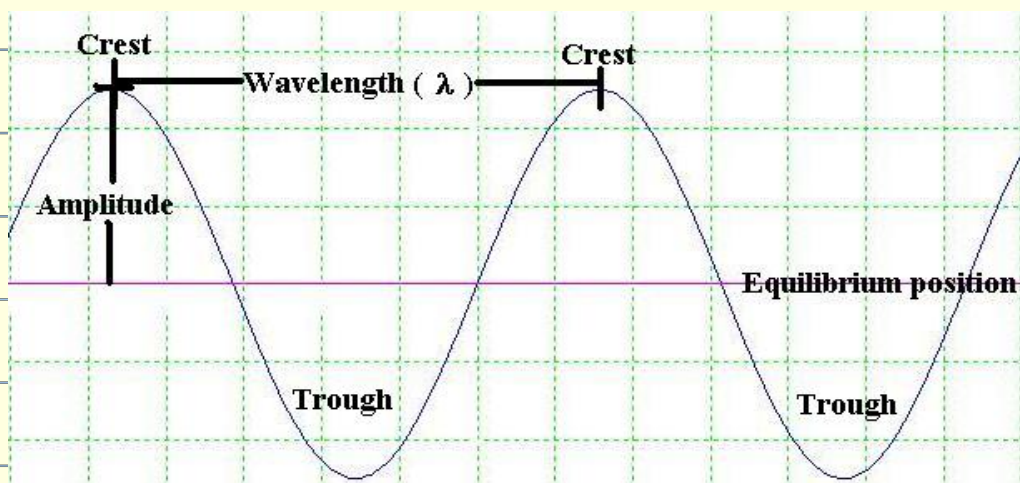
Electricity- A flow of electrons.

- Static Electricity- a build up of electrons
- Electrical Current- electrons flowing through a conductor

Conductor- A substance that electrons easily flow through.

Insulator- A substance that does not easily allow electrons to pass through.
(Gandalf)

Transverse Wave- Waves that travel perpendicular to the direction of the disturbance.



Ex) radio, micro, infrared, visible light, ultraviolet, x-ray, gamma

Frequency- The number of waves passing per second.

Measured in Hertz (Hz)= waves/sec

Wave Speed-

frequency \times wavelength = speed

$$f \times \lambda = \text{speed}$$

Relationships

↑ frequency \Rightarrow ↑ pitch (Direct)

↑ volume \Rightarrow ↑ amplitude (Direct)

↑ frequency \Rightarrow ↓ wavelength (Inverse)

Interference- When 2 waves meet their amplitude is added together.

Constructive Interference- When the resulting amplitude of the 2 waves is greater.

Destructive Interference- When the resulting amplitude of the 2 waves is less.

Name: _____ Date: _____

Introduction to the Electromagnetic Spectrum

Directions: Use the descriptions below to help locate examples of electromagnetic waves in the Wavestown picture.

Radio waves have the longest wavelength in the electromagnetic spectrum. These waves carry the news, ball games, and music you listen to on the radio. They also carry signals to television sets and cellular phones.

Microwaves have shorter wavelengths than radio waves, which heat the food we eat. They are also used for radar images, like the Doppler radar used in weather forecasts.

There are **infrared waves** with long wavelengths and short wavelengths. Infrared waves with long wavelengths are different from infrared waves with short wavelengths. Infrared waves with long wavelengths can be detected as heat. Your radiator or heater gives off these long infrared waves. We call these thermal infrared or far infrared waves. The sun gives off infrared waves with shorter wavelengths. Plants reflect these waves, also known as near infrared waves.

Visible light waves are the only electromagnetic waves we can see. We see these waves as the colors of the rainbow. Each color has a different wavelength. Red has the longest wavelength and violet has the shortest wavelength. These waves combine to make white light.

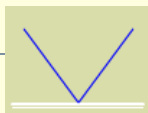
Ultraviolet waves have wavelengths shorter than visible light waves. These waves are invisible to the human eye, but some insects can see them. Of the sun's light, the ultraviolet waves are responsible for causing our sunburns.

X-Rays: As wavelengths get smaller, the waves have more energy. X-Rays have smaller wavelengths and therefore more energy than the ultraviolet waves. X-Rays are so powerful that they pass easily through the skin allowing doctors to look at our bones.

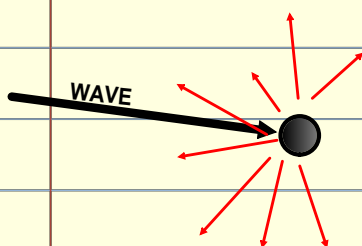
Gamma Rays have the smallest wavelength and the most energy of the waves in the electromagnetic spectrum. These waves are generated by radioactive atoms and in nuclear explosions. Gamma rays can kill living cells, but doctors can use gamma rays to kill diseased cells.

3 Things a wave can do when it hits an object

1. Reflect- The bouncing back of a wave after it strikes an object.



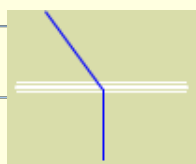
Special type of Reflection:



- Scatter- A wave strikes an object and is reflected in several different directions.

2. Transmit- The passing through of a wave after it strikes an object.

Special type of Transmission:



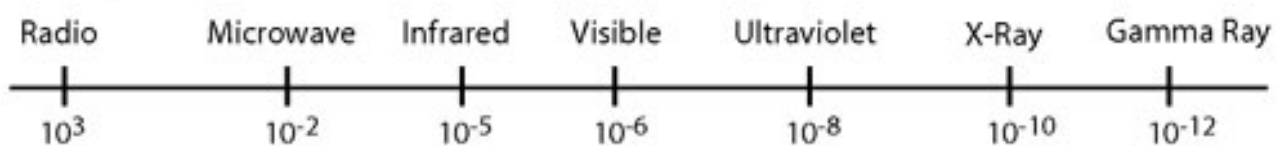
- a) Refraction- The bending of a wave as it enters a new medium.



- b) Diffraction- The spreading out of waves through an opening or around an object.

3. Absorb- The taking in of a wave after it strikes an object.

Wavelength
(metres)



Frequency
(Hz)

