

Properties of Waves

MY SO Waves Notes Part 1

Waves

- A disturbance that transfers energy from place to place
- Remember that energy is the ability to do work.
- Example: The energy carried by a wave can lift a large ship

What causes waves

- Waves are generated when a source of energy forces the matter in a medium (solid, liquid, or gas) to vibrate.
- Vibration - A repeated back-and-forth or up-and-down motion

Mechanical Waves

- Mechanical waves only travel through a medium

- Examples:
 - Ocean waves travel through water (liquid)
 - Sound waves travel through air (gas)
 - A wave can travel along a rope (solid)

Electromagnetic Waves

- Some waves can travel through empty space such as
 - X-rays
 - Visible light
 - Microwaves
 - Radio
 - UV - ultra violet

Two Types of Mechanical Waves

Waves are classified according to how they travel through a medium

Transverse Waves (A)

Longitudinal Waves (B)



Transverse Waves

- Waves that move through the medium at right angles to the direction the waves are traveling.
- Transverse means “across”
- As a transverse wave moves in one direction, the particles of the medium move perpendicular to the direction of the wave, or across it.

Transverse Wave Vocabulary

Crest - when the displacement of the medium is at a maximum

Trough - when the displacement of the medium is at a minimum

Rest position - where the medium shows no disturbance

Amplitude - The vertical distance between a peak or a valley and the resting position in a transverse wave.

Wavelength - the distance between two corresponding parts of a wave

Crest to crest or trough to trough

Longitudinal Waves

The medium moves parallel to the direction the waves are traveling.

The medium moves back-and-forth in the same direction the wave travels.

Longitudinal Wave Vocabulary

Compression - Particles are close together

Rarefaction - Particles are spread out

Amplitude - A measure of how compressed or rarefied the medium becomes in a longitudinal wave

Wavelength - The distance between two corresponding parts of a wave

Distance from one compression to the next

Frequency

The number of complete waves (wavelengths) that pass at a given point in a certain amount of time

Number of vibrations per second

Measured in units called hertz (HZ)

1 vibration per second = 1 HZ

Speed

How far the wave travels in a unit of time, or distance divided by time

The speed, wavelength, and frequency of a wave are related to each other by mathematical formulas.

Unit for speed is meters per second, or m/s