

Wave Vocabulary

- 1 Waves - disturbance that transfers energy from one place to another w/out transferring matter
- 2 Mechanical Waves - a wave that can travel through matter
- 3 Medium - material in which a wave travels
- 4 Transverse wave - a wave in which the disturbance is perpendicular (90°) to the direction the wave travels
- 5 CREST - highest point of a transverse wave
- 6 TROUGH - lowest point of a transverse wave
- 7 Longitudinal Waves - makes the particles in a medium move parallel (\parallel) to the direction of the wave
- 8 Compressions - regions of a longitudinal wave where the particles in the medium are closest together
- 9 Rarefactions - regions of a longitudinal wave where the particles of the medium are farthest apart
- 10 Electromagnetic Waves - a wave that can travel through empty space and through matter

- 11 Amplitude - is a measure of how far the particles in the medium move away from their normal rest position
- 12 Wavelength - Distance from any point on a wave to an identical point on the next wave
- 13 Wave Period - time required for one cycle
- 14 Frequency - how many cycles occur in an amount of time, usually 1 Sec.
- 15 Hertz (H_z) - measurement for frequency $f = \frac{\text{\# of cycles}}{\text{time}}$

WAVES

Key: Waves transfers ENERGY from place to place NOT matter

2 ways to classify

WHAT wave travels through

HOW energy travels through

① Mechanical Waves

- requires a medium (matter)
- requires the particles of the medium to vibrate/move to transfer energy

Ex: Water waves, earthquake (seismic) waves, sound waves, travel down rope or spring

② Electromagnetic Waves

- can travel through matter or empty space (No matter) vacuum

Ex: radio waves, microwaves, X-rays, infrared waves, UV rays, visible light,

① Transverse Waves

- mechanical waves
- medium vibrates (\perp) perpendicular to direction of wave

Ex: strings on instruments, secondary seismic waves, water waves, some rope or spring

② Longitudinal/Compressional waves

- mechanical waves
- medium vibrates (\parallel) parallel to the direction of the wave

Ex: Sound waves, primary seismic waves, some rope or spring

③ Surface Waves

Ex: Surface seismic waves

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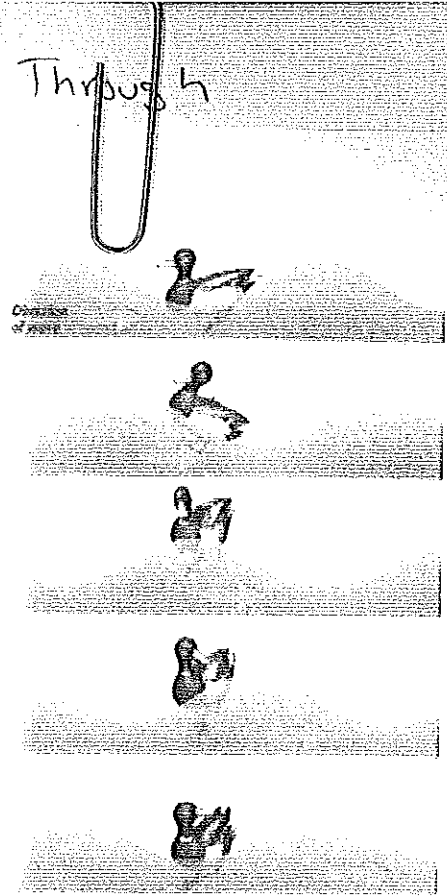
Example:
Electrom

Ex:

What Waves Travel Through

Mechanical Waves

- Requires a medium to travel through (cannot move through empty space)
- A medium is any type of material through which a wave travels
 - Gas (air)
 - Liquid (water)
 - Solid (rope, earth's crust)
- Waves travel through the medium, waves DO NOT carry the medium

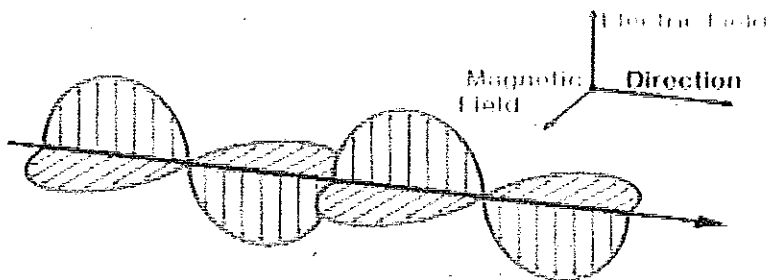


- Requires the medium to vibrate for energy to transfer
- Vibration is a repeated back and forth or up and down motion

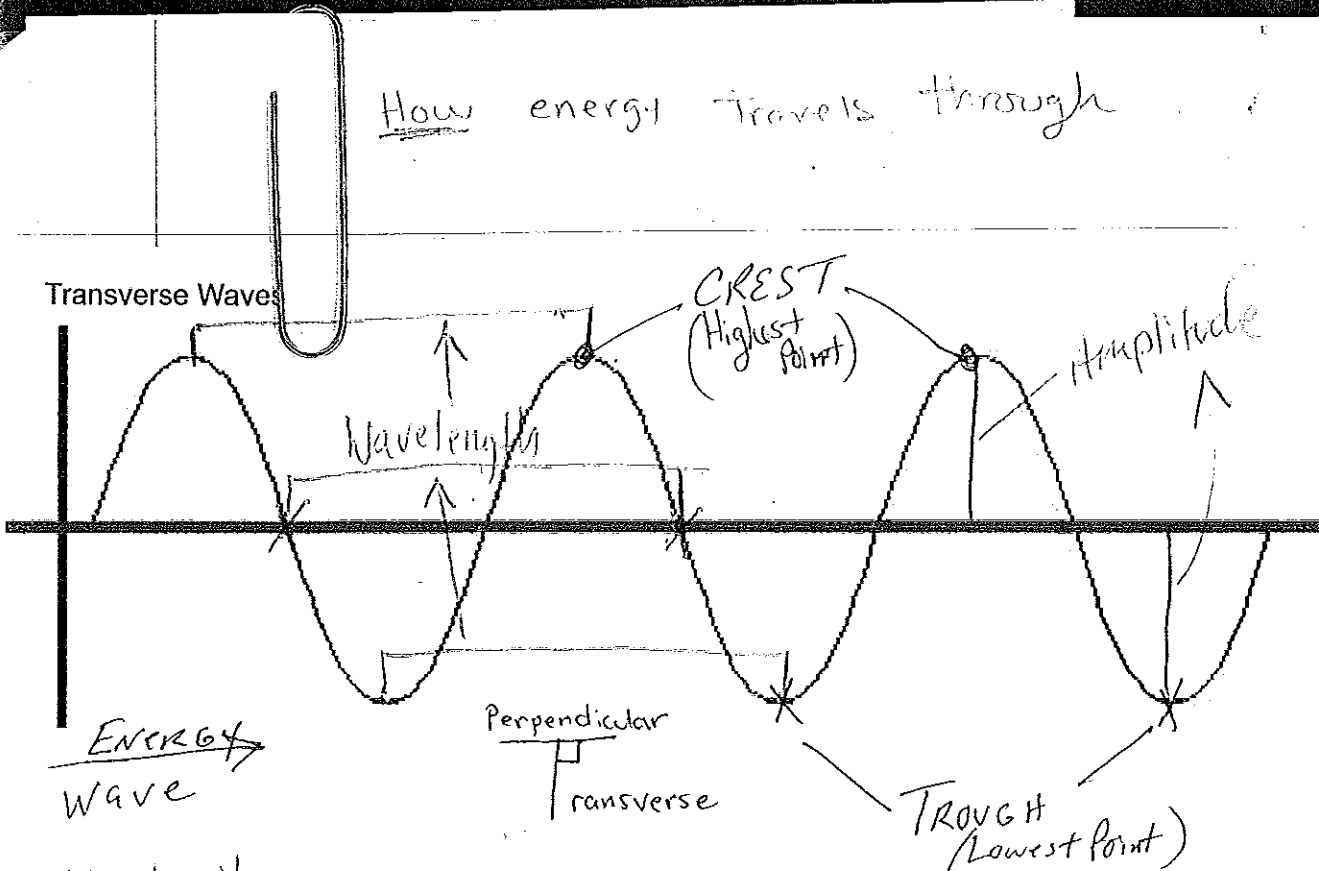
Example: Sound waves, Ocean waves, Seismic (Earthquake) waves, Electromagnetic waves ^{Waves down rope or string/spring}

- Can travel through matter or empty space (no matter, aka vacuum)
- Transverse waves

Ex: visible light, Radio waves, Micro waves, Infrared waves, UV rays, X-rays



How energy travels through



Wavelength is one complete cycle, 1 wave (crest to crest / trough to trough)
 Any point on a wave to the next identical point

Amplitude - distance away from the rest position / equilibrium and the crest or trough (farthest point away)

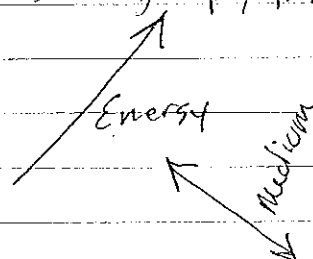
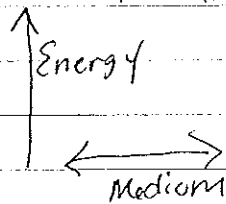
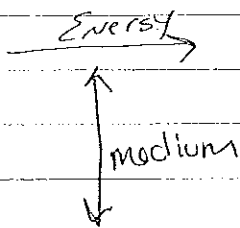
Frequency - number of waves that pass in a given amount of time (hertz) $\frac{1}{s}$

Mechanical waves or electromagnetic waves
 medium medium + empty space

Particles of the medium moves Perpendicular (\perp , 90 degrees) to the direction of the wave (energy) move up and down to the direction of the wave

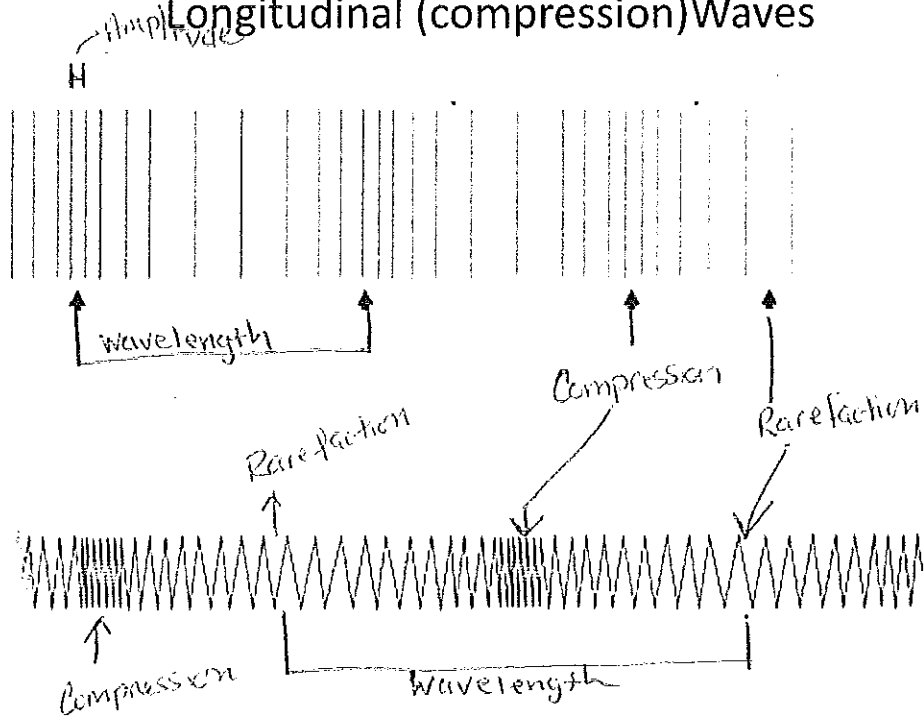
Examples

Strings on instruments, Secondary Waves (earthquake)
 Water waves, Waves through rope/string



(REP ch Far Study)

Longitudinal (compression) Waves



Parallel
longitudinal

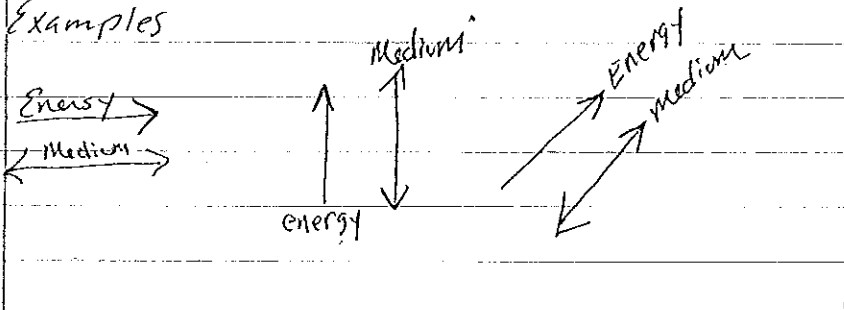
Medium vibrates back and forth (Parallel) to the direction of the wave (Energy)

Wavelength: 1 complete cycle

Amplitude: distance between particles at a compression

Mechanical waves only

Examples



Sound waves
P-Waves
Some rope / spring