

Waves!

Mar 30-8:54 AM

- A wave is any disturbance that transmits energy or information through matter or space.
- Examples of waves:
 - Water waves in the ocean
 - Microwaves
 - Light waves from the sun
 - Visible Light
 - Radio waves
 - Sound waves
 - Wifi

Write this
down!!



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- Some waves transfer energy by the vibration of particles in a medium
- A medium is a substance through which a wave can travel
- A medium can be a solid, liquid, or gas
- Sound waves, ocean waves, string instruments all require a medium.
- Waves that require a medium are called mechanical waves.

Write this
down!!



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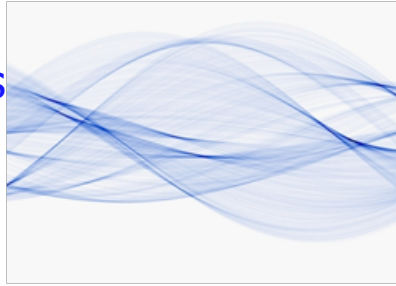
- Some waves can transfer energy without traveling through a medium
- Examples are: Visible Light, Microwaves, TV and Radio Signal, X-Rays
- Waves that do not require a medium are called electromagnetic waves
- Even though they do not require a medium, they can still travel through air, water, and glass



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There are 2 different types of waves:

Transverse waves

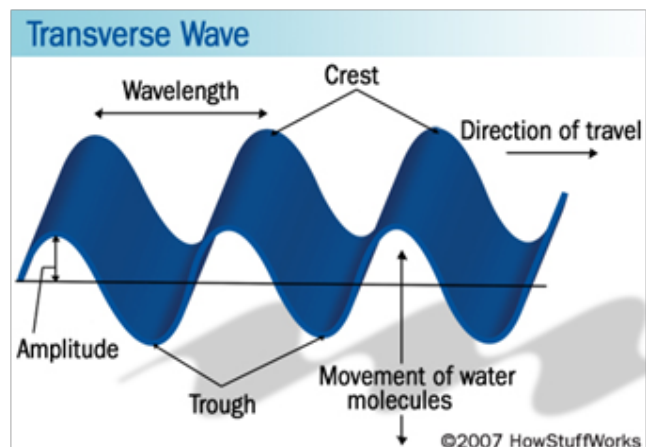


Longitudinal waves

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Transverse Waves

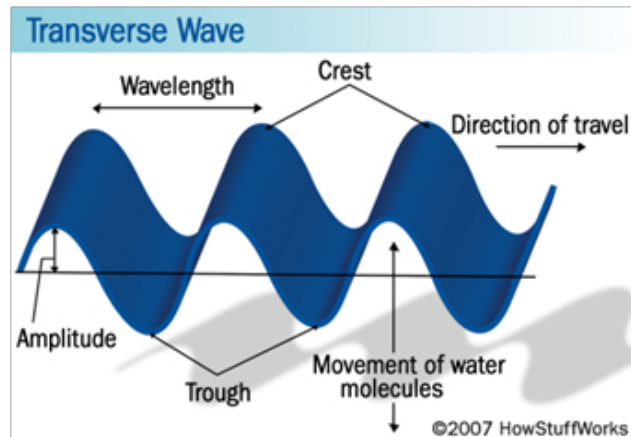
- Transverse waves are when the particles vibrate with an up-and-down motion.
- Transverse means "moving across"
- The particles move perpendicular to the direction the wave is traveling
- Example:
- Ocean Wave
- Radio Wave



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Transverse Wave Parts

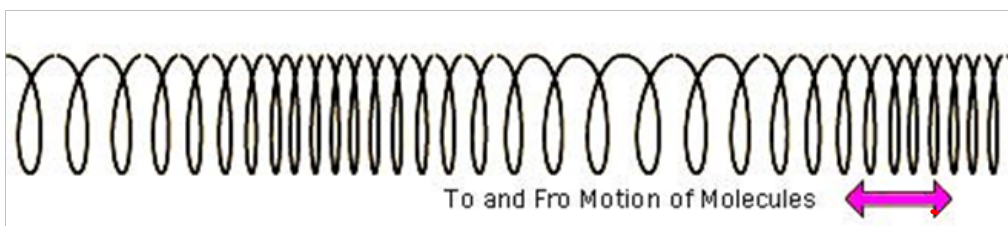
- Crest- top peak
- Trough- bottom
- Wavelength- distance from crest to crest (**or** trough to trough)
- Amplitude-distance from center line to crest (**or** trough)



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Longitudinal Waves

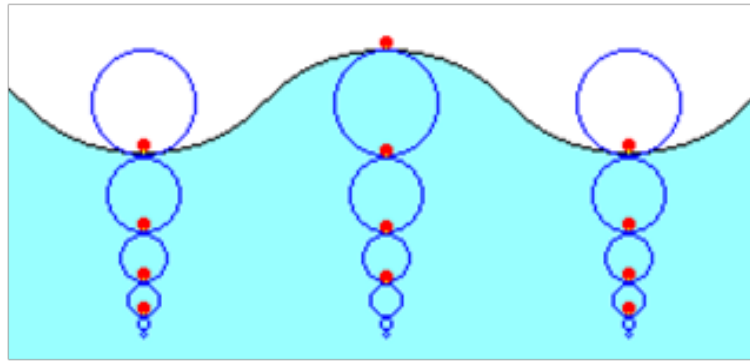
- In longitudinal waves the particles of the medium vibrate back and forth along the path of the wave
- An example is a spring, or a slinky
- When the particles are squished together it is called a compression
- When the particles are spread apart it is called a rarefaction
- Example: sound waves, springs



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Combinations of Waves

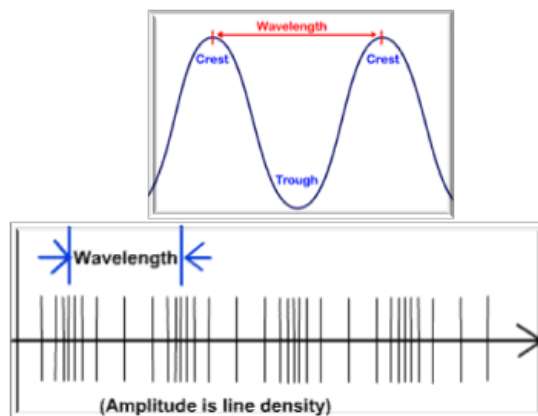
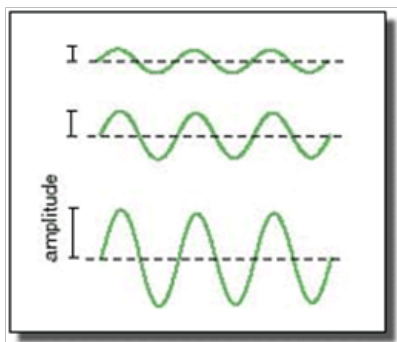
- Transverse and longitudinal waves can combine to form a surface wave
- Surface waves happen when the two waves occur at or near the boundary of two media



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Properties of Waves

- **Amplitude** is the height of a wave
- Larger amplitude = more energy
- **Wavelength** is the distance between crests or troughs
- In longitudinal waves it is between adjacent compressions or rarefactions



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Properties of Waves

- **Frequency** is the number of waves that occur in a given amount of time
- 1 wave is measured by 1 wavelength
- Measured in hertz (Hz)
- Higher frequency = more energy
- **Wave speed** is the speed that a wave travels (distance a wave travels divided by time)
- Depends on the medium the wave is traveling through
- $v = \lambda \times f$ (v is velocity, λ is wavelength, f is frequency)

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Think you are ready for a quiz?

Mar 9-3:39 PM