

Wave Basics

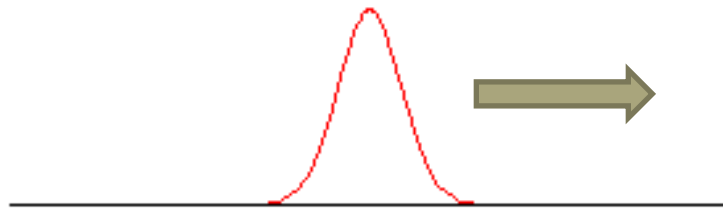
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Objectives

- Define a pulse.
- Describe the behavior of a pulse at a boundary.
- Explain the characteristics of transverse and longitudinal waves.
- Explain the characteristics of electromagnetic and mechanical waves.

Pulses

- A pulse is a single disturbance which carries **energy** through a medium or through space.
- Imagine you and your friend holding opposite ends of a slinky. If you quickly move your arm up and down, a single pulse will travel down the slinky toward your friend.



Waves

- Several pulses at regular time intervals create a wave carrying energy.
- A **wave** is a repeated disturbance which carries **energy**.
- Mass of the slinky doesn't move from one end of the slinky to the other, but the energy it carries does.

Waves at Boundaries

- When a pulse or wave reaches a hard boundary, it reflects off a boundary, and is inverted.
- When a pulse or a wave reaches a soft, or flexible, boundary, it reflects off the boundary but does not invert.
- Check website for examples.

Types of Waves

- **Mechanical waves** require a medium
 - Sound
 - Water
 - Seismic
- **Electromagnetic (EM) waves** require no medium
 - Light
 - X-Rays
 - Microwaves

Types of Waves

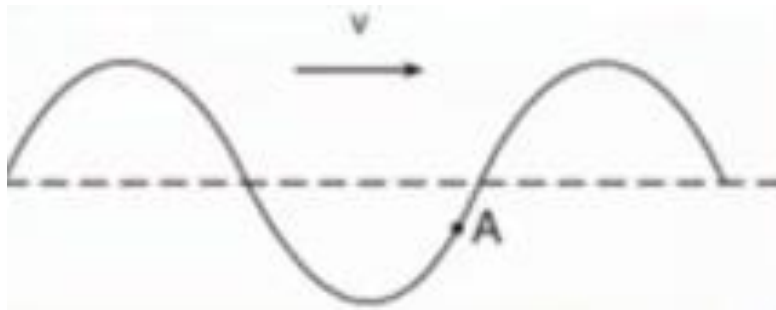
- **Longitudinal waves:** particles of the wave vibrate in the same direction as the wave velocity
 - Sound
 - Seismic P-waves
- **Transverse waves:** particles of the wave vibrate perpendicular to wave's velocity
 - EM waves
 - Stadium Waves

Sample Question 1

- Which type of wave requires a material medium through which to travel?
 - a) Sound
 - b) Television
 - c) Radio
 - d) X-ray

Sample Question 2

- The diagram represents a transverse wave traveling to the right through a medium. Point A represents a particle of the medium. In which direction will particle A move in the next instant of time?



Sample Question 3

- As a transverse wave travels through a medium, the individual particles of the medium move
 - a) Perpendicular to the direction of wave travel
 - b) Parallel to the direction of wave travel
 - c) In circles
 - d) In ellipses

Sample Question 4

- A ringing bell is located in a chamber. When the air is removed from the chamber, why can the bell be seen vibrating but not heard?
 - a) Light waves can travel through a vacuum, but sound cannot.
 - b) Sound waves have greater amplitude than light waves
 - c) Light waves travel slower than sound waves.
 - d) Sound waves have higher frequency than light waves.