rendezvous

Physics 100
Mechanical Waves Notes

Name: A3/4

Wave: an oscillation that travels through space, transferring energy

Oscillation: A back and forth movement; vibration

Types of Waves:

Mechanical Wave: Oscillation in matter.

Examples of Mechanical Waves: Slinky waves, water waves, Earthquake waves, sound waves

Electromagnetic Wave: Oscillating electric and magnetic fields, traveling through space.

Examples of Electromagnetic waves: radio, microwaves, infrared, visible light, ultraviolet, x-rays, gamma rays

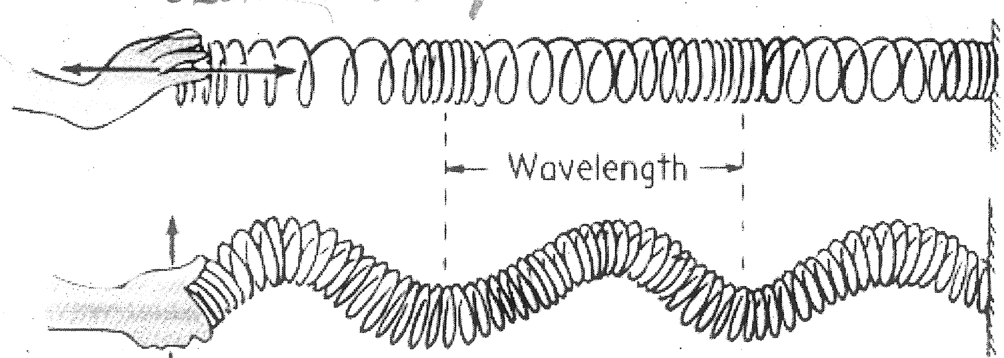
Types and parts of waves:

Name the two different types of waves, below, and explain their primary difference.

oscillations parallel to travel

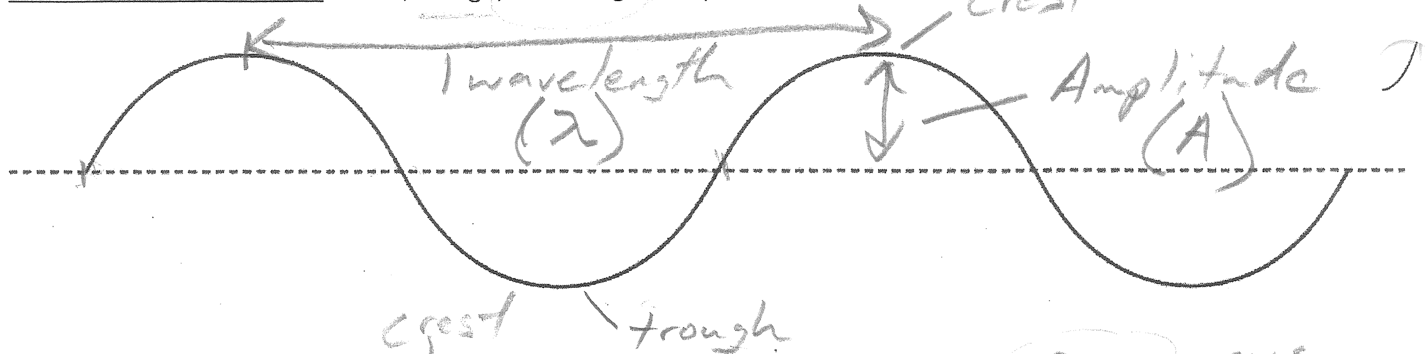
(a) Longitudinal

(b) Transverse

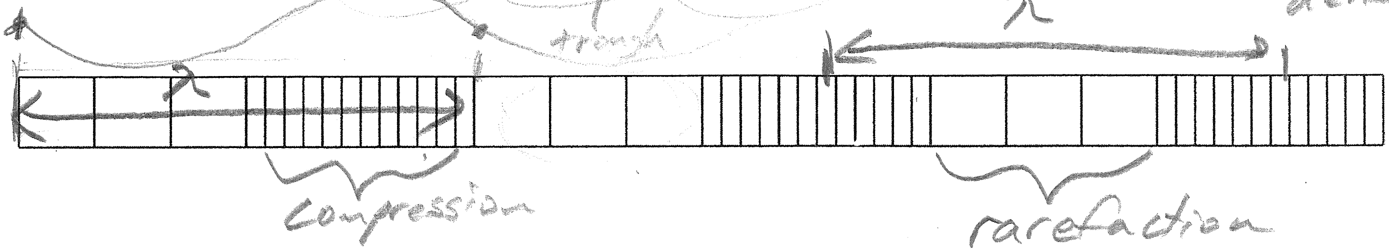


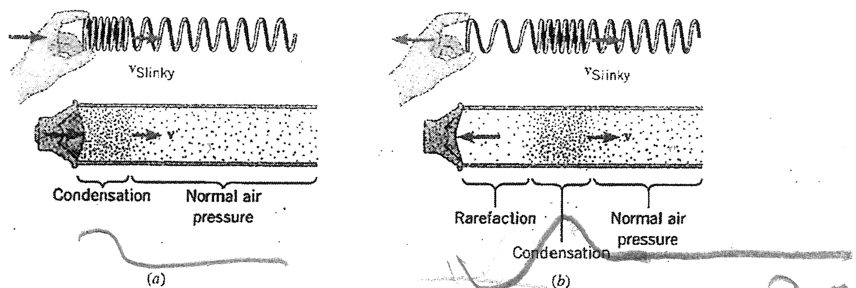
oscillations perpendicular to travel.

Parts of a transverse wave: crest, trough, wavelength, amplitude



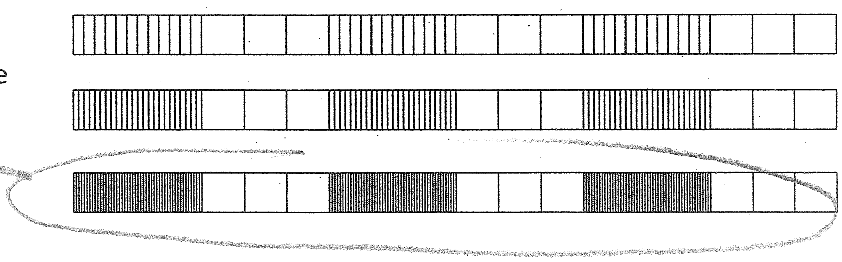
Parts of a longitudinal wave: compression, rarefaction, wavelength





What determines the amplitude of a longitudinal wave? — Density of the Compression

Which of the series of waves on the right shows the greatest amplitude?



Sound waves are longitudinal, but they can be represented as transverse waves:

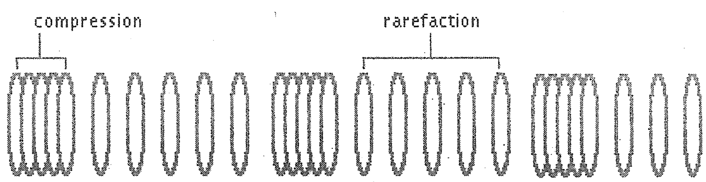


Figure 1: Longitudinal Wave

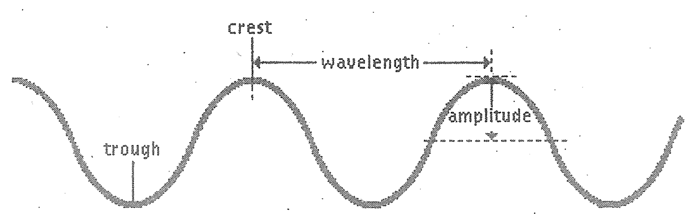


Figure 2: Transverse Wave

Period and Frequency

Period: (T) Time for one wavelength to pass; seconds per wave

Frequency: (f) waves per second

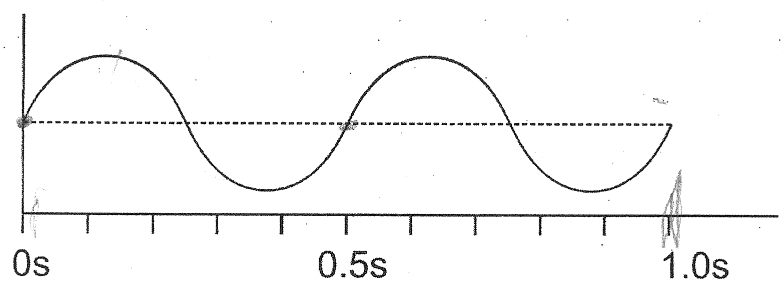
$T = \frac{1}{f}$ $f = \frac{1}{T}$

Symbol for frequency: f

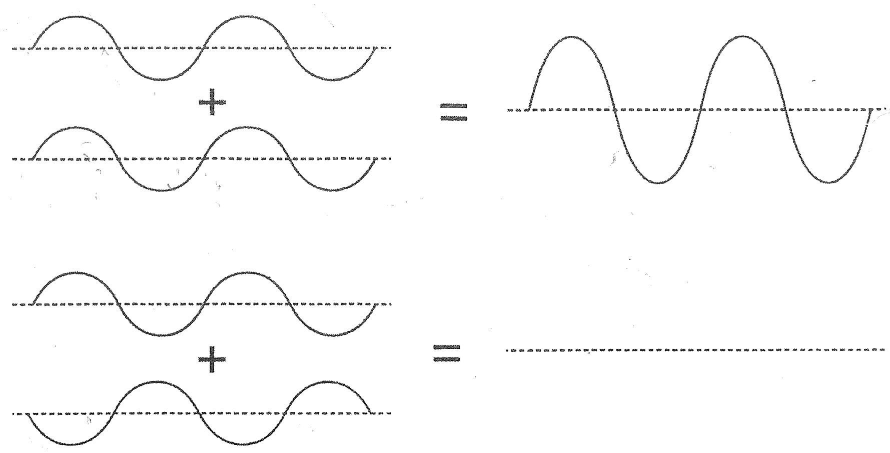
Units for frequency: hertz → hz (cycles per second)

What is the period of the waves below? 0.5s

Calculate the frequency of those waves. ~~λ~~ f = 2hz



Wave Interference: When two waves overlap one another, their oscillations can add to one another, or they can diminish one another. Label the examples of interference on the right.



Wave Interference can cause "**beats**". When two waves have slightly different frequencies, their interference alternates between constructive and destructive. The diagram below shows transverse representations of two sound waves (channels 1 and 2) and their resultant sound (channel 3).

- In the diagram, label the channel with the highest frequency (1 or 2).
- Then label regions of constructive and destructive interference. Channel 3 is the "sum" of channels 1 and 2.
- Label the "beats" that will be heard