

Name: _____

Study Guide, Chapter 1 of S&L: "Nature of Waves"

Waves can be thought of as energy, or that which can transfer energy.

Waves can also be thought of as a disturbance that sends energy through matter or empty space.

All mechanical waves, such as sound, water waves, seismic waves, string waves and spring waves, require a physical medium.

All non-mechanical waves, such as electromagnetic waves, including radio waves, microwaves, infrared, visible, ultra violet, x-rays and gamma rays, do NOT require a medium (though they can travel in a medium). EM waves can travel in the vacuum of space.

A medium is any physical substance (solid, liquid or gas) in which a mechanical wave can propagate. A medium can also be thought of as a physical environment in which phenomena occur.

A transverse wave is one in which the particles of the medium vibrate perpendicularly to the direction of the wave.

A longitudinal wave is one in which the particles of the medium vibrate parallel to the direction of the wave.

A surface wave is the combination of a transverse and a longitudinal wave near a boundary or surface.

Assuming the velocity of a wave stays constant, the frequency and wavelength are inversely proportional. This means, if the frequency of a new wave is tripled, the wavelength will become $\frac{1}{3}$ of the original.

Interference is the combination of two or more waves that result in a single wave.

Constructive interference occurs when the crest of one wave overlaps the crest of another.

Destructive interference occurs when the crest of one wave overlaps the trough of another.

A standing wave is the result of interference of a wave reflecting back on itself. A standing wave creates a pattern of vibration that simulates a wave that is standing still.

A reflected sound wave is known as an echo.

The part of a longitudinal wave in which the particles are packed tightly together is called a compression; the part where the particles are spread apart is called the rarefaction.

Wavelength is the measure of the distance between similar points on any 2 adjacent waves, such as crest to crest, or trough to trough.

The frequency of a wave is the number of wave cycles per unit time, typically measured in Hertz.

Amplitude is the maximum distance the particles of a wave's medium vibrate from their rest position.

Refraction is the bending of a light wave due a change in speed as it goes from one medium to another.

Diffraction is the change in direction of a wave as it encounters an obstacle, or edge, such as an opening.

Reflection is the bouncing back of a wave, such as a ray of light, sound or even heat, after it hits a surface.

Resonance occurs when two objects naturally vibrate at the same frequency.

Waves

Mechanical Waves

Sound	L
Water	L S
Seismic	L, T, S
String	T
Spring	L, T

Requires Medium

Solid, Liquid, Gas

Key: L: Longitudinal

T: Transverse

S: Surface wave

Non-Mechanical Electro-Magnetic Waves

Radio Micro Infra Red	Transverse
Visible Light "ROYGBIV"	
Ultra Violet	
X-Ray	
Gamma Ray	

Does Not Require
Medium

Study Guide for KFS Wave Speed Problem: Useful information: $v = \lambda \times f$

Determine the speed of a wave, which has a wavelength of 5.5 meters, and a frequency of 41.5 Hz. Please round answer to nearest whole number; with correct units! Must show all work in pencil.

K: _____

F: _____

S:

Write answer here:
