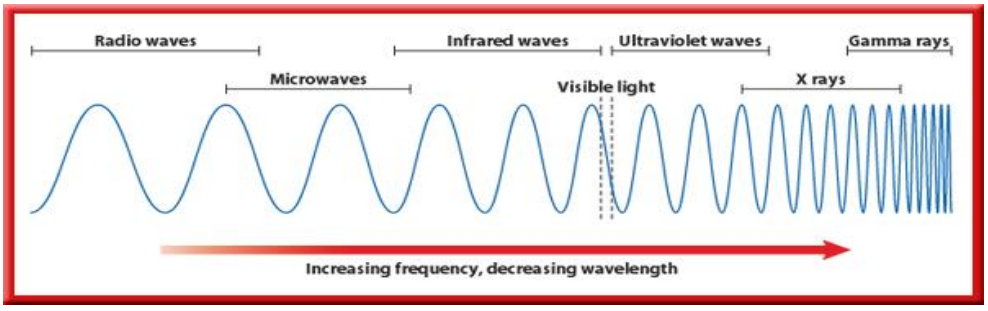
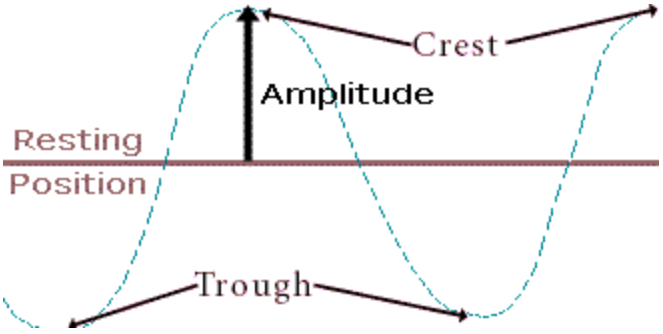
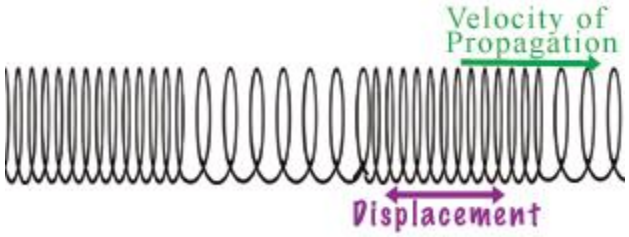
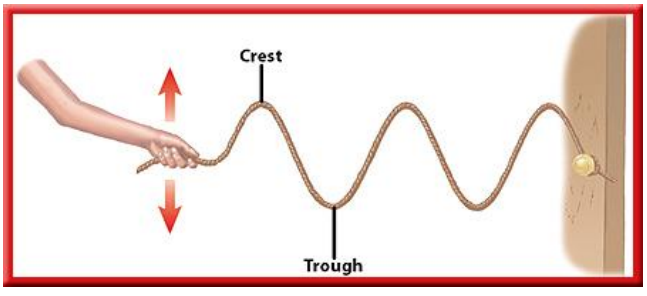
Class Notes: Waves

Name:
Class:
Period/Block:
Date:

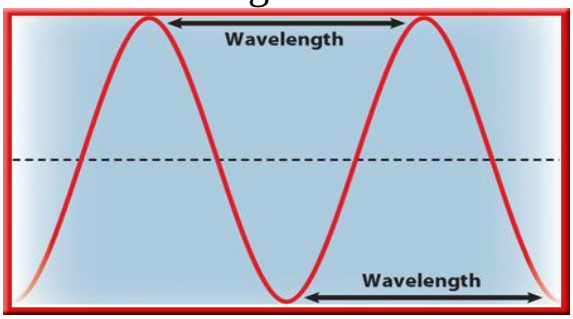
S8P4 Electromagnetic and mechanical waves.
a. Identify the characteristics of waves
f. Diagram the parts of a wave and explain how it is affected by changes in amplitude.

Topic: The properties of waves.
EQ: How do waves behave? What are the parts of a wave?

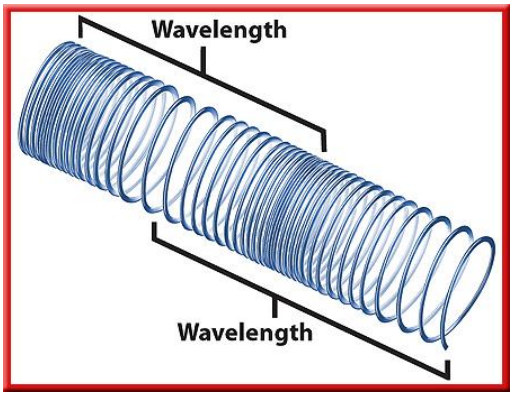
Questions/Main Ideas:	Notes:
What are Waves?	a. A disturbance that carries energy through matter or space b. Not made of matter. c. Travel through some type of matter called a medium (water, air, or earth) d. The larger the wave the more energy it carries e. Mechanical waves – require a medium. (Ex seismic, water, sound.)  f. Electromagnetic waves – do not require a medium and can travel through space where there is no matter . 

Wave Types?	a. Transverse waves – waves in which the motion of the particles of the medium is perpendicular to the motion of the wave as a whole. (Ex light and ropes)  b. Longitudinal or Compressional Waves – wave that cause the particles in a medium to vibrate parallel to the direction of the wave's motion. (Ex. Sound waves) 
Wave Parts	a. Amplitude - How high the wave rises above, or falls below, the normal level. (height of the wave). The higher the amplitude the more energy the wave has. b. Crest – highest point of the wave c. Trough – lowest point of the wave 

d. Wavelength of transverse waves - the distance from the top of one crest to the top of the next crest, or from the bottom of one trough to the bottom of the next trough.

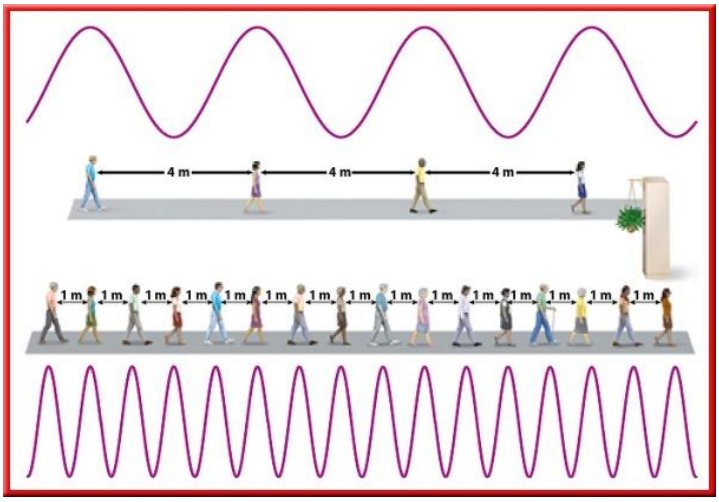


e. Wavelength of compressional waves - the distance between the center of one compression and the center of the next compression, or from the center one rarefaction to the center of the next rarefaction.



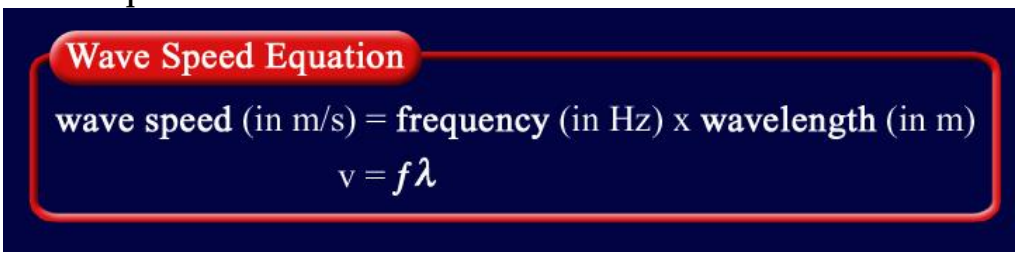
f. Compressions – The condensed parts of a longitudinal wave.
g. Rarefactions – The spread out parts of a longitudinal wave.

h. Frequency - is the number of wavelengths that pass a given point in 1 s. Measured in hertz (Hz). The faster the vibration, the higher the frequency

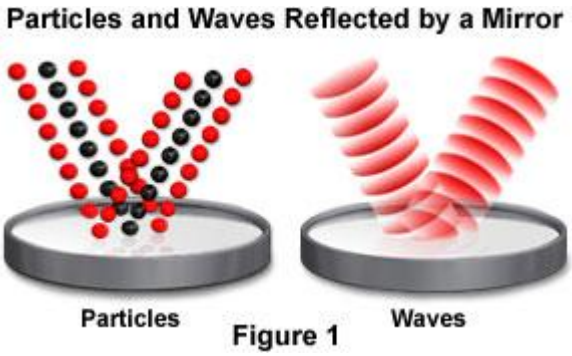
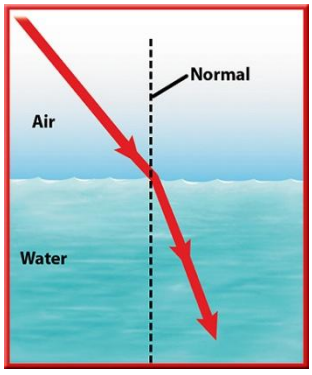
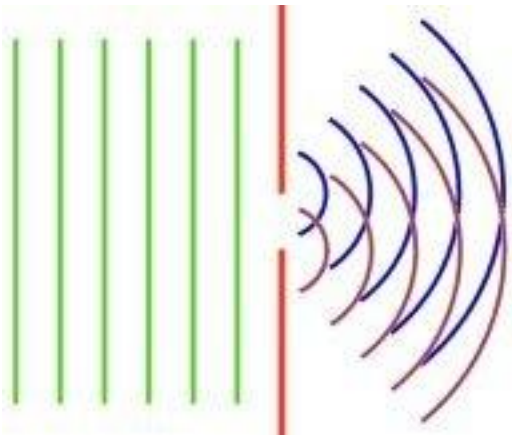


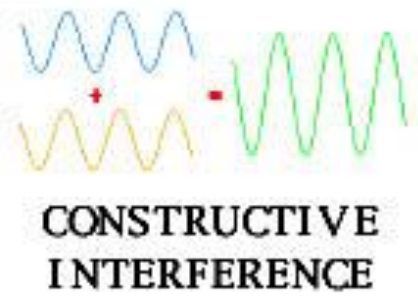
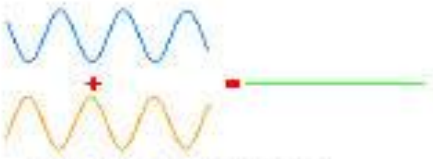
At the same speed, smaller frequencies result in longer wavelengths.

i. Wave speed – can be calculated using the following equation



j. the wavelength is represented by the symbol, λ, (lambda)
k. Waves travel at different speeds in different materials.
l. Mechanical waves usually travel faster in solids, and slowest in gases
m. Electromagnetic waves travel fastest in gases and slowest in solids.

Wave Interactions	a. Reflection – bouncing back of a wave when it meets surface or boundary  Figure 1 b. Refraction – bending of waves when they pass from one medium into another and the wave speed changes (why a pencil looks broken in water)  c. Diffraction – bending of waves around an object (water waves bend around block floating in water) 

Wave Interference	a. Constructive interference – waves combine to form a larger wave.  CONSTRUCTIVE INTERFERENCE b. Destructive interference – waves combine to form a smaller wave. If they have same amplitude, they cancel each other.  DESTRUCTIVE INTERFERENCE

Summary, Reflection, Analysis: