**Name\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_Period\_\_\_\_\_\_\_Date\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_**

**Physical Science-Guided Notes**

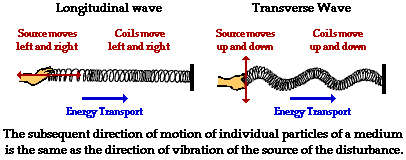
**Ch. 14-Waves**

**Waves**

* \_\_\_\_\_\_\_\_\_\_\_\_: rhythmic disturbance that carry \_\_\_\_\_\_\_\_\_\_\_ through matter or space
* \_\_\_\_\_\_\_\_\_\_\_\_\_\_: material through which a wave \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
  + Can be \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
  + \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_waves don’t need medium (e.g. \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_)
* Waves that require a medium are called \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
* Almost all waves are mechanical except \_\_\_\_\_\_\_\_\_\_\_\_\_\_ waves
* Waves transfer \_\_\_\_\_\_\_\_\_\_\_\_\_\_
* Energy =the ability to exert a \_\_\_\_\_\_\_\_\_\_\_\_\_ over a \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
  + Also known as the ability to do \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
* Energy may \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ as a wave travels
  + Think of throwing a stone into a pond
  + It makes circles called \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
  + Each wave front has the \_\_\_\_\_\_\_\_\_\_\_ amount of \_\_\_\_\_\_\_\_, just over a larger \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
* Sound waves travel in \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
* Waves are related to \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
  + Most waves are caused by \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ objects
* In mechanical waves, the particles in the \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ also \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ as the wave passes \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ the medium
* Vibrations involve \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
* Whenever a spring is \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_, it is exerting a \_\_\_\_\_\_\_\_\_\_ that pushes the mass almost back to the \_\_\_\_\_\_\_\_\_\_\_\_\_ position
  + As a result, the mass will continue to bounce \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
  + This type of vibration is called \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
* A vibration that \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ as energy is transferred from one object to another is called \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

**Types of Waves**

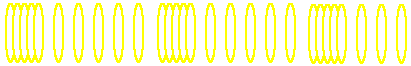
* Two types:\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_



* Transverse:
  + \_\_\_\_\_\_\_\_\_\_\_\_\_\_ moves \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ to the direction of wave movement
  + Like the wave in a stadium; \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ waves are transverse
* Transverse Wave anatomy



* + \_\_\_\_\_\_\_\_\_\_\_\_: Highest Point in a wave
  + \_\_\_\_\_\_\_\_\_\_\_\_: Lowest point a wave
  + \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_: the \_\_\_\_\_\_\_\_\_\_ distance that the particles of wave’s medium vibrate from their \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
  + \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_: distance from any point on a wave to an \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ \_\_\_\_\_\_\_\_\_\_\_ in the next wave
  + \_\_\_\_\_\_\_\_\_\_\_\_\_\_: time it takes to \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ or wave oscillation to occur
* Longitudinal Waves (aka \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_)
  + Medium moves in \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ as wave motion
  + \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ are longitudinal
* Longitudinal Wave Anatomy

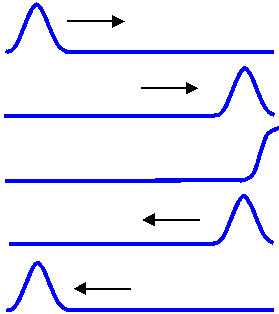
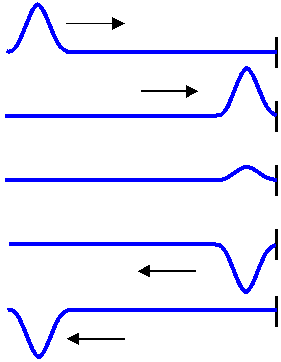


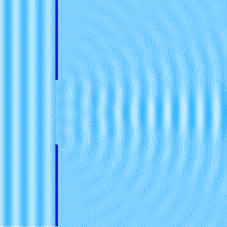
* \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_: crowded or bunched up areas of the wave
* \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_: stretched out areas
* Amt of \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ corresponds to the amt of energy ~\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

**Measuring Waves**

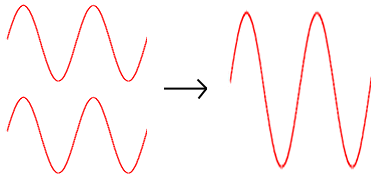
* \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_(\_\_\_)
  + \_\_\_\_\_ of waves passing a point in 1 second; SI unit: \_\_\_\_\_\_\_\_\_\_(1/s)
  + \_\_\_\_\_\_\_\_\_ wavelength=\_\_\_\_\_\_\_\_\_\_\_\_\_\_frequency=\_\_\_\_\_\_\_\_\_\_\_\_ energy
* \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_(\_\_\_\_\_)
  + \_\_\_\_\_\_\_\_\_\_\_of a wave as it moves forward
  + Depends on \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
  + v=\_\_\_\_\_\_\_\_\_\_\_\_\_\_, λ=\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_, f=\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
  + Speed (\_\_\_\_\_\_\_\_\_\_\_\_\_\_) of waves depends on \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
    - Why? 🡪\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
      * In gases, molecules are \_\_\_\_\_\_\_\_\_\_\_ apart so has to go through lots of \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_. Waves usually do \_\_\_\_\_\_\_ travel as fast in gases
      * In liquids, molecules are closer together. Waves are usually \_\_\_\_\_\_\_\_ in liquids than in \_\_\_\_\_\_\_\_\_\_\_\_\_
      * In solids, molecules are really close together, These are usually the \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ moving waves
* Measurement triangle for solving wave problems
* When have 2 things on bottom given in a problem, multiply them to get the answer
* If you have 1 thing on top & 1 thing on bottom given in a problem, divide the top by the bottom
* Example #1: Find the velocity of a wave in a wave pool if its wavelength is 3.2 m and its frequency is 0.60 Hz.
  + Given: Work:
* Example #2: An earthquake produces a wave that has a wavelength of 417 m and travels at 5000 m/s. What is its frequency?
  + Given: Work:

**Wave Interactions**

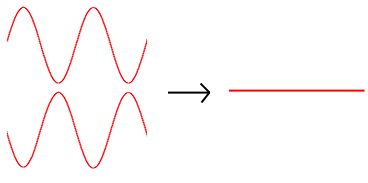
* \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_: the bouncing back of waves when they hit a surface that they do not go through
  + If waves reflect at a \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
  + The reflected wave is \_\_\_\_\_\_\_\_ like original wave except traveling in \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ direction
  + If the wave is \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ to something, then it is not a free boundary
  + Wave will reflect and turn upside down
* \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_: a change in the \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ of a wave when the wave finds an obstacle like an edge, such as an opening

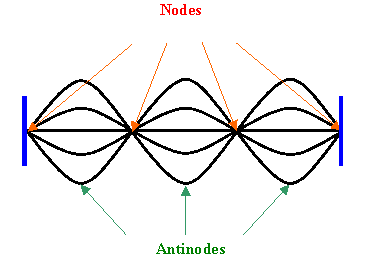


* \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_: the \_\_\_\_\_\_\_\_\_\_\_\_\_\_ of a wavefront as the wavefront passes between two substances (\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_) which the speed of the wave differs
  + Like when it looks like a straw is bent in water
* Interference:
  + The combination of \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ waves of the same \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ that results in a \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ wave
  + Two types:\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
* Constructive
  + Any interference in which waves \_\_\_\_\_\_\_\_\_\_\_\_\_\_ so that the resulting wave is \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
  + Constructive interference \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_



* Destructive Interference
  + Any interference in which waves \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ so that the resulting wave is \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ than the largest of the original waves. (may \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ completely)
  + Destructive interference \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_



* Waves also can interfere in another way. Suppose you send a wave down a rope tied at the end. The wave is reflected from the wall and travels back along the rope. If you keep doing this, the wave traveling forward will \_\_\_\_\_\_\_\_\_ with those traveling back
* \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ can form when a wave is reflected at the boundary of a \_\_\_\_\_\_\_\_\_\_
* Interference of the \_\_\_\_\_\_\_\_\_\_\_\_\_\_ wave causes the medium to \_\_\_\_\_\_\_\_\_\_\_\_\_ in a stationary pattern that resembles \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
* \_\_\_\_\_\_\_\_\_\_=points with \_\_\_\_\_\_\_\_ vibration; This is the point of complete \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ interference
* \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_=points of \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ vibration;

This is the point of complete

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ Interference