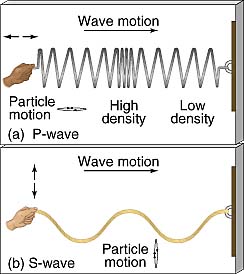
Guided Notes: Waves

Types of Waves

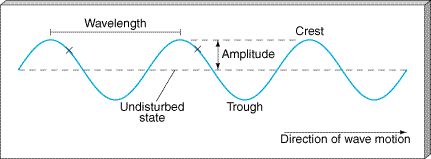
* \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ wave: oscillations are in the direction of motion (parallel to the motion)
  + Examples: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
* \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ Wave: oscillations are perpendicular to the direction of motion
  + Examples: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
* 

Wave Parameters

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ (l) length or size of one oscillation

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ (A) strength of disturbance (intensity)

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ (f) repetition / how often they occur per second



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

* Waves combine without any phase difference
* When they oscillate together (“in phase”)

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

* Waves combine differing by multiples of 1/2 wavelength

BEHAVIORS OF WAVES

4 Ways that waves interact

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_**: When a wave hits a surface through which it cannot pass, it bounces back.**

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_**: Is the bending of a wave as it moves from one medium into another medium at an angle, it changes speed as it enters the second medium, which causes it to bend**

* \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ Occurs when waves pass through a given point or medium.

*example: Sound waves transmitted thru solids, liquids and gases.* Radio waves are transmitted through one electron through another.

* **Light waves are transmitted – 3 ways light and matter can pass through material.**

A. **Transparent material**: Only a small amount of light is reflected or absorbed (may be clear or colored material such as filters, windows).

**B. Opaque material**: allows no light waves to be transmitted through them.

C. **Translucent materials**: Transmit some light, but cause it to be scattered so no clear image is seen.

4. \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

**Occurs when the energy is not transferred through or reflected by the given medium**

* Disappearance of an electromagnetic wave into a medium.
  + Opposite of reflection
* We see colors because of the selective absorption of visible light.
  + Objects absorb certain wavelengths and we see what is leftover.
  + The colors we see depend on the wavelength absorbed.

Electromagnetic Spectrum

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ ***waves*** are used to transmit radio and television signals. Radio waves have wavelengths that range from less than a centimeter to tens or even hundreds of meters.

* + \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ **wavelength**, \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ **frequency** and \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ **amount of energy**.
  + They travel long distances by reflecting their signals off Earth’s atmosphere or off satellites.

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ – shorter wavelengths, higher frequencies, and more energy than radio waves.

* + Cell phones and radar are two uses of microwaves.

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ ***Light*** - is the region of the electromagnetic spectrum that extends from the visible region to about one millimeter (in wavelength). **Infrared waves include thermal radiation.**

* + Associated with heat

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ ***Light*** – The range of EM waves that can be detected by the human eye.

* + \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ **wavelength is of visible light is** \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ **.**
  + \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ **wavelength of visible light is** \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ **.**
* The color we see is determined by the way the light interacts with the object.
  + How it is reflected and how it is transmitted.
* 400 – 700 nm (nanometers)

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ ***Light*** (UV)- Higher frequency than visible light and carry more energy.

* + Can damage or kill living cells
  + Tan skin by the sun or tanning bed

***\_\_***\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ - high energy waves which have great penetrating power and are used extensively in medical applications and in inspecting welds. The wavelength range is from about ten billionths of a meter to about 10 trillionths of a meter.

* + Short wavelengths and high frequencies allow them to travel through skin, but not bone (more dense)

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ ***Rays*** – \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ **waves**, with the \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ **frequency** (and highest energy).

* + They are more penetrating than X-rays
  + Can \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ living cells
  + Used to sterilize medical equipment

