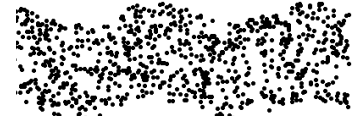


❖ Waves

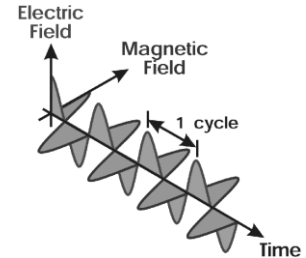
- \_\_\_\_\_ that move through an empty space or through medium (material)
- \_\_\_\_\_ without transferring matter.
- Particles of medium \_\_\_\_\_.

❖ Two Major Classes of Waves

- \_\_\_\_\_:
  - Caused by a disturbed medium and move by \_\_\_\_\_.
  - A medium is matter particles like gas (ex. air), liquid (ex. Water), and solid (ex. earth)
- \_\_\_\_\_:
  - \_\_\_\_\_ (no medium)
  - Created by moving electrons
  - Ex. radio waves, microwaves, light
- In order to start and transmit a wave, a source of disturbance (vibration) and a disturbed medium are required.
  - Mechanical caused by vibrating \_\_\_\_\_.
  - Electromagnetic by vibrating \_\_\_\_\_.



Mechanical Wave



Electromagnetic Wave

❖ \_\_\_\_\_:

- A decrease in the amplitude of a wave
- Caused by energy loss or the spreading out of the wave over a larger area.

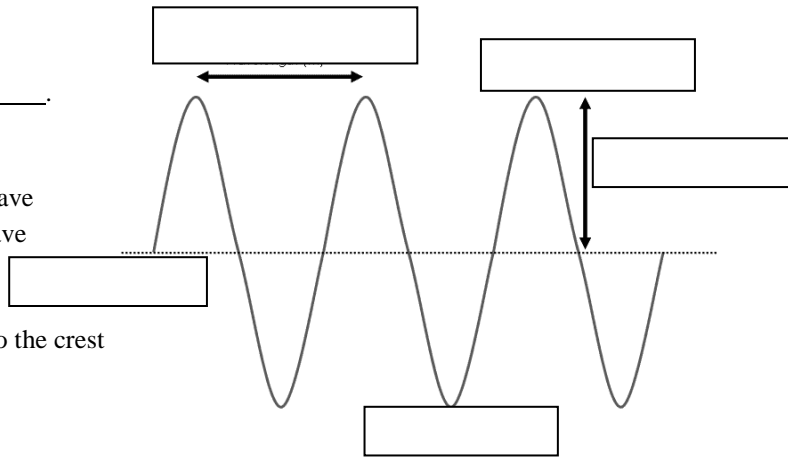
❖ \_\_\_\_\_ is a single wave disturbance

❖ \_\_\_\_\_ (continuous wave) - is a series of pulses at intervals

*Types of Mechanical Waves*

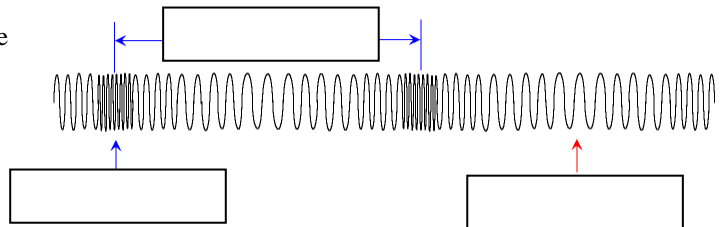
❖ \_\_\_\_\_:

- Wave particles move \_\_\_\_\_.
- Example: vibrating string of a musical instrument
- Parts of a Transverse Wave:
  - \_\_\_\_\_ - highest point on a transverse wave
  - \_\_\_\_\_ - lowest point on a transverse wave
  - \_\_\_\_\_ - center around which simple harmonic motion occurs
  - \_\_\_\_\_ - from the equilibrium position to the crest or trough



❖ \_\_\_\_\_:

- Particles vibrate \_\_\_\_\_ to the direction the wave travels
- Example: sound wave
- Parts:
  - \_\_\_\_\_ - point where the particles are closest together
  - \_\_\_\_\_ - point where the particles are furthest apart



### Relationship between Wavelength, Frequency and Wave Speed

- ❖ \_\_\_\_\_ (**v**) - speed of the wave; **unit: m/s**  
(meter/second)
- ❖ \_\_\_\_\_ (**f**) - vibrations per second of the wave; **unit: Hz (hertz)**
- ❖ \_\_\_\_\_ ( **$\lambda$** ) - length of one wave pulse; **unit: m (meter)**
  
- ❖ Relationship between frequency and wavelength.
  - Wavelength and frequency are inversely related
  - As frequency goes up the wavelength gets shorter (assuming no change in velocity)
  
- ❖ \_\_\_\_\_ (**T**) – seconds for one cycle (unit s)
- ❖ \_\_\_\_\_ (**f**) – cycles for one second (unit Hz)

1.
2.
3.

*Example 1:* The frequency of a wave is 560 Hz. What is its period?

*Example 4:* A distance of 0.33 m separates a wave crest from the adjacent trough, and the vertical distance from the top of a crest to the bottom of a trough is 0.24m.

- a) What is the wavelength?
- b) What is the amplitude?

*Example 2:* A girl floats in the ocean and watches 12 wave crests pass her in 46 s.

Calculate the wave:

- a) frequency
- b) period

*Example 5:* What is the speed of a 256 Hz sound with a wavelength of 1.35 m?

*Example 3:* The period of a wave is 0.044s. How many cycles will the energy source make in 22s?

*Example 6:* You dip your finger into a pan of water 14 times in 11s, producing wave crests separated by 0.16 m.

- a. What is the frequency?
- b. What is the period?
- c. What is the velocity?

