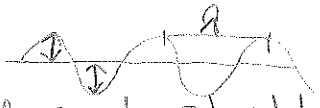
Topic 6B: Wave Vocabulary, Phases and Classification

Skill 48: Wave Vocabulary and descriptions

Waves transfer energy without transferring mass
- a single disturbance is known as a pulse
- a repeated disturbance at regular intervals is known as a periodic wave

Periodic waves are described by:

- Amplitude: disturbance from equilibrium point, 
  Part of any equations but refers to loudness of a sound or height of a water wave. Associated with energy of mechanical waves (ones that NEED a MEDIUM)
- Wavelength (λ) - distance between repeated points on a wave (ie 2 crests, or 2 troughs)
  $\lambda = \frac{\text{meters}}{\text{cycle}}$
- frequency (f) - number of repeated cycles in a second $f = \frac{\text{cycles}}{\text{second}}$
- Period (T) - number of seconds to complete a wave cycle $T = \frac{\text{seconds}}{\text{cycle}}$

$T = 1/f$ $f = 1/T$

Period is inverse of frequency

- Speed of a wave - rate of travel for wave energy
  $v = \frac{\text{distance}}{\text{time}}$ for waves d related to λ (wavelength)
  t related to f (frequency) or T (period)

($f = v/\lambda$ frequency & wavelength are inversely related)

$v = \lambda f = \frac{\text{meters}}{\text{cycle}} \times \frac{\text{cycles}}{\text{second}} = \frac{\text{meters}}{\text{second}}$ OR $v = \frac{\lambda}{T} = \frac{\frac{\text{meters}}{\text{cycle}}}{\frac{\text{seconds}}{\text{cycle}}} = \frac{\text{meters}}{\text{second}}$

Skill 49: Describing waves by particle vibration and phase

Waves are categorized by type of formation & propogation:
- Mechanical - requiring a medium (matter) to propogate (travel)
- Electromagnetic - able to travel through a vacuum or selective medium

Waves are also categorized by the way particles vibrate in comparison to energy
- Transverse - particles vibrate perpendicular to direction of energy
  ↕ particles ⟷ energy 
- Longitudinal - particles vibrate parallel to direction of energy
  ⟷ particles ⟷ energy

Vibrations can be considered a 360° cycle about the equilibrium point
This cycle can be broken down into 4 parts each representing 90°
(Easiest to represent transverse)

$1\lambda = 360°$ $\frac{1}{2}\lambda = 180°$ $\frac{1}{4}\lambda = 90°$

If the wave is moving left
particles 0 to 90° are displaced upwards
90° to 270° are displaced downwards
270° to 360° are displaced upwards

Two points that are experiencing the same motion are in phase
1λ or 360° apart or a multiple