Waves

Waves

- Properties
  - Frequency
    - How often something occurs
      - The number of crests or troughs that pass a given point in a given amount of time
    - Variable: f
    - Unit: Hertz (Hz)

Waves

$$f = \frac{1}{T} \qquad T = \frac{1}{f}$$

- Properties
  - Period
    - Amount of time needed to complete one cycle
    - Variable: T
    - Unit: Seconds (s)
  - Frequency and period have an inverse relationship
    - As one goes up, the other goes down

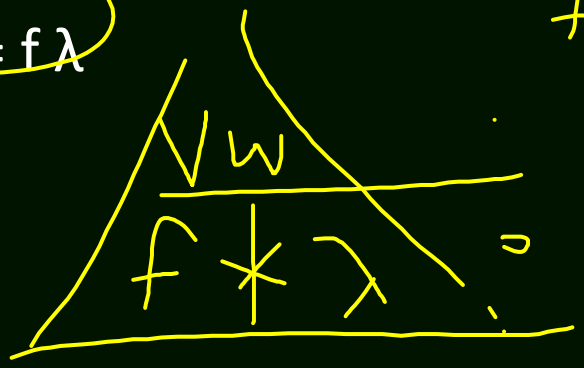
Waves

- Properties
  - Wavelength
    - Distance from one point on the wave to the next like point on the wave
      - Ex. Crest to crest or trough to trough
    - Variable: λ (Greek lowercase lambda)
    - Unit: Meters (m)

Waves

$v = \frac{d}{t}$ $v_w = \frac{\lambda}{T}$

- Properties
  - Wave Velocity
    - How far a wave travels in a given amount of time
    - Variable: v_w
    - Unit: Meters per Second (m/s)
    - Formula: $v_w = f\lambda$



$f = \frac{v_w}{\lambda}$

$\lambda = \frac{v_w}{f}$

Waves

v_w

1. What is the velocity of a wave with a frequency of 200Hz and a length of 0.25m? f λ

$$v_w = f\lambda = (200\,Hz)(0.25\,m)$$

$$v_w = 50\,m/s$$

Waves

2. What is the frequency of a 2.5m wave traveling at 50m/s?

$$f = \frac{V_w}{\lambda} = \frac{50\,m/s}{2.5\,m}$$

$$f = 20\,Hz$$

Waves

3. What is the wavelength of a wave traveling at 350m/s with a frequency of 125Hz?

v_w f λ

$$\lambda = \frac{v_w}{f} = \frac{350\ m/s}{125\ Hz}$$

$$\lambda = 2.8\ m$$