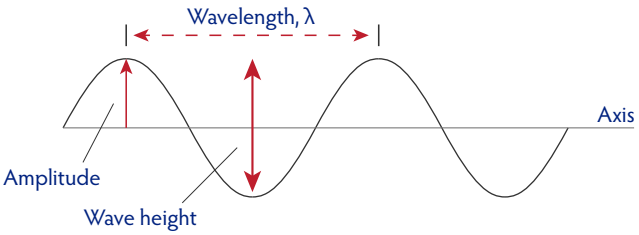
Waves

Definitions



- *Amplitude* - The distance from the axis to the top of a peak or bottom of a trough.
- *Axis* - The vertical midpoint of the wave; the direction along which the wave moves.
- *Frequency (ν or f)* - The number of waves that pass a point in a second. (The ν symbol is the Greek "nu," not a Roman "v.") Frequency is measured in waves per second, called "*Hertz*" (Hz).
- *Period (T)* - The time between adjacent waves, measured in seconds.
- *Waveheight* - The vertical distance between the bottom of the troughs and the top of the peaks. This is equal to twice the amplitude.
- *Wavelength (λ)* - The distance between adjacent waves. Usually measured in meters.

Numbers

Speed of sound = 343 m/s (in air at 20°C and 1 atmosphere)

Speed of light, c = 300,000 km/s = 3×10^8 m/s (near enough, anyway)

Equations

Basics

$$f = \frac{\text{waves}}{\text{seconds}}$$

$$v = \lambda f$$

v *- velocity, m/s;* ***λ*** *- wavelength, m;* ***f*** *- frequency, Hz*

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

T *- Period, s;* ***f*** *- frequency, Hz*

$$\lambda = v T$$

λ *- wavelength, m;* ***v*** *- velocity, m/s;* ***T*** *- Period, s;*

Doppler Effect

Full version

$$f_o = \frac{v + v_o}{v - v_s} f$$

f_o - *Observed frequency, Hz;* f - *Actual frequency, Hz*
v - *velocity of waves, m/s (i.e., speed of sound or light)*
v_s - *Velocity of source, m/s; Negative if source moves away from observer*
v_o - *Velocity of observer, m/s; Negative if observer moves away from source*

Observer Stationary

$$f_o = \frac{v}{v - v_s} f$$

f_o - *Observed frequency, Hz;* f - *Actual frequency, Hz*
v - *velocity of waves, m/s (i.e., speed of sound or light)*
v_s - *Velocity of source, m/s; Negative if source moves away from observer*