Properties of Light

- Transmits energy through space
- Travels at a finite speed \(3 \times 10^8 \text{ m/s}\)
- Exhibits refraction: A change in direction upon entering a new medium.
- Different colors of light refract by different amounts: White light separates into a rainbow, or continuous spectrum of colors.
- Reflects off of smooth, shiny surfaces.
  - Angle of incidence = angle of reflection.
- Diffractions when sent through small openings.
Some Wave Terminology

For any oscillatory motion (e.g., pendulum):

- **Period**: The length of time it takes for 1 complete oscillation. [seconds]
- **Frequency**: The number of oscillations per time interval. $f \equiv \frac{1}{T}$ [Hz]

In addition:

For waves:

- **Velocity**: The speed with which a wave propagates through a medium. Set by the property of the medium, not the wave. $v \equiv \frac{\lambda}{T}$
- **Wavelength**: The distance between 2 successive, identical parts of waves. [m]

**Diffraction**: The change of direction of a wave as it passes through an opening or around a barrier.

*Note*: Opening size must be close to λ to see diffraction effects.

- When a plane wave strikes a barrier with a small opening, a (semi-)circular wave is produced due to diffraction effect.

Kinds of waves:

- **Transverse**: The type of wave that results when the motion of the medium is at right angles to the direction of propagation of the wave. Water waves.
- **Longitudinal**: The type of wave that results when the motion of the medium is along the direction of wave propagation. Sound.