OPTICS & LIGHT SUMMARY

Reflection & Refraction

- **Law of Reflection** $\theta i = \theta r$
- **Refractive Index** $n = c / v$

$$n_1 \sin \theta_1 = n_2 \sin \theta_2$$

Snell's Law: Describes how light bends when passing between media.

Mirrors

- **Plane** Virtual, upright, same size
- **Concave** Converging (Real/Virtual)
- **Convex** Diverging (Virtual only)

$$1/f = 1/do + 1/di$$

Lenses

- **Convex** Converging (Positive f)
- **Concave** Diverging (Negative f)
- **Magnification** $m = -di / do$

$$P = 1 / f \text{ (Diopters)}$$

Wave Properties

- **Speed of Light** 3.00×10^8 m/s
- **Visible Spectrum** 400nm - 700nm
- **Photon Energy** $E = hf$

$$v = f \times \lambda$$

Total Internal Reflection

Occurs when $\theta i > \theta c$ moving from high to low refractive index.

$$\sin \theta c = n_2 / n_1$$

Key Constants

- h (Planck's) = 6.626×10^{-34} J·s

- n (Air) ≈ 1.00
- n (Water) ≈ 1.33
- n (Glass) ≈ 1.50