

Matter

Density: $d = \frac{m}{V}$

$$\text{density} = \frac{\text{mass}}{\text{volume}}$$

Force and Motion

Average Speed: $s = \frac{d}{t}$

$$\text{speed} = \frac{\text{distance}}{\text{time}}$$

Newton's Second Law: $F = ma$

$$\text{force} = \text{mass} \times \text{acceleration}$$

Kinetic Energy: $KE = \frac{1}{2}mv^2$

$$\text{kinetic energy} = \frac{1}{2} \text{mass} \times \text{velocity squared}$$

Waves and Light

Wave Speed: $v = f\lambda$

$$\text{wave speed} = \text{frequency} \times \text{wavelength}$$

Wave Energy: $E \propto A^2$

$$\text{energy is proportional to amplitude squared}$$

Units, Constants, and Conversions

Energy: 1 Joule = 1 Newton • meter

Length: 1 m = 100 cm
1 km = 1000 m

Force: 1 Newton = 1 $\frac{\text{kilogram} \cdot \text{meter}}{\text{second squared}}$

Mass: 1 kg = 1000 g

Hertz: 1 Hz = 1 $\frac{\text{cycle}}{\text{second}}$

Volume: 1 L = 1000 mL = 1000 cm³

Acceleration Due to Gravity: $g = 9.8 \frac{\text{m}}{\text{s}^2}$

Water at Room Temperature: 1 mL = 1 cm³ = 1 g