

# Shell Tutorial Center

## Momentum

$$\vec{p} = m\vec{v} \left( \text{kg} \cdot \frac{\text{m}}{\text{s}} \right)$$

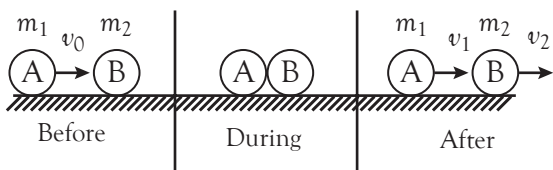
$$\vec{I} = \vec{F} \cdot t$$

$$\vec{p} = \vec{I}$$

$$\frac{d\vec{p}}{dt} = \vec{F}$$

## Collisions

**Elastic collisions** are those in **both** total momentum and kinetic energy is conserved.

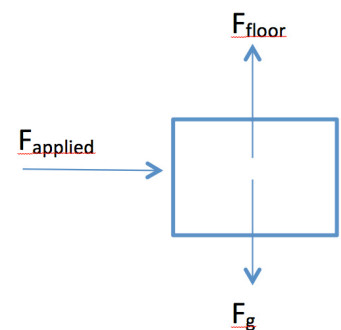
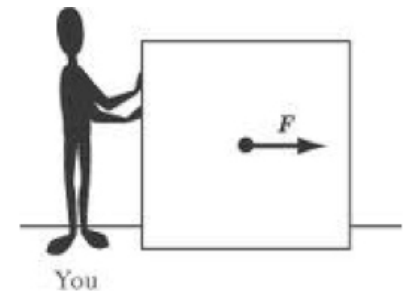
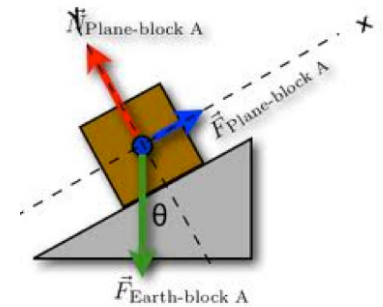
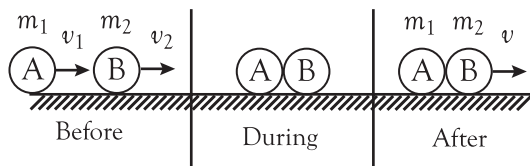


$$m_1 v_0 = m_1 v_1 + m_2 v_2$$

$$\frac{1}{2} m_1 v_0^2 = \frac{1}{2} m_1 v_1^2 + \frac{1}{2} m_2 v_2^2$$

Solving these equations gives:  $v_1 = \frac{m_1 - m_2}{m_1 + m_2} v_0$  and  $v_2 = \frac{2m_1}{m_1 + m_2} v_0$

**Inelastic collisions** are those in which bodies stick together after the collision and **only** momentum will be conserved.



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