Chapter 3 - Momentum & Angular Momentum

Recall: $\vec{p} = m\vec{v}$ $\quad \Sigma \vec{F}_n = \dot{\vec{p}}$

$$\mathbb{P} = \vec{p}_1 + \vec{p}_2 + \vec{p}_3 \cdots = \Sigma \vec{p}_n$$

$$\dot{\vec{\mathbb{P}}} = \vec{F}_{ext}$$

If $\vec{F}_{ext} = 0$

$$\dot{\vec{\mathbb{P}}} = 0$$

$$\mathbb{P}_i = \mathbb{P}_f$$ Conservation of Momentum

If two objects,

$$\vec{p}_{1i} + \vec{p}_{2i} = \vec{p}_{1f} + \vec{p}_{2f}$$

really 2 equations

$$m_1\vec{v}_{1i} + m_2\vec{v}_{2i} = m_1\vec{v}_{1f} + m_2\vec{v}_{2f}$$

If collision is perfectly inelastic

↳ stick together

then,

$$m_1\vec{v}_{1i} + m_2\vec{v}_{2i} = m_1\vec{v}_f + m_2\vec{v}_f$$

$$= (m_1 + m_2)\vec{v}_f$$

mass add up!

$$\vec{v}_f = \frac{m_1\vec{v}_{1i} + m_2\vec{v}_{2i}}{m_1 + m_2}$$ ✓ ← two equations!