

Momentum

Physics

Conservation of momentum, and how impulse relates to it.

Total momentum before a collision equals total momentum after, in a closed system.

$$\mathbf{p} = m\mathbf{v} \cdot \text{impulse} = F\Delta t = \Delta \mathbf{p}$$

Elastic collision Momentum AND kinetic energy conserved

Inelastic collision

To heat, sound, deformation.

Momentum conserved, KE lost

Perfectly inelastic

Maximum KE loss.

Objects move together afterwards

THE COMMON MISTAKE

✗ **Assuming kinetic energy is conserved**

✓ **Only momentum is, in general**

Only perfectly elastic collisions conserve kinetic energy. Most real collisions are inelastic.

Momentum is a vector. In two dimensions, conserve it separately in each direction.