

Chapter 6

Momentum and Collisions

Linear Momentum p (lower case) $p=mv$ $\text{kg}\cdot\text{m/s}$ not special unit

change in momentum $\Delta p=m(v_f-v_i)$ is equal is impulse $F\cdot t$ in units $\text{N}\cdot\text{s}$

so $\Delta p=m(v_f-v_i)=F\cdot t$

Collisions classified as

- elastic (two masses remain separate after collision/contact) or

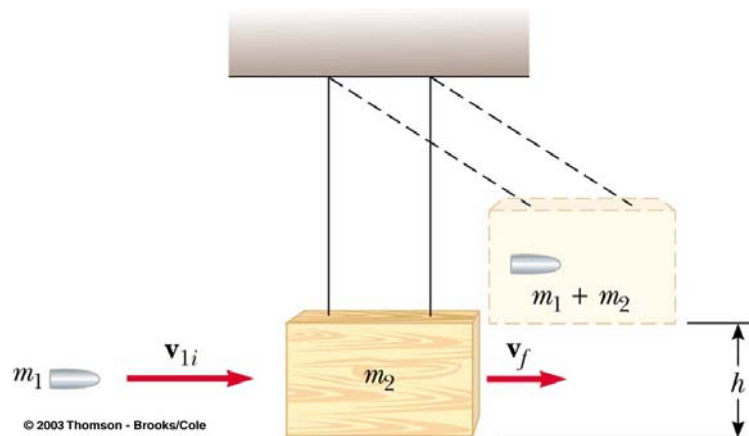
$$m_1v_{1i}+m_2v_{2i}=m_1v_{1f}+m_2v_{2f}$$

- inelastic (two masses hook together after collision/contact and move together with same v_f)

$$m_1v_{1i}+m_2v_{2i}=(m_1+m_2)v_{1,2f}$$

this is because momentum is conserved.

Classic physics problem is a ballistic pendulum which uses conservation of energy and momentum.



first use, $\frac{1}{2}mv_f^2=mgh$

then, $m_1v_{1i}=(m_1+m_2)v_f$

other application: rocket propulsion (model rockets)

$F\cdot t=m(v_f)$, since $v_i=0$

