

Newton's Laws of motion

1. An object will remain in a state of rest or constant velocity unless acted upon by an external force

2. The net force acting on an object is proportional to the rate of change of momentum and is in the same direction

$$F = \frac{\Delta p}{\Delta t} = \frac{\Delta mv}{\Delta t} = m \frac{\Delta v}{\Delta t} = ma$$

3. When two objects interact they exert equal and opposite forces on each other



$$F_A = -F_B$$

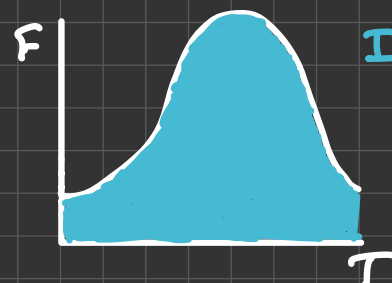
conditions:

- must act on different objects
- two forces of the same type
- equal in size but act in opposite directions

Impulse: the average net force acting on an object multiplied by the time it acts on it.

$$F = \frac{\Delta p}{\Delta t} \rightarrow F \Delta t = \Delta p$$

$$\text{Impulse} = \Delta p \\ = p_2 - p_1$$



Impulse = area under FT graph

Chapter 7 Laws of motion and momentum

Momentum

$$p = mv \text{ (kg ms}^{-1}\text{)}$$

principle of conservation of momentum:

The total momentum in a system remains unchanged unless there is an external force acting on it.

Perfectly elastic collision:

- **KE is conserved**
- Momentum is conserved

Perfectly inelastic collision:

- Momentum is conserved.