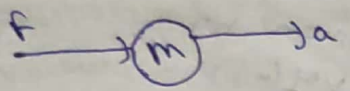


# Force & Laws of motion

→ Force →

→ It is an external effort in the form of pull or push to change the state of a object either in state of motion or state of rest or change the direction of moving object or change the shape & size. It doesn't mean we get an object by applying force.  
So force try to change or tend to change state of motion or direction of moving body.

→ Any external effort in the form of pull or push that change or tend to change the state of motion or dimension of body.

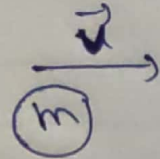
→   $\vec{F} = m\vec{a} = \text{kg m/s}^2 = \text{N} \rightarrow \text{S.I.}$   
 $\text{g m cm/s}^2 \rightarrow \text{dyne}$

$1\text{N} = 10^5 \text{ dyne.}$

→ Force is a vector quantity.

→ Gravitational unit → kgf or kgt = 9.8 N  
gf or gwt. = 980 dyne

→ Momentum → (p)

$\vec{p} = m\vec{v} = \text{kg m/s.}$  

→ It is the product of mass & velocity of a body.

→ Bulldozer & Bullet example.

Inertia →

→ If a body is at rest so it doesn't come into motion by itself.

→ Similarly in case of ~~rest~~ motion.

- It is the ability of body to remain in state of rest or state of motion.
- It is the inability of a body to ~~remain~~ <sup>change the</sup> ~~in the~~ state of motion by itself, or state of rest.
- depends on mass.

or

(2 kg)

(10 kg)

(Inertia more)  
or more free  
reference.

- Inertia of rest → Rest → Rest
- " of motion → motion → motion
- " of direction → direction → direction
- just from door mat, leaves fall from tree etc.

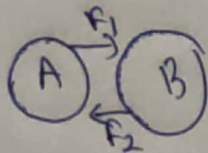
### Newton's laws of motion

#### 1st law - (Law of inertia)

- Every body continues to be in state of rest or of uniform motion in a straight line unless a unbalanced external force is applied on it.

#### 3rd law

- Every action has an equal & opposite reaction.



$F_1 = F_2$  only direction opposite.

- Rocket propulsion.

#### 2nd law -

- The rate of change of momentum is directly proportional to force & is in the direction of force.