

# Primary Concept of Force and

## Energy

### Concept of rest & motion

①

Class VI  
24/9/20

Stationary objects → The objects which do not change their positions with time are called stationary objects or the objects in resting condition.

Ex. → Houses, trees, fields etc.

Moving objects → The objects those change their positions with time are called moving objects or objects in motion.

Ex → Running train/bus, flying birds, floating of clouds, grazing of cow, playing of boys etc.

### Rest and motion are relative

A body seems to be at rest with respect to one fixed object but the same body may appear to be in motion with respect to some other fixed object. So, rest and motion are relative terms.



## Example

In a moving train, a passenger finds his co-passengers at rest, but to an observer standing on a railway platform the same passengers appear to be in motion since the train carrying them moves away from the person standing on the platform.

## Concept of force and its unit

Force → A force is that which acting on a body actually changes the state of rest or uniform motion of the body.

It is the cause due to which an object at rest can be in motion, a moving object can be at rest (zero velocity), direction of a moving object can be changed, velocity can increase or decrease and shape or volume of an object can also be changed.



216929587


 পশ্চিমবঙ্গ উচ্চ মাধ্যমিক শিক্ষা সংসদ  
 WEST BENGAL COUNCIL OF HIGHER SECONDARY EDUCATION

উচ্চমাধ্যমিক/একাদশ শ্রেণির বার্ষিক পরীক্ষা ২০১.....

Higher Secondary/Class XI Annual Examination 201.....

বিষয় / Subject

রেজিস্ট্রেশন নম্বর / Registration No.

--	--	--	--	--	--	--	--	--	--

বর্ষসহ (প্রয়োজনে) / With Year (if any)

--	--	--	--	--	--	--	--

Force with touch → Pushing or pulling

Ex → kicking a football, opening a door, displacing a chair, closing a drawer, cutting bread by a knife, lifting water from a well, stretching of a rubber band etc.

Force without touch

- (i) Magnetic force
- (ii) Gravitational force.

Magnetic force :

A magnet can attract iron, cobalt, nickel, an other magnet etc.

- a) When a magnet attracts an iron nail, called as magnetic force of attraction.
- b) When a magnet repels an other magnet called as magnetic force of repulsion.



## Gravitational force :

The force of attraction between any two objects in the universe is generally called gravitation.

The force of attraction between the earth and anybody i.e. the earth's gravitation is called gravity.

Weight of a body is the total force with which the earth attracts the body towards its centre.

Force = mass  $\times$  acceleration

$$F = m \times a$$

Unit of force is Newton (N)

$$F = m \times a$$

$$1 \text{ N} = 1 \text{ kg} \times \frac{1 \text{ m}}{\text{s}^2} = \text{kg} \frac{\text{m}}{\text{s}^2}$$

$\therefore$  SI unit of Force is (i) Newton

$$(ii) \text{ kg} \times \frac{\text{m}}{\text{s}^2}$$

C. G. S. unit of force is dyne.

$$F = m \times a$$

$$1 \text{ dyne} = 1 \text{ gram} \times \frac{\text{cm}}{\text{s}^2} = \text{gram} \times \frac{\text{cm}}{\text{s}^2}$$



∴ C.G.S. unit of Force is

(i) dyne

(ii) gram  $\times \frac{\text{cm}}{\text{s}^2}$

As the weight of the body is obtained by a kind of force, so its S.I. unit will also be called as Newton (N).

$$1 \text{ Newton } = 10^5 \text{ dyne }$$

Acceleration (a) → It is the rate of change of velocity with time.

$$\text{Acceleration} = \frac{\text{velocity}}{\text{Time}} = \frac{\text{metre/second}}{\text{Second}}$$

$$\text{Acceleration (a)} = \frac{\text{m}}{\text{s}^2}$$

Acceleration due to gravity is 'g'.

$$\underline{g} = \underline{9.816 \text{ m/s}^2}$$