



STEPPING STONE SCHOOL (HIGH)

CLASS – IX

PHYSICS

WORKSHEET- 11

Date – 17/06/2020, (Day- 11)

Chapter- LAWS OF MOTION (Pt. II)

Topic- Newton's First Law of Motion and Inertia

Time limit: 30 minutes.

Please read the notes carefully and on the basis of it copy down the questions and solve them on a sheet of paper date wise. Keep the worksheet ready in a file to be submitted on the opening day.

Introduction:

Generally a force is to be applied on an object to produce motion in it. Even it is said that no force is needed to continue the motion of a moving body. If a body is set in motion, it will remain in motion even when the force applied to set the body in motion is withdrawn provided that there is no other force such as friction etc. to oppose the motion.

Thus,

- (i) if a body is at rest, it remains at rest unless a force is applied on it.
- (ii) if a body is moving it will continue to move with the same speed in the same direction unless a force is applied on it.

Newton's First Law of motion:

According to Newton's first law of motion. If a body is in a state of rest, it will remain in the state of rest and if it is in the state of motion, it will remain moving in the same direction with the same speed unless an external force is applied on it.

Qualitative discussion:

(i) Definition of inertia-

The property of an object by virtue of which it tends to retain its state of rest or of motion, is called inertia.

E.g. a book lying on a table top will remain at its place unless it is displaced.

(ii) Definition of force-

Force is that external cause that tends to change the state of rest or the state of motion of an object.

Force is a vector quantity

E.g. a book lying on a table gets displaced from its place when it is pushed.

Inertia and its types:

Greater the mass, greater the inertia of the body.

Inertia are of two types:

(i) Inertia of rest-

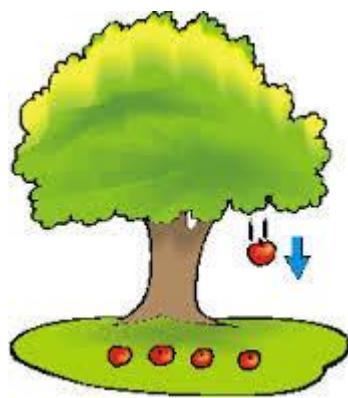
If a body is at rest, it will remain at rest unless an external force is applied to change its state of rest.

E.g. (a) When a bus suddenly starts moving forward, the passenger standing in the bus tends to fall backwards.



Passengers experience a backward push due to inertia of rest.

(b) On shaking the branches of a tree, the fruits fall down.



(ii) Inertia of motion-

A body in a state of motion continues to be in the state of motion with the same speed in the same direction in a straight line unless an external force is applied to change its state.

E.g. (a) An athlete often runs before taking a long jump.



(b) a cyclist riding along a level road does not come to rest immediately after he stops pedalling.



Exercise:

Answer the following questions:

1. Name the physical quantity which causes motion in a body.
2. A ball moving on a table top eventually stops. Explain
3. Name the factor on which inertia of body depends and state how it depends on the factor stated by you
4. Give qualitative definition of force on the basis of Newton's first law of motion.
5. Two equal and opposite forces act on a stationary body. Will the body move? Give reason

6. Give reasons:

- (i) Dust particles are removed from a carpet by beating it
- (ii) People often shake branches of a tree for getting down its fruits

Please tap on the hyperlink below to watch the video content of the topic Newton's first law of motion and inertia

<https://www.youtube.com/watch?v=erghLWXDScl>

[https://www.youtube.com/watch?v= HFgDBIP_Gg](https://www.youtube.com/watch?v=HFgDBIP_Gg)