Revision Notes for Class 8 Science

Chapter 8 – Force and Pressure

Definition of Force:

- Force is defined as a push or a pull on an object, which changes or tends to change the state of rest or uniform motion of the object.
- It may lead to a change in the direction or shape of the object.
- Some of the cases which involve force are simple actions like opening a pencil box/lunch box, kicking a football, lifting a box, pushing a chair etc.
- In all these cases, a push or pull is being exerted on the object to change its state of motion. Like the closed pencil box is being opened, the football moves on kicking etc.

Unit of force: Force is represented in the SI units as Newton.

Effects of Force:

1. A force is a result of the interaction between two objects. If we consider football, then it will not move unless a person kicks it. So, it is an interaction between the person and the football which creates a force that results in its movement.

2. A force has strength which is known as magnitude as well as direction. The magnitude of the applied force can be large, small or it can also be equal. The force can be applied in the same or opposite direction to each other. These change the effect of the force on the object. It is easy to push a heavy object in the same direction by two people instead of two people pushing it in opposite directions to move it.

3. A force may bring about a change in the speed or the direction of motion or both of an object. This implies that the object has undergone a change in its state of motion. If we consider

a football being kicked by a player, then the kick sets the stationary ball into motion towards the direction in which it is being kicked. The amount of force exerted on the object decides the speed of the object.

4. A force that is acting on an object may tend to bring a change in its shape. The dough can be rolled into chapatis by applying force and rolling them.

5. A force can act on an object by being in contact with it or by not being in contact with it.

Types of Forces:

There are two types of forces based on whether the force acting on the object is by being in contact with it or not. Further, each of them can be subdivided according to the type of contact or non-contact force being applied.

1. Contact Forces: A force that acts on an object when it is in contact with the body is called a contact force. The point of application of force on the object is called the point of application of the force or the point of contact.

The contact forces can be categorised as follows:

- **Muscular Force:** A force that is exerted as the result of the action of the muscles in our body is termed a muscular force. We use the muscular force to carry out some of our bodily actions like breathing, digestion etc. The animals like buffalo, camels or horses use their muscular force to get activities done for us like ploughing, pulling, or carrying the load.

- **Frictional Force:** A frictional force is one that opposes the motion of an object and it always acts in the direction opposite to the motion of the object. This can be understood when a boat stops moving when we stop rowing. This is due to the frictional force between the boat and the water.

2. Non-Contact Forces: A force that does not involve any kind of physical contact between two objects on which they act is called a non-contact force.

The non-contact forces can be categorised as follows:

- **Magnetic Force:** A force exerted by a magnet on objects made of iron, steel, cobalt, or nickel without being in contact with them is termed a magnetic force.
- **Electrostatic Force:** A force that is exerted by a charged body on another charged or uncharged body is termed an electrostatic force. It may result in the repulsion of similar charges like if we bring two straws rubbed with paper [charged] near each other and attraction of opposite charges if we bring a charged straw near an uncharged straw.
- **Gravitational Force:** A force that is exerted by each and every object in the world on another object which is an attractive force, is termed as gravitational force.

Pressure:

1. The unit force that acts on the per unit area of a surface is called pressure. The relationship between pressure and force can be defined as,

$$Pressure = \frac{force}{area\ on\ which\ it\ acts}.$$

2. It is easy to push a nail into a wooden board with its pointed end instead of the head as the smaller area exerts a larger pressure for the same amount of force and the nail goes into the wood easily with one push.

3. The unit of measurement for pressure in the SI system, is Newton per square metre which is equal to 1 Pascal (Pa).

4. It is seen that fluids and gases also exert pressure like solids.

5. A solid generally exerts pressure in the downward direction only, which is mostly due to its weight.

6. On the contrary, liquids and gases exert pressure in all directions. It can be noted that when a water pipe leaks, you can see fountains of water coming in all directions. This is because the water exerts pressure on the wall of the pipes. Similarly, when a balloon has holes, the air escapes in all directions. So this shows that the liquids and gases exert pressure on the walls of their container.

Atmosphere:

1. The thick blanket of air that surrounds the earth above its surface is termed as atmosphere.

2. The pressure that is exerted by this column of air in the atmosphere is called atmospheric pressure. It is this pressure that allows a rubber sucker to stay attached to the surface.

3. We cannot feel this tremendous atmospheric pressure that surrounds us. This is so because the fluid pressure inside our bodies actually counterbalances the atmospheric pressure that surrounds us.