

## **Force**

A **force** is an interaction that, when unopposed, will change the motion of an object. A force can cause an object with mass to change its velocity (which includes beginning moving from rest i.e., to accelerate. Force can also be described intuitively as a push or a pull. A force has both magnitude and direction, making it a vector quantity. It is measured in the SI unit of velocity and represented by the symbol F.

Fundamentally force is divided into 4 types-

- 1. Gravitational force
- 2. Electromagnetic force
- 3. Strong nuclear force
- 4. Weak nuclear force

Some common forces as follows-

1. **Contact forces**- This force is applicable only when two bodies are in contact with each other. Both of the bodies exert a force on each other and such forces are-

Frictional force, Tension force, Spring force, Muscular force etc.

1. Frictional force- This force opposes the motion of an object over another object which is in contact with it.

2. **Elastic recoil-** It is the common and special property of solids, not found in liquid and gas, which resist the change in their shapes. You may have noticed it when you push a solid it pushes you back. The floor in which we walk pushes us upwards as our weight pushes us downwards, causing the change in shape of the floor.

3. **Tension**- This is also a type of elastic recoil force which results due to the stretching of a thing. You may have played tug of war in your school, the rope we use for this purpose when pulled from both the sides, pulls back on both the teams at the opposite ends. This pulling back is what we call tension.

4. **Buoyant force**:- whenever an object is submerged in a liquid it experiences an upward force which is what we call as buoyant force. A rock under water will feel lighter in comparison to the same rock in the air. If buoyancy is greater than weight, the object rises like for a cork under water. This happens because of buoyancy only.

5. **Normal force**- when the contact forces between the bodies are at the right angle to the surface in contact it is known as normal force. An example of such force is a book on the table where the table pushes the book upwards and the book pushes the table downwards. The table and the book are exerting the normal force in upwards and downwards direction on each other respectively.

6. **Viscous drag**- whenever an object moves through a liquid or gas, it experiences friction-like a force which retards the movement of the object. In order to reduce this viscous drag, the automobiles are streamlined, a boat needs an engine, a parachute is advised to a person falling from an airplane.

7- **Force exerted by a spring**- when the spring has neither been pushed or pulled, it is called its natural length. At natural length, a spring does not exert any force on the object attached to it. But if spring is pushed from one side, then it would exert force by pushing the object attached on the other side.

**Non- Contact forces-** The forces which come into play when the bodies are not in contact with each other. Such types of forces are as follows-

1. **Gravitational force**- Force of attraction exerted by the earth on a body is called gravitational force. An object always falls downwards when it falls freely from a height.

2. **Electrostatic force**- The force exerted by any type of a charged body.

3. Magnetic forces - This type of force is exerted by the magnets to attract or repel objects accordingly.

If all the net forces on the body become zero, this means the forces have been balanced. Balanced forces do not change the speed.

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