

Force and Pressure



Force

Force is a push or pull applied to an object. It can move, stop, change direction, or alter the shape of an object.

Formula: Force (F) = Mass (m) $\times$ Acceleration (a)

SI Unit: newton (N)

Force is a **Vector** Quantity (has both magnitude and direction).

Types of Forces

Contact Forces: These forces act when objects are in direct contact.

- ➔ **Muscular Force:** Applied using body muscles. (e.g., Lifting a bag)
- ➔ **Frictional Force:** Opposes motion between surfaces. (e.g., Brakes in vehicles)

Non-Contact Forces: These forces act without physical contact.

- ➔ **Gravitational Force:** The force of attraction between objects. (e.g., Falling of an apple)
- ➔ **Magnetic Force:** Force between magnets or magnetic materials. (e.g., Magnet attracting iron nails)
- ➔ **Electrostatic Force:** Force due to electric charges. (e.g., Rubbing a balloon on hair)

Effects of Force

- ➔ Force can **move or stop** an object.
- ➔ It can **change the speed or direction** of an object.
- ➔ Force can **change the shape or size** of an object. (e.g., Squeezing a rubber ball)

Pressure: Pressure is the amount of force applied on a surface per unit area.

Formula: Pressure (P) = $\frac{\text{Force (F)}}{\text{Area (A)}}$

SI Unit: pascal (Pa)

- ➔ Pressure is a **Scalar** Quantity (has only magnitude).

Example: *Sharp knives apply more pressure and cut easily.*

Liquids and gases exert pressure in all directions. Pressure increases with depth in liquids.
(e.g., Water pressure in dams)

Gases exert pressure due to the movement and collision of particles.

Atmospheric Pressure: It is the pressure exerted by the air around us. It is caused by the weight of air above us.

At higher altitudes, the atmospheric pressure decreases, making it harder to breathe.

Example: *Drinking with a straw.*

