BEST Learning Centre
Joining us to write your Own Success Story

FORCE AND MOTION

GENERAL SCIENCE

FORCE AND MOTION

INTRODUCTION

- In a common man's understanding of motion, a body needs a 'push' or 'pull' to move, or bring to rest or change its velocity. Hence, this '**push' or 'pull'** is called as 'force'.
- Let us define force in a more scientific manner using the **three laws** proposed by **Sir Isaac Newton.**

FORCE AND MOTION

- According to **Aristotle** a Greek Philosopher and Scientist, the natural state of earthly bodies is 'rest'.
- He stated that a moving body naturally comes to rest without any external influence of the force.

INERTIA

- The **inherent property** of a body to resist any change in its state of rest or the state of uniform motion, unless it is influenced upon by an external unbalanced force, is known as **'inertia'.**

Types of Inertia

a) Inertia of rest
b) Inertia of motion
c) Inertia of direction

NEWTON'S LAWS OF MOTION

Newton's First Law

- This law states that **everybody continues to be in its state of rest or the state of uniform motion along a straight line unless it is acted upon by some external force.**

NEWTON'S SECOND LAW OF MOTION

- According to this law, "**the force acting on a body is directly proportional to the rate of change of linear momentum of the body and the change in momentum takes place in the direction of the force**".

NEWTON'S THIRD LAW OF MOTION

- Newton's third law states that **'for every action, there is an equal and opposite reaction. They always act on two different bodies'.**
- If a body A applies a force FA on a body B, then the body B reacts with force FB on the body A, which is equal to FA in magnitude, but opposite in direction.

$$FB = -FA$$

MASS AND WEIGHT

- **Mass:** Mass is the basic property of a body. Mass of a body is defined as the quantity of matter contained in the body. Its SI unit is **kilogram** (kg).
- **Weight:** Weight of a body is defined as the **gravitational force** exerted on it due to the Earth's gravity alone.

APPARENT WEIGHT

- The weight that you feel to possess during **up and down motion** is not same as your actual weight. Apparent weight is the weight of the body acquired due to the action of gravity and other external forces acting on the body.

Application of Newton's law of gravitation

1. Dimensions of the heavenly bodies can be measured using the gravitation law. Mass of the Earth, radius of the Earth, acceleration due to gravity, etc. can be calculated with a higher accuracy.