



LAWS OF MOTION



Learning Objectives



At the end of this lesson students will be able to:

- ◆ Understand the concepts of force and motion.
- ◆ Explain inertia and its types.
- ◆ State the three laws of Newton.
- ◆ Apply Newtonian concept of force and motion.
- ◆ Define force, momentum and impulse.
- ◆ Distinguish between mass and weight
- ◆ Analyze weightlessness and the principle of conservation of momentum.
- ◆ Explain the law of gravitation and its applications.
- ◆ Understand the variations in 'g' due to height and depth.
- ◆ Solve numerical problems related to force and motion

INTRODUCTION

Human beings are so curious about things around them. Things around us are related to one another. Some bodies are at rest and some are in motion. Rest and motion are interrelated terms.

In the previous classes you have learnt about various types of motion such as linear motion, circular motion, oscillatory motion, and so on. So far, you have discussed the motion of bodies in terms of their displacement, velocity, and acceleration. In this unit, let us investigate the cause of motion.

When a body is at rest, starts moving, a question that arises in our mind is 'what causes the body to move?' Similarly, when a moving object comes to rest, you would like to know what brings it to rest? If a moving object speeds

up or slows down or changes its direction. what speeds up or slows down the body? What changes the direction of motion?

One answer for all the above questions is 'Force'. 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. These laws help you to understand the motion of a body and also to predict the future course of its motion, if you know the forces acting on it. Before Newton formulated his three laws of motion, a different perception about the force and motion of bodies prevailed. Let us first look at these ideas and then eventually learn about Newton's laws in this unit.

