

UNIT

1

MEASUREMENT

Learning Objectives



After completing this lesson, students will be able to

- understand the fundamental and derived quantities and their units.
- know the rules to be followed while expressing physical quantities in SI units.
- get familiar with the usage of scientific notations.
- know the characteristics of measuring instruments.
- use Vernier caliper and screw gauge for small measurements.
- find the weight of an object using a spring balance.
- know the importance of accurate measurements.

Introduction

Measurement is the basis of all important scientific study. It plays an important role in our daily life also. While finding your height, buying milk for your family, timing the race completed by your friend and so on, you need to make measurements. Measurement answers questions like, how long, how heavy and how fast? Measurement is about assigning a number to a characteristic of an object or event which can be compared with other objects or events. It is defined as the determination of the size or magnitude of a quantity. In this lesson you will learn about units of measurements and the characteristics of measuring instruments.

1.1 Physical Quantities and Units

1.1.1 Physical quantities

Physical quantity is a quantity that can be measured. Physical quantities can be classified into two: fundamental quantities and derived

quantities. Quantities which cannot be expressed in terms of any other physical quantities are called fundamental quantities. Example: Length, mass, time, temperature etc. Quantities which can be expressed in terms of fundamental quantities are called derived quantities. Example: Area, volume, density etc.

Physical quantities have a numerical value and a unit of measurement (say, 3 kilogram). Suppose you are buying 3 kilograms of vegetable in a shop. Here, 3 is the numerical value and kilogram is the unit. Let us study about units now.

1.1.2 Units

A unit is a standard quantity with which the unknown quantities are compared. It is defined as a specific magnitude of a physical quantity that has been adopted by law or convention. For example, feet is the unit for measuring length. That means, 10 feet is equal to 10 times the definite pre-determined length, called feet.