



Measurement

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Measurement is a technique in which the properties of an object are determined by comparing it with a standard quantity.

Types of Measurement

(a) **Measurement of Length:** Length is the distance between two points or places, it can be measured in meters (m), centimeters and kilometers.

$$\therefore 1 \text{ m} = 100 \text{ cm} = 100 \times 10 = 1000 \text{ mm}$$

$$\therefore 1 \text{ km} = 1000 \text{ meters} = 100000 \text{ cm} = 1000000 \text{ mm}$$

$$\text{Also, } 1 \text{ km} = (1000 \text{ m} \times 1000 \text{ mm}) = 1000000 \text{ mm}$$

Relation Between Different units of Lengths

The basic unit of length (metre)	Conversion fraction to other metric units	Simple length conversion units
1m	1000 millimetres	1 km = 1000 m
1m	100 centimetres	1 m = 100 cm
1m	10 decimetres	1 cm = 10 mm
1m	$\frac{1}{10}$ decametres	1 hm = 100 m
1m	$\frac{1}{100}$ hectometres	
1m	$\frac{1}{1000}$ kilometres	

Example: 8 decimeter is equal to

Sol: 8 decimeter = $\frac{8}{10000}$ km = 0.0008 km

(b) **Measurement of Mass:** To measure the weight or mass of different types of objects we can use kilograms (abbreviated to kg), gram (gm) and milligram (mg) depending upon the size of the object.

- To measure the weight of an object we use different types of weighing scales.

- Using balance scales
- Using electronics machine scales

Unit conversion for Mass	
1 milligram	0.001 gram
1 centigram	0.01 gram
1 decigram	0.1 gram
1 decagram	10 gram
1 hectogram	100 gram
1 kilogram	1000 gram

(c) **Measuring Capacity:** When we talk about the “capacitance” of a container, we are talking about the holding capacity of container. This means how much of an item or liquid can be placed in the container. It is typically measured in units such as liters, cubic centimeters, or gallons. It depends on the size, shape, and design of the container.

Metric units: To measure the capacitance of any object in metric units, we use liters, milliliters, and kiloliters.

Conversion of units of capacitance

- 1 kiloliter = 10 hectoliter = 100 decalitre = 1000 liters
- 1 hectoliter = 10 decalitre = 100 liters
- 1 decaliter = 10 liter
- 1 liter = 10 deciliter = 100 centiliter = 1000 milliliter
- 1 deciliter = 10 centiliter = 100 milliliter
- 1 centiliter = 10 milliliter
- 1 liter = 0.001 cubic meter

Example: Convert 63 liters into cubic meters.

Sol: 1 liter = 0.001 cubic meter

63 liters = 0.063 cubic meter

(d) **Measurement of Time:** Time is measured in different units such as hours, minutes and seconds.

Units of time measurement and their relations:

1 Day = 24 Hours

1 Hour = 60 Minutes = 3600 Seconds

1 Minute = 60 Seconds

Example: Convert 580 minutes into hours and minutes.

Sol: Given, time = 580 minutes = $\frac{580}{60} = 9\frac{40}{60}$ hour
= 9 hour 40 minute

(e) **Monetary System:** Currency of every country is different like Indian currency is, Rupee'. Rupee has been given a special symbol (₹). The smallest unit of Rupee is, Paisa'.

Example: Convert 30 paise into rupees.

Sol: 30 paise = $\frac{30}{100} = ₹0.3$