

Measurement

Measurement is the process of comparing an unknown quantity with another quantity of its kind (called the unit of measurement). The measurement process has three key elements:

- The physical quantity to be measured.
- The necessary measuring tools.
- Units of measurements used (standard units).

Definition: Every physical quantity can be represented by its numerical value and unit.

Measuring Length

When you are measuring the length of objects, you are comparing it with the standard length. The SI unit of length is meter (m) as we discussed before. There are also non SI units of length. These are millimeter (mm), centimeter (cm) and kilometer (km).

Measuring Mass

Measuring mass is a day to day activity in human life. People in various parts of the world measure the mass of an object in different ways.

Definition: Mass is a basic physical quantity. It is defined as the amount of matter contained in a body.

The SI unit of mass is a kilogram (kg). There are also non SI units used to measure the mass of an object. In scientific way mass is measured by an instrument called beam balance.

Measuring Time

How long does it take between the sun rise and set in your location? Do the people in your locality use the sun set and sun rise for measuring time? Some people in the rural parts of Ethiopia traditionally use the position of the sun or the position of shadows of their house or trees to estimate the time. A traditional clock that shows the time of the day by the shadow of an upright object that falls on to a flat surface marked with hours is called sundial. However, this way of measuring time has no standard and is not accurate.

Time is the basic physical quantity. It describes the duration between the beginning and end of an event. The SI unit of time is second (s). The commonly used non SI units of time are: minute, hour, day, week, month and year.

Traditional measuring units are not exact and have no a standard.

Prefixes are used to simplify the description of physical quantities that are very big or very small.

Prefix	Symbol	Factor	Scientific Notation
Tera	T	1,000,000,000,000	10^{12}
Giga	G	1,000,000,000	10^9
Mega	M	1,000,000	10^6
Kilo	k	1,000	10^3
Hecto	h	100	10^2
Deca	da	10	10^1
(Base Unit)	(none)	1	10^0
Deci	d	0.1	10^{-1}
Centi	c	0.01	10^{-2}
Milli	m	0.001	10^{-3}
Micro	μ	0.000001	10^{-6}
Nano	n	0.000000001	10^{-9}
Pico	p	0.000000000001	10^{-12}
Femto	f	0.000000000000001	10^{-15}
Atto	a	0.000000000000000001	10^{-18}

These prefixes are used to denote decimal multiples and submultiples of units, making it easier to express very large or very small quantities.