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STUDY MATERIAL SCIENCE

CLASS-VI

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▶ Motion & Measurements

In ancient time man used to move only on foot and carry goods either on his back or on the back of some animals.

A great change in the modes of transport was made:

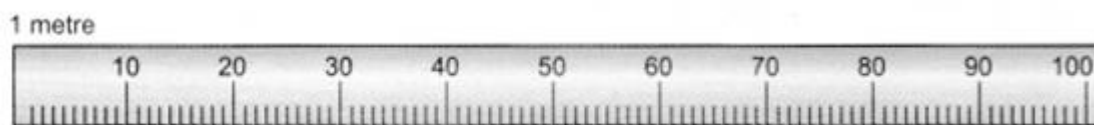
- by the invention of wheel.
- by the invention of steam engine.

Non-standard measures: The lengths of steps, arms, hands, or fingers of different people are different, therefore the distance measured with their help is not always reliable. These methods are, therefore, called non-standard measures.

Standard measures: Measures that are the same all over the world are known as standard measures.

In October 1960, the 12th general conference on weight and measures adopted the International system of units. "The System International Units" is the set of units to maintain uniformity all over the world.

Metre: It is the standard unit of length. The symbol of metre is m.



A metre scale

Each metre (m) is divided into 100 equal divisions, called centimetre (cm). Each centimetre has ten equal divisions, called millimetre (mm). Thus

$$1 \text{ m} = 100 \text{ cm}$$

$$1 \text{ cm} = 10 \text{ mm}$$

For measuring large distances, metre is not a convenient unit. We define a larger unit of length. It is called kilometre (km).

$$1 \text{ km} = 1000 \text{ m.}$$

Simple multiples of units: Units that are used for the measurement of larger distances are the multiples of SI unit. For example: deca, hecto, kilo.

$$1 \text{ decametre} = 10 \text{ m}$$

$$1 \text{ hectometre} = 100 \text{ m}$$

$$1 \text{ kilometre} = 1000 \text{ m}$$

Sub-multiples of units: Units used for measuring smaller distances are the sub-multiples of SI units.

For example, milli, centi, deci.

$$1 \text{ m} = 10 \text{ decimetre}$$

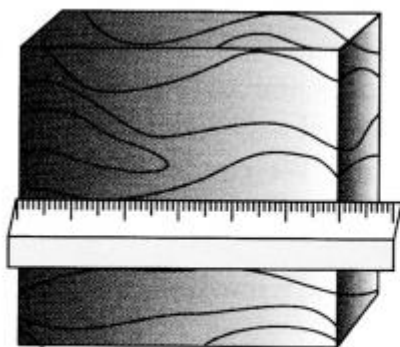
$$1 \text{ m} = 100 \text{ centimetre}$$

$$1 \text{ m} = 1000 \text{ millimetre.}$$

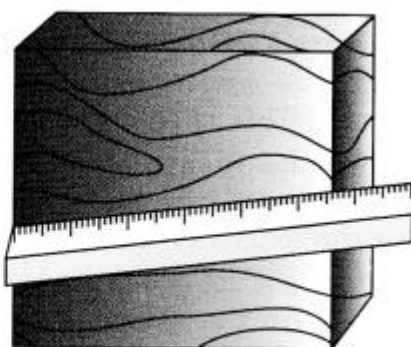
Making measurement of a length: In making measurement of length of an object, we should follow the following procedure:

Place the scale in contact with the object along its

length as shown in Fig.



Correct

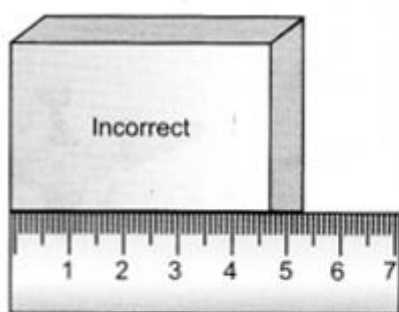


Incorrect

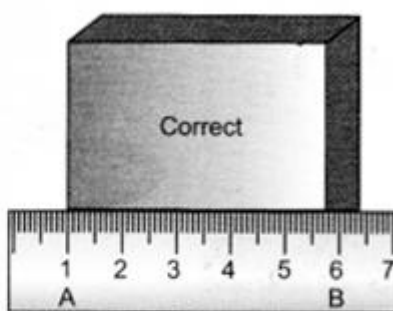
Method of placing the scale along the length to be measured

Measurement with a scale with broken ends

- Avoid taking measurements from zero mark.
- Use any other full mark of the scale, say 1.0 cm.
- Subtract the reading of this mark from the reading at the other end. For example, in Fig. 10.3 (6), the reading at starting mark is 1.0 cm and at the other end it is 6.5 cm. Therefore, the length of the object is $(6.5 - 1.0) \text{ cm} = 5.5 \text{ cm}$.



(a)



(b)

(a) and (b) Method of placing the scale with broken ends

Correct position of the eye is also important for making measurement. Your eye must be exactly above the point where the measurement is to be taken as shown in Fig. 10.4. Position 'A' is the correct position of the eye. Note that from position A', the

reading is 1.0 cm. From positions 'B' and 'C', the readings may be different.

