LITTERA PUBLIC SCHOOL

CLASS V CHAPTER 9 MATHS

MEASUREMENT OF LENGTH

Length is the term used for identifying the size of an object or distance from one point to the other. For example, the length of a ruler given below tells us how long the ruler is.

What Is Length?

Measurement of length can be defined as an act of identifying the length of objects in some standard or non-standard units. The skill to measure the length is very important in our everyday life.

Suppose Mathew is going to a store with his friend and he sees a beautiful picture frame that can be placed in his parents' bedroom. But how would he tell them the length of the frame? He can do that if he knows the length in a certain unit, say 3 feet. In the image given below, the length of the picture frame is 3 feet.

Units to Measure Length

We can measure the length of an object by using different units like meter, centimeters, feet, inches or by using a handspan, foot-span, etc. We classify the units to measure length into two types:

1. Non-standard units of measuring length

The non standard units do not have any fixed measurement in numbers. The measurements vary from person to person and object to object.

For example, a kid and his father are measuring a painting using their hands. So, the length they will get will be different because the handspan of a kid is usually smaller than that of an adult. Some of the non-standard units of length are handspan, foot span, finger width, a thread or a rope, etc.

1. Handspan

Handspan is the maximum distance between the tips of the thumb and the little finger. It is generally about 8 inches, but it depends on your hand.

2. Foot-span

The foot-span is defined as the distance between the point of the toe and the heel of the foot.

2. Standard units of measuring length

Standard units are predefined and they do not change from person to person or object to object. Suppose, there are two people measuring the length of a pencil with the ruler. If they use the standard units, they will get the same value. Some examples of measurement of length using standard units are centimeters, meters, kilometers, inches, feet, yards, etc.

We can divide the standard units of measuring length into two types:

1. Metric System

The metric system includes kilometer, hectometer, decameter, meter, decimeter, centimeter, and millimeter. There is a relationship between these units. The base unit is meters. The relationship of every other unit with the base unit (meters) is given below:

- 1 kilometer (km) = 1000 meters (m)
- 1 hectometer (hm) = 100 m
- 1 decameter (dam) = 10 m
- 1 decimeter (dm) = 1/10 m = 0.1 m
- 1 centimeter (cm) = 1/100 m = 0.01 m
- 1 millimeter (mm) = 1/1000 m = 0.001 m

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2. Imperial System

The imperial system includes feet, yard, inches, etc. The relation is given by:

1 yard = 3 feet

1 feet = 12 inches

Metric to Imperial System

1 m = 3.28 feet

1 m = 39.37 inches

Imperial to Metric System

1 inch = 2.54 cm

1 foot = 30.48 cm

1 foot = 0.3048 m

S.I. Unit of Length

The S.I. unit is an international system of measurements that are used universally in technical and scientific research to avoid the confusion with the units. The S.I unit to measure the length is given in meter (m). The meter is the base unit of length.

Tools used for Measurement of Length

1. Rulers

Rulers have straight edges and are stiff. One side of the ruler has markings in inches and the other side has markings in centimeters. Rulers are good to use for shorter lengths like the length of a pencil or notebook.

2. Tape Measures

Tape measures are flexible straight edges with graduated markings. Since most tape measures only measure one unit system (U.S. customary or metric), you'll need to find one that uses the unit system you need. Since these tools can

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3. Meter Sticks

Meter sticks and yardsticks are the same in construction and length. Both have straight edges and are stiff. Meter sticks measure all lengths up to 1 meter, and yardsticks measure all lengths up to 3 feet.

4. Odometers

Odometers are tools that measure long lengths traveled by vehicles, like cars and bicycles. Pedometers measure long lengths traveled by a human or other living creature as it walks. These tools are good for measuring miles and kilometers, but they are calibrated by professionals and work without hands-on involvement from the user.

How to Measure Length?

There are two sides of a ruler. On one side, we see centimeters/millimeters and on the other side, we see inches. The following steps are required to measure the length of an object:

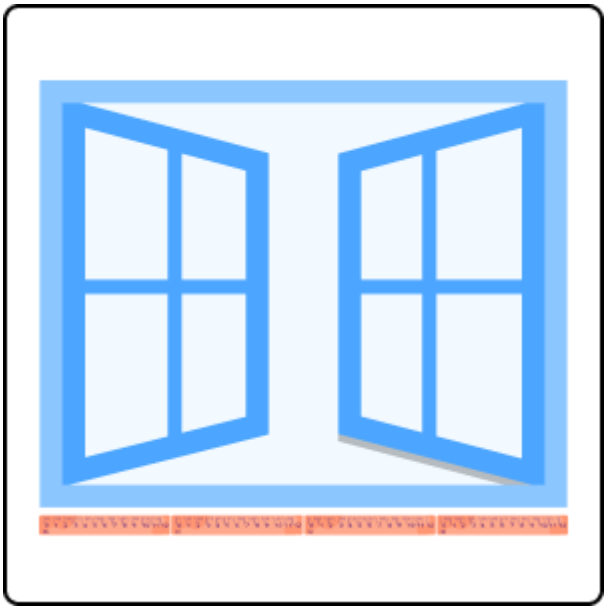
Step 1: Choose the unit in which you want to measure the length of an object. If you want a value in cm/mm, then use the cm/mm side of the ruler. If you want the value in inches, then use the inches side of the ruler.

Step 2: Find 0 mark on one end of the ruler. Align the zero mark with the starting edge of the object to be measured.

Step 3: Look at the endpoint of the object and note the value. For example, in the below figure, the length of the pencil is from 0 to 10 cm.

Solved Examples

Example 1: What is the length of the window (in feet) if a 12-inch ruler is placed 4 times in line?



Solution: A 12-inch ruler is placed 4 times.

So, length of the window is 12 × 4 = 48 inches = 4 feet.

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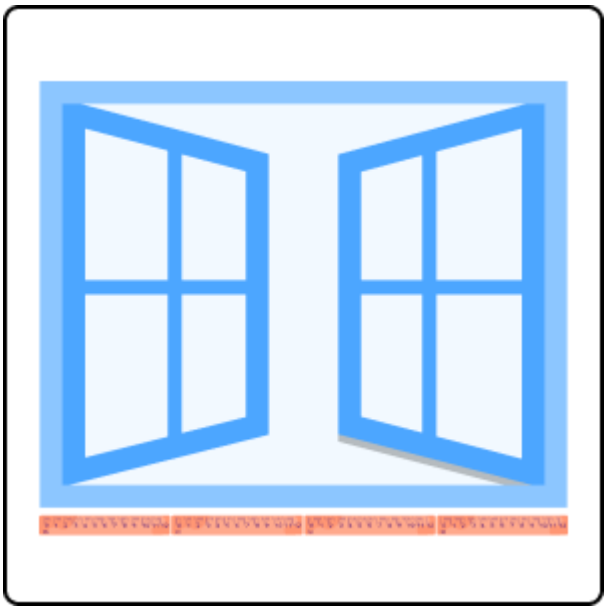

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Example 2: What should be the minimum length(in cm) of a pencil box so that a pen of length 450 mm can fit inside it?

Solution: 1 mm = 110 cm

450 mm = 45 cm

The minimum length of a pencil box should be more than 45 cm only.

Example 3: The gate is 3 feet long. How many inches is it long?

Solution: 1 feet = 12 inches

3 feet = 3 × 12 = 36 inches

Example 4: Olive walked 100 yards from her house to the bookstore and Mark walked 300 feet from her house to her friend's house, who walked more?

Solution: 1 yard = 3 feet

100 yards = 300 feet

So, Olive walked 300 feet and Mark also walked 300 feet.

Both walked the same distance.