UNIT - I

MEASUREMENT OF LENGTH

Section 1.1 - Instructional Objectives.

1.2 - Initial Instruction.

1.3 - Formative Test.

1.4 - Remedial Instructional Material.

1.5 - Enrichment Activities.

1.6 - Final Test.

1.1 INSTRUCTIONAL OBJECTIVES

1. The pupil will be able to write one example of measurement of length. (K)

2. Given examples, the pupil will be able to identify the units used in measurement of length. (U)

3. The pupil will be able to recognise that a fixed unit of measurement of length is required to compare the lengths. (A)

4. Given a new situation, the pupil will be able to recognise that a standard unit of measurement of length is required to compare the length of things. (A)

5. The pupil will be able to recall that a metre rule has

   a. 100 number of markings.
   b. These markings on the metre rule starts from '0' and end to '100'.
   c. The distance between two consecutive long marks is a centimetre.
   d. The distance between two consecutive long marks has 10 small spaces.
   e. Each small space present between two consecutive small marks is called a millimetre. (K)

6. The pupil will be able to recall and write how many millimetres make a centimetre, how many centimetres make a metre, and how many metres make a kilometre. (K)

7. Given examples, the pupil will be able to convert

   a. Metre to Centimetre.
   b. Kilometre to Metre.
   c. Centimetre to Millimetre.
   d. Metre to Millimetre. (A)

8. Given different situations, the pupil will be able to identify the appropriate unit of measurement of length to be used in those situations. (A)

9. The pupil will be able to measure and report the length of a given object as follows:

   a. Locate the length of the object (if two or more sides).
   b. Locate the beginning point of the object (A).
   c. Locate the end point of the object (B).
   d. Identify the beginning point of the measuring scale.
   e. Place the scale parallel and side by side to the object (AB).
   f. Position the eyes vertically above the beginning point of the object. (A)
   g. Place the scale in such a way that the beginning point of the scale 'zero' and the beginning point of the object (A) coincide.
   h. Position the eyes vertically above the end point of the object. (B)
   i. Locate the consequently falling point on the scale.
   j. Identify the closest number of the centimetre marking coming before the falling point or the centimetre marking falling on the point.
   k. Count the number of millimetres from this centimetre marking up to the falling point:

l. Write down the measurement of the object by

(i) Recording the number of centimetres on the left hand side (L.H.S.)

	L.H.S.	R.H.S.
(Eg)	10 cm	

& (ii) Recording the numbers of millimetres on the right hand side. (R.H.S.)

	L.H.S.	R.H.S.
(Eg)	10 cm	8 mm

m. Convert the millimetres into the decimal form of a fraction of a centimetre.

n. State the measurement of the length of the object in centimetres by inserting the decimal point between where the centimetre unit ends and the fractional part of the centimetre namely the millimetre starts. (S)

10. The pupil will be able to measure and report the breadth of a given object as follows:

a. Locate the breadth of the object.

b. Choose one of the sides (AB) of the breadth of the object for measurement.

c. Locate a beginning point 'A'.

d. Locate the end point 'B'.

e. Identify the beginning point of the measuring scale.

f. Place the scale side by side to AB.

g. Adjust the 'zero' of the scale with the beginning point 'A'.

h. Position the eyes vertically above the end point 'B'.

i. Locate the consequently following point on the scale.

j. Identify the closest number of the centimetre marking coming before the falling point 'B' or the centimetre marking falling on the point 'B'.

k. Count the number of millimetres from this centimetre marking upto the falling point 'B'

l. Write down the measurement of the object by

(i) Recording the number of centimetres on the left hand side (L.H.S.)

L.H.S. R.H.S.

Eg - 10 cm.

& (ii) Recording the number of millimetres on the right hand side (R.H.S.)

L.H.S. R.H.S.

Eg - 10 cm 8 mm

m. Convert the millimetres into the decimal form of a fraction of a centimetre.

n. State the measurement of the breadth of the object in centimetres by inserting the decimal point between where the centimetre unit ends and the fractional part of the centimetre namely the millimetre starts (S)

ll. The pupil will be able to measure and report the height of a given object as follows:

a. Locate the height of the object.

b. Choose one of the sides (AB) of the height of the object for measurement.

c. Locate a beginning point (A).

d. Locate the end point (B).

e. Identify the beginning point of the measuring scale.

f. Place the scale parallel & side by side to 'AB'.

g. Position the eyes vertically above the beginning point 'A'.

h. Place the scale in such a way that the beginning point of the scale (zero) and the beginning point 'A' coincide.

i. Position the eyes vertically above the end point 'B'.

j. Locate the consequently following point on the scale.

k. Identify the closest number of the centimetre marking coming before the falling point 'B' or the centimetre marking falling on the point 'B'.

l. Count the number of millimitres from this centimetre marking upto the falling point 'B'.

m. Write down the measurement of the object by

i) Recording the number of centimetres on the left hand side (L.H.S.)

	L.H.S.	R.H.S.
Eg.	10 cm.	

& ii) Recording the number of millimetres on the right hand side (R.H.S.)

	L.H.S.	R.H.S.
Eg.	10 cm	8 mm

n. Convert the millimetres into the decimal form of a fraction of a centimetre.

o. State the measurement of the height of the object in centimetres by inserting the decimal point between where the centimetre unit ends & the fractional part of the centimetre namely the millimetre starts (S).

12. The pupil will be able to measure and report the length of a wavy line as follows:

a. Locate the beginning point 'A' of the line.

b. Place the beginning point 'P' of the thread in such a way that it coincides with the beginning point 'A' of the line.

c. Locate the end point 'B' of the line.

d. Place the remaining thread exactly over the line.

e. Locate the point 'Q' on the thread where the end point 'B' of the line meets and mark it.

f. Place the beginning point 'P' of the thread on the beginning point 'zero' of the measuring scale.

g. Place the remaining thread parallel to the measuring scale.

h. Position the eyes vertically above the end point 'Q' of the thread.

i. Locate the consequently falling point on the scale.

j. Identify the closest number of the centimetre marking coming before the falling point 'Q' or the centimetre marking falling on the point 'Q'.

k. Count the number of millimetres from this centimetre marking upto the falling point 'Q'.

l. Write down the measurement of the object by

   i) Recording the number of centimetres on the left hand side (L.H.S.)

L.H.S.	R.H.S.
Eg. 10 cm.	

   & ii) Recording the number of millimetres on the right hand side (R.H.S.)

L.H.S.	R.H.S.
Eg. 10 cm	8 mm

m. Convert the millimetres into the decimal form of a fraction of a centimetre.

n. State the measurement of the length of the line in centimetres by inserting the decimal point between where the centimetre unit ends and the fractional part of the centimetre namely the millimetre starts (S).

N.B. : Measurements were also taken using metre as the unit of measurement besides centimetre and millimetre.

1.2 INITIAL INSTRUCTION

SS 1 Suppose you want to get an uniform stitched, you go to the cloth shop and asks him for drill material in the colour you need. The shopkeeper asks you how much cloth you want. You tell him the exact amount of cloth you want. For example, you may tell him you want 2 metres of cloth. The shopkeeper measures the cloth and cuts out a piece of cloth which is 2 metres long. Here the shopkeeper uses the measuring unit to measure the length of the cloth. Here you will observe that the shopkeeper has to know how to measure the lengths accurately so that you get the exact amount of cloth. If you don't know how to measure, you may get a smaller piece of cloth which is not sufficient for the uniform or a bigger piece of cloth, most of which gets wasted. Thus you know how important it is to know how to measure lengths. When you give the cloth to the tailor, the tailor will find out how long the uniform should be stitched by measuring the length, from the shoulder to the knee. He will cut the cloth according to this length. He will also take other measurements. He will cut the cloth and stitch it according to the measurement so that the uniform will fit you exactly. You can see here that the tailor has to know how to measure length accurately in order to stitch the clothes.

Write down some more examples where there is a need for knowing how to measure the lengths

_____

_____

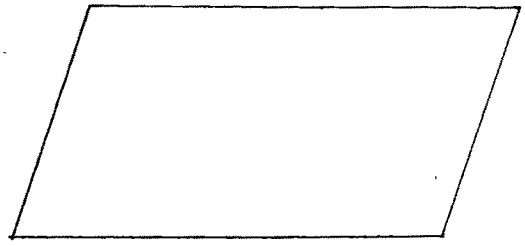
_____

_____

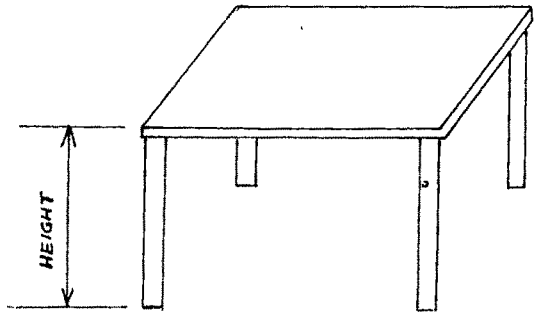
_____

Measurement of length
Measurement of breadth
Measurement of height

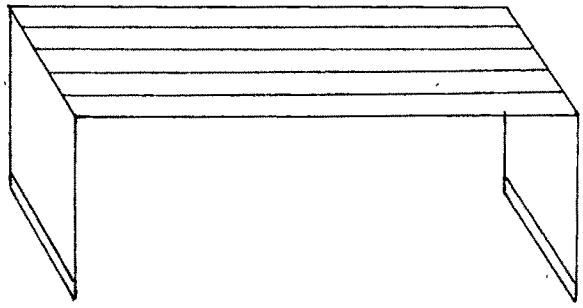
Observe the above three measurements. All of these measure how long a thing is. When we find out how long a thread is, we are measuring the length of the thread. But if we want to find out how long a book is , we cannot call any of the sides of the book as length because one side may be longer than the other. In order to know whether measurement is of the longer side or shorter side, we give different names for each of the sides. We call the longer side as the length of the book and the shorter side as the breadth of the book. Point out the length and breadth in this figure.



Observe the figure of the table, measurement of length can be taken from yet another side, i.e. from the ground upwards, that is the height of the table. We call it the height to differentiate it from the length and breadth.



Point out the length, breadth and height of this bench.

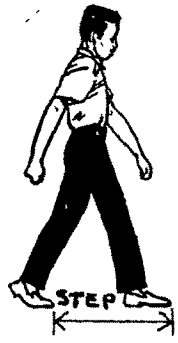


In ancient times, there were no measuring scales. Do you know how they measured?

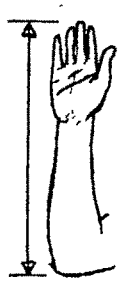
a. The distance they walked
( )

b. The length of a sari
( )

They measured the distance they walked with the step.



They measured the length of sari with the forearm.



FORE ARM

They used their body parts for measuring the things. Since 'span' is used to measure the length and also to express the length, it is called the unit of measurement of length. Forearm, Step etc., which are also used to measure and express the length are units of measurement of length.

§§ 2 Now let us measure the height of Sheetal using Nancy's forearm and fingers, let us measure Sheetal's height using Suparna's forearm and fingers. Why do you get different measurements?

_____

_____

_____

Thus, you see that the measurement of these parts of the body are different from person to person. So if each one uses his own forearm to measure the length of a sari we will not get the same measurement. To overcome this problem and to get the same measurement we have to fix a unit for measurement.

Let us use this stick for measuring the height of Sheetal. Nancy and Suparna will measure the height of Sheetal.

What do you notice?

_____

_____

You will notice that the height of Sheetal is 5½ sticks when measured by Nancy and also by Suparna. If any of you measure it with this stick the measurement of the height will be the same. Hence it is necessary to have a fixed unit.

Now if Sheetal wants to tell her friend in Ahmedabad how tall she is, she cannot say she is 5 1/2 sticks tall because her friend does not know how long the stick is. Thus her friend too must have the same unit of measurement as Sheetal. Thus, if we want to tell clearly to everyone our height, everyone should have the same unit of measurement. Hence, we need a uniform and fixed unit of measurement. This is the standard unit of measurement. The metre is used as a standard unit of measurement. Look at the length of the metre. All over the world, the metre has this length. It is difficult to use the metre to measure small objects. Hence the length of it is divided into smaller parts called centimetres. Centimetre is still further divided into smaller parts called millimetres. The metre becomes inconvenient to measure the length of long distances etc. hence the Kilometre is used. It is 1000 times longer than a metre.

Look at the metre rule.

From what point does the marking start?

The marking starts from zero.

At what point does the marking end?

The marking ends at 100.

What do you see above each number?

Above each number a long line is seen.

The distance between one long line andthe next long line is one centimetre.

How many smaller spaces do you see between the two big lines?

Between these two big lines we see 10 small spaces.

Each of this space is called a millimetre.

Count how many centimetres are present in the metre.

There are 100 centimetres present in a metre.

Therefore 100 centimetres make a metre. Now count how many millimetres are present in a centimetre.

There are 10 millimetres present in a centimetre.

Therefore 10 millimetres make a centimetre.

How many millimetres make a metre?

Since 10 millimetres make a centimetre and 10 centimetres make a metre.

1 centimetre = 10 millimetres

100 centimetres = ?

10 x 100 = 1000 millimetres

∴ 100 centimetres = 1000 millimetres

But 100 centimetres = 1 metre

∴ 1000 millimetres = 1 metre

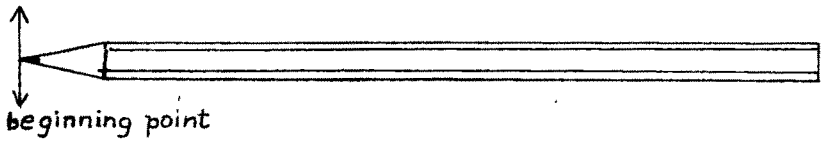
As mentioned earlier one Kilometre = 1000 metres

Metre, Centimetre, Millimetre and Kilometre are also the units of measurement of length and are the standard units of measurement of length. There are also other standard units of measurement like inches, feet, yard, but these units are not as convenient to use as the former units. The metre, kilometre, centimetre and millimetre belong to the metric system of measurements where we always work in multiples of ten.

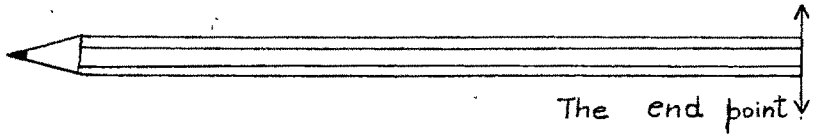
SS 3 Let us measure the length of a pencil using a graded ruler.

(N.B. : In case the object has 2 or more sides, identify the length of the object first.)

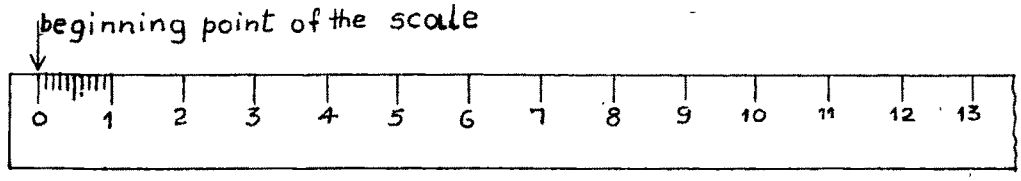
(a) Locate the beginning point of the pencil.



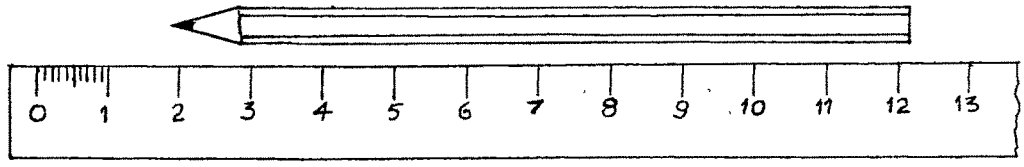
(b) Locate the end point of the pencil



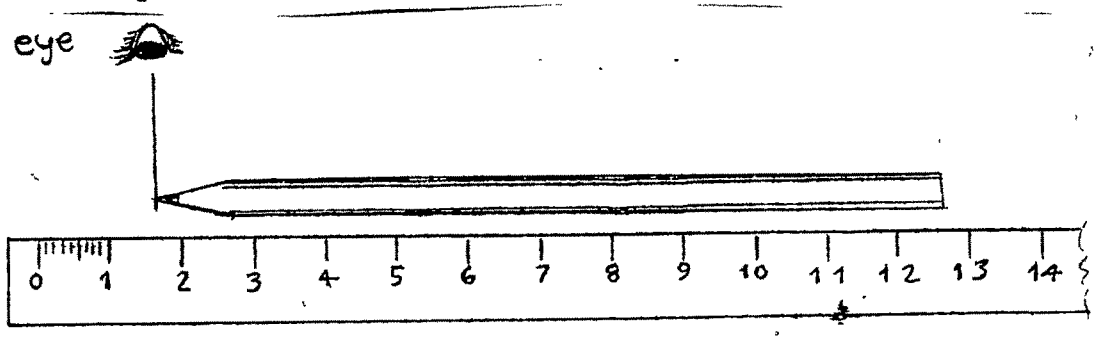
(c) Identify the beginning point of the measuring scale.



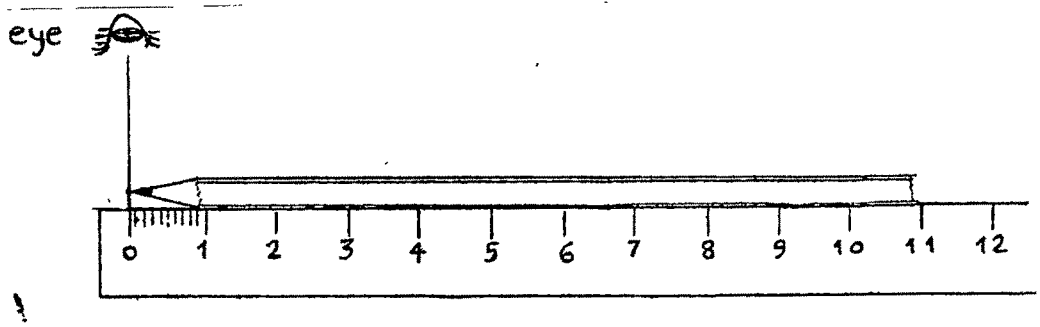
(d) Place the scale parallel and side by side to the pencil.



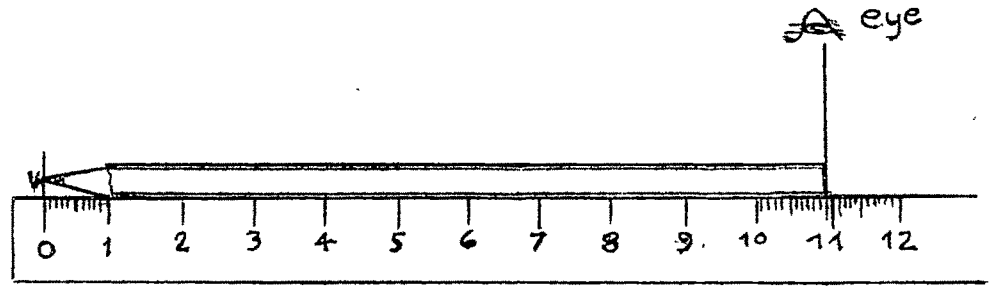
(e) Position the eyes vertically above the starting point of the pencil.



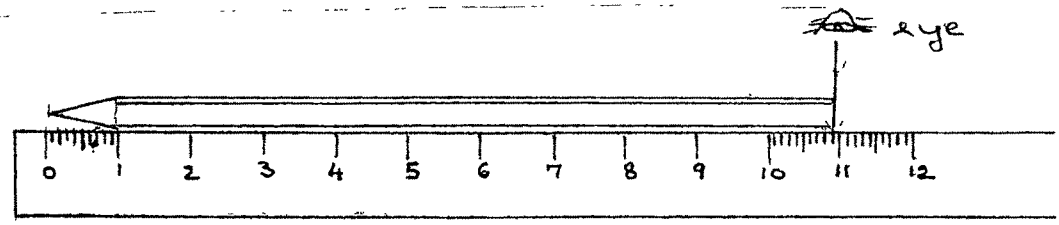
(f) Place the scale in such a way that the beginning point of the scale and the beginning point of the pencil coincide.



(g) Position the eyes vertically above the end point of the pencil.



(h) Locate consequently the falling point on the scale.



(i) Identify the closest number of the centimetre marking coming before the falling point or the centimetre marking falling on the point.

10 centimetre

(j) Count the number of millimetres from this centimetre marking upto the falling point.

9 millimetres

(k) Write down the measurement of the pencil by

(i) Recording the number of centimetres on the left hand side. (L.H.S.)

L.H.S.	R.H.S.
10 cm	

& (ii) Recording the numbers of millimetres on the right hand side (R.H.S.)

L.H.S.	R.H.S.
10 cm	9 mm.

(l) Convert the millimetre into the decimal form of a fraction of a centimetre.

Since 10 mm = 1 cm

9 mm + ?

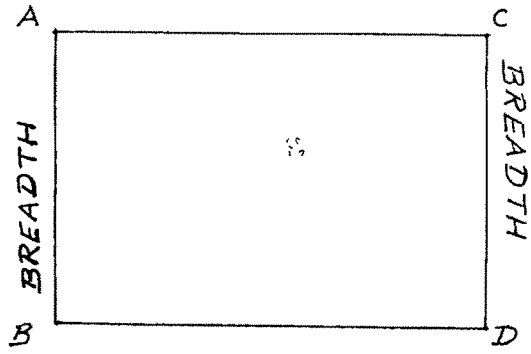
$$\frac{1 \times 9}{10} = 0.9 \text{ cm.}$$

(m) State the measurement of the length of the pencil in centimetres by inserting the decimal point between where the centimetre unit ends and the fractional part of the centimetre namely the millimetre starts.

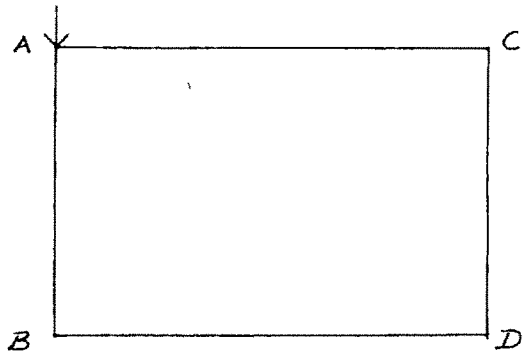
10.9 cm.

SS 4 Let us measure the breadth of this rectangle using a graded ruler.

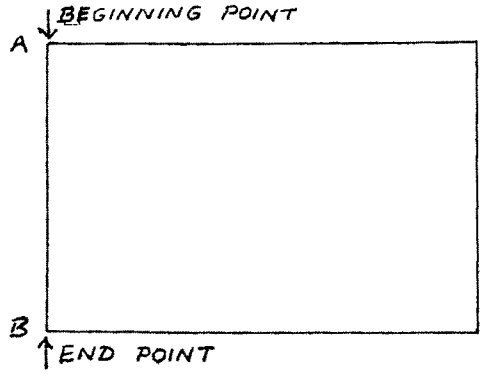
a. Locate the breadth of the rectangle.



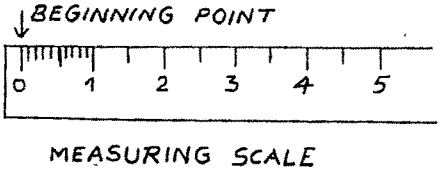
b. Choose one of the sides of the breadth for measurement.



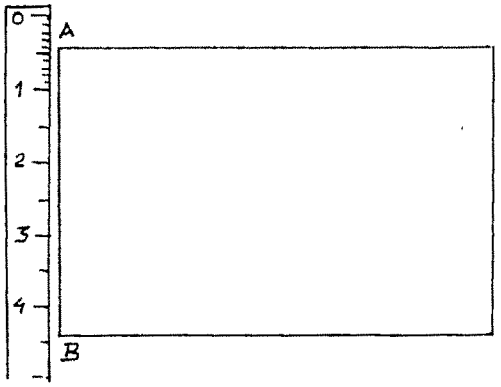
c. Locate the beginning point 'A' and end point 'B' of this breadth of the rectangle.



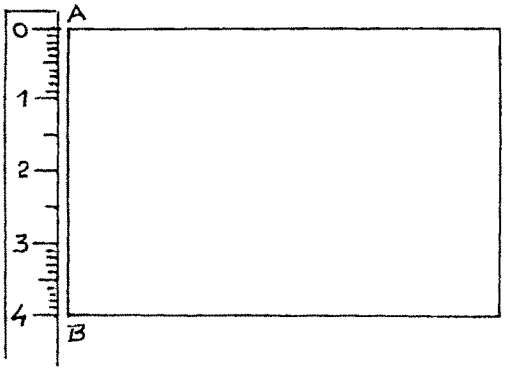
d. Identify the beginning point of the measuring scale.



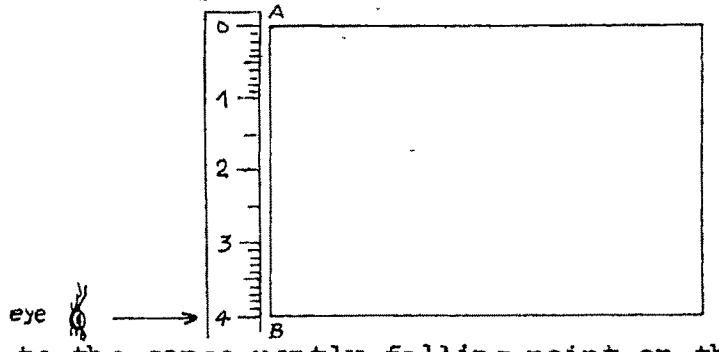
e. Place the scale, side by side to AB.



f. Adjust the 'zero' of the scale with the beginning point 'A'.



g. Position the eyes vertically above the end point 'B'.



h. Locate the consequently falling point on the scale.

i. Identify the closest number of the centimetre marking coming before the falling point 'B' or the centimetre marking falling on the point 'B'.

4 Centimetres

j. Count the number of millimetres from this centimetre marking upto the falling point 'B'

0 millimetres

k. Write down the measurement of the breadth of the rectangle by

(i) Recording the number of centimetres on the left hand side (L.H.S.)
L.H.S. R.H.S.
4 cm.

& (ii) Recording the number of millimetres on the right hand side (R.H.S.)
L.H.S. R.H.S.
4 cm. — (since there are no millimetres)

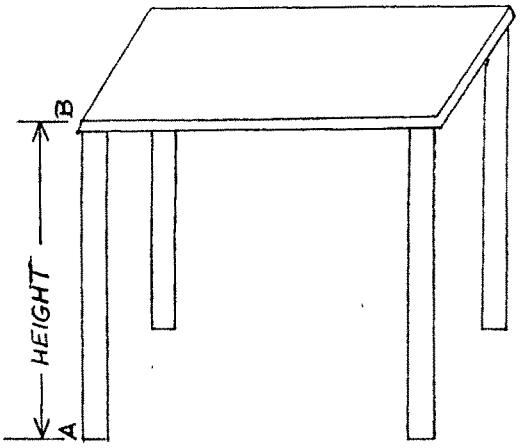
l. Convert the millimetres into the decimal form of a fraction of a centimetre
(Since there are no millimetres this step is omitted here)

m. State the measurement of the breadth of the rectangle in centimetres

4 cms.

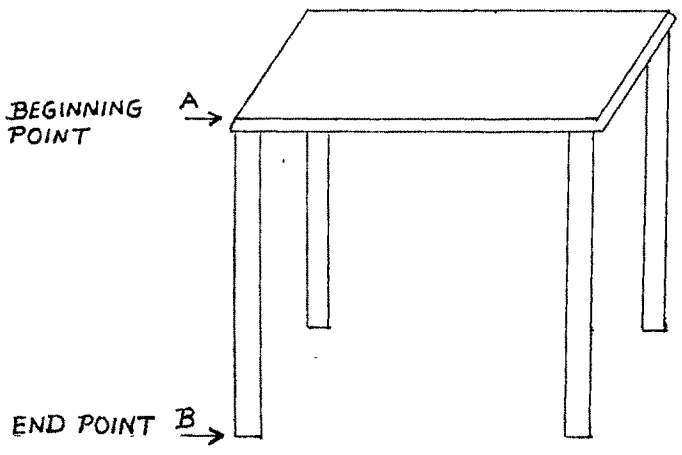
Let us measure the height of a table as follows:

a. Locate the height of the table.

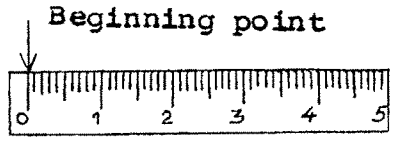


b. Choose one of the sides (AB) of the height of the table for measurement.

c. Locate a beginning point 'A' and an end point 'B'.

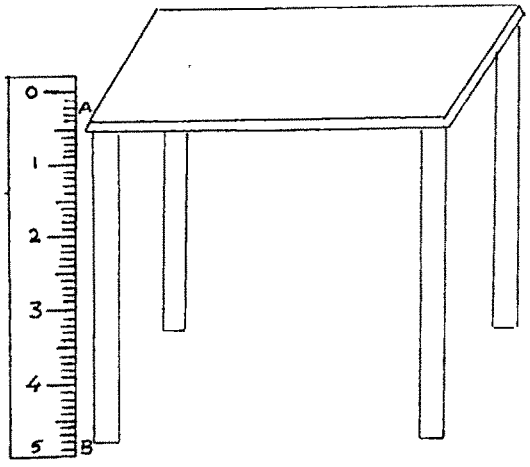


d. Identify the beginning point of the measuring scale.

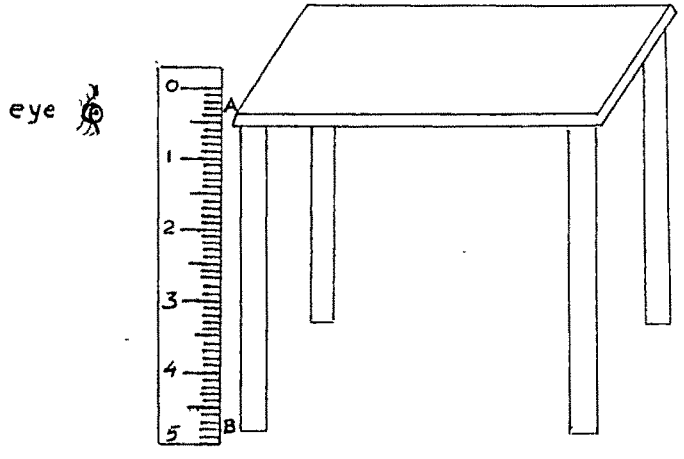


Measuring scale

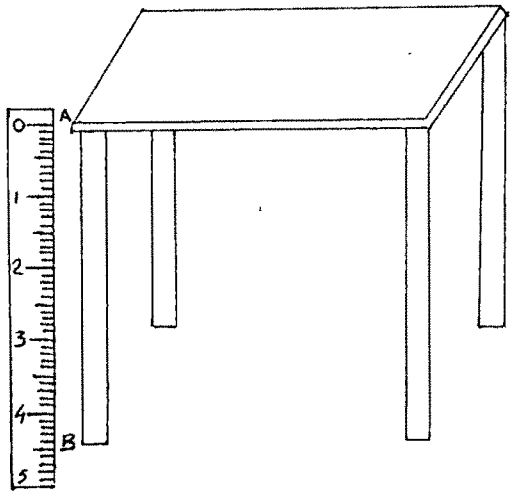
e. Place the scale parallel and side by side to 'AB'.



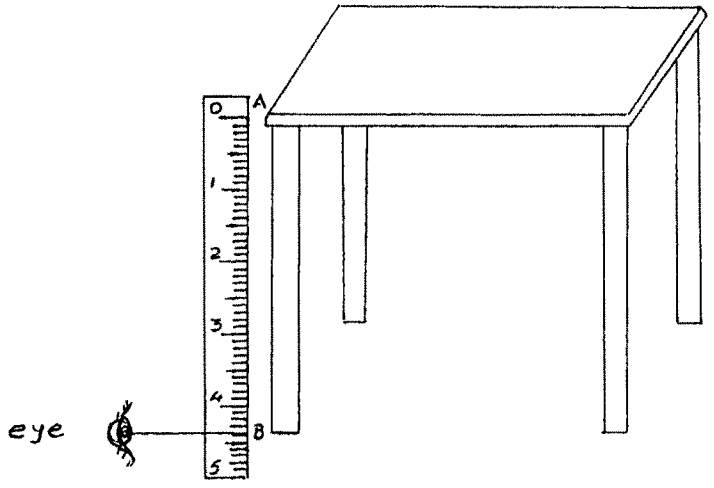
f. Position the eyes vertically above the beginning point 'A'.



g. Place the scale in such a way that the beginning point of the scale 'zero' and the beginning point 'A' coincide.



h. Position the eyes vertically above the end point 'B'.



i. Locate the consequently falling point on the scale.

j. Identify the closest number of the centimetre marking coming before the falling point 'B' or the centimetre marking falling on the point 'B'.

4 centimetre

k. Count the number of millimetres from this centimetre marking upto the falling point 'B'.

4 millimetres

l. Write down the measurement of the object by

(i) Recording the number of centimetres on the left hand side (L.H.S.)

L.H.S.	R.H.S.
4 cm.	

& (ii) Recording the number of millimetres on the right hand side (R.H.S.)

L.H.S.	R.H.S.
4 cm.	4 mm.

m. Convert the millimetres into the decimal form of a fraction of a centimetre

Since 10 mm = 1 cm

4 mm = ?

$$\frac{1 \times 4}{10} = 0.4 \text{ cm.}$$

n. State the measurement of the height of the table in centimetres by inserting the decimal point between where the centimetre unit ends and the fractional part of the centimetre namely the millimetre starts.

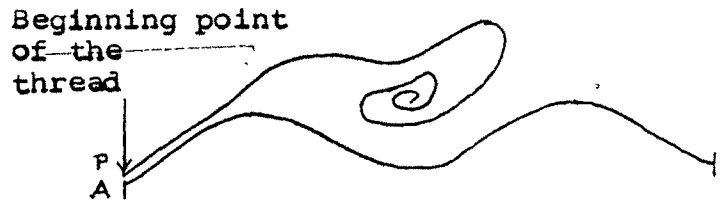
4.4 cms.

§ 5 Let us measure the length of this wavy line.

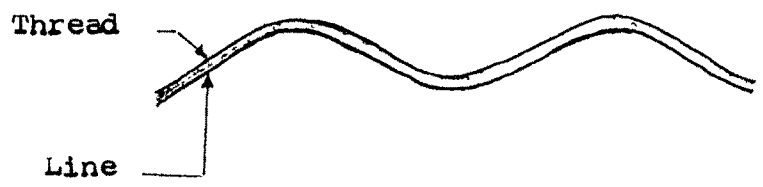
a. Locate the beginning point 'A' of the line.

b. Locate the end point 'B' of the line.

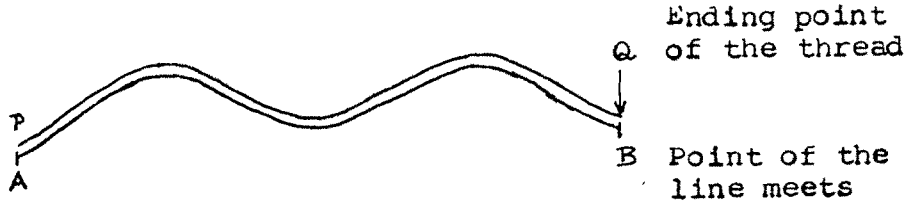
c. Place the beginning point 'P' of the thread in such a way that it coincides with the beginning point 'A' of the line.



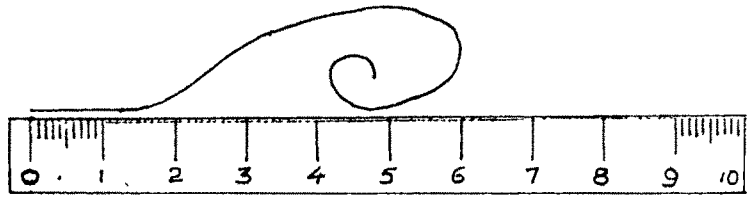
d. Place the remaining thread exactly over the line.



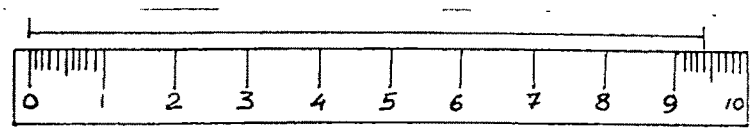
e. Locate the point 'Q' on the thread where the end point 'B' of the line meets and mark it.



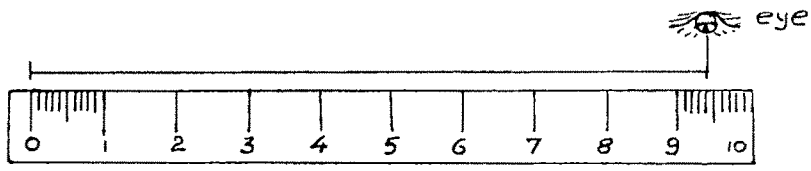
f. Place the beginning point 'P' of the thread on the beginning point, 'Zero' of the measuring scale.



g. Place the remaining thread parallel to the measuring scale.



h. Position the eyes vertically above the end point 'Q' of the thread.



i. Locate the consequently falling point on the scale.

j. Identify the closest number of the centimetre marking coming before the falling point 'Q' or the centimetre marking falling on the point 'Q'.

9 centimetres

k. Count the number of millimetres from this centimetre marking upto the falling point 'Q'.

4 millimetres

l. Write down the measurement of the object by

(i) Recording the number of centimetres on the left hand side (L.H.S.)

L.H.S.	R.H.S.
9 cm.	

& (ii) Recording the number of millimetres on the right hand side (R.H.S.)

L.H.S.	R.H.S.
9 cm.	4 mm.

m. Convert the millimetres into the decimal form of a fraction of a centimetre.

Since 10 mm = 1 cm

4 mm = ?

$$\frac{1 \times 4}{10} = 0.4 \text{ cm.}$$

n. State the measurement of the length of the line in centimetres by inserting the decimal point between where the centimetre unit ends and the fractional part of the centimetre namely the millimetre starts

9.4 cm.

Summary

Measurement is taken using units for measuring. Traditionally a span, forearm, feet etc., were used as units of measurement but since these body parts varied from one person to another it was decided to use fixed units of measurement. Hence, rods, stick or only a single persons measurement was used. But it was felt that communicating such measurement to people from far off places would be possible if they too had the same fixed units hence the standard unit was introduced. It is a fixed unit of measurement used throughout the world. The standard unit used is a metre. The metre has been divided into smaller units for measuring lengths smaller than it, and also have been multiplied into bigger units for measuring lengths much larger than it. The units of measurement accordingly are millimetres, centimetres, metres, kilometres. There are some more units of measurement which you will study later. The kilometre is the largest. It is 1000 times bigger than a metre. The millimetre is the smallest. 1000 millimetres make a metre. 100 centimetres make a metre and 10 millimetres make a centimetre.

1.3 FORMATIVE TEST

1. State an example of measurement of length.

2. In the examples given below, underline the unit of measurement of length.

   a. The book is 16 centimetres long.
   b. The classroom is 30 steps wide.
   c. The distance from Makarpura to Railway station is 12 kilometres.
   d. The desk is 7 spans long.

3. a. Suppose a farmer asks you to buy a cloth for turban. He measures his old turban and tells you it is 5½ forearms in length when he measures it with his forearm. You go to the clothshop and buy a cloth for the turban which is 5½ forearms in length when you measure it with your forearm. When you give it to him, he finds that the length of the turban is 5 times his forearms.

   (i) Why is it so?

3. (ii) What will you do to get the turban of an almost accurate length as asked by the farmer?

_____

_____

_____

_____

_____

b. Suppose you want to find which of the two tables

a. Table in Standard IV
b. Table in Standard III

is longer and how much longer one is from the other? Which of the following do you feel most appropriate? Tick mark (✓) your answer.

(i) Measure the IV Standard table with the finger as the unit of measurement and measure the III standard table with the span as the unit of measurement. ( )

(ii) Measure the IV standard table with the matchstick as the unit of measurement and measure the III standard table with the same matchstick as the unit of measurement. ( )

4. a. Choose the most appropriate answer and fill in the blanks.

The height of two doors can be compared more accurately using _____ _____ for measurement of length.

a. Your Forearm
b. Standard Unit
c. Match Stick

b. Suppose you want to find which of the two classrooms

a. Standard V
b. Standard II

is longer and how much longer one is from the other.

Which of the following do you find most appropriate?

Tick mark (_/) your answer

i. Measure Standard V classroom and Standard II classroom with span and fingers as the units of measurement. ( )

ii. Measure Standard V classroom and standard II classroom with metre and centimetre as units of measurement. ( )

5. Fill in the blanks:

A metre rule has :

a. _____number of long markings

b. These markings on the metre rule start from _____ and end up to _____

c. The distance between two consecutive long marks is a _____

d. The distance between two consecutive long marks has _____ number of small spaces

e. Each small space present between two consecutive long marks is called a _____

6. Fill in the blanks:

a. _____ millimetres make a centimetre.

b. _____ centimetres make a metre.

c. _____ metres make a kilometre.

7. Express each measurement in the units indicated.

5 Metres	=	Centimetres.
2 Kilometres	=	Metres.
20 Centimetres	=	Millimetres.
3 Metres	=	Millimetres

8. Write your answer in the bracket given below.

Among the following units

a. Kilometre
b. Metre
c. Centimetre
d. Millimetre

which is the most appropriate unit you will use to measure.

i.	The length of a pencil	( )
ii.	The thickness of your ruler	( )
iii.	Length of your classroom	( )
iv.	Breadth of a postcard	( )
v.	Distance from Mandvi to Alkapuri	( )
vi.	Thickness of your Science Workbook	( )
vii.	Length of your school playground	( )
viii.	Distance from Bombay to Baroda	( )

9. A line has been drawn below.

Measure the length of this line with the help of a graded ruler and report the length using centimetre and in addition if needed millimetre as units of measurement of length.

_____

_____

_____

_____

The length of the line is _____

10. A card has been given to you.

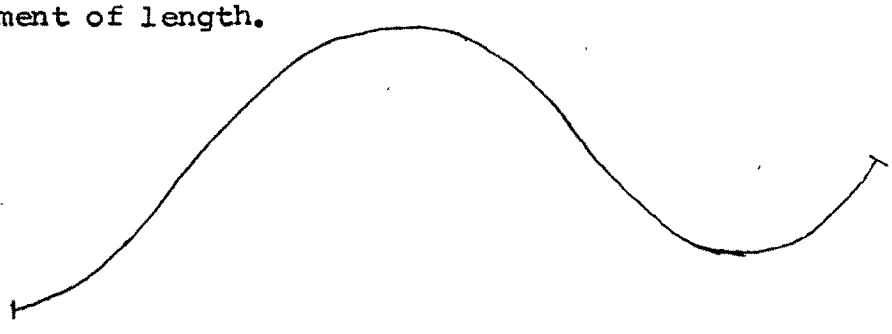
Measure the breadth of this card with the help of a graded ruler & report the breadth using centimetre and in addition if needed millimetre as units of measurement of length.

The breadth of the card is _____

11. Measure the height of table 'A' with the help of a measuring scale and report the height using centimetre and if needed millimetre as units of measurement of length.

The height of the table is _____

12. Measure the length of this wavy line with the help of a string and measuring scale. Report the length using centimetre and if needed millimetre as unit of measurement of length.



The length of the line is _____

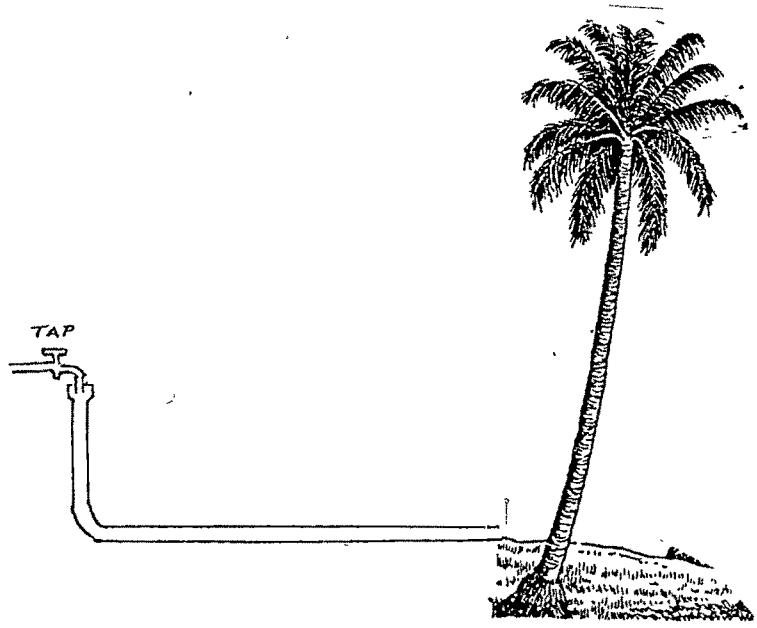
1.4 REMEDIAL INSTRUCTIONAL MATERIAL

1.4.1 Instructional Objective .1

Examples of measurement of length

(i) Flash Card

a. Suppose you have a rubber pipe which is 100 metres in length. You want a piece of this rubber pipe to water a coconut tree that is 25 metres from the tap. For this, you will cut a piece of rubber pipe which is 25 metres long so that the water reaches the coconut tree from the tap through this pipe. Here you measure and cut out a piece of pipe such that the piece of the pipe is 25 metres long. Thus you have used the measurement of length.



b. Suppose a tailor wants to stitch a dress. He measures the length and breadth of the cloth. He also measures and finds the size of the person for whom he is stitching the dress. Here is an example of measurement of length.

c. The carpenter measures the length, breadth and thickness of wooden planks in order to cut out and make the right size furniture.

d. The cloth merchant measures the cloth before cutting it out for the customers.

e. In an assembly, the people are made to stand according to their heights.

f. When a house is being constructed, the length, breadth and height of it are considered.

g. In a race competition, the distance each person has run is measured.

(ii) Oral Verbal Elaboration

Here is a ribbon. Suppose you want to find out how long it is, you place a ruler on the table. Hold one end of the ribbon at one end of the ruler and hold the other end of the ribbon close to the markings on the ruler.

Observe the markings on the ruler, where the ribbon's end meets. You find that it is 25 centimetres in length. Thus you measure the length of the ribbon. This is an example of measurement of length.

(iii) P.L.M. (Deviated form)

Section A

The following are examples of measurement of length.

a. Measuring the height of an object.

b. e.g. Person

b. Measuring the length of an object.

e.g. Stick, Book

c. Measuring the breadth of an object

e.g. Box

d. Measuring the thickness of a book.

e. Measuring the distance walked, travelled or the distance between two distant places.

Turn to Section B

Section B

Your mother goes to market and buys

a. 2 Kgs. of sugar ( )

b. 3 metres of cloth ( )

c. 1 litre of milk ( )

d. 200 gms. of Coffee powder ( )

e. A pair of ribbons ( )

Tick mark (_/) where she has used the measurement of length.

(iv) 'Do it Yourself'

a. Teacher (investigator) asks two boys to run at the same time. As soon as one minute has passed, she stops them and lets them stand in the same place. She asks them, "Who has covered more distance?" She waits for the reply and then asks, "How much more distance was it than the other?" Teacher listens and explains "We know who has covered more distance by seeing how much distance each of them have covered. The pupil 'A' has covered more distance than the pupil 'B'. Here we measured the distance they have run and so we have used the measurement of length."

b. Teacher instructs the pupil "Two sticks 'A' and 'B' are given to you. Keep them apart. Which one is longer?" After the pupil has measured and reported, the teacher explains "Here you have measured the length to find how much longer is 'B' stick from 'A' stick."

1.4.2 Instructional objective.2

Identify units of measurement of length

(i) Flash Card

a. The distance between Sheetal and Roopali's home is 18 kilometres. Here kilometre is the unit of measurement used.

b. The sari length is 11 forearms. Forearms forms the unit of measurement as it is used to express the length.

c. In ancient days, the distance a person walked was expressed in steps. Thus step formed a unit of measurement used to express the distance.

d. The thickness of your science textbook is 6 millimetres. Millimetre is the unit of measurement.

e. When playing marbles, the span is used to measure and express the distance. Here span is a unit of measurement.

f. I cut out a piece of wire 3 metres long. Here metre is the unit of measurement.

g. The book is 10 centimetres broad. Here centimetre is the unit of measurement.

Thus millimetre, span, forearm, metre, kilometre, centimetre, step are some of the units of measurement of length.

(ii) Oral Verbal Elaboration

1. Suppose you want your friend to buy a pair of chappals for you. You measure the length of your foot as 18 centimetres. Here centimetre is a unit used to convey the length of your foot.

2. A lady wants to buy a cloth which is 3 metres. Here metre is a unit of measurement used to tell how long a cloth she wants.

(iii) P.L.M. (Deviated form)

Section A

Many years back there were no measuring instruments. But the people did measure things. They measured the distance from one place to another by using their step. Step is a unit of measurement. People also measured the length of sarees by using span as _____ of measurement.

Ravi measured the length of the electric wire. It was 12 forearms in length. Here forearm is the unit of measurement of length.

Underline the unit of measurement of length in this example .

Geetha measured the length of her ribbon. It was 15 match-sticks in length.

Rohan measured the length of a thread with a ruler. It was 75 centimetres in length. Here centimetre is the unit of measurement of length.

Underline the unit of measurement of length in this example.

The carpenter measured the height of the ladder with a measuring scale. It was 3 metres long.

Turn to Section B

Section B

Some examples are given below. Underline the unit of measurement of length.

1. The door is 2½ metres in length.
2. The school playground is 1 kilometre wide.
3. The bench is 3 forearms in length.
4. The stick is 13 inches in length.

(iv) 'Do it Yourself'

Teacher (investigator) asks "Measure the length of this strip of paper with a match-stick. Report the length." After the pupils have completed it, the teacher asks, "What is the unit of measurement used?"

1.4.3 Instructional Objective. 3

Need for a fixed unit of measurement of length

(i) Flash Card

Radha wanted to buy a table. She advertised in the the Loksatta Newspaper as follows:
"Wanted a table which is 2 forearms in length, 1 forearm in breadth and 2 forearms in height. Many carpenters measured their tables with their forearms and brought the table according to the size mentioned. Radha measured the tables with her forearm and found that none of these tables were exactly, the size she had mentioned. Why was it so?

Radha's forearm was not the same size as the carpenters' forearms. So, naturally the measurement of these tables taken by carpenters using their forearms was different from Radha's. She could have got the exact size of the tables had she and the carpenters used a fixed unit for measuring the table.

(ii) Oral Verbal Elaboration

1. Suppose your mother asks you to buy a plastic wire as long as 4 spans when she measures it with her span. You go to the shop and measure a plastic wire with your span and buy 4 spans of it. When you come home, your mother measures and finds that it is 3½ spans in length. Why is there a difference in the number of spans?

   The reason for this is that your mother's span is bigger compared to your span. So, naturally, when you measured the wire with your span , the number of spans was more compared to the number of spans when your mother measured the wire with her span. To overcome this difference in measurement a fixed unit should be used for measuring and expressing lengths.

2. Two boys, Ram and Raju measure a line with their spans.

   Ram = 3 spans
   Raju = 4 spans

   Why is there difference in the two measurements?

   This is because Ram's span is bigger compared to Raju's span.

Ram and Raju measure the same line with a stick (Both of them use the same stick)

Ram = 3 sticks
Raju = 3 sticks

There is no difference in the two measurements.

This is because the stick size remains the same no matter who uses it for measuring. Thus it can be seen that a fixed unit must be used to get the same measurements of an object.

(iii) P.L.M. (Deviated form)

Section A

a. Let us measure D's height (a medium height pupil) with F's forearm (a pupil with small forearms) and fingers.

How many forearms & fingers is her height?

_____

Let us measure D's height with G's forearm and fingers (a pupil with longer forearm).

How many forearms and fingers is her height?

_____

Why is there difference between F's and G's measurement of height of D?

_____

_____

Do you think this method of using our body parts for measuring length is correct?

Why is it so?

(Teacher listens and then explains)

The size of F's forearm and fingers is different from G's forearm and fingers.

Thus we see that the size of our body parts vary hence we cannot get a definite measurement. Therefore, we should use a fixed unit for measuring as a fixed unit will remain the same size no matter who uses it for measurement.

b. You (H) measure the height of I by using this stick. What is her height i.e. how many sticks is his height.

J measures the height of I using another stick. What is her height i.e. how many sticks is her height?

Why is there difference in the measurement of height of I?

(Teacher listens and explains)

Here two sticks have been used, each of them varies in size. For accurate measurement we should use a fixed stick.

Now 'H' measure the height of I, by using this stick. What is her height? i.e. how many sticks is her height?

J measure the height of I using the same stick. What is her height?

In both the cases, we get the same measurement i.e. 2 sticks. This stick is a fixed unit of measurement that you have used in measuring the heights. Thus for accurate measurement there's need of a fixed unit of measurement.

Turn to Section B

Section B

An example has been given to you where measurement has been done in two ways. Tick mark (✓) the more accurate measurement of the two. Satish measured the twine thread with his span and lend it to Rahul. When Rahul returns it, which would be the more accurate way of measuring the twine?

a. Rahul measuring with his span ( )

b. Satish measuring with his span ( )

(iv) 'Do it Yourself'

The teacher (investigator) asks student 'A' "Measure the breadth of the cupboard with your forearm and fingers." The teacher then measures the breadth of the same

cupboard with her forearm and fingers. The teacher asks pupil A, "What is the breadth of the cupboard?" The pupil replies. The teacher asks "What is the breadth of it when I measured it?" The pupil replies The teacher asks "Why is this difference? Teacher listens. She then holdsher span over the pupil's span and asks "Whose span is bigger?" The pupil replies. The Teacher says "Since the size of my span is bigger, I get lesser number of spans in my measurement compared to your measurement. To overcome this difference, a fixed unit of measurement must be used."

1.4.4 Instructional Objective 4

Need for Standard Unit of measurement

(i) Flash Card

a. Sita was asked by her mother to measure the length of a sari, using one which is more appropriate of the two ways of measuring.

(a) Measuring the sari using forearm and fingers as units of measurement of length.

(b) Measuring the sari using metres and centimetres as units of measurement of length.

Sita chose to measure the length of a sari using metres and centimetres as units of measurement of length because she could conveniently measure the length of the sari accurately and it was easier for her to communicate to her mother the length of the sari.

b. In order to measure different things and give consistent meaning to the measurements, it is essential that we have standard units of measurement. Without standard units of measurement, it would be virtually impossible to communicate about measurements and make comparisons of measurements. For example, if a person's "step" was used as a unit of measurement, a particular room might be four steps long when measured by a long-legged person and five steps long when measured by a short-legged person. In other words, "step" is not a standard unit of measurement because it varies with the length of the legs.

(ii) Oral Verbal Elaboration

Rajiv was asked by his teacher to measure Hemant's height using one which is more appropriate of the two ways of measuring.

a. Measuring Hemant's height using a stick as unit of measurement.

b. Measuring Hemant's height using metres and centimetres as units of measurement.

Rajiv chooses to measure Hemant's height using metres and centimetres as units of measurement because he can conveniently measure the height accurately and it is easier for him to communicate to his teacher the height of Hemant.

(iii) P.L.M. (Deviated form)

Section A

Suppose you have a pen friend in Bombay. You want to know whether he is taller than you. How would you find out?

It is not possible for you to measure your height with a stick and send the same stick to your friend to measure his height. In the same way, it is not possible for you to compare your height with other people unless all of you have the same fixed unit of measurement. In order to help all the people to communicate to each other accurately the height, length etc. of things we use a standard unit. A standard unit is a fixed unit used by all the people in the world to measure things.

Turn to Section B

Section B

Suppose you are asked to mention your height in an admission form. You know your height in two forms.

a. Your height measured using a stick ( )

b. Your height measured using metre/ centimetre. ( )

Which of these two measurements will you fill in the admission form? Tick mark (✓) the correct answer.

Why will you fill the particular measurement?

(iv) 'Do it Yourself'

Teacher (investigator) asks "Measure the breadth of your book with the match-stick. Measure the breadth of the book with a ruler." After the pupils measure the teacher asks "What is the breadth of your book when you measured it with the match-stick?" Teacher waits for the reply and then asks "What is the breadth of the book when you measure it with the ruler?" Teacher listens and then asks "Which of these do you find convenient and why do you find it convenient.

1.4.5/6 Instructional Objectives 5 & 6.
Description of the metre rule and Relationship of Km/m/cm/mm to each other and use of the appropriate unit for measurement

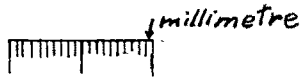
(i) Flash Card

A metre rule has 100 markings which start from '0' and end to 100.

Near each number, there is a long mark (red colour)

The distance between two such long marks which come just one after the other is called a centimetre.

This distance is again divided into 10 number of equal parts. Each of these parts is called a millimetre (green colour).



Since there are 10 mm between one centimetre and the next centimetre we can say that 10 mm make a cm. Since there are 100 cm in a metre, we can say that 100 cm make a metre. But 1 cm = 10 mm. Therefore 100 cm (1 m) = 10 x 100 = 1000 mm.

There is another unit which is bigger than a meter. It is 1000 times a metre. It is called the Kilometre (Km). Therefore 1000 metres make one kilometre.

(ii) Oral Verbal Elaboration

Look at the metre rule. Count how many long markings the metre rule has?

There are 100 long markings present in the metre.

The distance between one long marking and the next marking is a centimetre. Thus how many centimetres are present in a metre.

There are 100 cm present in a metre. Therefore 100 cm make a metre.

How many smaller spaces do you find in a centimetre?

There are 10 small spaces in a centimetre. Each of this space is called a millimetre. Therefore 10 mm make a cm. Thus how many millimetres make a metre?

Since 10 millimetres make a centimetre and 10 centimetres make a metre

1 Centimetre = 10 millimetres

$\therefore$ 100 centimetres = ?

10 x 100 = 1000 mm.

Therefore 100 cm = 1000 mm

But 100 cm = 1 m

$\therefore$ 1000 mm = 1 m.

There is another unit of measurement of length. It is called kilometre.

1000 metres make a kilometre.

(iii) P.L.M. (Deviated form)

Section A

1. Observe the metre rule. From what number does the metre rule start?

The metre rule starts from zero.

To what number does it end?

The metre rule ends at 100.

Turn to Section B.1

Section B.1

2. Look at the markings which are coloured blue. How many such markings are there on the metre rule?

There are 100 such markings on the metre rule. The distance between two such markings is called a centimetre.

Turn to Section B.2

Section B.2

3. Thus how many centimetres are present in the metre.

(Count the number of centimetre on the metre rule). There are 100 centimetres present in the metre. Above each of these blue markings, what do you see?

Numbers are seen above the blue markings. Each of these numbers shows the distance of the corresponding centimetre marking from the starting point.

Therefore, the distance of this marking

i.e. 7 from the starting point is 7 centimetres.

Turn to Section B.3

Section B.3

4. Look at the centimetre.

How many smaller spaces does it have?

There are 10 smaller spaces in a centimetre. Each of this space is called a millimetre.

∴ Each centimetre has 10 millimetres.

A metre has 100 centimetres

∴ A metre has _____millimetres.

A Kilometre is a bigger unit of measurement as compared to metre. It is 1000 times bigger than a metre i.e. 1000 metres make a kilometre.

Turn to Section B.4

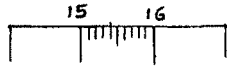
Section B.4

Section B

1. Fill in the blanks

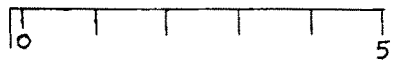
The metre rule starts from _____and ends upto _____number.

2. Therefore the distance between 15 & 16 is a _____



∴

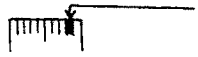
3. How much distance is this marking from the starting point.



Fill in the blanks

There are _____number of centimetres in a metre.

4. (i) Therefore



the shown space is a _____

(ii) Fill in the blanks

a. _____millimetres make a centimetre.
b. _____millimetres make a metre.
c. _____metres make a kilometre.

(iii) Tick (mark (✓) the correct answer.

The centimetre and millimetre are _____than a Kilometre.

(a) bigger ( )
(b) smaller (( )

(iv) Alternative Reading Material

a. Measuring in metres

A metre is longer than a step, so we cannot show the length on this page. We can however show one-tenth of a metre. Here it is, in the form of a small ruler (Fig.A)

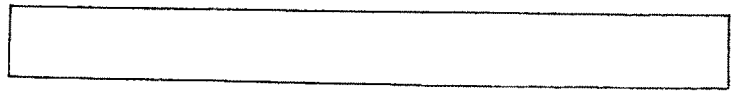


FIG. A

The reason that one tenth of a metre is shown rather than some other fraction, is that when the metre was introduced it was decided that larger units would be 10 metres, 100 metres, etc., while smaller units would be one-tenth of a metre, one-hundredth of a metre etc. This system of measurement was called the metric system. It may be noted that in metric system, we always work in multiples of ten as it is convenient for remembering and conversions. The abbreviation for metre is m. We write : 15 metres as 15 m.
27 metres as 27 m.

b. Measuring in Centimetres

A metre is a convenient unit to use for measuring, for example, the distance between two trees, the length of a football pitch, the width of a room. But even for these lengths we often find that we do not have an exact number of metres. We find for instance that a length is just over forty seven metres and that another length is just under forty two metres. In these cases, we give the length to the nearest metre. If the extra bit is less than half a metre we ignore it; if it is more than half a metre we count it as whole metre.

Giving the length in this way, to the nearest metre, is often good enough for our purpose. But there are many occassions when we have to be more exact. There are also many lengths for which a metre is far too big a unit in which to measure. For e.g., the length and width of this paper cannot be measured using a metre rule. We have to divide the metre into smaller parts.

We have already used a tenth of a metre to make our smaller ruler (Fig.A). But this is itself still too large a unit to measure a pencil eraser. We need something much smaller. So, as we always work in tens, in the metric system, we divide this tenth of a metre into ten equal parts, as shown in B below.

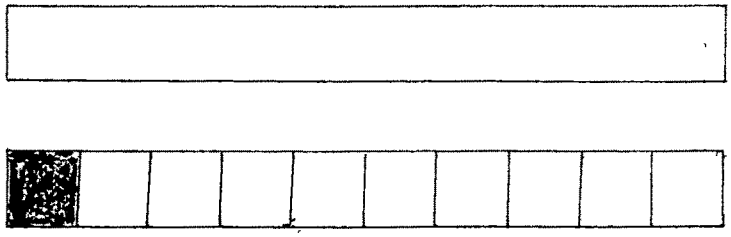


Fig. B

Since we need ten of the strips, labelled A, to make a metre-strip, we shall need one hundred of the smaller parts shown in B to make a metre-strip. So the length of the shaded part of B is one-hundredth of a metre.

One hundredth of a metre is called a centimetre.

1 metre = 100 centimetres.

A ruler marked in centimetres is given below.

The abbreviation for a centimetre is cm.

d. Measuring in Kilometres

So far we have been measuring in metres, centimetres and millimetres. When we come to measuring distances between towns; however, these units are rather small. We could go on using metres but it would not be very convenient. The numbers would become very large, so we usually use a larger unit.

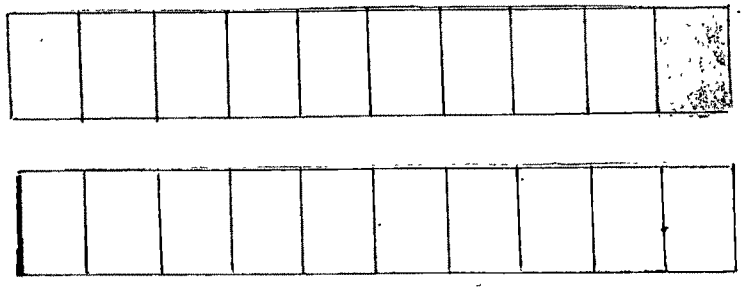
Remembering that in the metric system, we always work in multiples of ten, we could make our larger unit equal to 10 metres or 100 metres or 1000 metres etc. The first two of these are sometimes used but generally we choose to work with a unit which is 1000 metres. This new unit of length is called a **kilometre.**

1 Kilometre = 1000 metres.

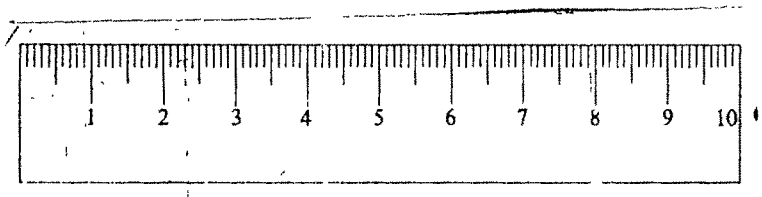
The abbreviated form of Kilometre is km.

e. Measuring in Millimetres

At times, we find some lengths are exact number of centimetres. In most cases, we have to give the length to the nearest centimetre. This is sometimes good enough for our purpose, but at times we have to be more accurate. This is especially true in engineering and science. So, once again we need a small unit of length. This we get by extending the pattern used so far. We divide the centimetre into ten equal parts.



This new unit is called a millimetre. It is one-thousandth of a metre.



1 metre = 1000 millimetres

The abbreviated form of Millimetre is mm.

Observe the small ruler. There are millimetre and centimetre markings on it.

1.4.8. Instructional Objective.8

Use of Appropriate units of measurement

(i) Oral Verbal Elaboration

The distance between station and Makarpura is

a. 9 kilometres
b. 9000 metres
c. 9,00,000 centimetres
d. 90,00,000 millimetres

From the above measurements, we can observe that for distance between two far off places, it is convenient to use kilometre as unit of measurement because it expresses the length in minimum digits. If we use millimetres as unit of measurement, it becomes difficult to write as well as remember all the digits correctly. Similarly if the measurement is in metres or centimetres it requires more digits.

The length of a room is

a. 6/1000 kilometre.
b. 6 metres
c. 600 centimetres
d. 6,000 millimetres.

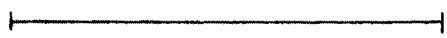
From the above measurements, we can observe that for measurements, which are smaller than a kilometre, metre would be most suitable unit because it expresses the length in minimum digits. If we use kilometre as the unit, it becomes difficult to express it in fractions of kilometre, because the room is much smaller than a kilometre. It is also difficult to express the length of the room in millimetres and centimetres.

Similarly for things smaller than one metre, we should use centimetre as the unit and for things smaller than one centimetre we should use millimetre as the unit of measurement.

(ii) P.L.M. (Deviated form)

Section A

1. Measure the length of the line drawn. Express it in centimetres and millimetres.



It is _____ centimetres long.
It is _____ millimetres long.

Which of these, centimetre or millimetre is convenient and appropriate to express this length?

It is more convenient and appropriate to express this length in centimetres.

Turn to Section B.1

2. Measure the length AB. Using which of these units - centimetre, millimetre, metre, will you express the length of AB.

It is _____long.

The length of AB should be expressed in millimetres.

Turn to Section B.2

3. Measure the length of this cloth. Express it in millimetres, centimetres and metres respectively.

It is _____millimetres long.

It is _____centimetres long.

It is _____metres long.

Which of these - millimetres, centimetres or metres is convenient and more appropriate to express the length of this cloth.

Metre is convenient and more appropriate to express the length of this cloth.

Turn to Section B.3

4. Which is the most convenient and appropriate unit of the following units - millimetre/centimetre/metre kilometre to express the distance from Baroda to Surat.

Of these units, kilometre is the most convenient and appropriate unit to express this distance.

Turn to Section B.4

Section B

1. Measure the length of the card, given and express it in centimetres and in millimetres.

   The length of the card is _____centimetres.

   The length of the card is _____millimetres.

   Which of these, centimetres or millimetres is convenient and appropriate to express this length?

2. Measure the thickness of this book. Using which of these units - centimetre, millimetre, will you express this thickness.

   The thickness of this book should be expressed in _____

3. Measure the distance from the red mark on the floor to the blue mark on the floor. Express it in millimetres, centimetres and metres respectively.

   It is _____ millimetres long.

   It is _____ centimetres long.

   It is _____ metres long.

   Which of these centimetres, millimetres or metres do you find more convenient and appropriate to express this distance?

4. Which is the most convenient and appropriate unit of the following units - millimetre/centimetre/ metre/kilometre, to express the distance from Alkapuri to Makarpura.

_____is the most convenient and appropriate unit to express this distance.

1.4.9/10/11/12 Instructional Objectives 9,10,11 & 12

Differentiation between Length, Breadth and Height

(i) Flash Card

When we measure how long a wire is, we are measuring its length.

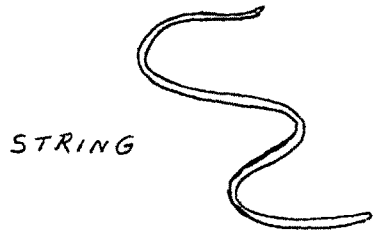
When we measure how broad or wide a window is, we are measuring its breadth.

When we measure how high the building is, we are measuring its height.

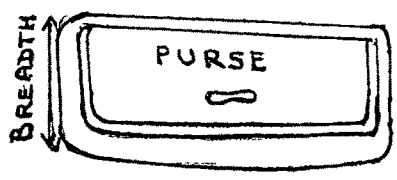
(ii) P.L.M. (Deviated form)

Section A

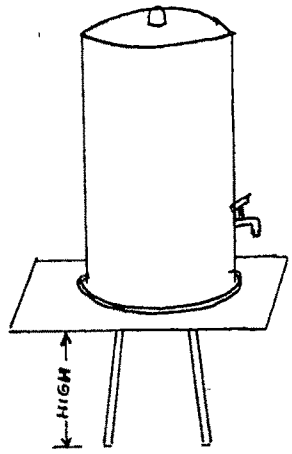
When we measure how long a thing is, we are measuring its length.



When we measure how broad or wide a thing is, we are measuring its breadth.



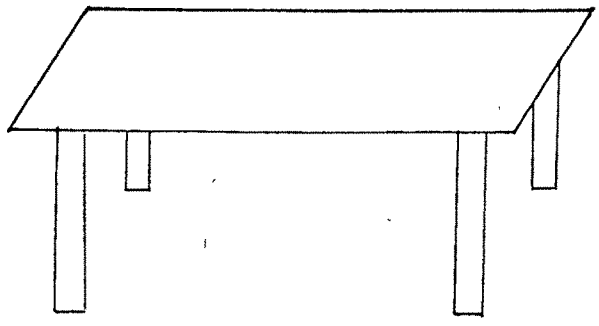
When we measure how high a thing is, we are measuring its height.



Turn to Section B

Section B

Look at this figure. Point its length, breadth and height.



Abbreviations of the units of measurement of length

(i) P.L.M. Deviated form)

Section A

The millimetre can be expressed in the abbreviated form (short form) as mm.

Thus millimetre = mm

The centimetre can be expressed in the abbreviated form (short form) as cm.

Thus centimetre = cm

The metre can be expressed in the abbreviated form (short form) as m.

Thus metre = m

The kilometre can be expressed in the abbreviated form (short form) as km.

Thus kilometre = km

Turn to Section B

Section B

The abbreviated form (short form) of millimetre is _____.

The abbreviated form (short form) of centimetre is _____.

The abbreviated form (short form) of metre is _____.

The abbreviated form (short form) of kilometre is _____.

Turn to Section C

Section C

The full form of mm is _____

The full form of cm is _____

The full form of m is _____

The full form of km is _____

Using the decimal notation to write lengths.

Oral Verbal Elaboration

Your height can be written in many ways.

E.g. : My height is : 1 metre 74 centimetres
174 centimetres
1740 millimetres.

It could be written more appropriately in metres and fractions of a metre. For this we have to use our knowledge of decimal notations for numbers so as to include fractional parts.

For whole numbers we have:

Hundreds Tens Units
H T U

So for the whole number 276

H	T	U
2	7	6

For whole numbers and fractions we have:

Hundreds Tens Units Tenths Hundredths
H T U t 'h

So for 193 metres and 27 centimetres we can write as HTUth
19327

Without using HTUth, we show where the units end and the tenths start by inserting a decimal point between the '3' and '2' and write as 193.27 metres.

Exercises :

Write as metres, using decimal form

a. 3 m 76 cm _____

b. 2.65 cm _____

c. 308 cm _____

Change to metres and centimetres

a. 4.69 m _____

b. 0.27 m _____

c. 194.0 cm _____

d. 0.08 m _____

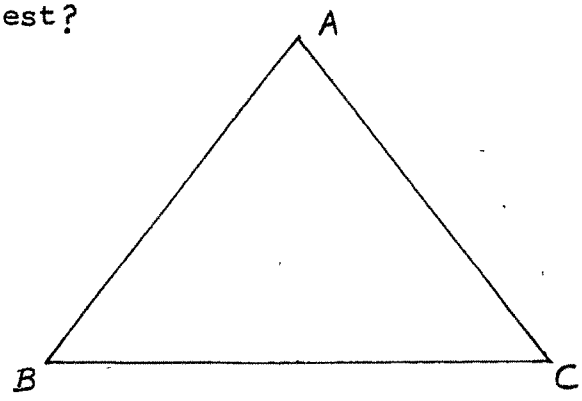
e. 250.0 cm _____

f. 18.8 m. _____

1.5 ENRICHMENT ACTIVITIES

1. A card strip has been supplied to you. Make a measure scale by making marks at a distance of 10 mm each (one cm.). The measuring scale should be 15 cm long.

2. Measure the sides AB, BC & AC. Which of the sides is the longest?



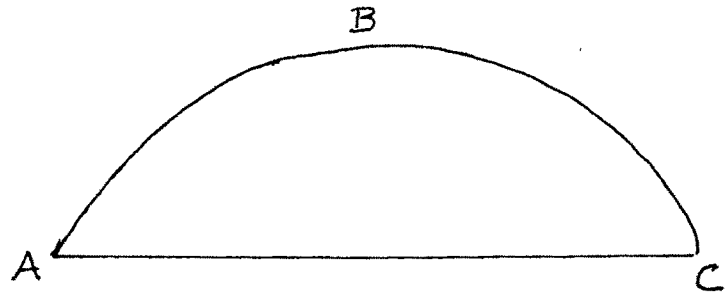
AB =

AC =

BC =

_____is the longest side.

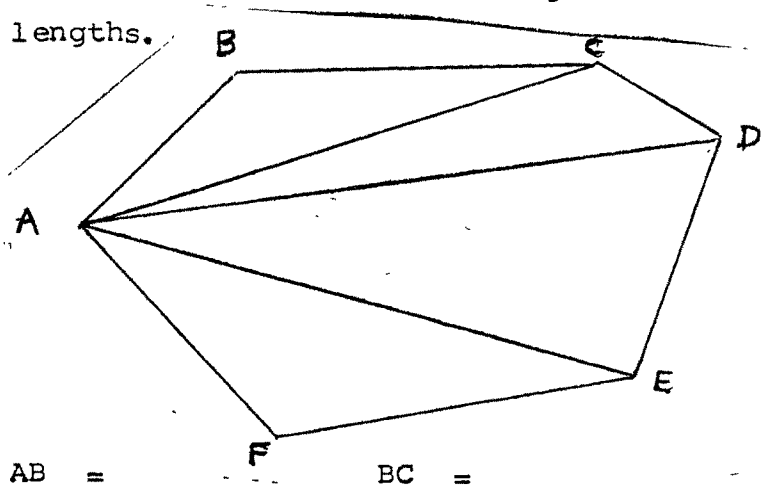
3. Measure the side ABC & the side AC.



ABC =

AC =

4. Among the following AB, AC, AD, AE, BC, CD, DE, EF and AF. write down which is the shortest and which is the longest. Mention their lengths.



AB = BC =

AC = CD =

AD = DE =

AE = EF =

AF =

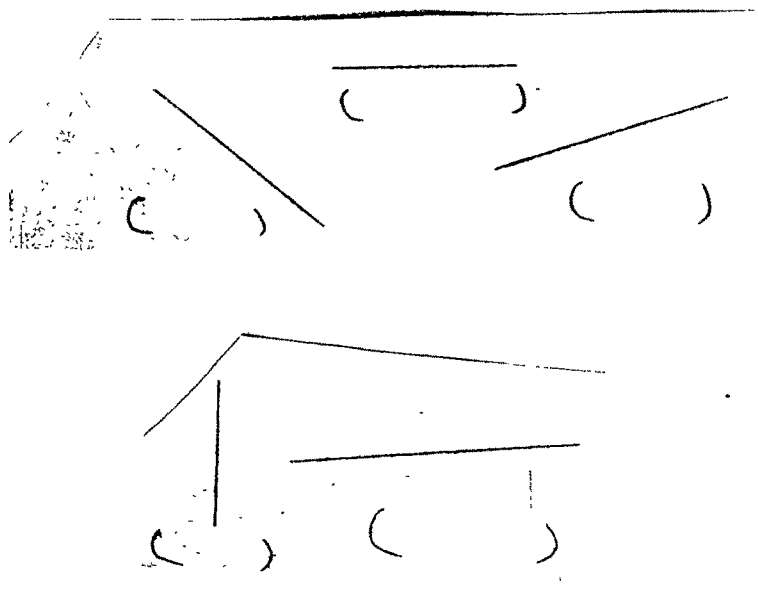
_____ is the shortest.

_____ is the longest.

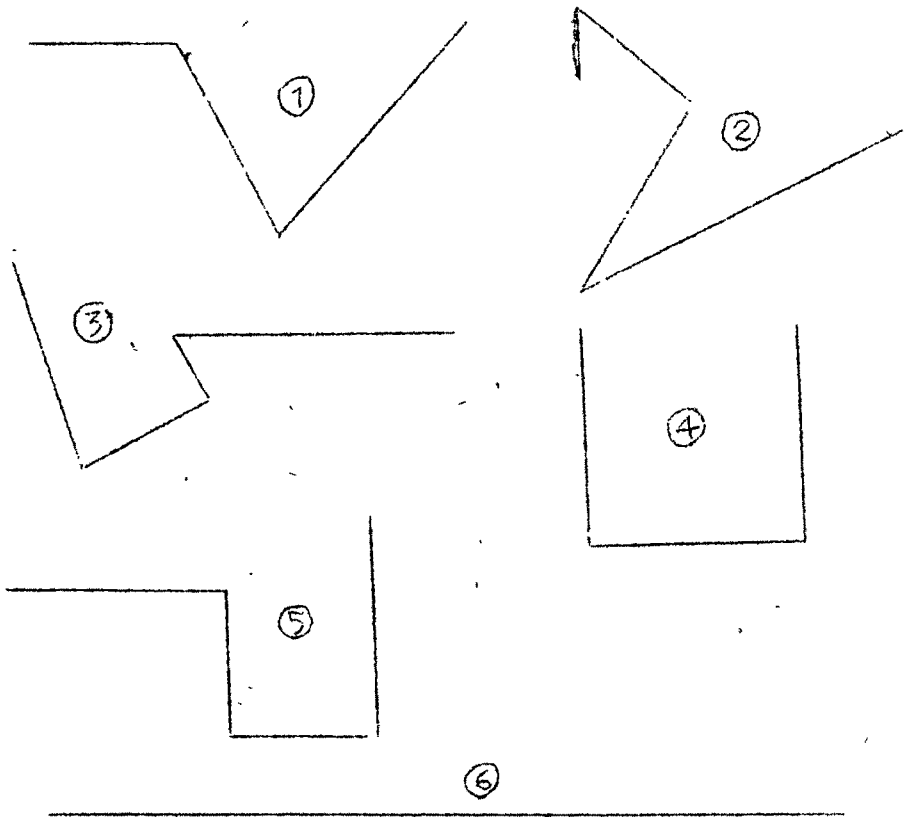
The length of the shortest line is _____

The length of the longest line is _____

5. Number the following from 1 to 5 from the shortest to the longest.



6. Write the figure numbers which have the same lengths.



7. Bill and his father wanted to build a kennel for the puppies. They wanted the fence to be at least 2½ metres high. They had a choice of 230 cm. or 200 cm. Which did they buy to have a fence at least 2½ metres high?

_____

_____

_____

_____

How many centimetres lesser was it than needed?

_____

_____

8. As Tom was building a hen's pen, he realised he needed two more pieces of board. One piece measuring 2.46 metres and the other piece 3.94 metres.

   a. Can these two pieces be sawed from a board 7 metres long?

   _____

   _____

   _____

   b. The 7 metres board is how many metres or centimetres too long or too short?

   _____

   _____

9. The school teacher told Raju that he was 1½ metre tall. Last week, his father measured his height and said he was 150 centimetres tall. Had Raju grown taller?

10. Mary is buying ribbon for gift wrappings. One rool is marked "120 cm" and another is marked "1.8 m". Which roll has more ribbon?

How much more ribbon does it have?

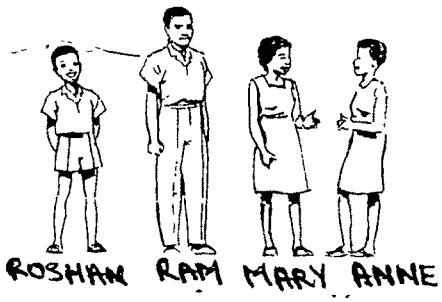
11. Reading Material

A. Comparing two quantities.

We can compare two quantities without the help of measuring instruments, that is, by using only sight and other senses.

For example

(a) By looking at a set of people, we can compare their heights and make statements such as: Ram is taller than Roshan, Roshan is shorter than Ram, Mary is the same height as Anne.



Exercise :

(Do not use any standard measuring instrument for these exercises)

1. Stand outside and pick out two trees which appear to be about the same distance away from where you are standing. Try to find a way of deciding which is the nearer to you.

Here is a method that you may have used in exercise 1.

Use a ball of string. Find how much is required to reach onetree and then see whether this is more than, less than, or the same as the amount needed to reach the other tree.

Another method is to count the number of steps to each tree.

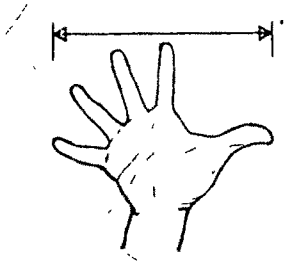
B. Natural Units.

In the above exercise we have compared two quantities either by:

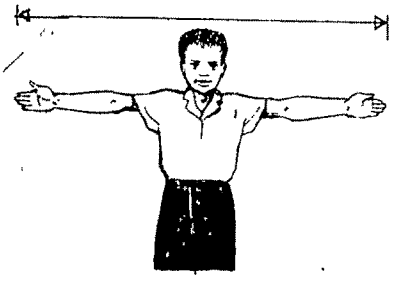
(a) direct comparison (e.g. using the ball string).

(b) using some kind of simple measure (e.g. step) and counting the number which make each quantity.

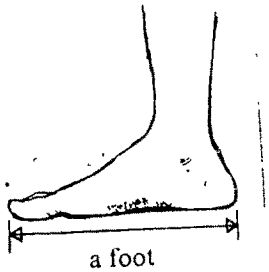
In every day life these two methods of measuring have been used for a long time. We often have no choice but to look around to see what we can use as a simple measure. For example, when working in the fields. If we want to compare two lengths, we can use our step as a measure. It is usually good enough for our purpose. In fact, over the centuries many parts of the body have been used as natural units for measuring length. Here are some examples.



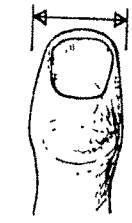
a hand-span



a fathom



a foot



a thumb-width

a palm

For long distances, units such as a 'stone-throw', a 'spearcast', a 'furrow' long (or 'furlong'), and a 'day's journey' were used.

All these natural units are, of course not very accurate. They vary very much from person to person.

Exercises :

1. (a) Ask some of your friends to count the number of their steps to a tree

   (b) Ask them also to count the number of steps when they come back

   (c) Do all your friends take the same number of steps to the tree?

   (d) Do they each take the same number coming back as going?

   a. _____

   _____

   b. _____

   _____

   c. _____

   _____

   d. _____

   _____

2. Pick out a distant tree

   (a) Ask your friends to find how many stone-throws it is to the tree.

   _____

   (b) Do they all take the same number?

   _____

   _____

From these exercises, we see that although natural units often serve our purpose in everyday life, they do vary a lot. They can give rise to much argument and disagreement when they are used in trade or commerce. To avoid this, units of measure are needed which are always the same no matter in which village, town or district they are being used. In the same way, because countries trade with one another, it is much less complicated if all countries use the same units for their measures. For this reason it is more and more necessary to have a set of standard units throughout the world.

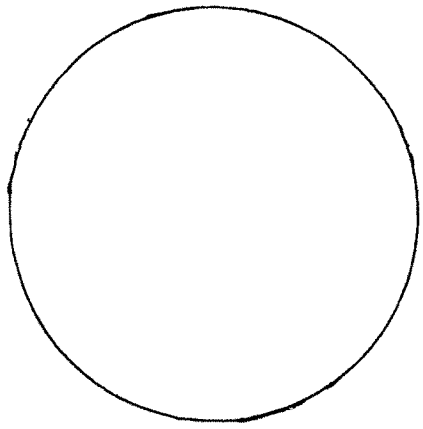
C. Standard Units

For a long while it was found that, even in one country, it was far from easy to choose standard units which everyone would accept and use. People do not like to change their habits. They prefer to go on using the old ways of measuring even though these are often unsatisfactory.

The rulers of some countries did try to introduce better units. For example, some used the length of the foot of a particular person as the standard unit of length. Units of this kind were better than those used previously but they still varied from district to district. Trading remained difficult and inefficient.

Such was the state of affairs in France at the time of the Revolution in 1789. The efforts of the Government to introduct proper standards had met with little success. There were still many different units in common use. They varied from province to province and even from town to town. Trade was suffering because of the lack of well-defined standard units.

At last, in 1791, a new standard unit of length was agreed upon. It was not like any of the earlier units. It was to be one ten-millionth of a quarter of a circle on the earth, passing through the North & South poles. In 1793 the name 'metre' was given to



this unit of length. The units for the other measures were then based on the metre.

1.6 FINAL TEST

1. Explain with the help of an example how you measure length.

_____

_____

_____

_____

_____

_____

2. In the examples given below, underline the unit of measurement of length.

   a. The table is 120 centimetres long.

   b. The door is 5 spans wide.

   c. The Everest mountain is 8848 metres high.

   d. The distance between my door and my neighbour's door is 12 steps.

3. a. Hema measured a sari with her forearm and fingers and found it to be 5 forearms and 4 spans. Leela measured the same sari with her forearm and span and found it to be 5 forearms and 2 spans.

   (i) Explain why there is this difference in length.

   _____

   _____

   _____

   _____

   _____

   (ii) How can you overcome this difference?

   _____

   _____

   _____

   _____

b. Suppose you and your friend want to find which blackboard is longer.

(a) Standard I

(b) Standard V

Which of the following do you feel most appropriate? Tick mark (_/) your answer.

(i) You measure the I standard blackboard with your span and fingers and your friend measures the V standard blackboard with her span and fingers. ( )

(ii) You measure both the I standard and the V standard blackboard with your span and fingers.

( )

4. a. Choose the most appropriate answer and fill in the blanks:

The length of two lines can be compared more accurately using _____ _____ for measurement of length.

(a) A stick
(b) Your span
(c) Standard unit.

b. What will you do to find out, how much wider is the class door from the class window. (Tick mark (_/) the one you find more appropriate.

(a) Measure the window width and the door width with span and fingers as units of measurement.

( )

(b) Measure the window width and the door width in centimetres. ( )

(c) Measure the window width and the door width with match-stick as unit of measurement ( )

5. Fill in the blanks:

a. A metre rule has _____ number of long markings.

b. These markings on the metre rule start from _____ and end up to _____.

c. The distance between two consecutive long marks is called a _____

d. The distance between two consecutive long marks have _____number of small spaces.

e. Each small space present between two consecutive long marks is called a _____

6. Fill in the blanks :

a. One centimetre = _____millimetres

b. One metre = _____centimetres

c. One kilometre = _____metres

7. Fill in the blanks :

a. 18 metres = _____centimetres

b. 13 Kilometres = _____metres

c. 5000 millimetres = _____metres

d. 15000 metres = _____kilometres.

8. Write your answer in the bracket given below:

Among the following units:

a. Millimetre

b. Centimetre

c. Metre

d. Kilometre

which is the most appropriate unit you will use to measure

i) The length of a sari ( )

ii) Distance from Makarpura to Mandvi ( )

iii) Length of a pen ( )

iv) The height of the classroom ( )

v) Breadth of this paper ( )

vi) The thickness of your pencil eraser ( )

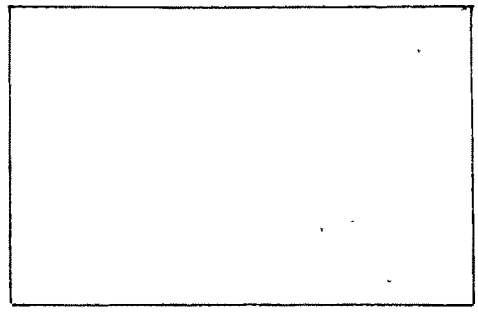
vii) Distance from Delhi to Baroda ( )

viii) The thickness of your Mathematics textbook ( )

9. A strip of card has been given below. Measure the length of this strip with the help of a graded ruler and report the length using centimetre and in addition if needed millimetre as units of measurement of length.

The length of the strip is _____

10. A rectangle has been drawn below. Measure the breadth of the rectangle with the help of a graded ruler and report the breadth using centimetre and in addition if needed millimetre as units of measurement of length.

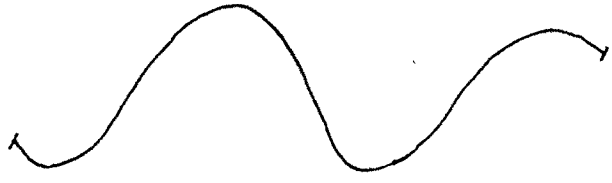


The breadth of this rectangle is _____

11. Measure the height of this cupboard with the help of a measuring scale and report the height using centimetre and if needed millimetre as units of measurement.

The height of this cupboard is _____

12. Measure the length of this wavy line with the help of a string and a measuring scale. Report the length using centimetre and if needed millimetre as units of measurement of length.



The length of this line is _____