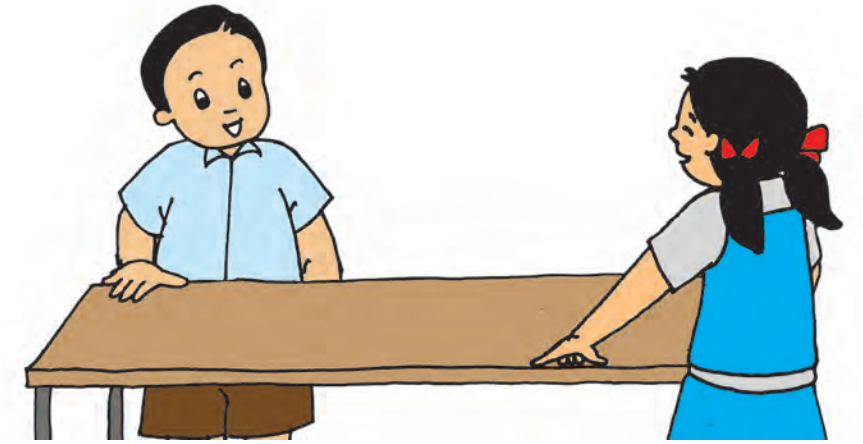
Measurement

Length

Tai told Nandu and Sonu to measure the length of the table.

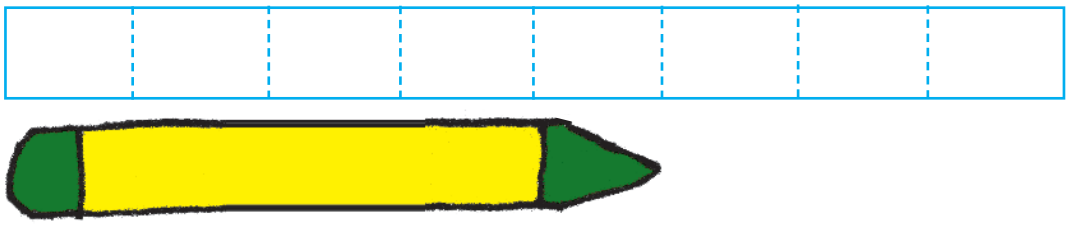


Nandu : The length of this table is 11 spans of my hand.
Sonu : The length of the table measures 12 spans of my hand.
Salma : Both of you used your hand spans. Then why is there a difference in your measurement ?
Tony : Are their hand spans equal ?
Nandu : Mine is bigger than Sonu's. That's what caused the problem.
Tai : All right. I'll give paper strips of equal length to both of you. Use them to measure this length.

Nandu : The length of the table is 9 of these strips.
Sonu : When I measured it, it was 9 strips, too.
Nandu : The strips you gave us were of equal length. That's why the length of the table measured the same.
Salma : So, if we measure the length of something using similar means, it measures the same.
Sonu : If I have to measure a chalkstick, can I use this strip ? This strip is longer than the chalkstick.

Tai : We will fold this paper strip to make equal parts. These small parts will be useful for measuring the piece of chalk.

Tony : Let's fold the strip three times and get 8 equal parts.

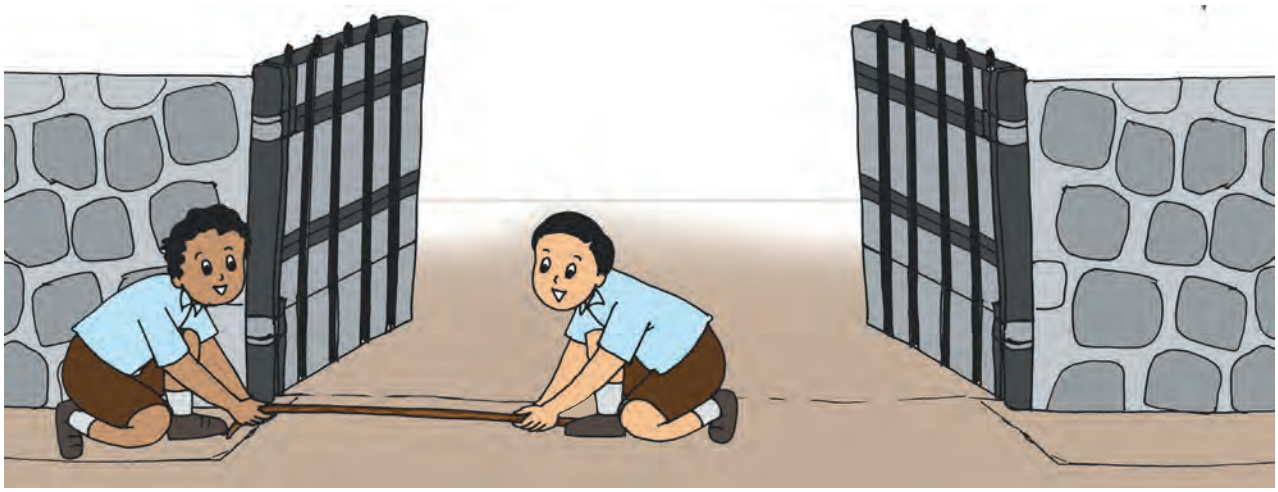


Salma : I'll place the chalk along the paper strip.
This chalk is equal in length to five of these small parts.

Nandu : Now, shall we use this strip to measure the distance between the two posts of the main gate ?

Salma : No, this strip is too short.

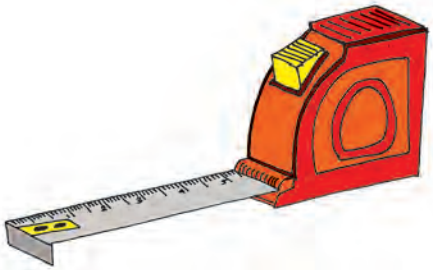
Tai : I have a long string. Let's use that.

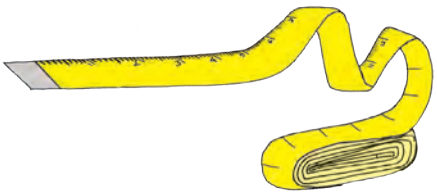


Nandu : Yes, let's use the string to measure the distance between the gate posts.

Tony : The distance between the gate posts is equal to three strings.

Tai : It's easier to measure a great distance using something of greater length. And, to measure shorter lengths, it is easier to use a shorter thing. You have seen that for yourselves, haven't you ?





Tai : A sheet of cloth must measure the same, no matter who measures it. That is why a long metal scale is used to measure cloth in a cloth shop.

This scale is one metre long. The metre is a standard unit which is used for measuring length. If we divide a metre into 100 equal parts, each part is called a centimetre.

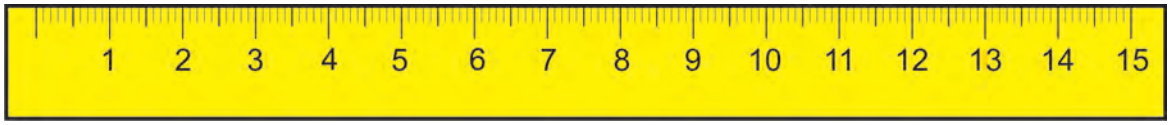
1 metre = 100 centimetres

Salma : We measured the distance between the gate posts with a string. Now let's use this metre scale and measure it again in metres and centimetres.

Nandu : The distance between the posts is 3 metres and 80 centimetres.

Tony : My big brother uses a small ruler from his compass box to measure short distances.

Tai : The numbers 1, 2, 3, 4, ... written beside the bigger markings on this ruler show centimetres. Between two big markings there are smaller markings. They show units of length smaller than centimetres.

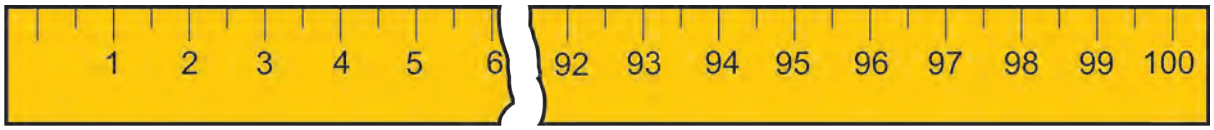


Nandu : Let's use this standard scale to measure the chalkstick again.

Salma : The chalk is 8 centimetres long.

Metre-Centimetre

A metre is hundred times as long as a centimetre. We use the standard unit metre to measure bigger distances.



A metre scale

✦ In the table, write whether you will measure the following lengths/distances in centimetres or metres.

Length of a pencil		Length of your notebook	
Distance between two buildings		Length of a mobile phone	
Width of a road		Distance between two poles	

✦ Measure the following distances in standard units. Get your friends to do so too. Compare your observations. And measure again if there is a difference.

- Length of the school compound wall
- Length of a book
- Length of a newspaper
- Length of a table
- Length of the verandah
- Height of a table above the floor

✦ **Find out the lengths of the following.**

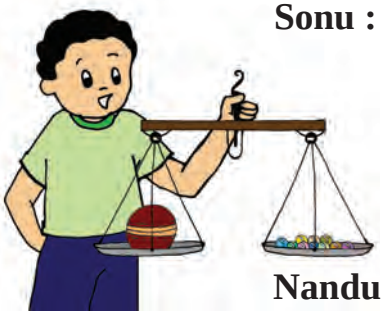
- A sari
- Cloth required to make Father's shirt
- A *dupatta*
- A towel
- A handkerchief

✦ Make an estimate of the measures of the following things. Then check your estimate against an actual measurement.

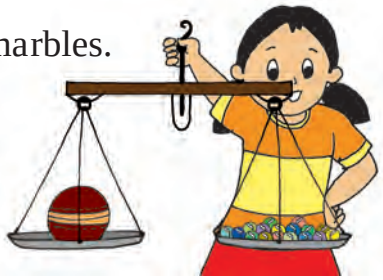
Name	Estimate	Actual measurement using tape/scale
Length of a ladyfinger		
Length of a cluster bean (guar) pod		
Height of a jowar plant		
The girth of a banyan tree trunk		
Distance between two trees in your school		

✍ **For teachers :** Fix a strip showing metres and centimetres on a wall of the classroom. Let the children measure each other's height against it.

Measurement : Weight (Mass)



Sonu : The weight of this ball is 17 marbles.



Nandu : The same ball weighs 10 of my marbles.

Salma : How is that possible ? How can the same ball have different weights ?

Tony : The marbles that Sonu brought were smaller than the marbles that Nandu brought. That's the reason for this confusion.

Tai : That's the reason why shops keep weights which are the standard units for measuring weight.

If something is weighed using standard weights, it measures the same no matter who does the weighing.
The kilogram is a standard unit for measuring weight.

Make a guess about the weight of the given things : Is it greater than or less than 1 kilogram ? Then go to a shop and check if you guessed right.

Things	Estimated weight : 1 kg/ more than 1 kg/less than 1 kg	Actual weight
A packet of salt		
One big lump of jaggery		
50 biscuits		
5 cups of sugar		

Tony : My mother wanted half a kilogram of sugar to make some *halwa*. And we had a bag of one kilogram of sugar.

Salma : Then what did you do ?

Tony : Little by little, I put all the 1 kg sugar in the two pans of the balance and brought them at the same level. In this way, I separated the sugar into two equal parts. Thus, each pan held half a kilogram of sugar. This is how I gave my mother half a kilogram of sugar.

Salma : My mother also often needs half a kilogram of something or the other.

Tony : I'll make a half-kilogram measure for your mother. I'll put the left over half a kilogram of sugar in one pan and some small stones in the other to balance the sugar. I'll tie those stones in a handkerchief and that'll be a half-kilogram measure.

Salma : We could even make a quarter kilogram measure in the same way !

✦ **Use a 1 kilogram weight and a balance to measure out the following weights of rice/wheat/jowar.**
✤ 2 kilograms ✤ 5 kilograms ✤ 3 kilograms ✤ Half a kilogram

✦ **Find out your own weight. Also find out by how much it is more or less than the weight of one of your classmates.**

✦ **Find out about various kinds of balances and use them yourself.**
For example :
✤ The spring balance ✤ Electronic balance/scales ✤ The common balance
✤ Scales for body weight.

Measurement - Volume and Capacity

These are some vessels full of water. Observe them and tell which ones can hold more water and which ones, less.

The bucket will hold the most water and the bowl the least.

This bucket became full when 40 glasses of water were poured into it.

This bucket became full with 10 pitchers of water.

The same amount of water measures different because different means were used to measure it.

No matter who fills water in the bucket, it should measure the same. For that, we must use a standard measure.

This is a measure of 1 litre. The milkman keeps this.

It is used to measure out liquids such as milk and oil.

We can easily get a one-litre water bottle.

The picture alongside shows a measure used especially for kerosene.

The litre is a standard unit for measuring liquids.

✤ Take various vessels such as a pitcher, a box, a pan, etc. and make an estimate of how much water they can hold –1 litre / less than 1 litre / more than 1 litre. Verify your guess by actually using a one-litre bottle.

Pour 3 litres of water into each of the above containers. The water will take a different shape in each container because each container is of a different shape. But the volume of water in each container is 3 litres.

Five 1-litre bottles of water were poured into this bucket. The volume of the water in the bucket is 5 litres.

Find out how much more water can be added to fill this bucket completely.

This bucket can hold 12 litres of water. It means that the capacity of this bucket is 12 litres.

The amount of water that is needed to fill any container such as a pot, a bucket, a drum, or a pan is called the capacity of the container.

✦ Take a bottle with a quarter-litre capacity. Using this as a measure, mark the following measures on a container.

- 2 litres
- Half a litre
- One and a half litre
- A quarter litre

✦ Note how many litres of water you use for the following purposes in your house.

- Bathing
- Washing kitchen utensils
- Brushing teeth
- Mopping the floors
- Drinking
- Watering the garden
- Cooking
- Making 10 cups of tea
- Washing vehicles

✦ Make a list of all those places where water is wasted. Make an estimate of how much water is wasted and suggest ways of reducing the wastage.

No.	Place	Approximate amount of wastage	Remedy