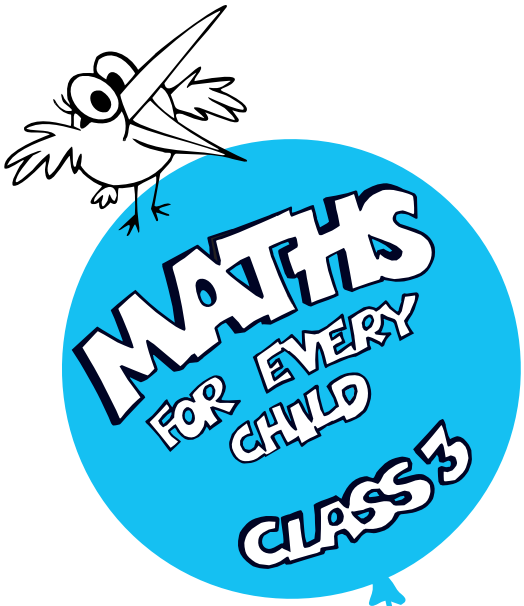
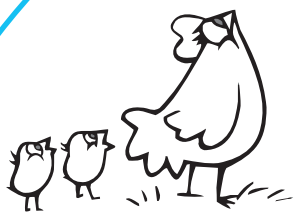


PART B

Text-cum-workbook

K. Subramaniam



Homi Bhabha Curriculum for Primary Mathematics

Pilot Version

Homi Bhabha Centre for Science Education
Tata Institute of Fundamental Research, V. N. Purav Marg, Mankhurd, Mumbai 400 088

Maths for Every Child

Text-cum-workbook

Class III

Pilot Edition, 2001 Reprinted, 2006, 2011

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General preface

Not a day passes in our country when somebody somewhere has not criticized our system of education, particularly our school education. A great many ills and inadequacies of the system probably flow from extraneous causes and need socio-political initiatives that go beyond mere reforms in the school curriculum. Some problems however arise directly from the curriculum – text books, teaching and evaluation practices. We need to keep these problems in view and to continually devise new curricula to overcome them.

Curricular reform efforts and innovations are not new to our country. Nearly every decade, there have been initiatives by the Central and State government agencies to effect changes in curricula. Several independent school networks and voluntary groups have brought out their own textbooks and related materials. There is no doubt that significant progress has been made by the country in better conceptualization of the school curriculum at primary, middle and secondary levels. The paradigms of school curriculum in India have steadily evolved and become more relevant and modern. Unfortunately, the over-all deterioration of the system due to extraneous factors has tended to obscure these gains. Also, and most important for our purpose here, there is a large gap between the generally agreed objectives of the curriculum and their actual translation into textbooks and teaching practices.

Homi Bhabha Curriculum is basically an attempt to close this gap as much as possible. It is not conceived to be a revolutionary curriculum. The broad aims of the curriculum are much the same as those articulated in countless reports and articles of different education departments and agencies. The idea is not to produce a fanciful, 'museum-piece' curriculum that nobody would adopt, but to attempt to discover a sound and wholesome curriculum that is practical to implement in our school system. 'Practical' is, however, not to be regarded as a euphemism for the status quo. As the users will find out, the alternative textbooks of the Homi Bhabha Curriculum are full of radical unconventional ideas that we believe are both urgent, necessary and, given enough efforts, feasible. But rather than describe here what we believe to be these innovative aspects, we leave the users, students and teachers, to find and experience them. In the simplest and most favourable situations, devising a curriculum and translating it into books, laboratories and teacher manuals is a daunting task. In the complex parameters and constraints that govern our country's educational system, the task is formidable. Only time will tell if and to what extent the Homi Bhabha Curriculum is an effort in the right direction.

Arvind Kumar

Note to teachers and parents

As you skim through the pages of Maths for Every Child, you will notice some differences from other textbooks. We have tried to make the book attractive in appearance and interesting to children. However, the most important differences are not in the appearance.

Our aim is to move away from an emphasis on merely knowing procedures to an emphasis on reasoning and understanding. In addition to the learning of facts and procedures, we have laid stress on the connections between concepts and procedures, on finding patterns and on mental arithmetic skills. In many places, we have provided the child with enough concrete experience that will form a strong foundation for further mathematical learning. While doing all this we have retained the positive elements of the traditional approach: systematic organization of topics, careful sequencing and plenty of practice.

If children do not develop a strong sense of the two and three-digit numbers and their operations, it can become a handicap later on. To build a strong number sense, children need plenty of opportunity to play with two and three-digit numbers, to explore patterns and connections and to carry out simple addition and subtraction mentally. Units 1, 3 and 4 give them this opportunity. Unit 5 introduces a systematic approach to word problems using key diagrams, which will be developed further in class IV and V.

In Unit 2, it is important that students get an opportunity to work individually at adding and subtracting with actual matchstick bundles and sticks, at least at home if not at school. This helps children understand the basis for the 'carry' and 'borrow' procedures. The 'games for two', spread through different units, are also intended for playing outside the classroom, possibly at home. The measurement units (9-13) are all activity based and much will be lost if these activities are omitted. To make it easier for the student to carry and use the text-cum-workbook, we have bound it in two parts - Part A (Units 1 to 7) and Part B (Units 8 to 14).

The text-cum-workbook has been designed to be teacher friendly and easy to implement in the classroom. The material in the book has been developed through a process of continuous classroom trials with the participation of able teachers. However we realize that the needs of different kinds of classrooms vary. To take care of such needs we have provided additional help in a separate teachers' book.

We hope that this book takes us part of the way towards an educational culture where mathematics is no longer a source of fear and mystery. Do write and tell us how successful we have been in our endeavour. We would appreciate your feedback about how you used the books and your suggestions.

K. Subramaniam

subra@hbcse.tifr.res.in

Acknowledgement

Porus Lakdawala, my colleague, produced the initial drafts of the first few units. His contribution to the overall approach and framework of the curriculum has been fundamental.

Venola Fernando shouldered both the teaching and the organizational responsibilities of the trial programs. I thank her for her steady support and all-round contributions to the design of the curriculum.

Sumant Rao, Anagha Deshpande and Chetan Sharma, together with the team of Animagic Special Effects, not only produced the beautiful layout and illustrations but also greatly enhanced the quality of the book through their design and content suggestions. The book owes a great deal to their efforts.

I thank my colleagues at HBCSE for their support, feedback and encouragement through the long gestation period of the books. Arvind Kumar, Centre Director, HBCSE, initiated the Homi Bhabha Curriculum project and supported the work on these books at all stages. H.C. Pradhan, co-ordinator, Mathematics Curriculum, helped shape the framework underlying the books besides providing detailed criticism and feedback. Chitra Natarajan, Jayashree Ramadas, G. Nagarjuna and Arun Mavlankar shared their insights and criticisms and helped to make significant improvements in the content and presentation.

Adarsh Gupta helped me learn something about the fine art of teaching. I am indebted to her and to Hemakshi Selani for handling the bulk of the teaching in the vacation trial programs and for their contributions to the design of the learning material.

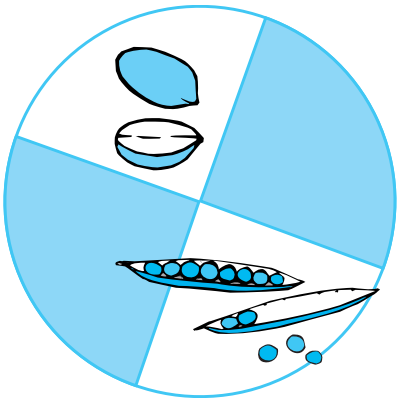
I thank the principals and teachers of the following schools in Mumbai for permission to try the curriculum material in their classrooms: Atomic Energy Central Schools no. 3 and no. 5, Children's Aid Society, Deonar Pada Municipal School, and Nutan Vidya Mandir.

I also thank U. Subbaraju of Timbaktu School, Andhra Pradesh, and Nilesh Nimkar of Grammangal for help with trials with the children of their schools and for valuable feedback and suggestions.

I thank P. R. Fadnavis of HBCSE and his team for providing administrative support. Gajanan Mestry and N. S. Thigale gave prompt help in the production of drafts.

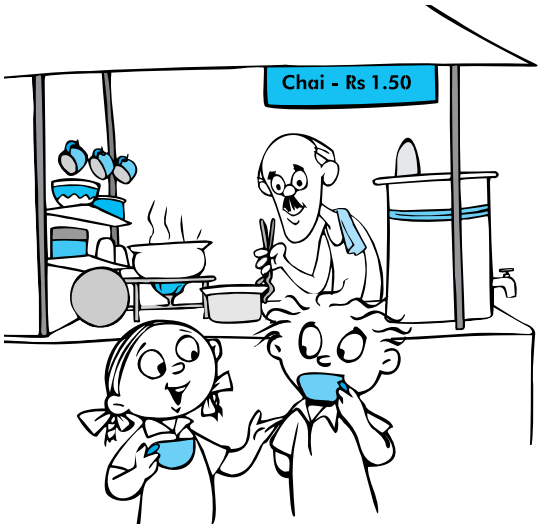
Leena and Chaitanya gave unflinching support and made many criticisms and suggestions.

K. Subramaniam



UNIT 8

Fractions

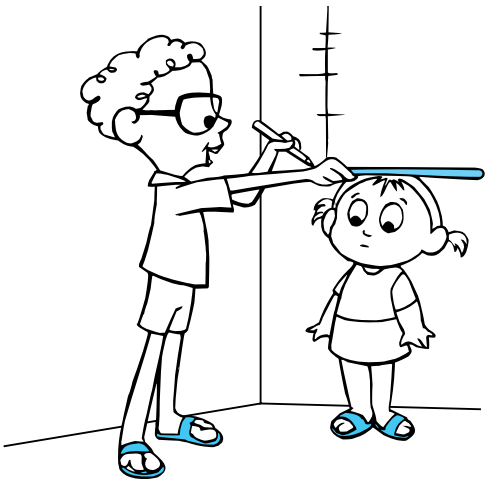


UNIT 9

Money

UNIT 10

Length



UNIT 11

Weight

UNIT 12

Volume

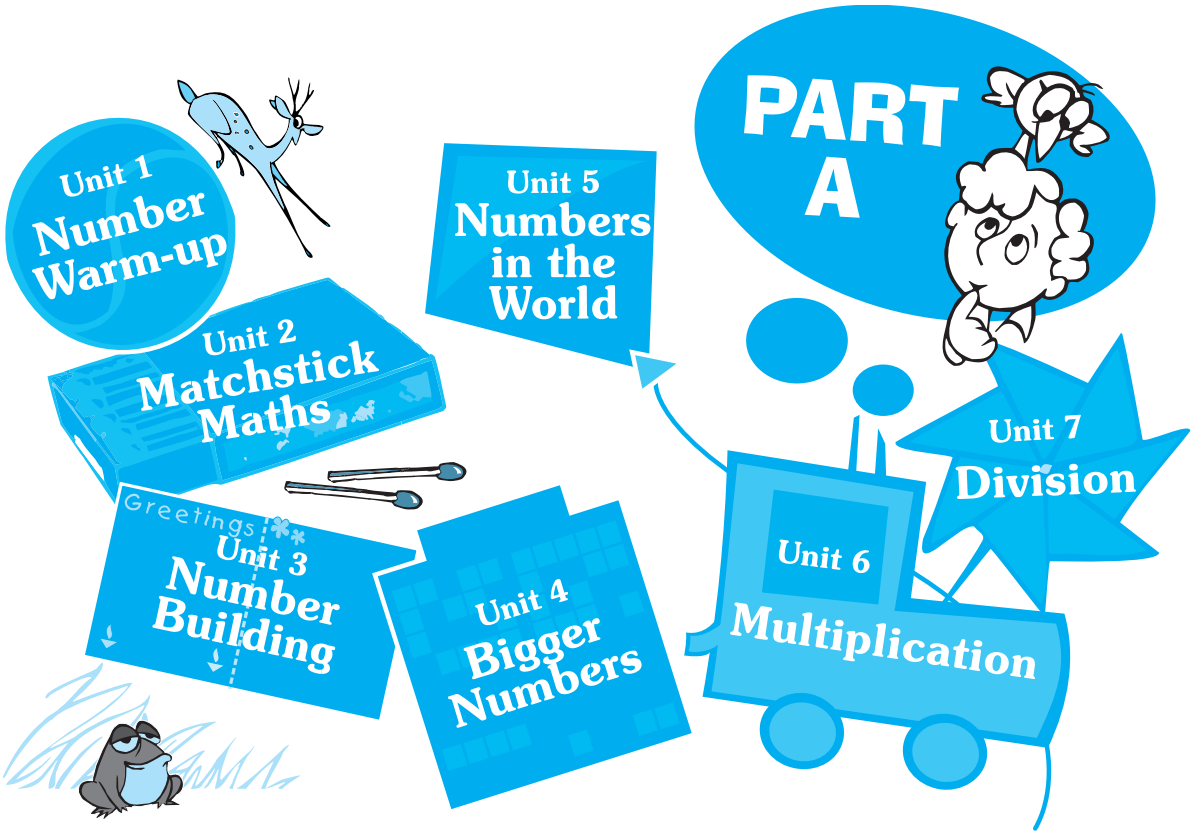
UNIT 13

Time

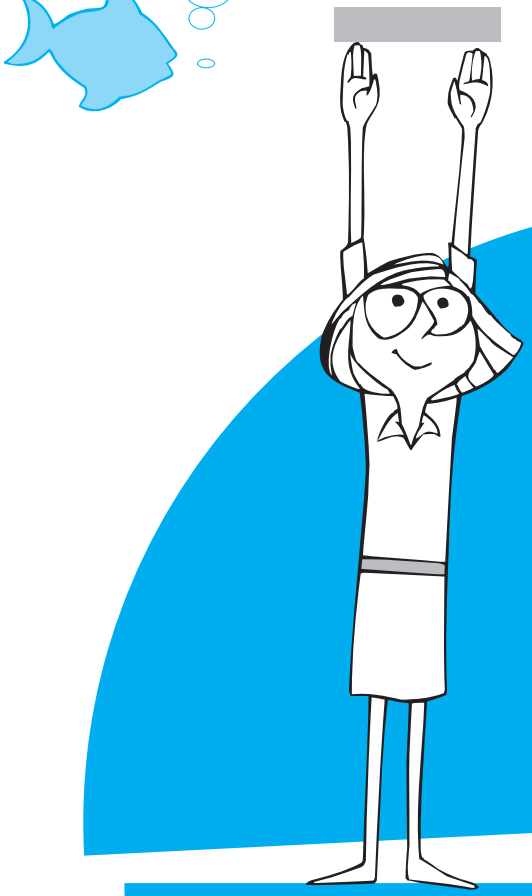
UNIT 14

Geometry

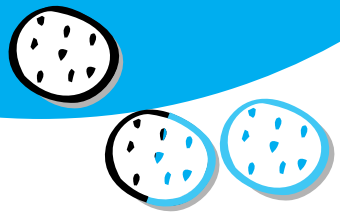
Contents of Maths for Every Child Part A



FRACTIONS

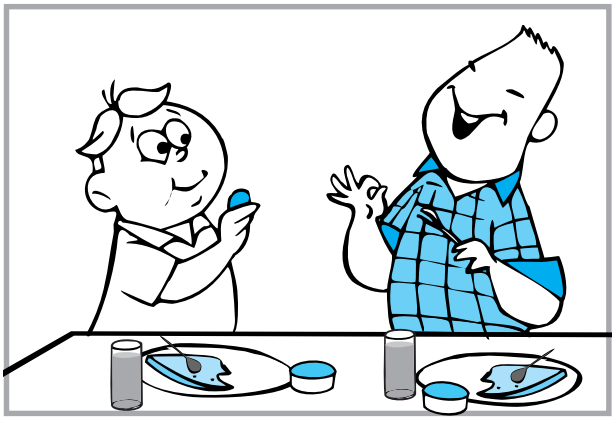


Unit 8

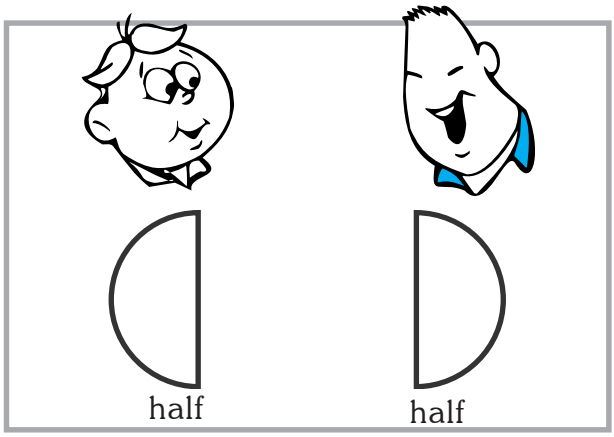


Half time

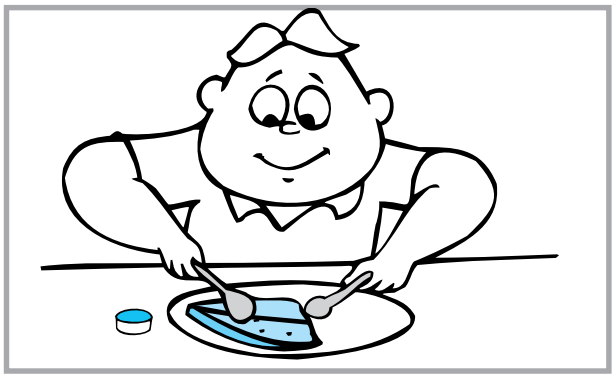
Tuttu and Ranjit are sitting in a restaurant. They are sharing a dosa. Each gets half a dosa.



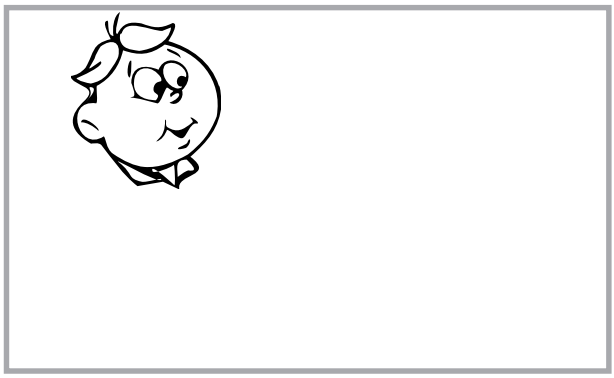
See how much dosa each gets.



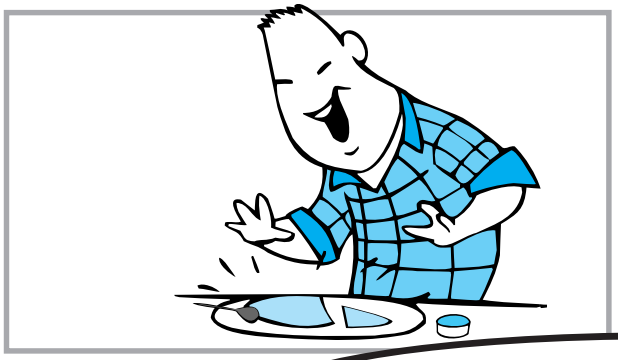
Tuttu is not hungry. So he gives Ranjit half of his share – half of half a dosa.



Draw how much dosa Tuttu gives to Ranjit and name the part: **'quarter or one-fourth'**.



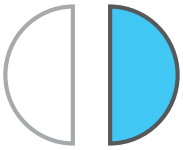
Ranjit is happy. He has half a dosa and a quarter more.



Draw how much dosa Ranjit has and name the part: **'three-quarters or three-fourths'.**

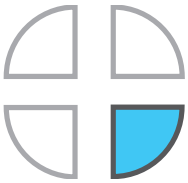
Half, quarter and three-quarters are fractions. They are parts of a whole.

The symbol for half is $\frac{1}{2}$.
This means we cut the whole into two equal parts and take only one part.



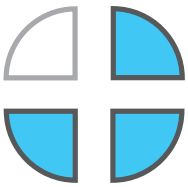
$\frac{1}{2}$ → How many equal parts we took.
$\frac{1}{2}$ → How many equal parts we cut the whole into.

The symbol for quarter is $\frac{1}{4}$.
Here we cut the whole into four equal parts and take only one part.



$\frac{1}{4}$ → Parts we took.
$\frac{1}{4}$ → Parts we cut the whole into.

The symbol for three-quarters is $\frac{3}{4}$.

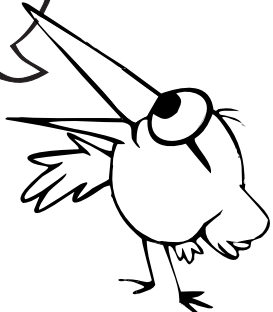


$\frac{3}{4}$ → Parts we took.
$\frac{3}{4}$ → Parts we cut the whole into.

Match the name of the fraction with the correct symbol and picture.

Half — $\frac{1}{4}$
One-fourth — $\frac{3}{4}$
Three-fourths — $\frac{1}{2}$
Whole — $\frac{4}{4}$

Here is another way of reading fractions:
$\frac{1}{2}$ → one by two
$\frac{1}{4}$ → one by four
$\frac{3}{4}$ → three by four



Choose the correct word from these words and fill in the blanks.

one-fourth, quarter, two-fourths, half, three-fourths, three-quarters, one

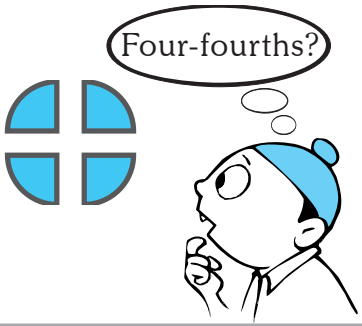
How much dosa Ranjit ate: _____

This means half of half: _____ or _____

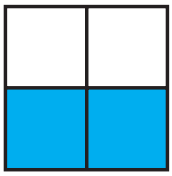
This means half: _____

Another name for three-quarters is _____

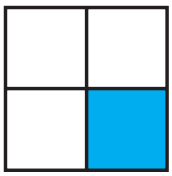
Four-fourths is the same as _____



Write the correct fraction for the part which is coloured.



$\frac{2}{4}$ or $\frac{1}{2}$



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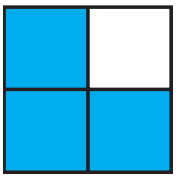

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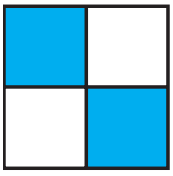

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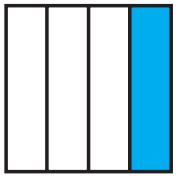

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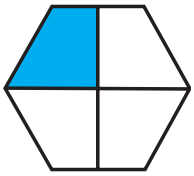

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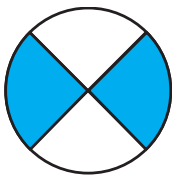
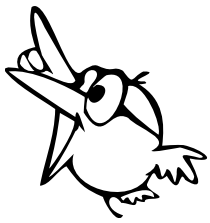


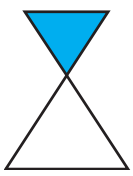
_____

Remember the parts must be **equal** parts.

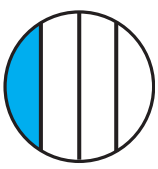


Why are these fractions wrong?

$\frac{1}{4}$

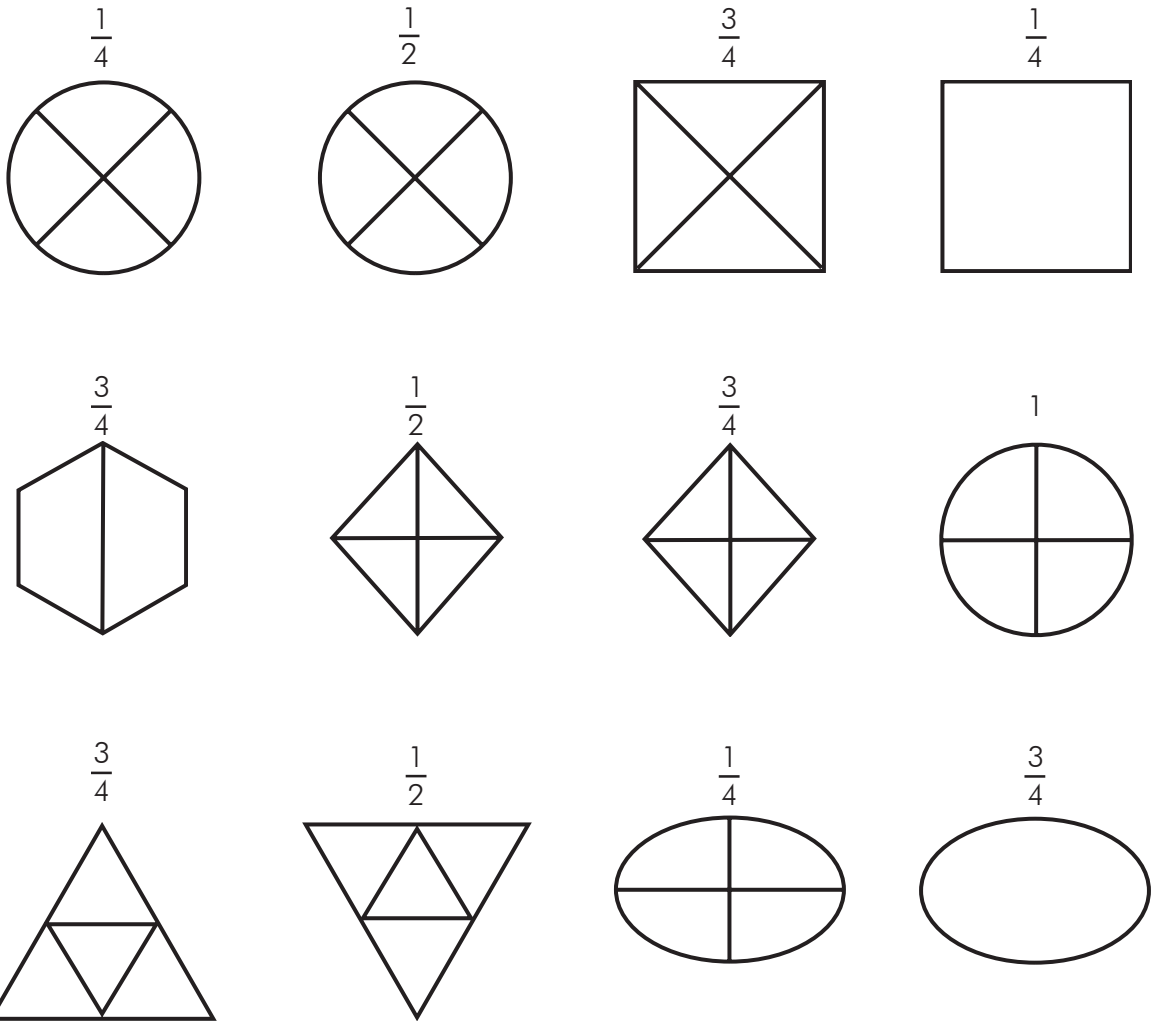


$\frac{1}{2}$

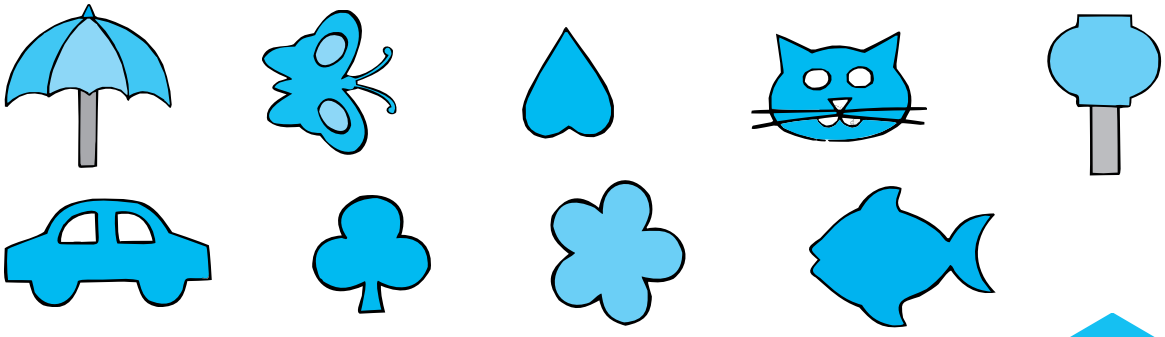


$\frac{1}{4}$

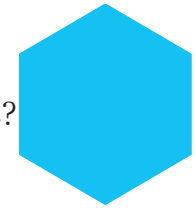
Colour the part for which the fraction is written.



Draw a line which breaks these shapes into half.



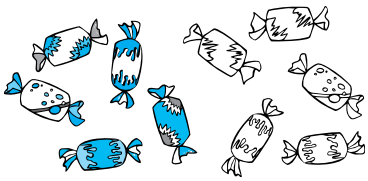
In how many different ways can you break this hexagon into halves?

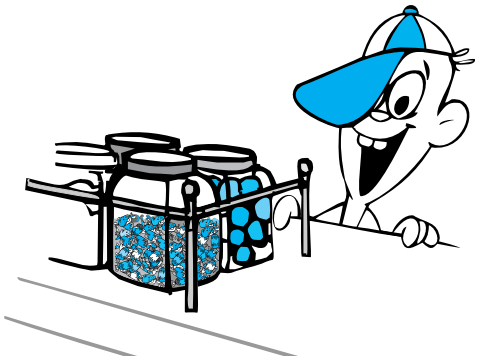


Halves and quarters

Colour half of the set.

Example

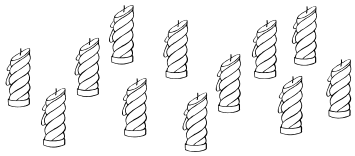




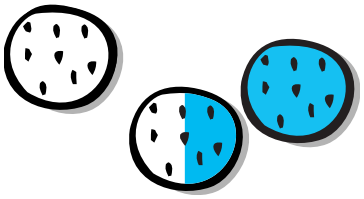
Half of 10 toffees is ____ toffees.

Half of 10 is ____

Half of 8 is ____

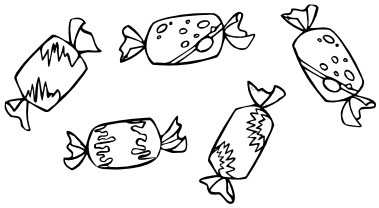


Half of 12 is ____



Half of three is one and a half.

Half of 3 is $1\frac{1}{2}$



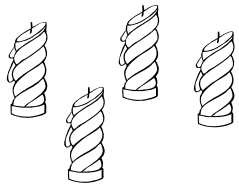
Half of five is _____

Half of 5 is ____

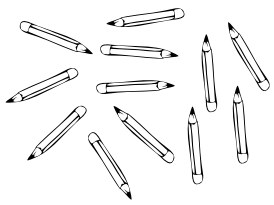
Quarter of 8 marbles is ____ marbles.

Quarter of 8 is ____

Colour quarter of the set.



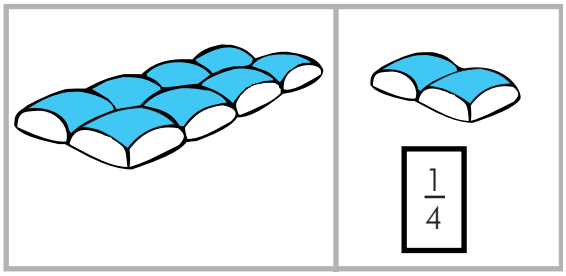
Quarter of 4 is ____

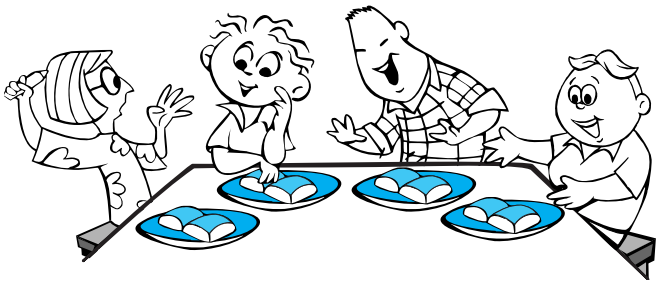


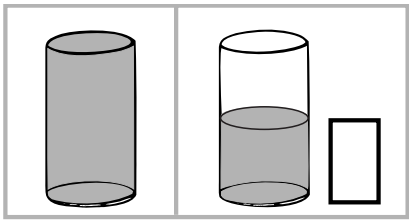
Quarter of 12 is ____

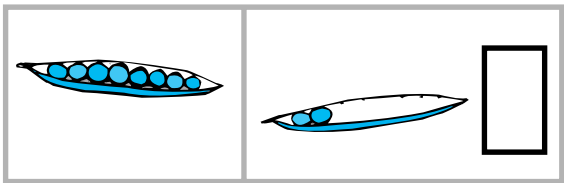
Quarter of 2 is ____

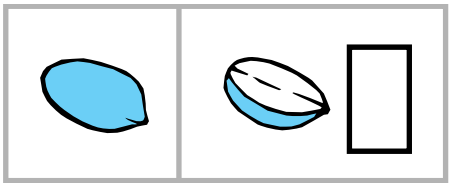
Write the correct fraction for the part shown.



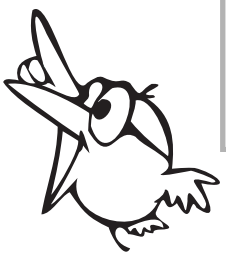




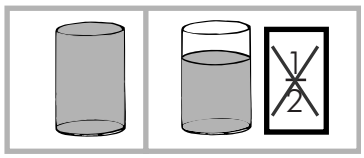


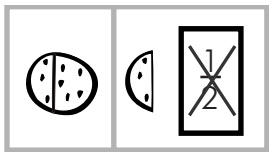


Remember the parts must be **equal** parts.

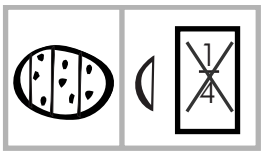


These are not halves.





This is not quarter.



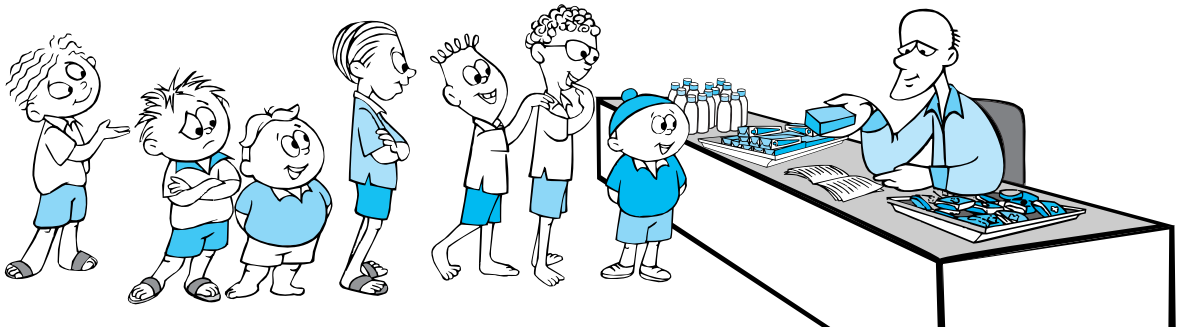
Notebook Exercise

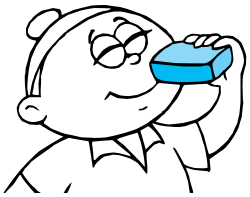
In your notebook, draw these and colour the part written in the brackets.

6 stars $(\frac{1}{2})$	10 flowers $(\frac{1}{2})$	20 mangoes $(\frac{3}{4})$
12 stars $(\frac{1}{4})$	16 marbles $(\frac{3}{4})$	14 pencils $(\frac{1}{4})$

Soap story

Chunindar lived in a hostel. One day he was standing in a queue with his friends to get his share of things for the month — toothpaste, soap and oil.

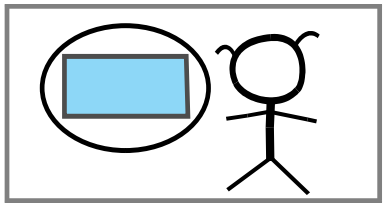




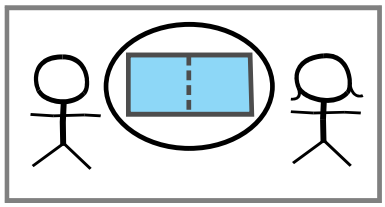
He liked the soap the most. He loved its cold, hard feel. And he liked to smell his clothes after he had washed and dried them.

He started dreaming about how much soap his teacher would give them.

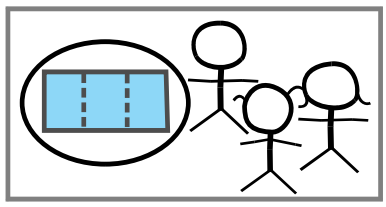
'What if the teacher has only ONE SOAP BAR,' he thought 'and if there is only one child?
'How much soap would the child get?'



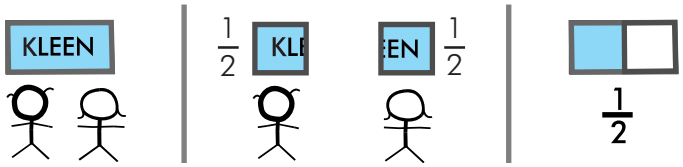
Then he thought, 'if there is one soap bar and there are two children...?'



'...and if there are three children? Or four children?'

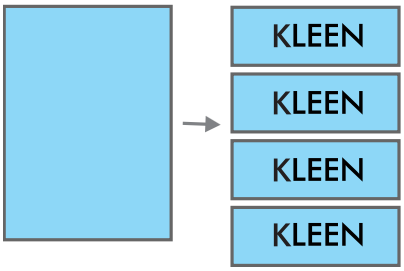


If one soap bar is shared by 2 children equally, how much would each get?




Activity

Take a sheet of paper and colour it. Cut the paper into four equal strips. These are your soap bars. Write the name of a common soap on each of the four 'soap bars'.



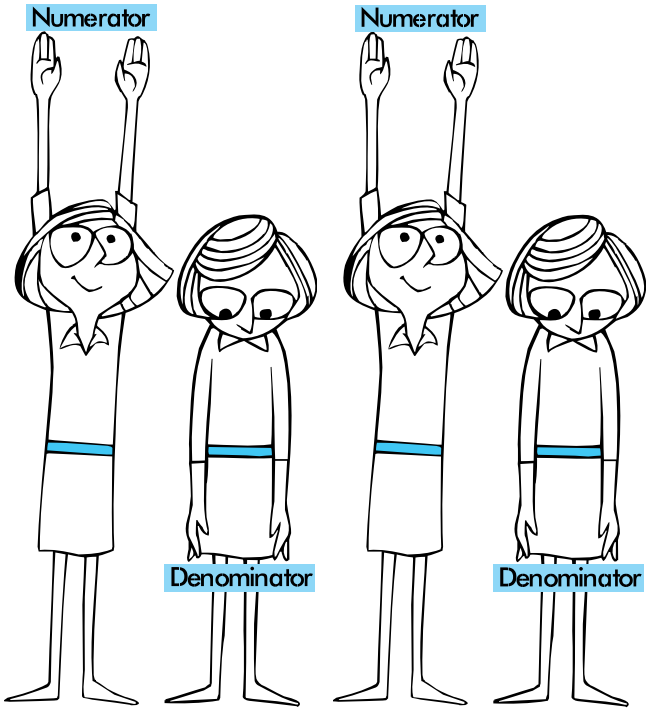
Make a chart and show how ONE soap bar would be shared between

* One child * Two children * Three children * Four children

The picture at the bottom of the previous page tells you how you could make the chart.

The fraction PT

Just to help you remember
that the top number
is called 'numerator'
and the number below
is called 'denominator',
stretch your hand above
and say 'numerator'.
Put your hand down, bend low,
now say 'denominator'.
It's a new kind of PT.
Think of it as a duty
'cos all these funny actions
will help you learn fractions.



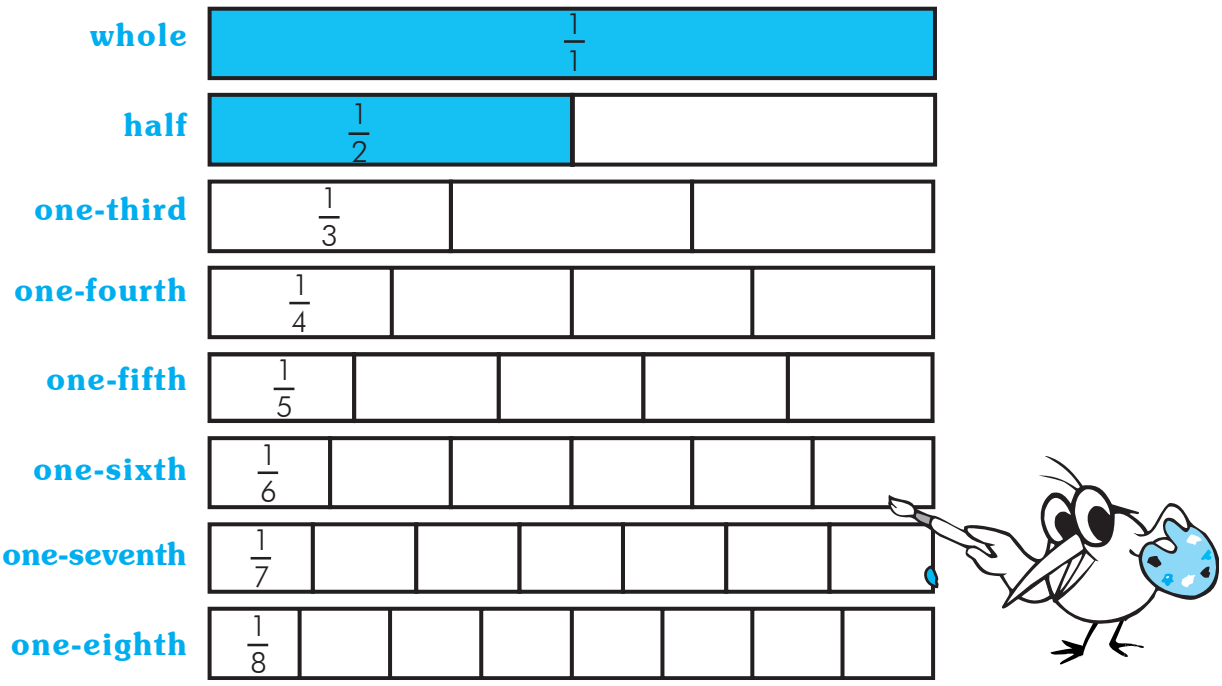
Do the fraction PT as fast as you can! — "numerator, denominator"

Practice writing the words 'numerator' and 'denominator'. Try to write the words backwards starting from 'r'.

Unit fractions

Fractions which have the numerator (top number) as '1' are called unit fractions.

Here is a chart of unit fractions. Colour or shade the fraction shown. The first two have been done for you.



Look at the chart and circle the bigger fraction.

$\frac{1}{2}$ or $\frac{1}{3}$ $\frac{1}{5}$ or $\frac{1}{4}$ $\frac{1}{4}$ or $\frac{1}{3}$ $\frac{1}{7}$ or $\frac{1}{8}$

As the denominator (bottom number) becomes bigger,
the unit fraction becomes _____ (smaller/bigger).

Circle the bigger fraction.

$\frac{1}{10}$ or $\frac{1}{12}$ $\frac{1}{16}$ or $\frac{1}{15}$ $\frac{1}{10}$ or $\frac{1}{9}$ $\frac{1}{10}$ or $\frac{1}{100}$

Put these unit fractions in order from the smallest to the largest.

$\frac{1}{5}$ $\frac{1}{4}$ $\frac{1}{6}$ $\frac{1}{7}$ $\frac{1}{2}$ $\frac{1}{3}$ $\frac{1}{8}$

Check if the fractions on the chart you made for the soap story are unit fractions.

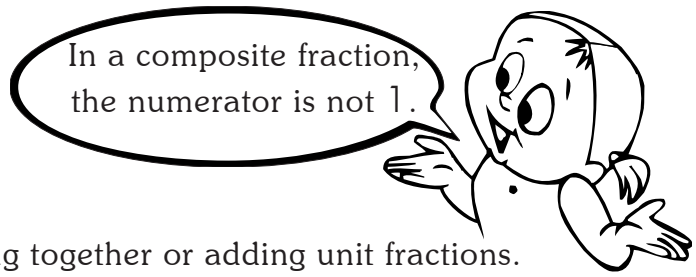
5 children share a soap bar equally. Each child gets ____ of the bar.

____ children share a soap bar equally. Each child gets $\frac{1}{7}$ of the bar.

Composite fractions

Fractions which are not unit fractions are called **composite fractions**.

Examples: $\frac{3}{4}$ $\frac{2}{3}$ $\frac{3}{5}$ $\frac{4}{6}$



We get a composite fraction by putting together or adding unit fractions.

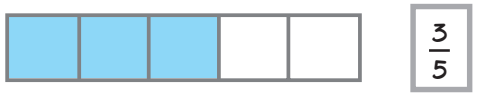
'Three-fourths' just means 'three one-fourths'.

$\frac{3}{4} = \frac{1}{4} + \frac{1}{4} + \frac{1}{4}$

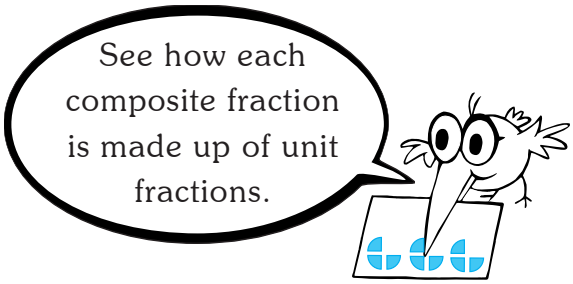
'Two-thirds' means 'two one-thirds'.

$\frac{2}{3} = \frac{1}{3} + \frac{1}{3}$

Look at the pictures and write the fraction shown in the box.



$\frac{3}{5}$



Show how the composite fractions are made of unit fractions.

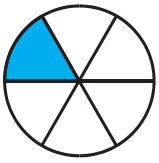
$\frac{3}{5} = \frac{1}{5} + \frac{1}{5} + \frac{1}{5}$

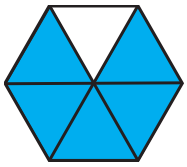
$\frac{4}{5} =$

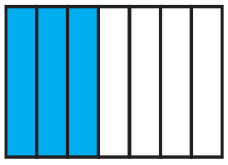
$\frac{5}{6} =$

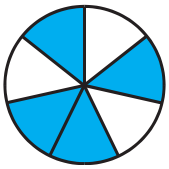
Write the correct fraction for the part that is coloured.

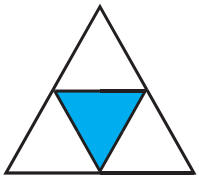
$\frac{2}{5}$

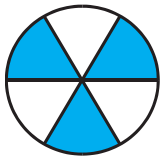


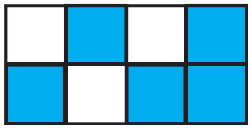




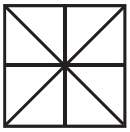




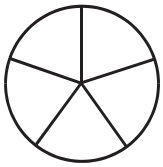




Colour the part for which the fraction is written.

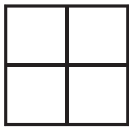


$\frac{7}{8}$

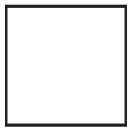


$\frac{2}{5}$

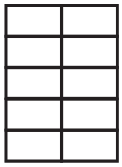
$\frac{5}{7}$



$\frac{3}{8}$



$\frac{5}{8}$



$\frac{7}{10}$

The unit fractions on this page are: _____

The composite fractions on this page are: _____

Think, think! Write down what you think is a very small unit fraction. Now write down a unit fraction that is even smaller than that.


भारत
INDIA
रुपया
2
RUPEES

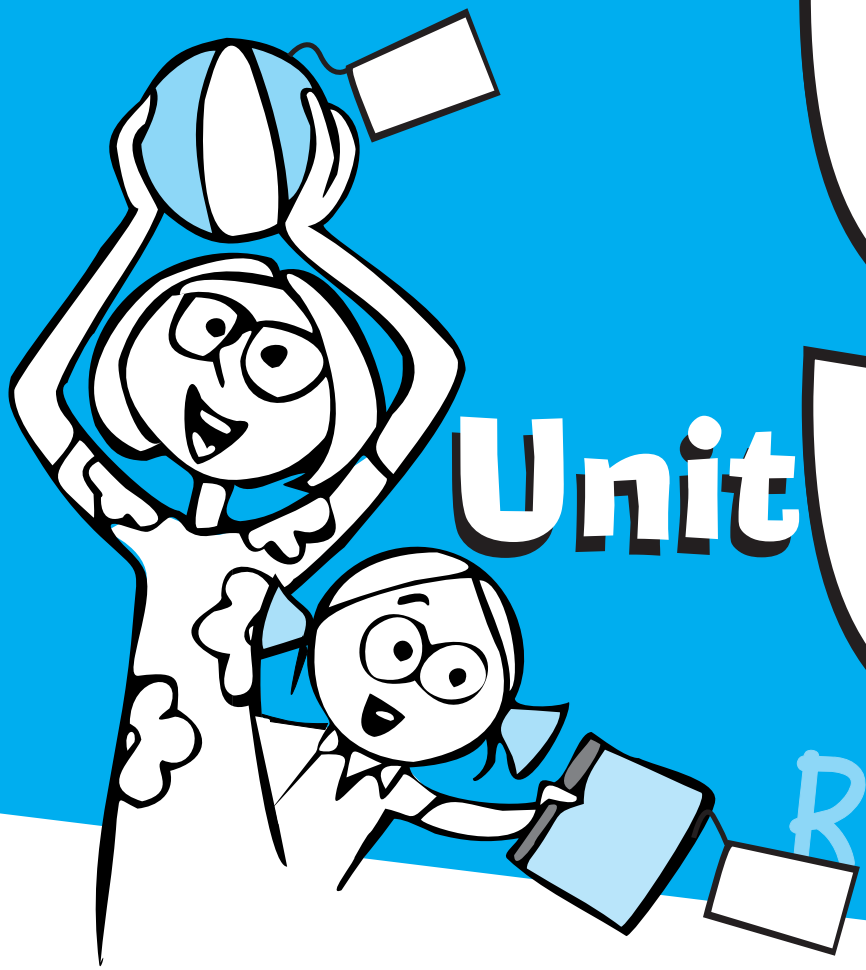

10
PAISE
1996


रुपया
1
RUPEE
2000


रुपये
5
RUPEES
2000

MONEY

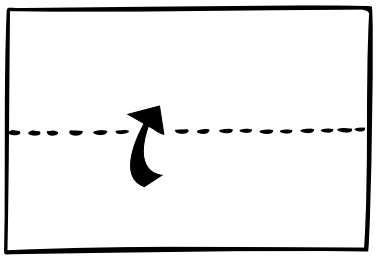
Unit 9


RS 10

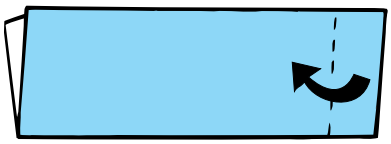
Making money

How to make a money purse:

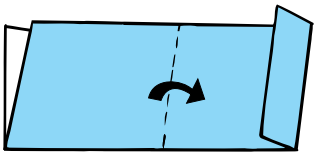
1 Take a sheet of paper (a page from an old magazine). Fold it along its length in half.



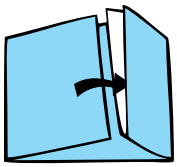
2 Fold a part of the length inwards like in the figure



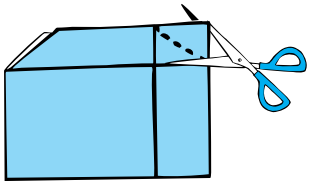
3 Fold the remaining part of the length in half.



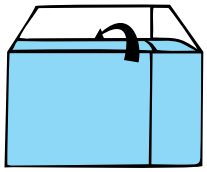
4 Insert the folded part as in the figure.



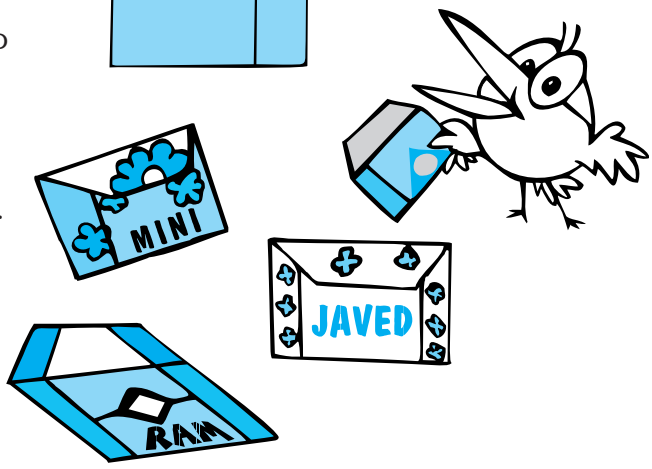
5 Fold and unfold the top part and cut the corners.



6 Fold the first layer of the flap inwards to make an envelope. You can fold the next two layers also inwards to get two pockets.

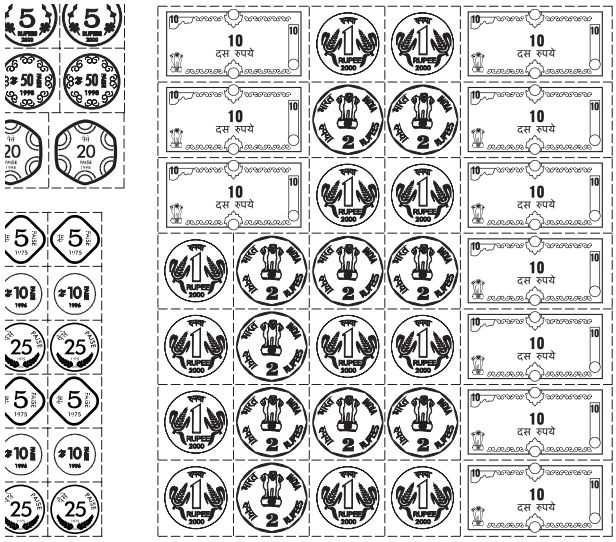


7 This is your money purse.
Decorate it and write your name on it.

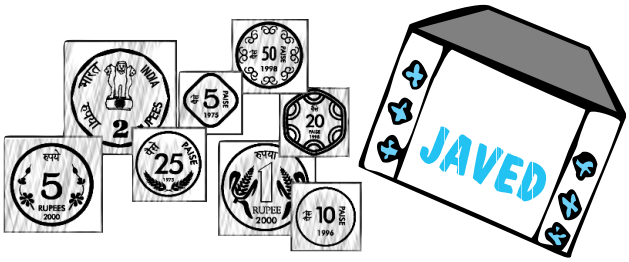


How to make money:

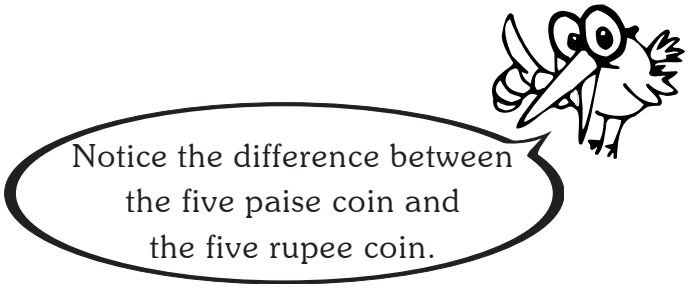
On the last page of the book, you will find prints of different coins and notes. Cut out these coins and notes and keep them in the purse.



After you have made enough money, make separate piles of each kind of coin or note.



Count how many coins or notes of each kind you have.



Take the help of an older person to fill up the table and find out how much money you have.

5 p ×	= Rs	Rs 1 ×	= Rs
10 p ×	= Rs	Rs 2 ×	= Rs
25 p ×	= Rs	Rs 5 ×	= Rs
50 p ×	= Rs	Rs 10 ×	= Rs

Total = Rs

Take the coins out from your money purse for each of these amounts.
Use as few coins as possible.

35p, 40p, 45p, 55p, 60p, 65p, 70p, 75p.

Draw the coins that you took out.

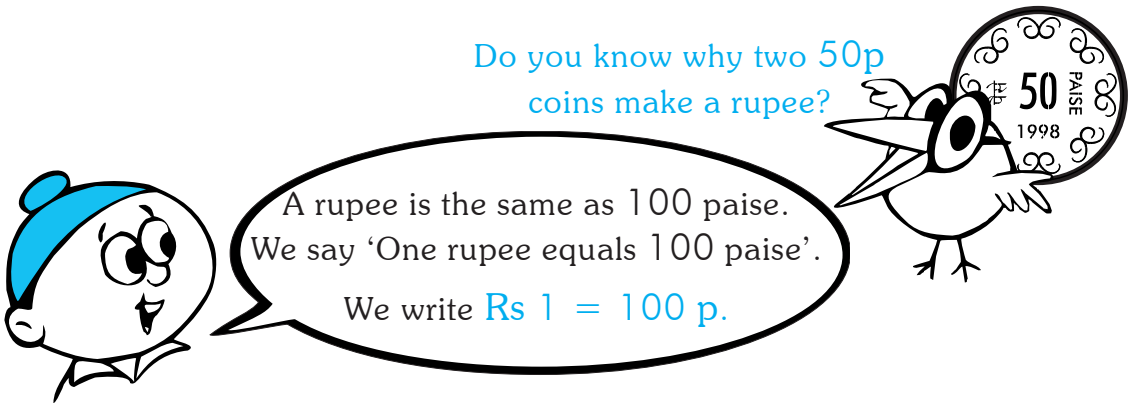
Example 35p → 25p 10p

40p →

How much money is this?

Rupees and paise

How many 50p coins make a rupee? _____



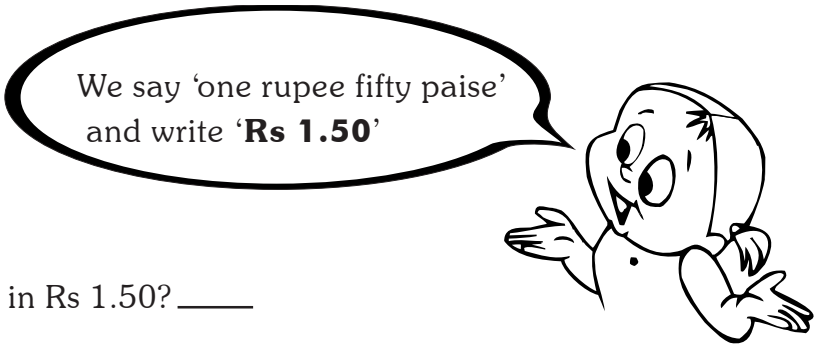
How many paise?

Rs 1 = _____	Rs 10 = _____	Rs 90 = _____
Rs 2 = _____	Rs 15 = _____	Rs 99 = _____
Rs 4 = _____	Rs 20 = _____	Rs 100 = _____
Rs 5 = _____	Rs 48 = _____	Rs 200 = _____
Rs 9 = _____	Rs 60 = _____	Rs 500 = _____

How many rupees?

300p = _____	1000p = _____	3000p = _____
600p = _____	1200p = _____	5700p = _____
800p = _____	2300p = _____	6500p = _____

How much money is this?



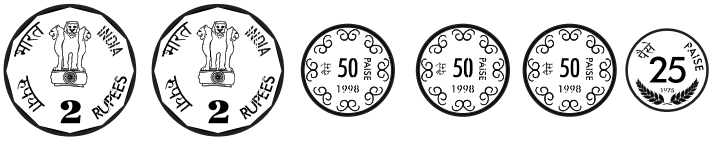
How many paise are there in Rs 1.50? ____

Write the amounts shown here.

= Rs 2.50

= Rs _____

= Rs _____



= Rs _____

How many paise?

Rs 1.50 = 150 p
Rs 1.05 = _____
Rs 2.50 = _____
Rs 2.05 = _____

Rs 3.70 = _____
Rs 12.80 = _____
Rs 0.50 = _____
Rs 0.05 = _____

Rs 0.75 = _____
Rs 0.10 = _____
Rs 42.95 = _____
Rs 199.95 = _____

How many rupees?

40p = Rs 0.40
65p = _____
25p = _____
95p = _____

365p = _____
640p = _____
1250p = _____
2495p = _____

4005p = _____
2705p = _____
105p = _____
5p = _____

Notebook Exercise

Just one rupee

In your notebook show as many ways as you can of making one rupee.

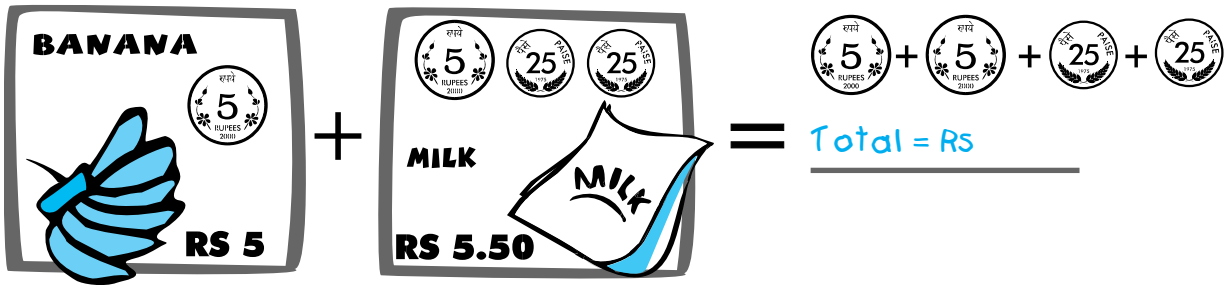
(You can see an example here.)

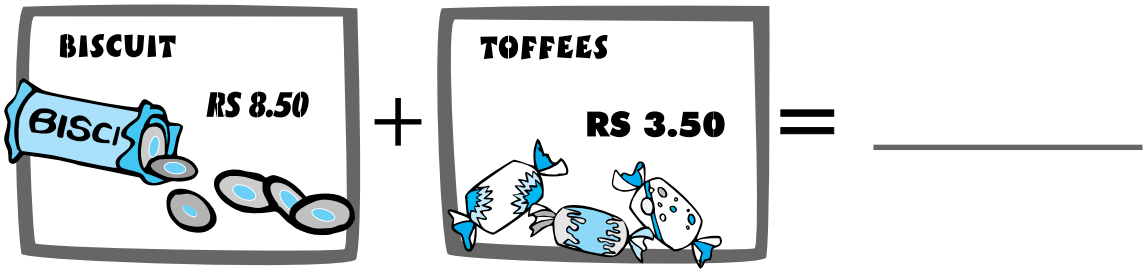
Rs 1 → 50p 25p 10p 5p 5p 5p

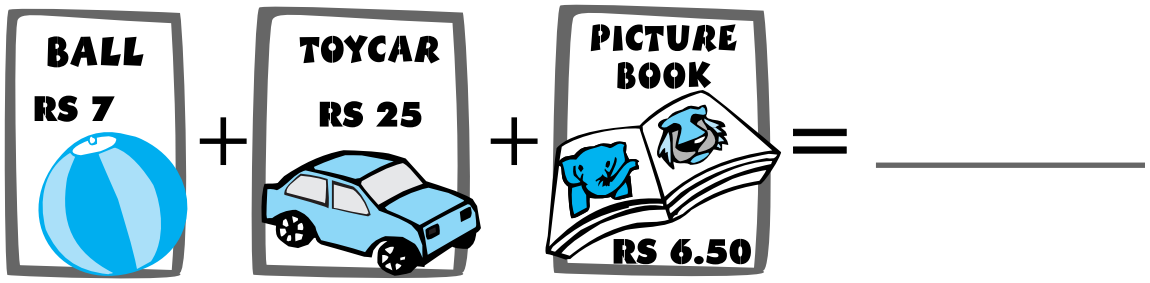
Paying up

You have to pay for these things.
Take out the money from your purse and put it on the pictures.

Write the total amount in the blanks.







Money tables

Table of 50p

50p

50p 50p

50p 50p 50p

50p 50p 50p 50p

50p 50p 50p 50p 50p

Rs 0.50

Rs _____

Rs _____

Rs _____

Rs _____

Tables of 25p

25p

25p 25p

25p 25p 25p

25p 25p 25p 25p

25p 25p 25p 25p 25p

Rs 0.25

Rs _____

Rs _____

Rs _____

Rs _____

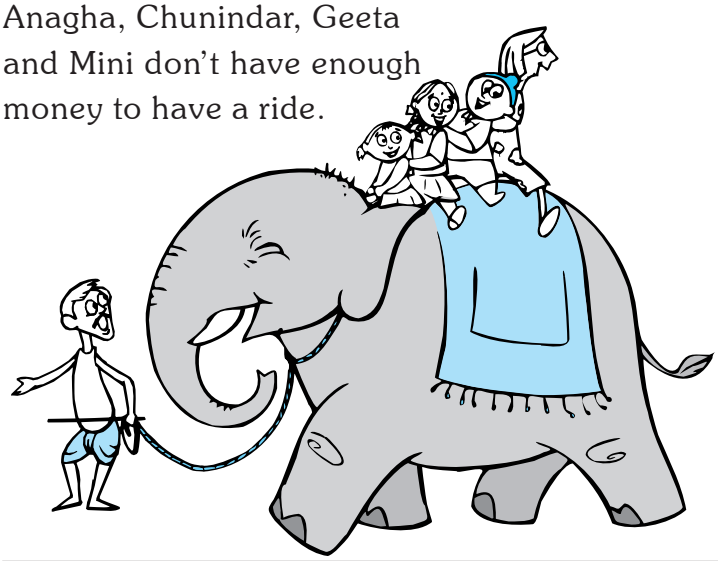
Notebook Exercise

1. Continue these tables in your notebook.
2. Show different ways of making Rs 10. (Draw pictures in your notebook.)

You could for example make Rs 10 by
* Using coins of 3 different kinds → Rs5 Rs2 Rs2 Rs1
* Using coins of only two kinds
* Finding other ways of making Rs 10.

Making ten

An elephant ride costs Rs 10. Anagha, Chunindar, Geeta and Mini don't have enough money to have a ride.



Add some money to each one's purse so that they have exactly Rs 10.

Rs 2.50 + _____ = Rs 10

Rs 6.75 + _____ = Rs 10

Rs 5.25 + _____ = Rs 10

Rs 7.50 + _____ = Rs 10

How much change?

Imagine you are the shopkeeper. The children buy different things. But each of the children gives you a 10-rupee note.

Draw how much change you will give each child.

Rs 10 −  4.00 =

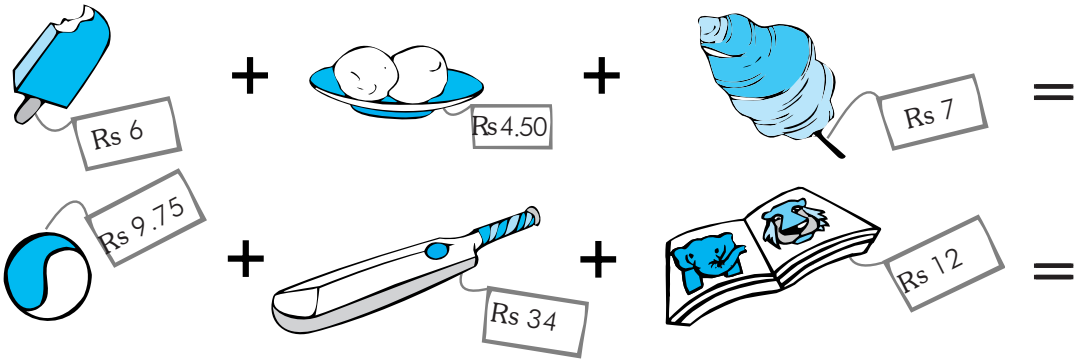
Rs 10 −  7.50 =

Rs 10 −  2.75 =

Rs 10 −  9.50 =

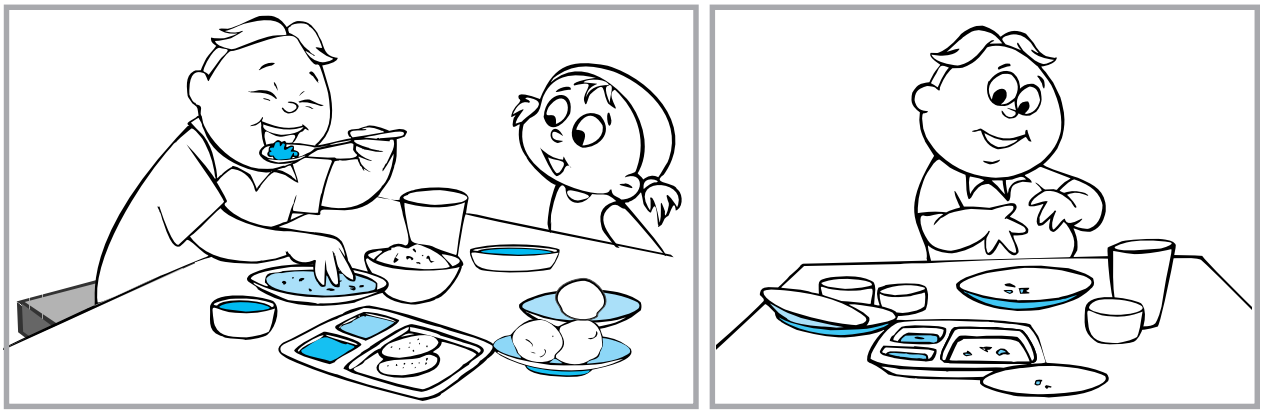
Finding Totals

Find the totals for each picture without using money from your purse.



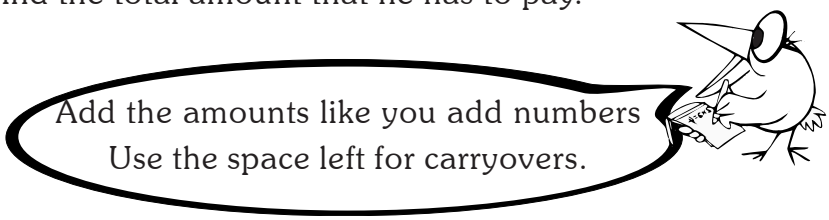
Eating out

Tuttu went to Hotel Samrat and had a big meal.



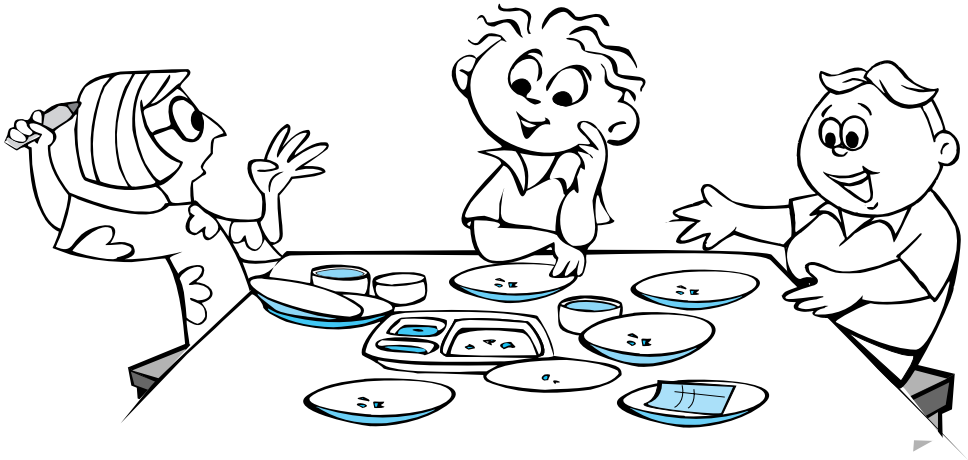
MENU CARD	
Tea	1.50
Coffee	3.00
Veg. Sandwich	5.00
Samosa	5.00
Idly	8.00
Vada Sambar	6.00
Masala Dosa	12.00
Mysore Masala	15.00
Pav Bhaji	18.00
Cheese Pizza	20.00
Lemon Juice	5.00

Here is a bill for what Tuttu ate. Fill in the correct amounts. Find the total amount that he has to pay.



	Rs	Paise
2 Idly	16	00
2 Vada Sambar		
2 Samosa		
1 Lemon Juice		
Total		

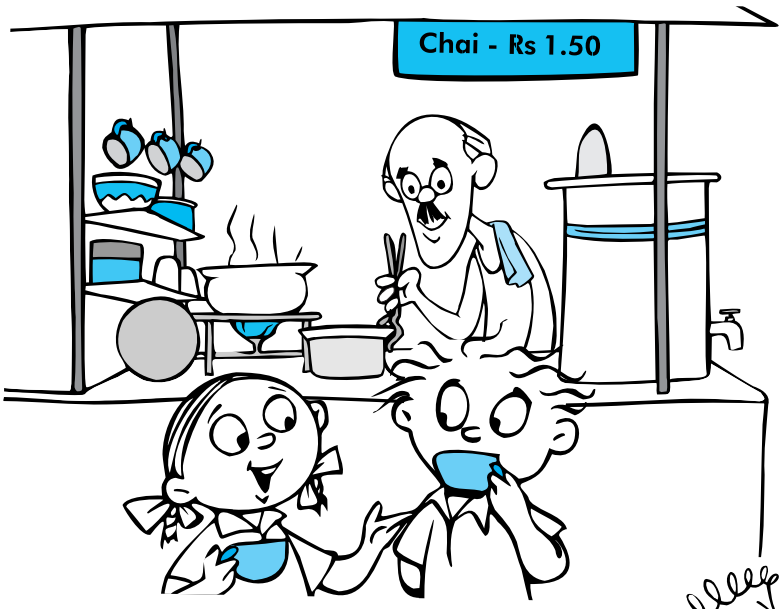
Anagha and Javed are also eating a meal in Hotel Samrat. Please order what they are going to have. Make a bill for each of them. The bill should show what they ate, how much each item cost and the total.



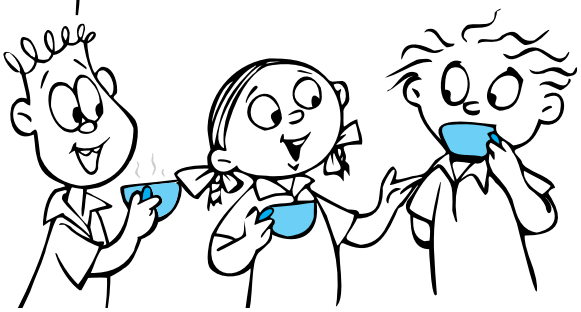
Anagha's bill:

Javed's bill:

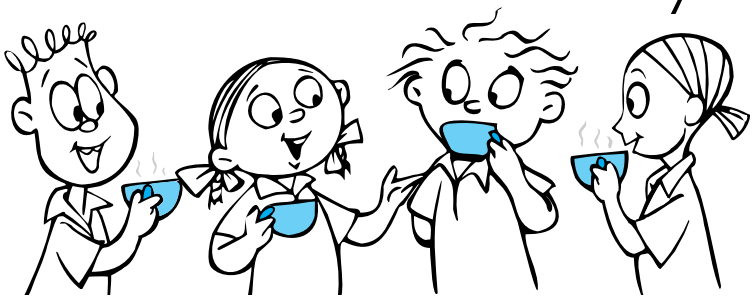
Chai and samosa



Rani and Javed are having a cup of chai each. A cup of chai costs Rs 1.50. How much do they have to pay?



As they are having chai, Eti joins them. He too has a cup of chai. How much do they now have to pay? (You can use your money to find out.)



If four children have a cup of chai each, how much will they have to pay?

Notebook Exercise

Make a table like the one shown below of the cost of cups of chai upto 10 cups. Use your play money to find the cost of cups of tea.

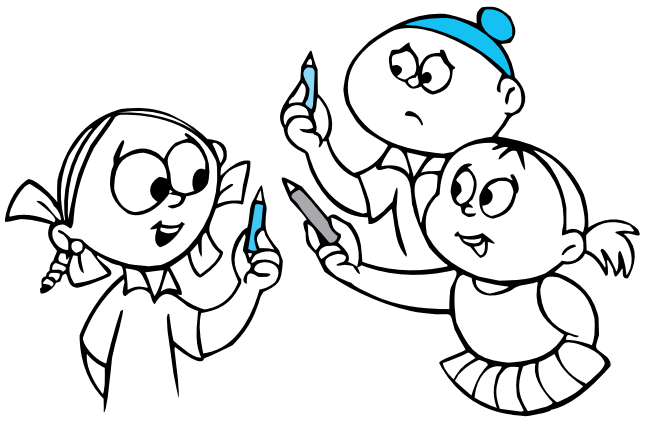
Number of cups of tea	Cost Rs	Paise
1	1	50
2	3	00
3	4	50

The cost of a samosa is Rs 2.50. Make a table of the cost of samosas upto 10 samosas.

Number of samosas	Cost Rs	Paise
1	2	50
2	5	00
3	7	50

LENGTH

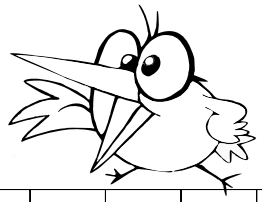
Reading the scale



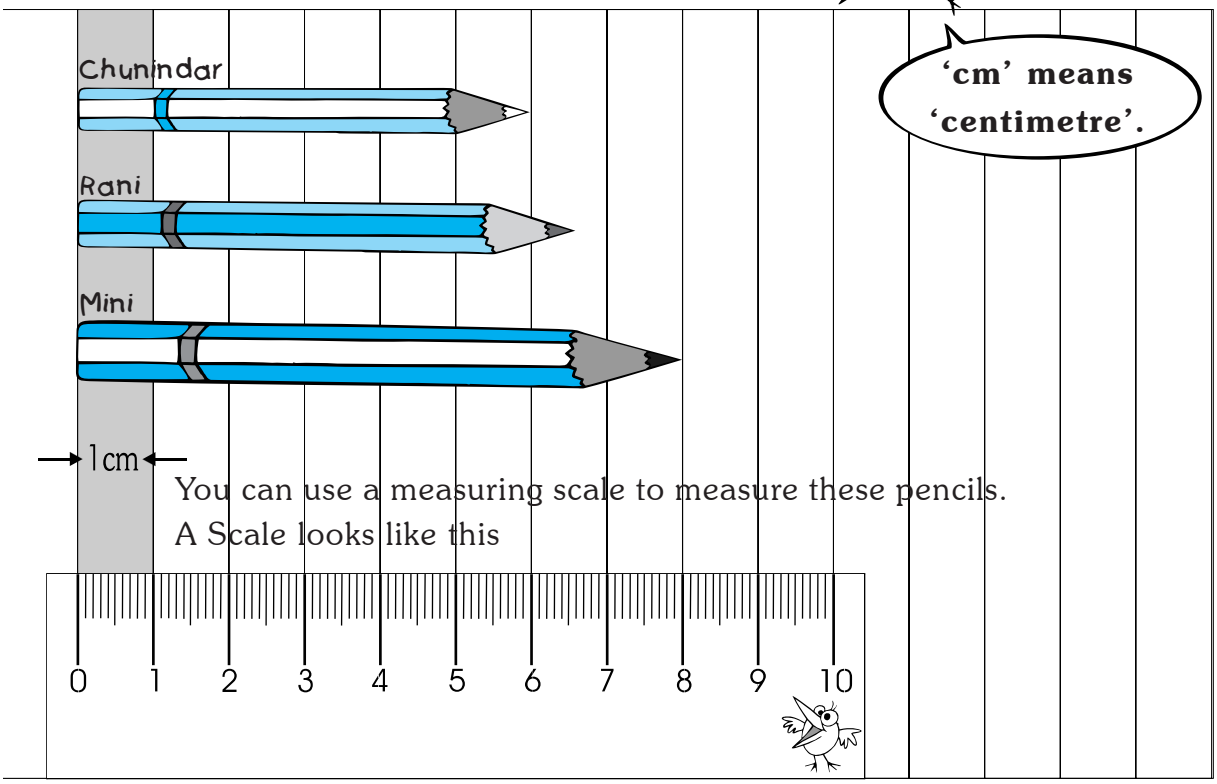
Chunindar, Rani and Mini measured the lengths of their pencils.

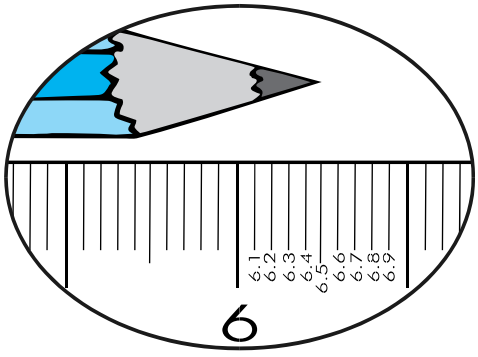
Whose pencil is the longest?

Whose is the shortest?



Write the length of each pencil next to it.



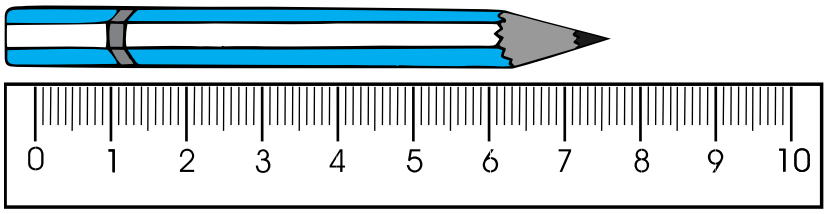


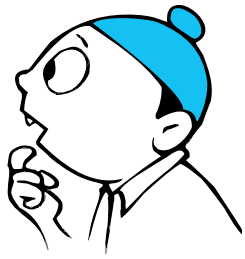
Rani's pencil is longer than 6 cm but shorter than 7 cm.

Using the smaller marks, we find that it is 6.5 cm.

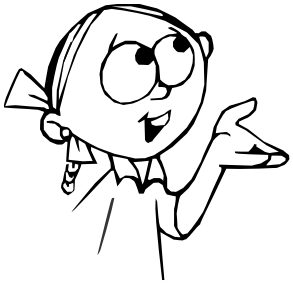
The children wanted to check how long Mini's pencil was.

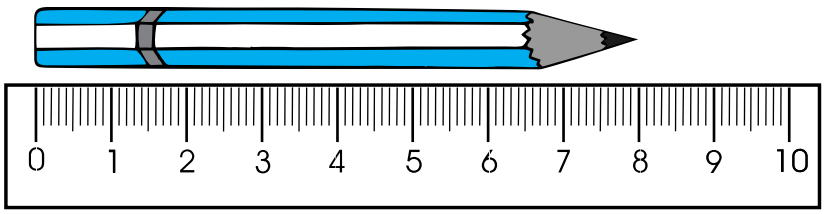
Chunindar measured it like this.



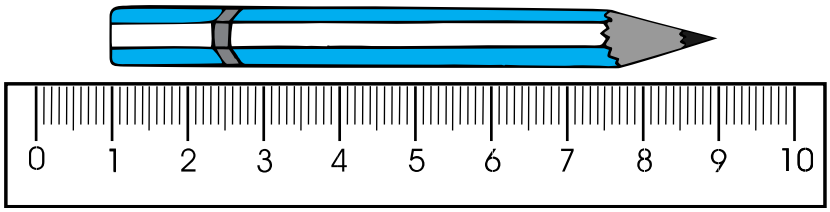


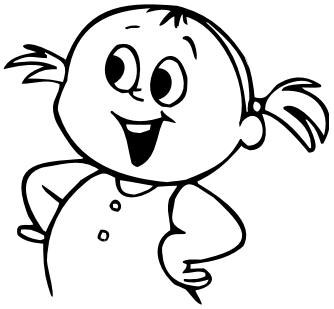
Rani measured it like this.





Mini measured it like this.

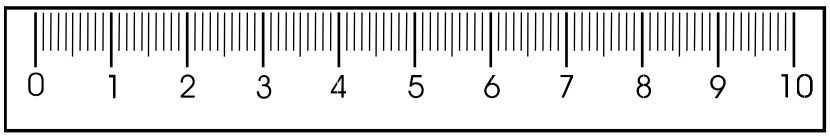




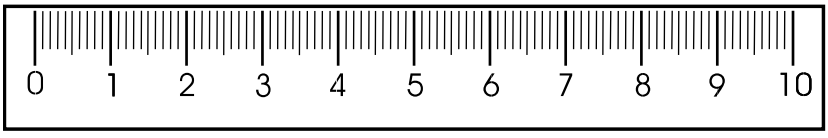
Is any of them measuring the length wrongly? Why?

What is the correct length of the pencil?

Draw dots and mark 2.3 cm, 4.6 cm, 6.5 cm and 8.4 cm on the scale.



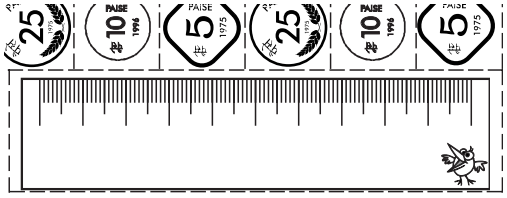
Mark 1.8 cm, 5.9 cm, 3.4 cm and 7.2 cm on the scale.



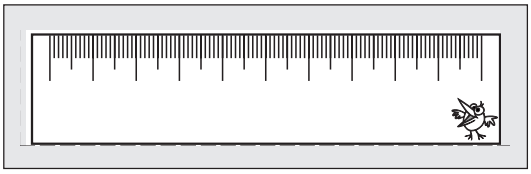
Making a scale

Classroom Activity

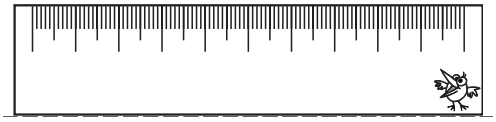
1 On the last page of the book, you will find a print of the scale.



2 Cut it out and paste it on thick paper. Cut out the extra paper.



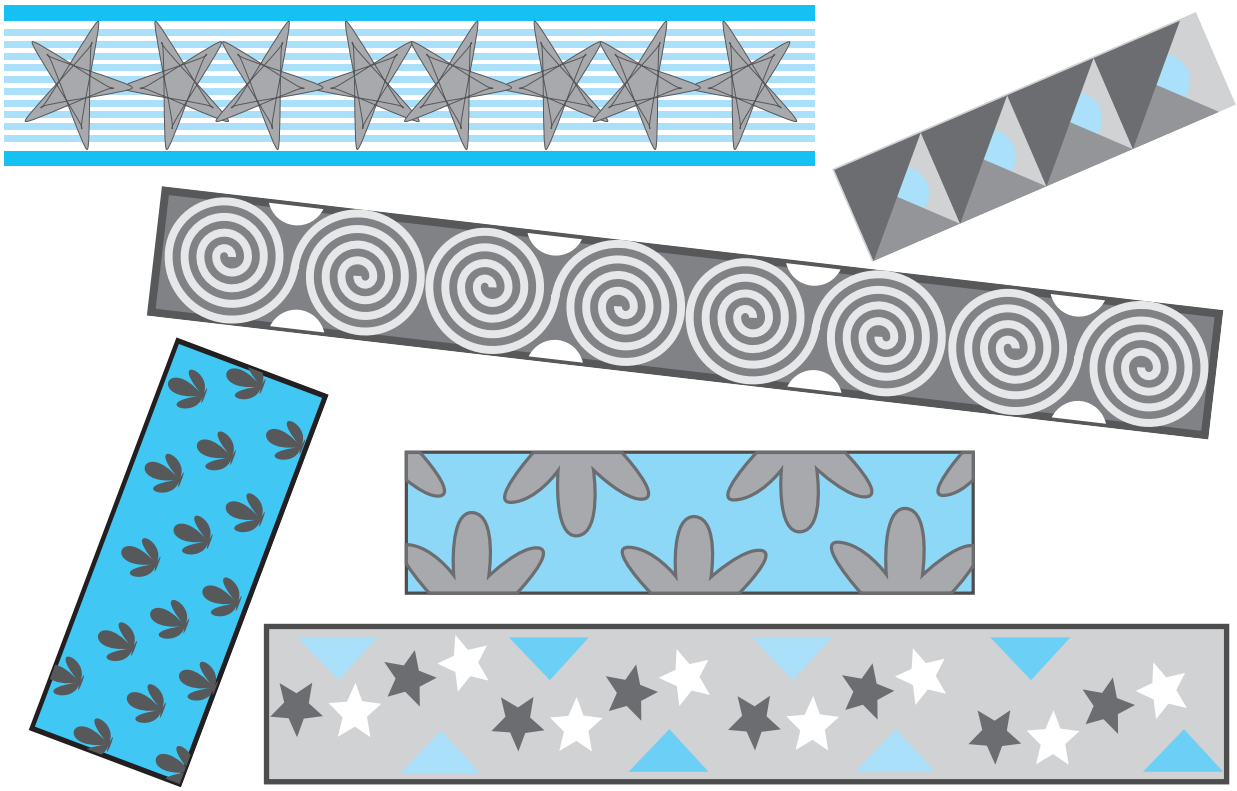
3 Your scale is now ready.



Carefully mark numbers on the lines. Will you start from '0' or from '1'?

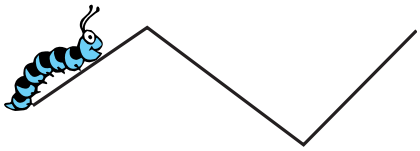
Now you have a paper scale which you can carry in your pocket.

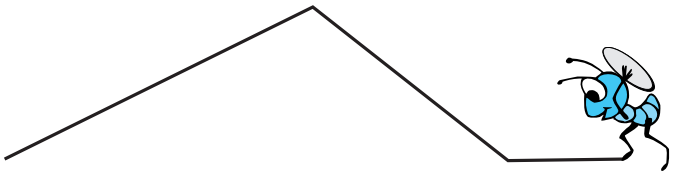
Use your paper scale to measure the length of these border design strips.

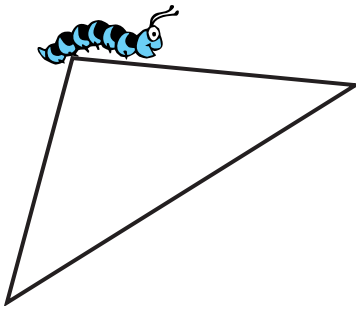


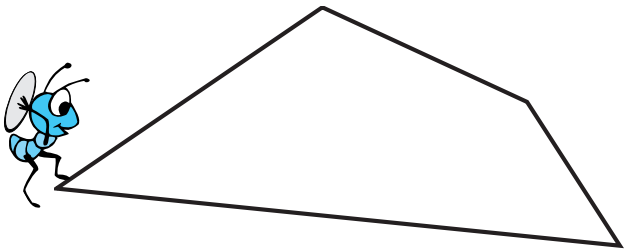
Insect pathways

Use your scale to find the distance the insect would have to walk to reach the end or to return to the starting point?
(Add the lengths like you add numbers.)





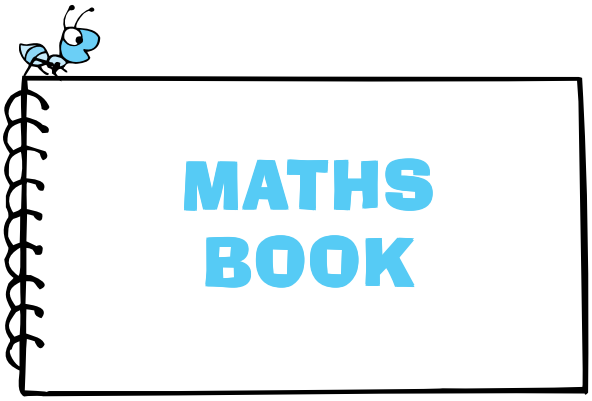




An ant is going from one corner of a book to the opposite corner.

Which is the shortest path? Measure and find out how long it is? _____

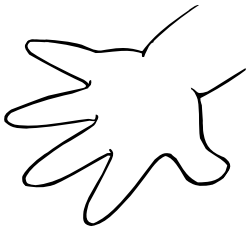
If the ant walks along the edge, how long will the path be? _____



How long, how wide?

Measure these and write your measurements down in your notebook.

The length of your span

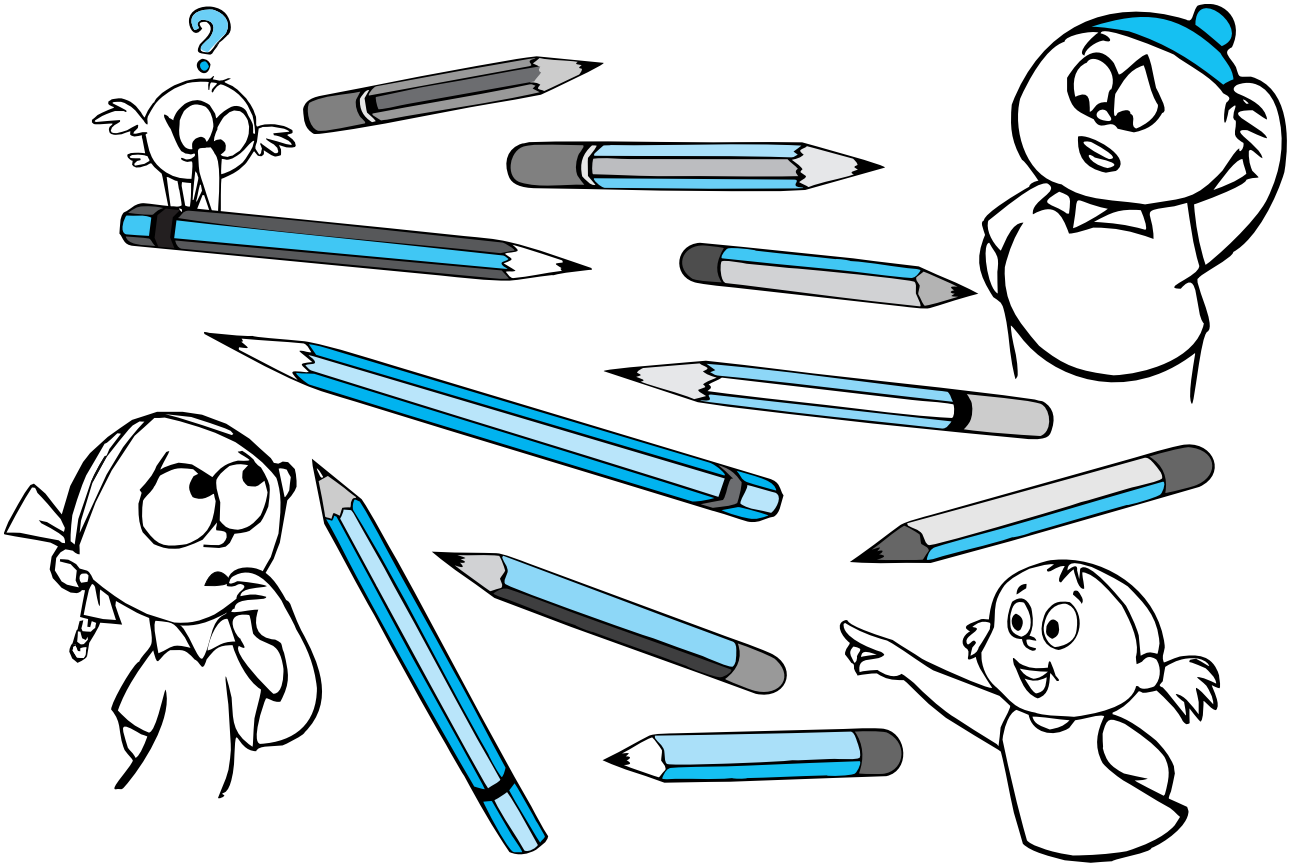


Your notebook (the longer side is the length, the shorter side is the width).

Your pencil box (it has length, width and height).

Chunindar's pencils are exactly 5cm long. Rani's pencils are exactly 4cm long and Mini's pencils are exactly 6cm long.

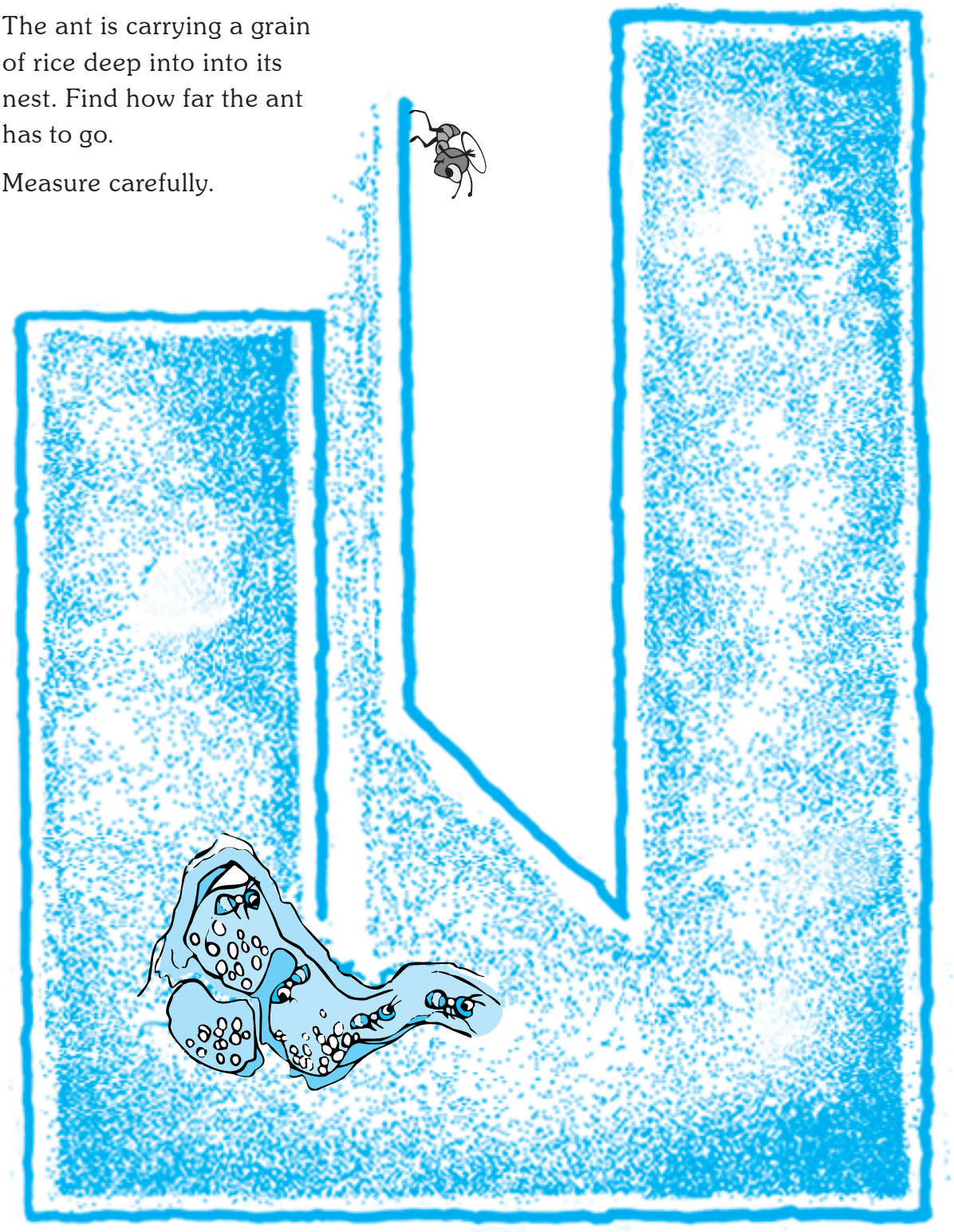
Try and find their pencils without using a scale. Draw a line connecting the children to their pencils.



Measuring by the metre

The ant is carrying a grain of rice deep into into its nest. Find how far the ant has to go.

Measure carefully.



How far did the ant have to travel? _____ cm.

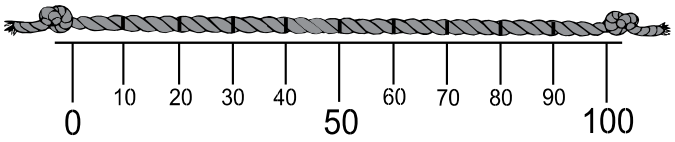
100 centimetres is the same as 1 metre.

So the ant had to travel __ m.

Making a metre rope

Find a metre scale or a measuring tape. A metre scale is a wooden or steel scale which is one metre long. It has markings showing centimetres.

Get a thick jute string. Make two knots on the string so that the length of string between the knots is one metre.



Mark 10 cm distances on the rope with a pen.
This is your **metre rope**.

Use the metre rope to find out which of these things are longer than a metre.

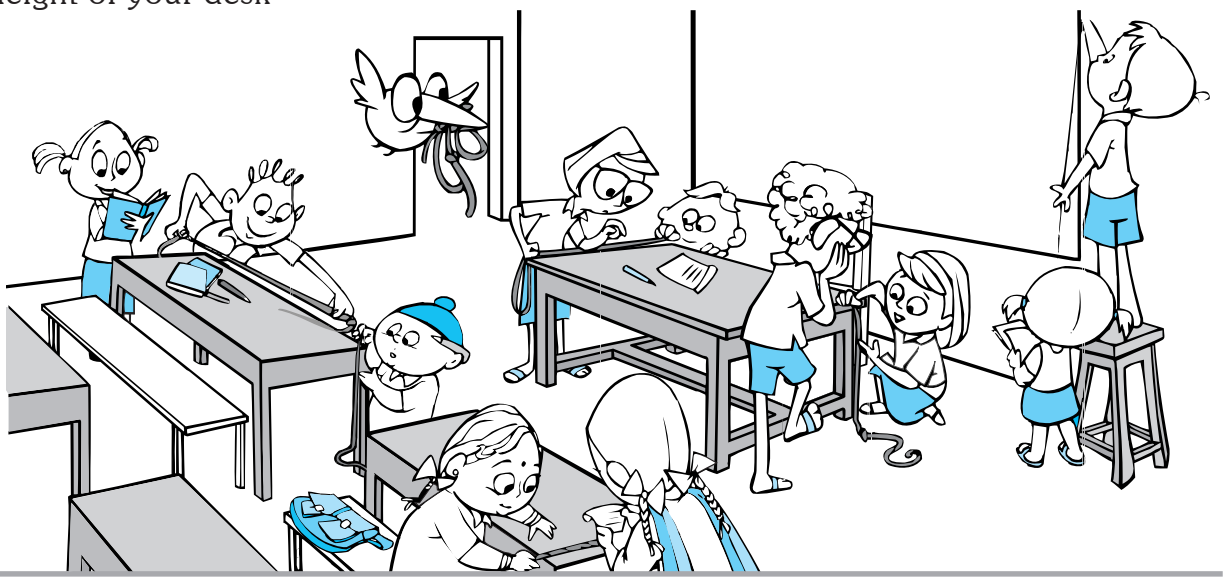
Length of your desk

Width of your desk

Height of your desk

Length of your bench

Length of the blackboard

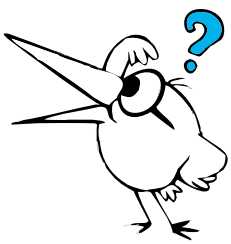


Fold the metre rope in half. How long is it now?_____

Half a metre is_____cm.

Fold the metre rope again in half.
How long is it now?_____

_____ of a metre is 25 cm.



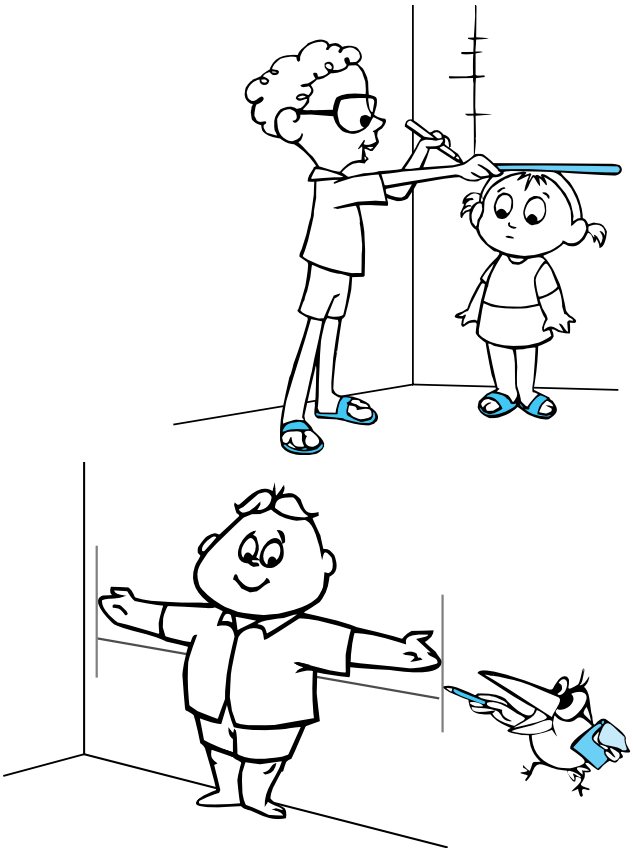
My measurements

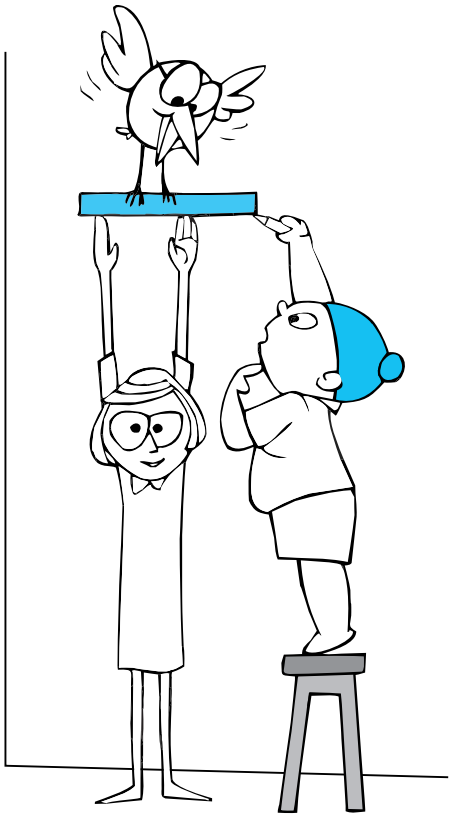
Use a metre scale or a metre rope and take the help of a friend to make these measurements.

Mark your height on the wall and measure it in metres and centimetres.

Measure your arm span.

Raise your arms above your head and measure your height upto your fingertips.





Make a table of your own measurements in your diary.

How many cm?

1 m = ____ cm	5 m = ____ cm	12 m = ____ cm	$\frac{1}{2}$ m = ____ cm
2 m = ____ cm	10 m = ____ cm	20 m = ____ cm	$\frac{1}{4}$ m = ____ cm

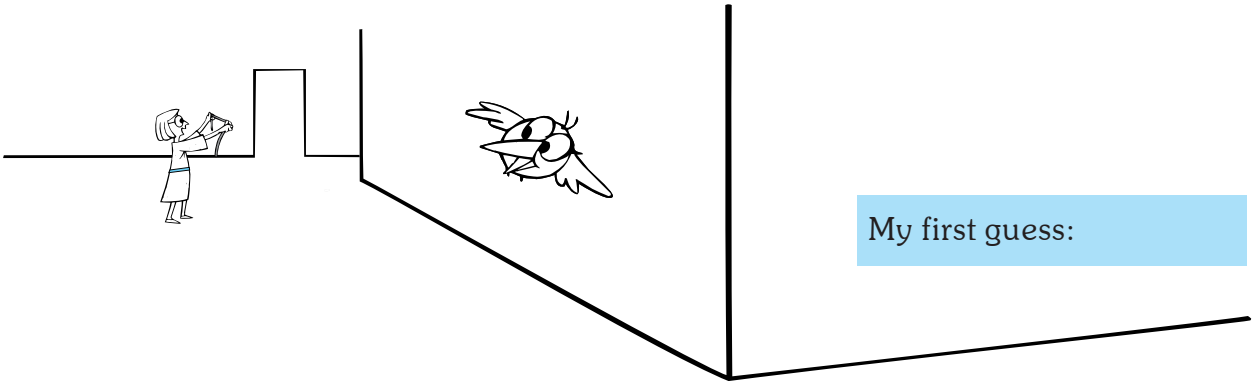
How many metres?

100 cm = ____ m	600 cm = ____ m	1500 cm = ____ m	1200 cm = ____ m
300 cm = ____ m	1000 cm = ____ m	3000 cm = ____ m	50 cm = ____ m

Guess how long

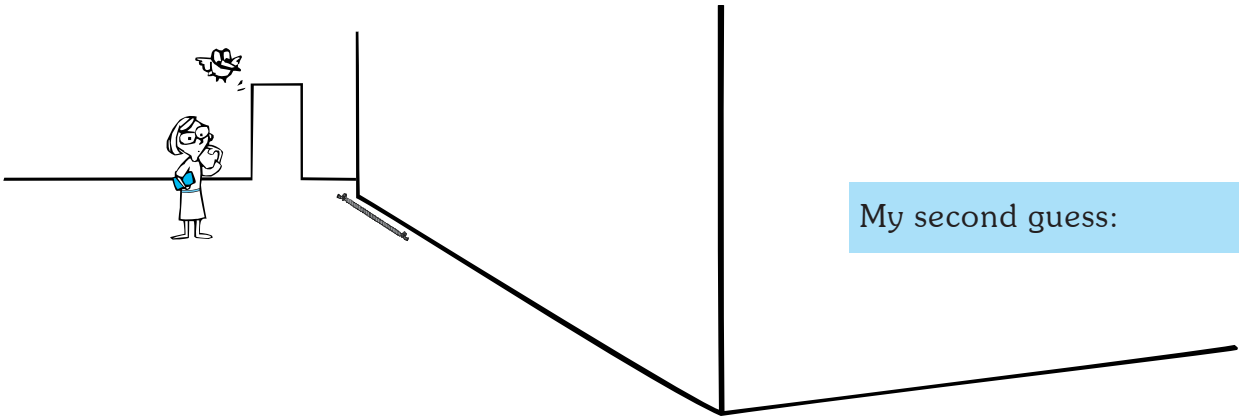
Guess in three steps:

Step 1 Hold a metre rope in your hand. Look at the edge where one wall of your classroom meets the floor. Guess how long the wall is by looking at the edge. Write your guess down.



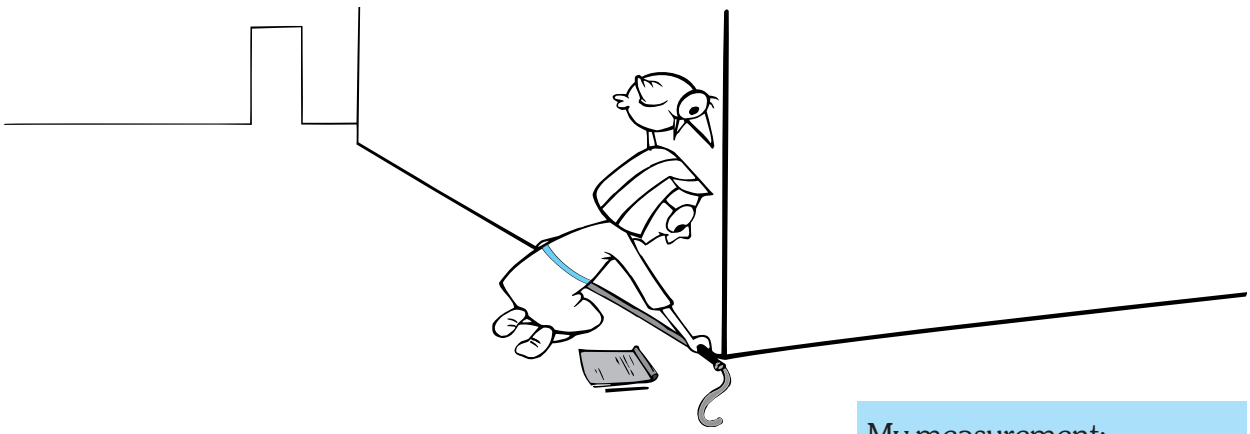
My first guess:

Step 2 Place the metre rope along the edge at a corner. Now try to guess how long the wall is.



My second guess:

Step 3 Measure the length of the wall using your metre rope.

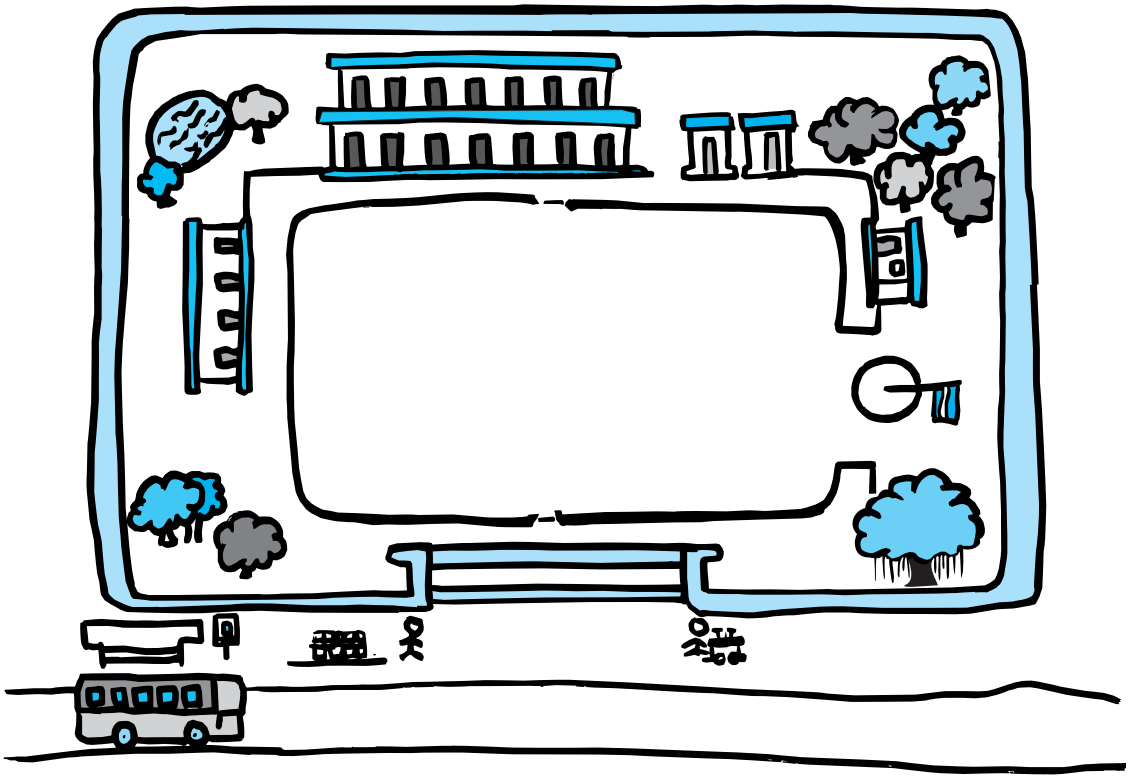


My measurement:

Drawing a map

Classroom Activity

Here is a map of the children's school. Find and label these places: classrooms, playground, flagpole, road, bus stop, pond, toilets, kulfiwala, banyan tree.



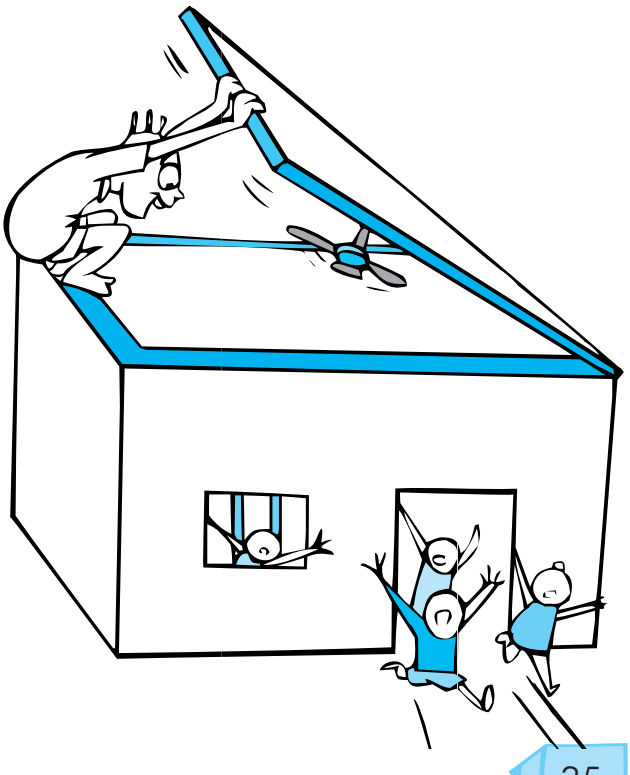
Imagine that you have opened the roof of your classroom and you are looking at everything from the top.

Make a map of your classroom.

Show how long the walls are.

Mark where you are sitting in the classroom.

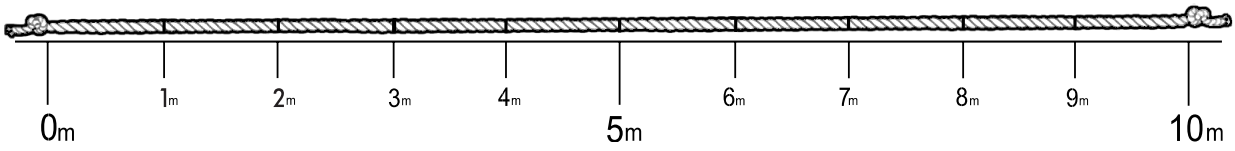
How far are you from the nearest wall?



How far can you throw?

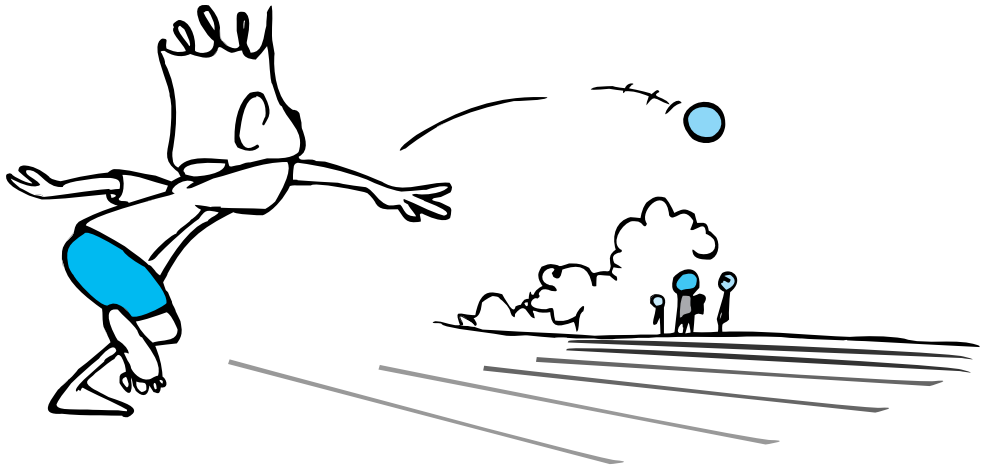
Take your teacher's help and make a rope which is 10m long.

(Tie two knots so that the distance between the knots is 10m. Mark distances of 1 m on the rope with a pen.)



Go out into the ground or an open place. Mark a line on the ground for you to stand and throw from.

From this line at a distance of 10m draw another line. At a distance of 20m draw another line. Similarly draw lines at distances of 30m, 40m and 50m.



Throw a rubber ball from the throwing line. Mark the place where the ball lands. Measure how far you threw the ball using your 10m and 1m ropes. Take turns and find out how far you can throw the ball.

How many steps?

Walk normally from the throwing line to the 50m line and count the number of steps.

I can cover 50m in _____ steps.

How many steps would you take to cover 100m? _____

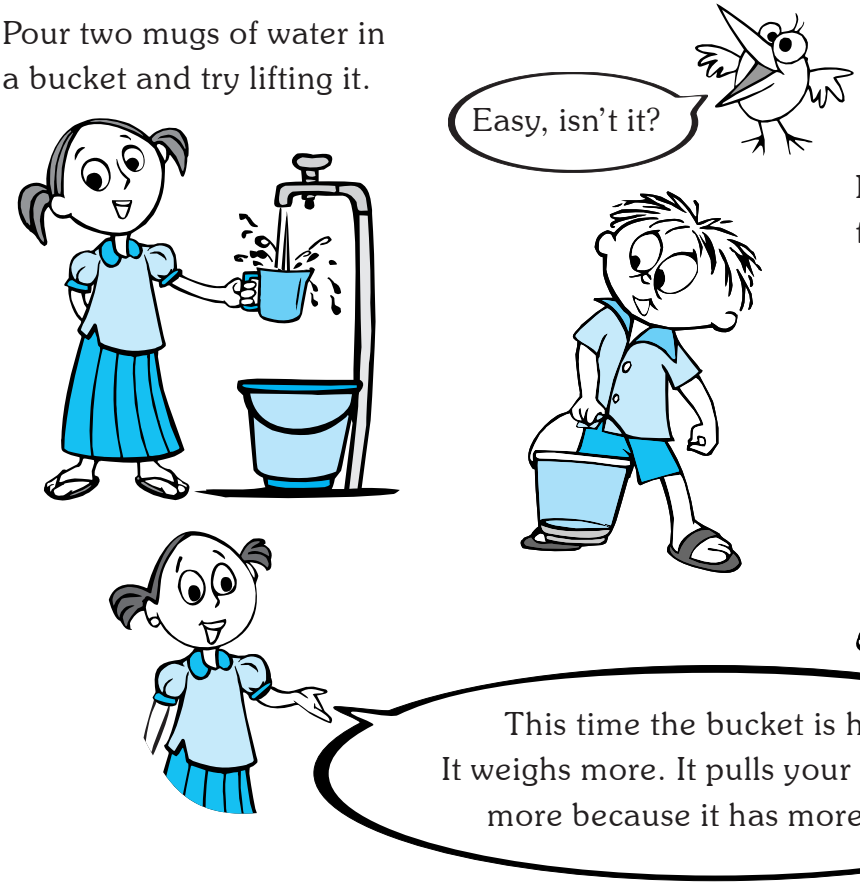
How many steps would you take to cover 25m? _____

WEIGHT

Unit 11

Heavy, heavier ...

Pour two mugs of water in a bucket and try lifting it.



Pick up a stone and stretch out your hand. The weight of the stone pulls your hand down. Pick up a much bigger stone and stretch out your hand. Because the weight is more, it pulls your hand down more.

Notebook Exercise

Make pairs of objects (a pair is a group of two): a book and a stone, or two stones, or a pencil box and a book. Try to guess which object in each pair is heavier.

Know these words

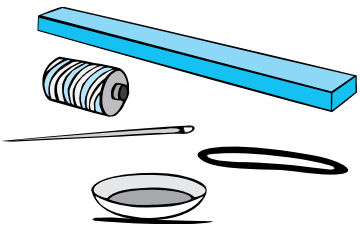
heavy, heavier, heaviest light, lighter, lightest

weigh, weighs more, weighs less, weight

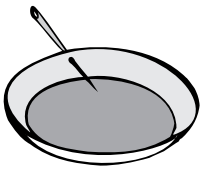
Note to teacher: It is better to do this unit after you have done chapter 9 in the *Small Science* textbook for class 3.

A simple balance

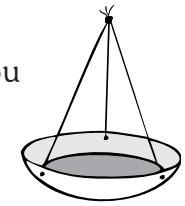
To make the balance, you will need a small plastic plate or a plastic lid, a big rubber band (not very old), a stick, a needle and some thread. Take an older person's help to make the balance.



1 Make 3 holes in the plastic plate by heating a needle and tie threads like in the figure.

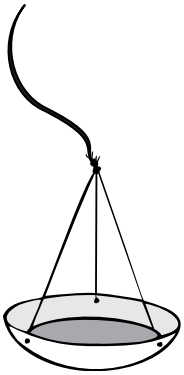


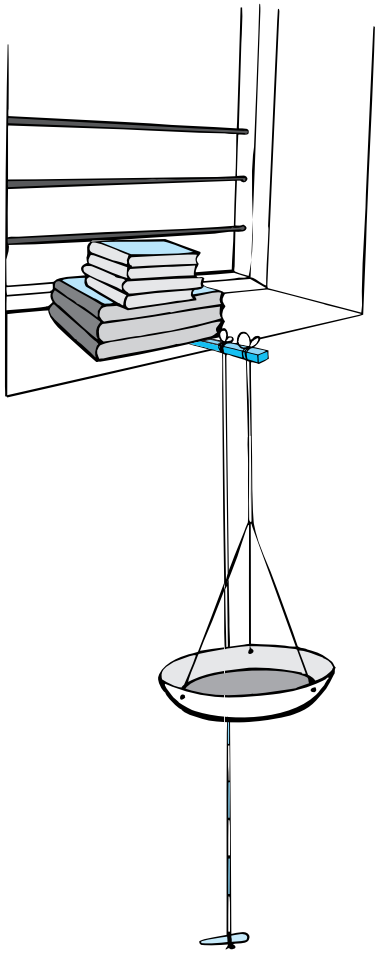
2 Make a knot on top so that the plate hangs flat when you hold it by the knot. This is your weighing pan.

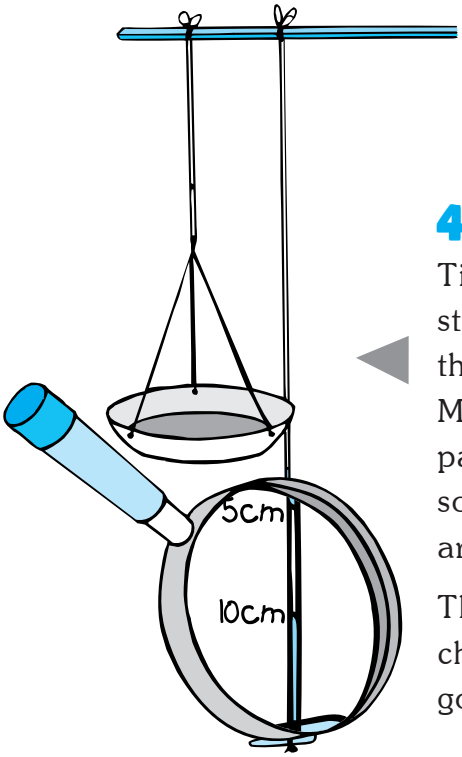


3 Cut open the rubber band and tie one end to the knot.

Tie the other end of the rubber band to a stick and hang it from a table or a window ledge



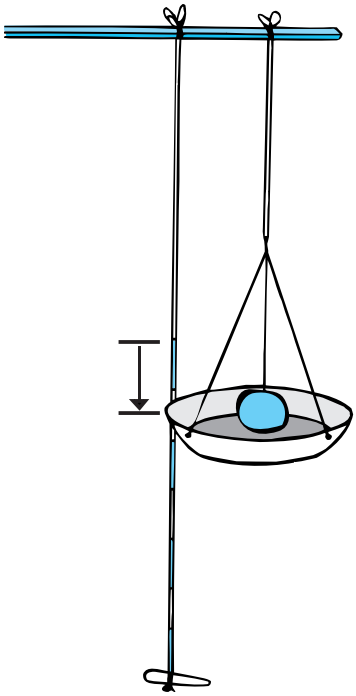




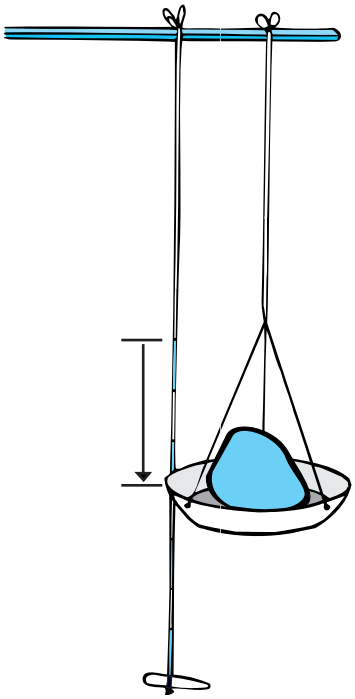
4 Tie a small stone to a string and hang it next to the pan like in the picture. Mark the position of the pan on the string and add some more marks which are 5 cm apart.

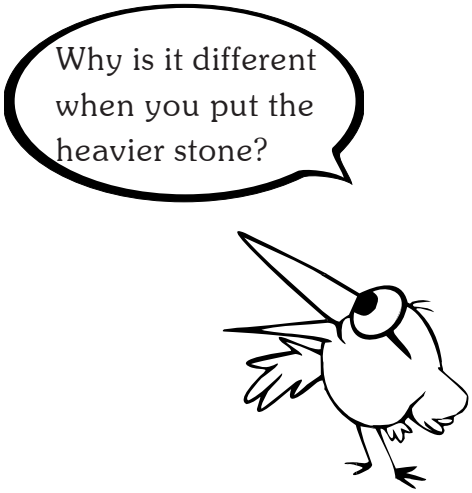
The string helps you to check how much the pan goes down.

Put a stone in the pan.
What happens?



Now put a heavier stone in the pan. What happens?



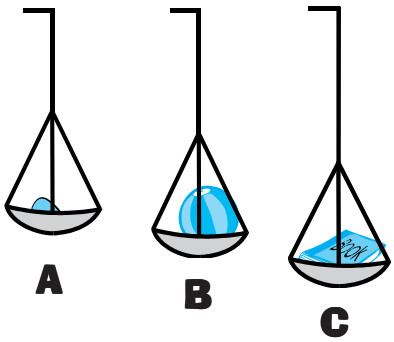


Use the simple balance to find which object is heavier in the pairs of objects that you made earlier.

Make groups of 3 objects. Using the simple balance, arrange the objects in order of weight: first the lightest, then the one with in between weight, then the heaviest.

Look at the picture and tick which of the sentences is true of the three objects shown.

1. The ball is the lightest.
2. The book is the heaviest.
3. The stone is lighter than the book.
4. The book weighs more than the ball.
5. The stone weighs more than the ball.



✦ Caution: The simple balance is not accurate. The rubber band does not always stretch to the same length even if the weight is the same. But it still allows us to roughly compare weights.

Fun with wrappers

Collect as many empty wrappers, containers, cartons, packets, boxes, etc., as you can. Bring them to the class.

Read the numbers written on the wrappers, containers, etc. You may find numbers like 50g, 100ml, etc.

50g means 50 grams. It tells you how heavy the thing inside the wrapper was.

Notice that containers for liquids are usually marked in 'ml': 100 ml, 200 ml, etc. This tells you how much liquid there is. It is easier to say how much liquid there is by volume. You will learn about volume in the next unit.

What other numbers do you find on the wrapper? Discuss with your teacher and with others and find out what all the numbers mean.

Classroom Game

Guess how much.

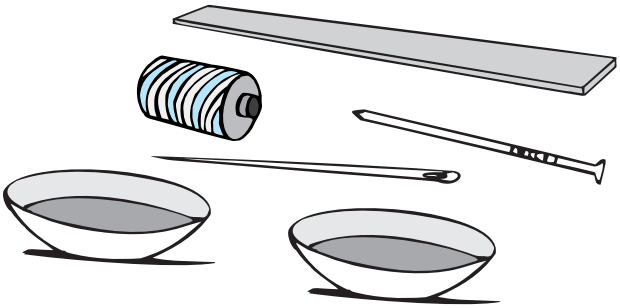
Make two teams. Keep a pile of empty wrappers in front of the class. One student from team A goes, picks up a wrapper, say a toothpaste packet. Team B has to guess how much the packet contained - 50g, 100g, 500g, etc. If the guess is correct, the team gets one point. If the guess is wrong, team A gets a chance to earn a bonus ½ point. Both the teams take **5** turns each.

You will need a collection of empty wrappers, cartons for this section.

A better balance

How to make a better balance:

This balance is much better than the simple one you made first.

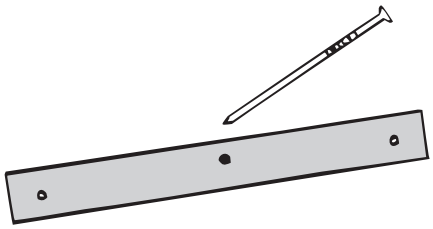


You will need a one-foot wooden or plastic scale, two pans like the ones you made for the simple balance, strong twine or string and a thick needle.

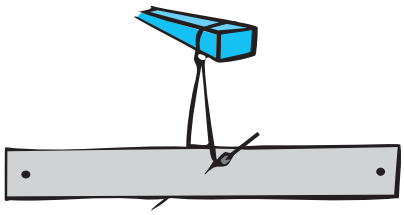
Take the help of an older person to make the balance.

1 Mark the middle point of the scale and make a small hole using a nail. (Use a hot needle for a plastic scale.)
Your needle should move freely inside the hole.

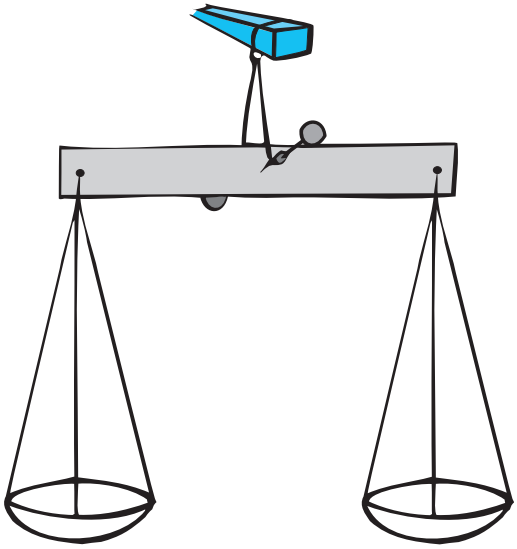
Make two more holes at the end of the scale. The holes should be equally far from the centre.



2 Put the thick needle through the hole in the centre. Hang it by tying twine on both sides of the scale.



3 Hang the pans from the two holes at the end.



When the pans are empty, the scale must be horizontal. If it tilts to one side, hang paper clips or stick a bit of clay to balance the pans.

Stick some clay at both ends of the needle because the ends are sharp.

✦ It is essential to use balances and weights for this activity. See teacher's book.

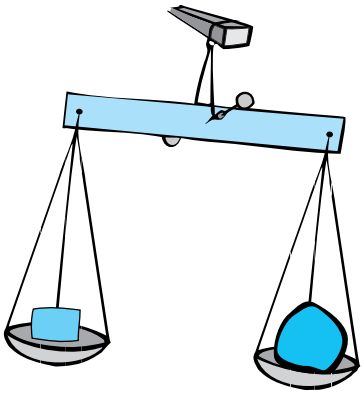
Group Activity

Make groups of 4 or 5 children for this activity.

Put an object in each pan of the balance. Which one goes down? Why?

The heavier object pulls down more, so the balance tilts to one side. When both pans carry the same weight the balance is horizontal, and the pans are balanced.

Make pairs of objects and use the balance to decide which is heavier.



Make groups of 3 objects. Use the balance to arrange the objects in order of weight: first the lightest, then the one with in between weight, then the heaviest.

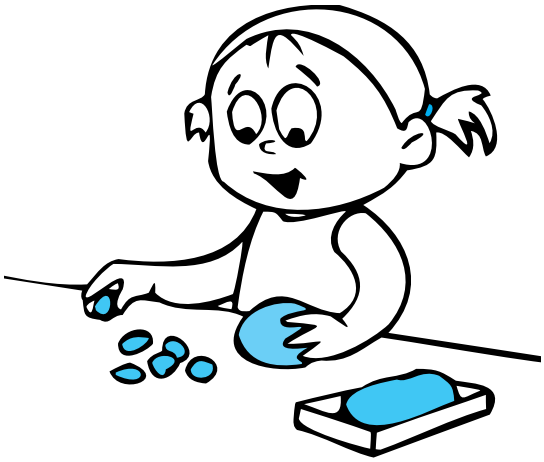
Think think!

Sometimes, you need to weigh only twice to arrange 3 objects in order of weight. Try this out and discuss when this works.

Breaking up weights

Make two balls of atta or clay and put one on each pan of the balance. Add or Remove clay (or atta) till the weights of the two balls are equal.

What would happen if we interchanged the balls on the pans? 'Interchange' means shift the ball on the left to the pan on the right and vice versa. Would the balance still show them as equal? Check your guess.



Now take one of the balls and break it into two smaller balls. Does the weight increase, decrease or remain the same? Guess first. Then put the smaller balls back in the balance and check your guess.

What would happen if you broke the ball into many small balls? Would the weight change?

Making weights

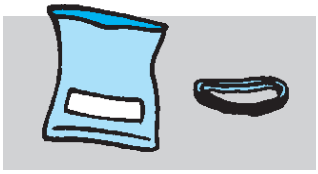
Classroom Activity

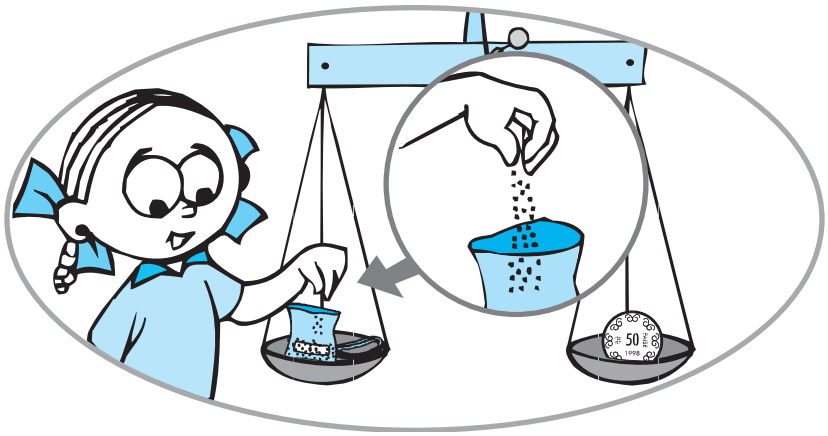
Get an old 50p coin which looks like this.

The weight of an old 50p coin is almost exactly 5 grams.
If you have standard weights check this in your balance.

You can make your own weights.

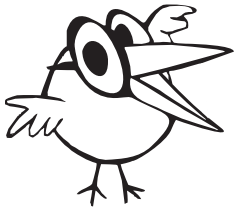
Stick a strip of paper on a small plastic packet with cellotape.



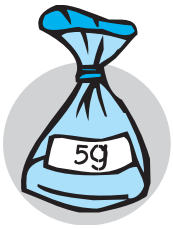


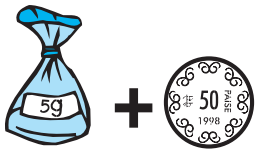
Put it along with a rubber band in one pan of the balance. Put the 50p coin in the other pan.

Slowly add sand inside the packet till the pans are balanced.



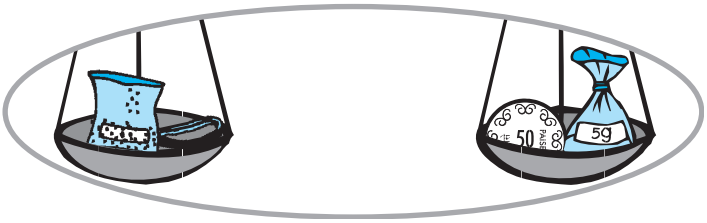
Close the packet with the rubber band and write '5g' on the strip of paper. You have a 5g weight.





Now put the 50p coin and the 5g weight you just made in one pan.

In the other pan put an empty plastic packet, with a strip of paper stuck on it, and a rubber band.



Again add sand inside the new packet till the pans are balanced.
How much will this new weight be?

✦ You need balances, weights, old 50p coins, plastic packets, sand and rubber bands for this section. See teacher's book.

Similarly make weights of 15g, 20g and 25g. Make a drawing first and plan what you will put on the pans each time.

Make some bigger weights of 50g, 100g, 200g, 250g and 500g.

Think, think!

Why do we also put the rubber band in the pan when making a new weight?

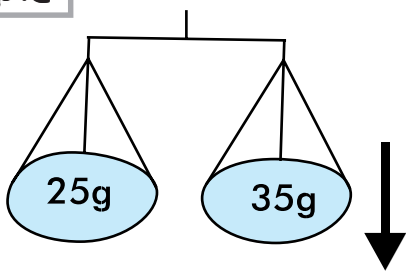
Classroom Activity

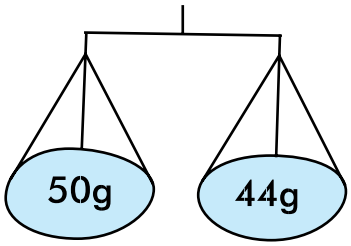
Use the weights you have just made to weigh different objects.

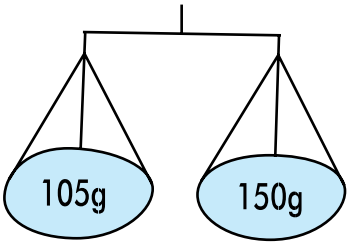
Record your measurements in your notebook.

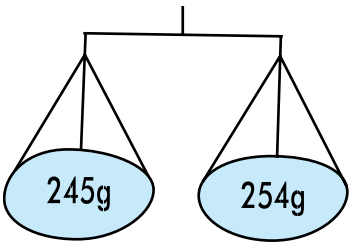
Which side of the balance will go down? Show by drawing an arrow.

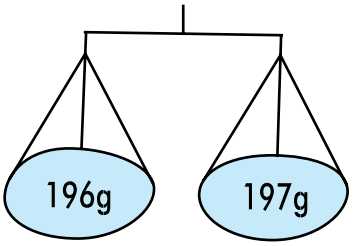
Example

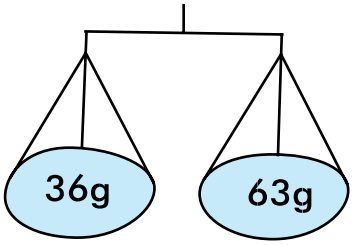






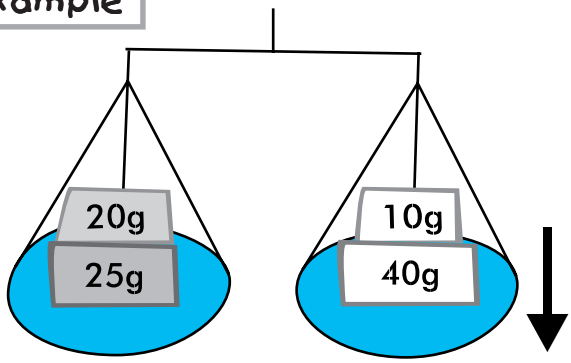


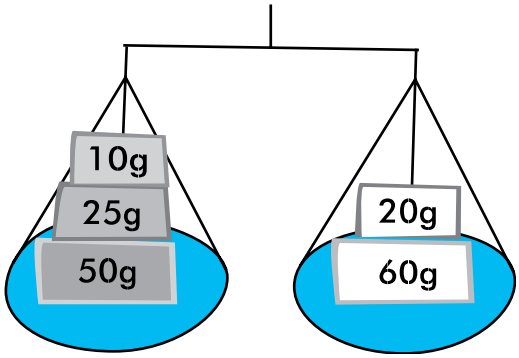


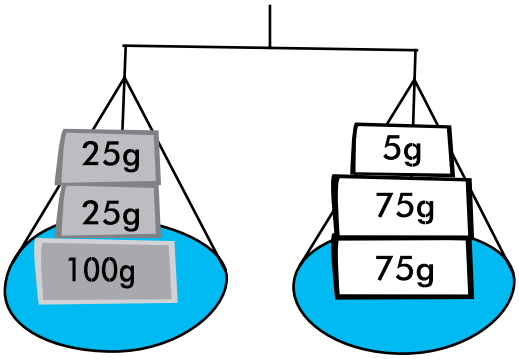


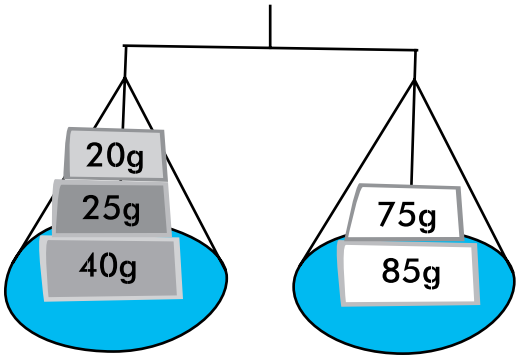
Which side of the balance will go down? Show by drawing an arrow.

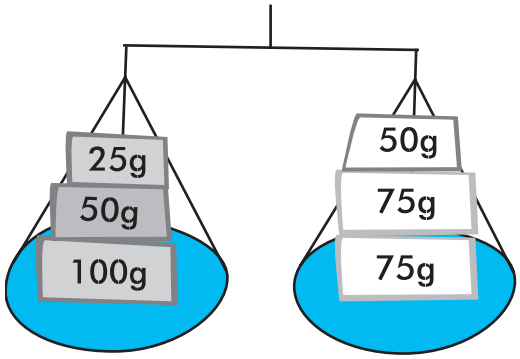
Example

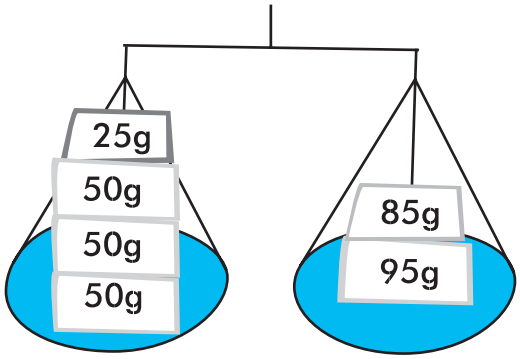






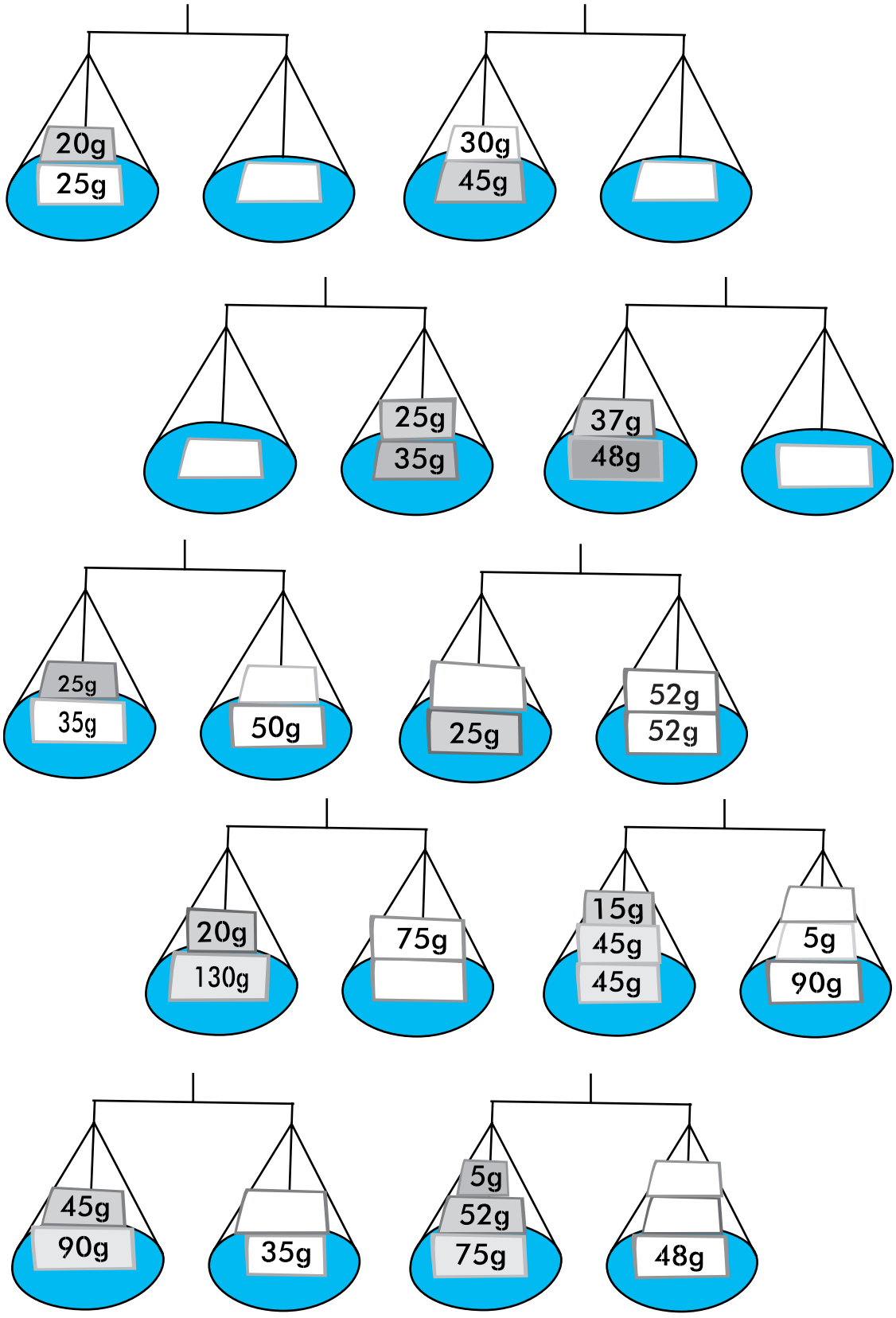




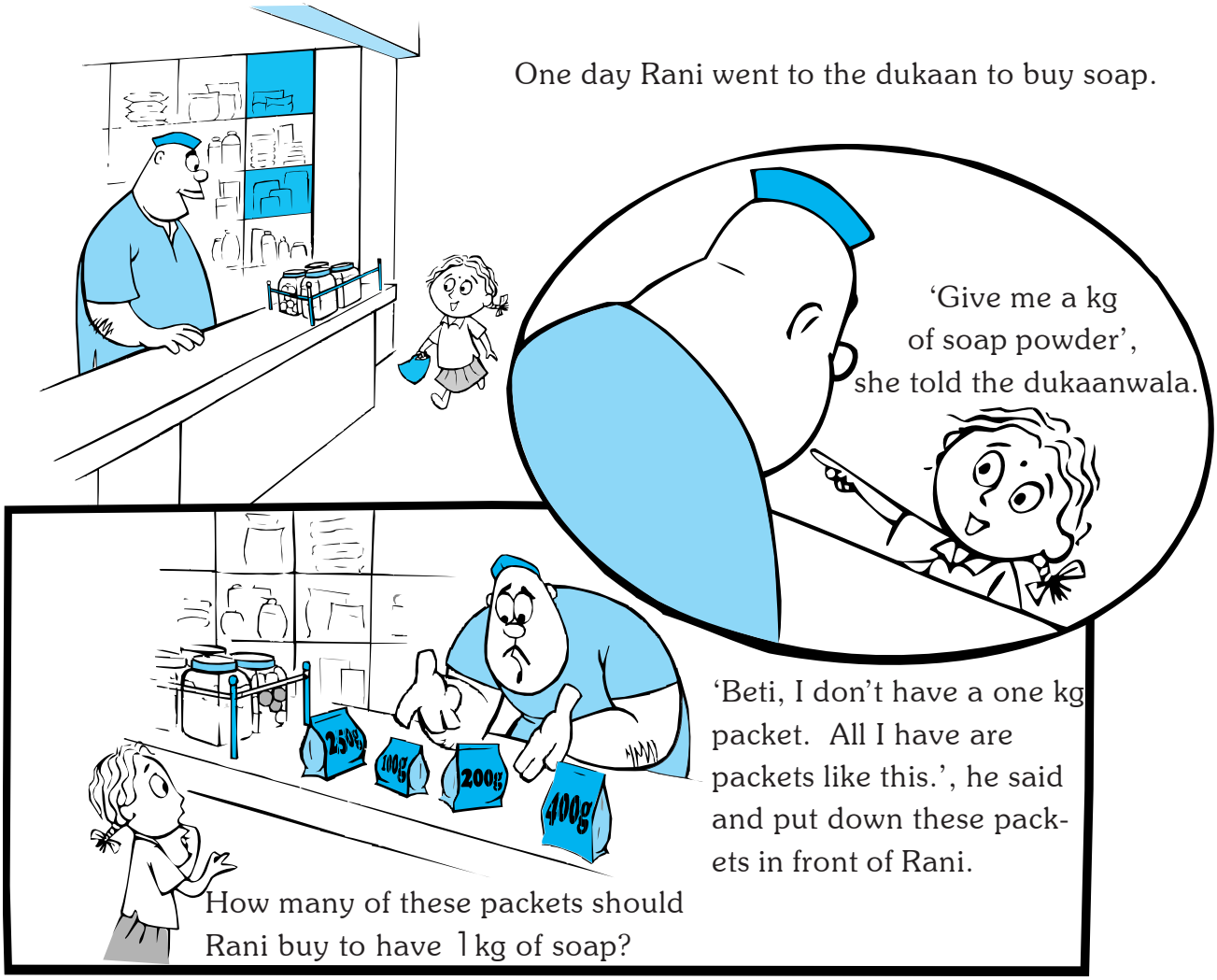


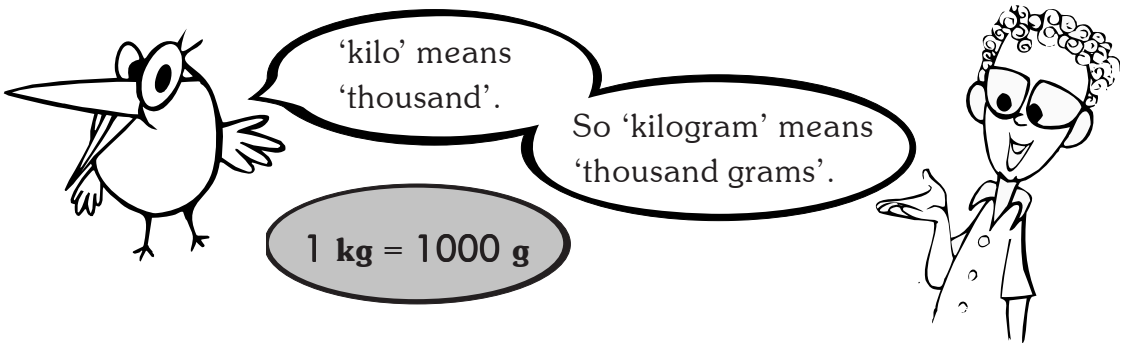
Balancing weights

How much weight on the second pan will balance the first?



Buying one kg





Know these words

kilo, gram, kilogram

Puzzle: I took a balance. On one pan I put a kg of iron bars. Other pan I put a kg of cotton. Which pan will weigh more?

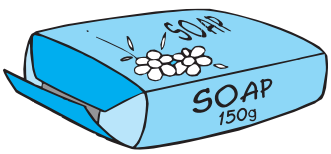
How heavy?

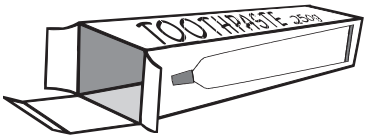
Get some articles from home - soap, toothpaste, biscuit packet. Weigh the articles in your balance. Write down the weight written on the wrapper and the actual weight measured in your balance in your notebook. Discuss why the two weights are different.

What I weighed	Weights I used	Total weight
		

A big bath soap weighs 150g. Make a table to show the weight of 2, 3, 4 and more soaps.

Number of soaps	Weight
1	150g
2	
3	
4	
5	
6	
7	





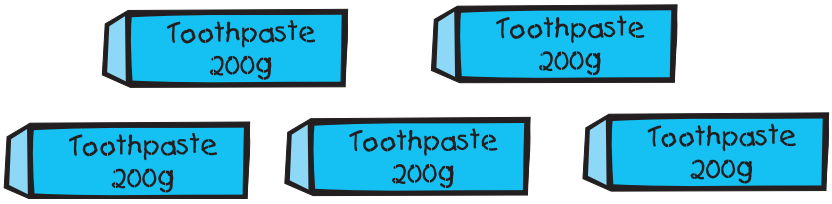
A toothpaste tube weighs 250g. How much do 2, 3, 4 and more tubes weigh?

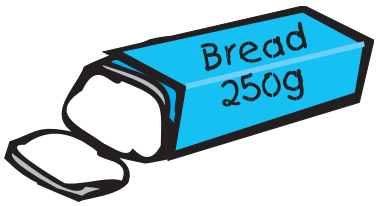
Number of soaps	Weight
1	250g
2	
3	
4	
5	
6	
7	

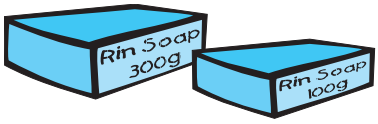
Make a kg

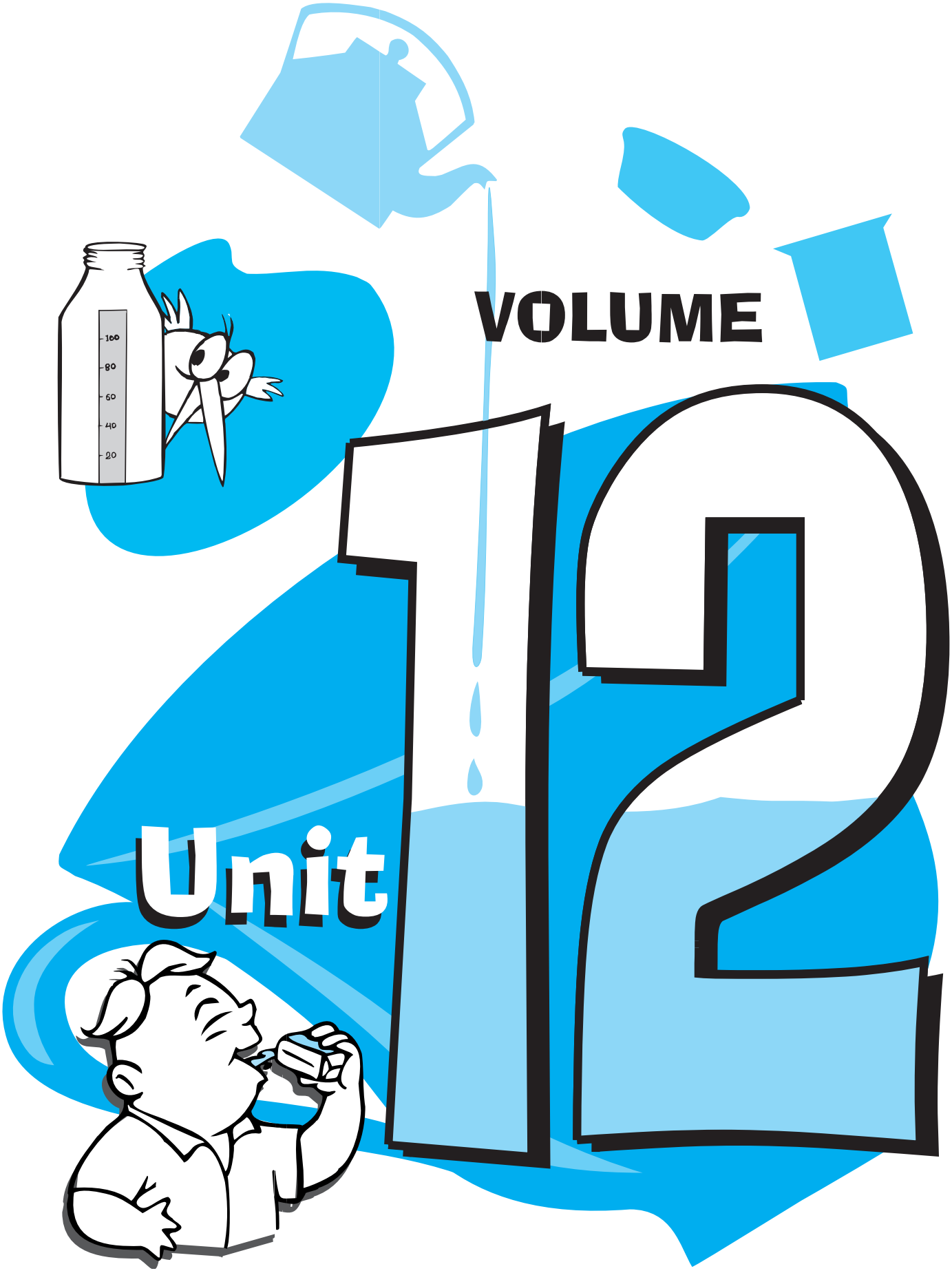
How many of these will you need to make a kg?

Example

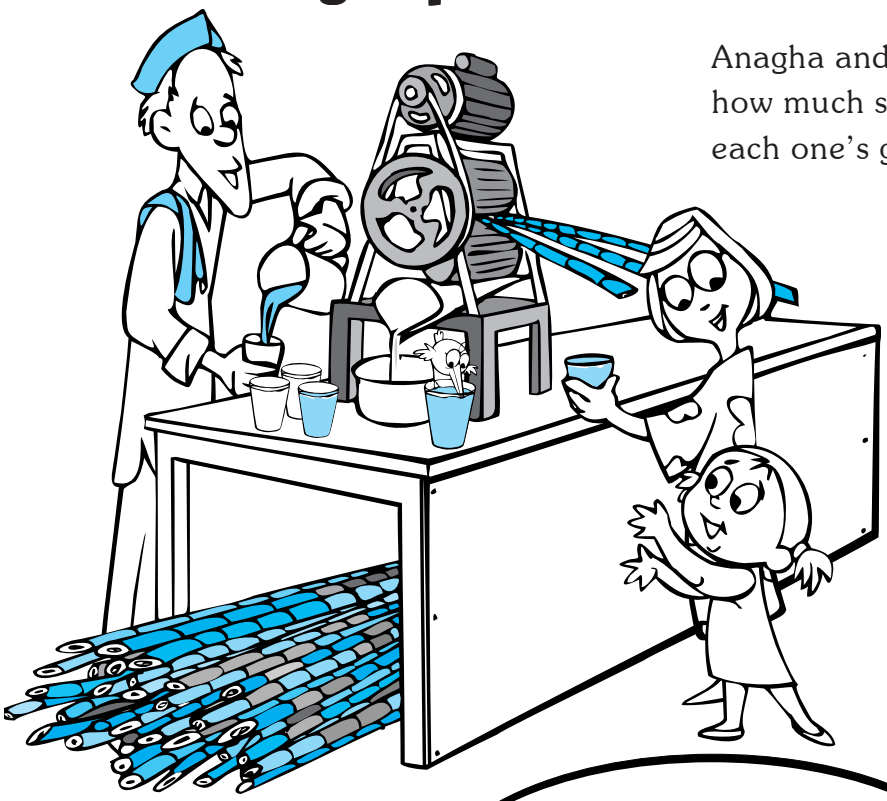




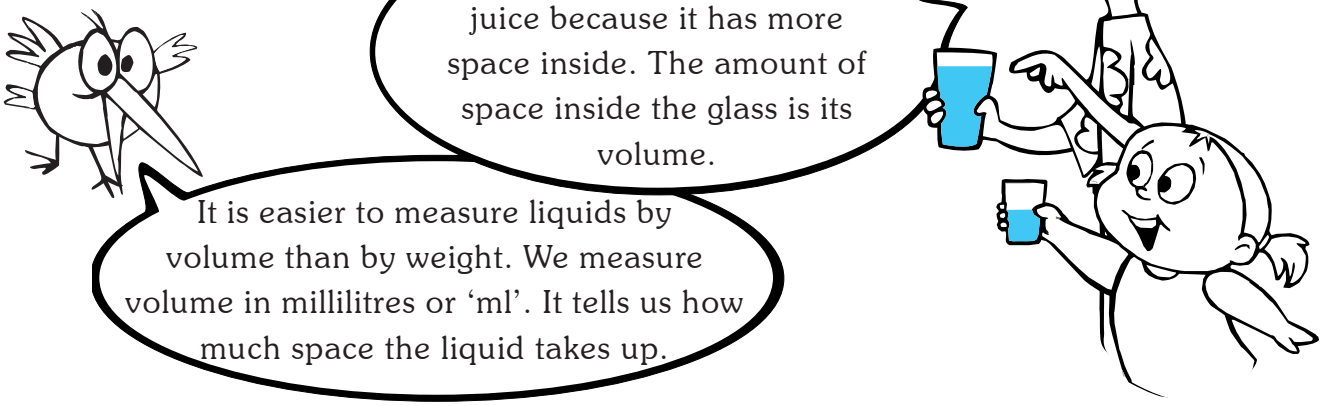


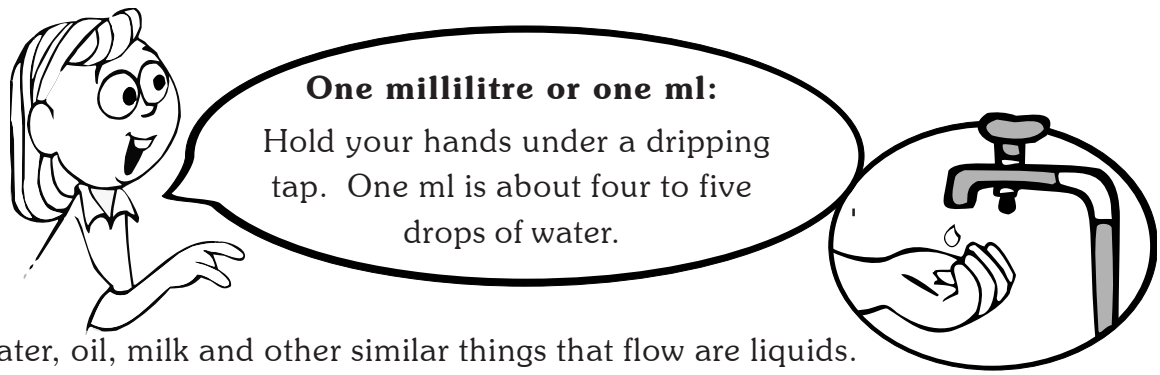

VOLUME
Unit
12
100
80
60
40
20

Measuring liquids



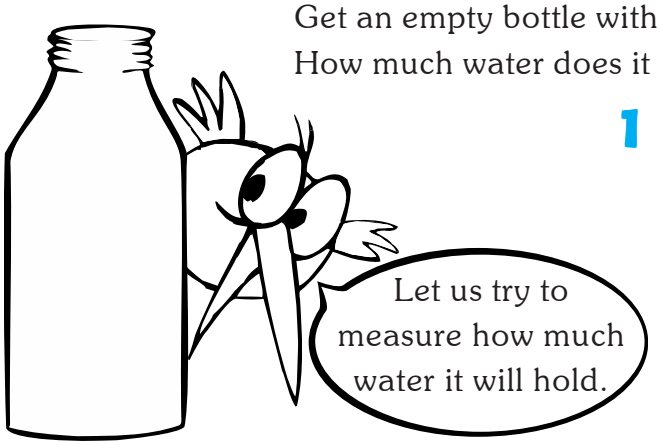
Anagha and Mini were checking how much sugarcane juice was in each one's glass.





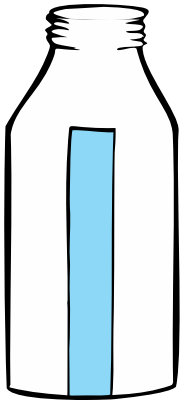
Water, oil, milk and other similar things that flow are liquids. Write down the names of some other liquids.

Activity: Making a measuring bottle

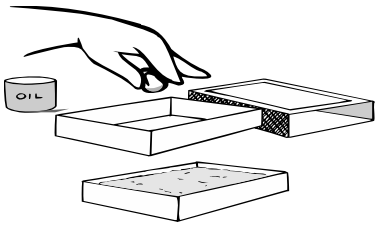


Get an empty bottle with a wide mouth. Fill it with water. How much water does it hold?

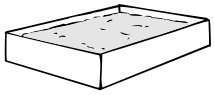
1 Stick a strip of paper on the side of the bottle like in the figure.

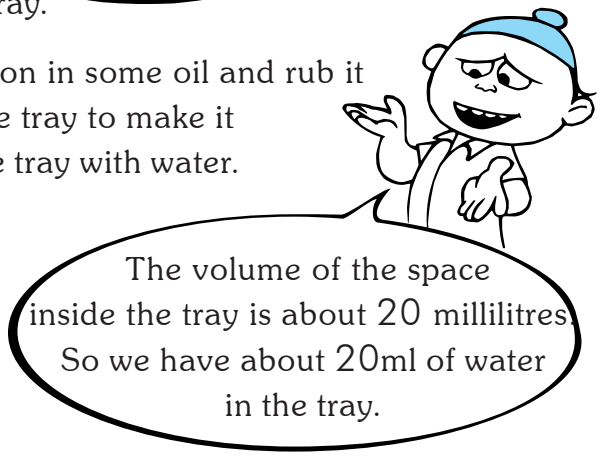


2 From an empty matchbox take out the tray.

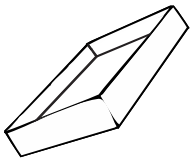


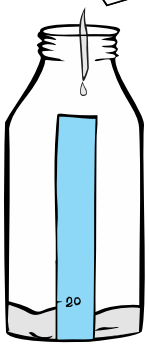
Dip a piece of cotton in some oil and rub it on the inside of the tray to make it waterproof. Fill the tray with water.





3





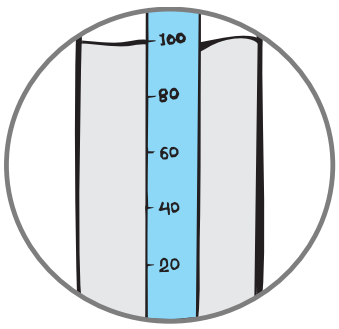
Pour out the water from the tray into the bottle. Take care not to spill any water.

Now the bottle has about 20 ml of water. Mark the level of water on the paper strip. Write '20 ml' next to the mark. ('ml' means millilitre.)

4 Take another 20ml of water in the tray and pour it into the bottle. The bottle will now have about ____ ml of water.

Mark the new level and write '40ml' next to it.

Pour more water from the tray into the bottle and mark the levels for 60ml, 80ml, 100ml, etc. You now have a measuring bottle. How much water does the bottle hold?



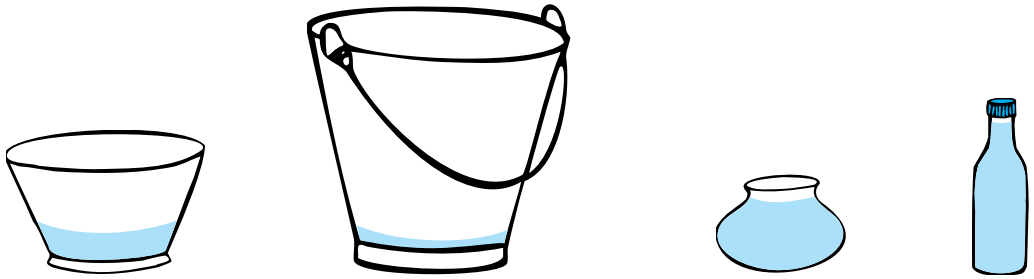
Activity

Get some empty containers (medicine bottles, shampoo bottles, etc.) with labels. Check for the volume marking on the labels. Use your measuring bottle to check how much water they will actually hold.

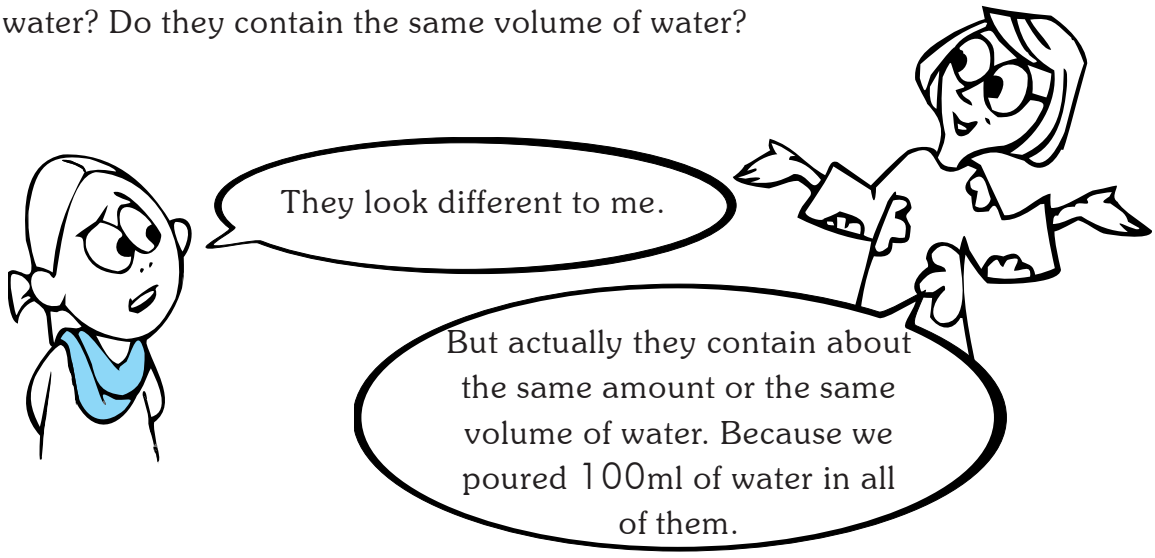
Do the bottles usually hold more than the volume marked or less? Why?

Activity

Collect containers of different sizes and shapes.
Use your measuring bottle to pour 100ml of water into each container.



Look at the water level in each container. Do all of them contain the same amount of water? Do they contain the same volume of water?



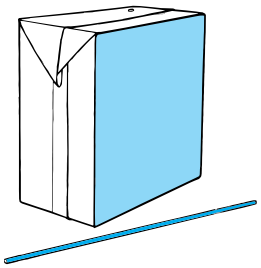
We cannot usually tell how much volume of liquid there is by looking. We need to measure it with a measuring cup.

Think, think!

Do you think the volume of water changes when you pour it from the bottle into another container? Why or why not?

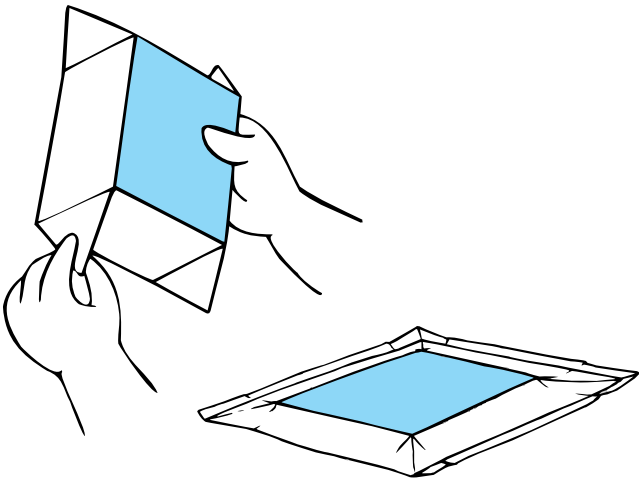
A 100ml measuring cup

Get an empty juice tetrapack. You will easily find them in railway stations or in bus stands. What numbers are written on the pack?

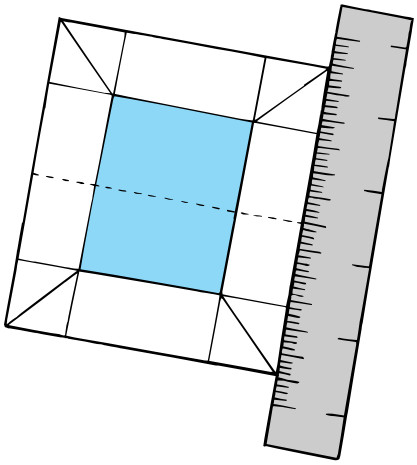


The small juice tetrapack usually holds 200ml of juice.

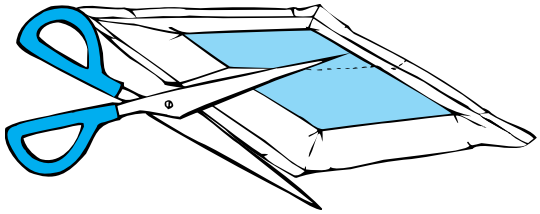
1 Carefully open the folds on the top and bottom of the tetra pack.
Flatten the pack.



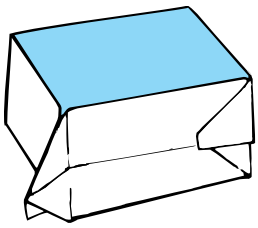
2 Use your scale to measure carefully and draw a line exactly through the middle of the pack.

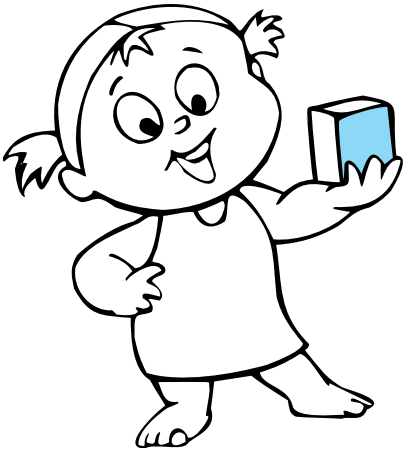


3 Cut the pack through this line.



4 Now open out the pack and fold the bottom in.

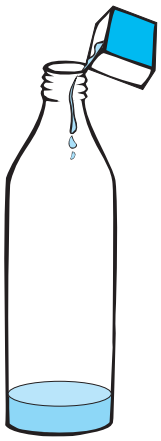




You have a measuring cup which can hold 100ml of water (or juice).

Note: If you cannot get a juice tetrapack, take your teacher's help and make a 100ml measuring cup from a mineral water (bisleri) bottle.

How much water?



Get a large empty bottle.

Fill your juice pack measuring cup with water and pour it into the bottle. How much water is in the bottle now? _____

Pour out another cupful of water in the bottle.
What is the volume of water in the bottle now? _____

How many cupfuls do you need to fill the bottle?_____

About how many ml does the bottle hold? _____

How much water do you drink?

Clean your juice pack measuring cup thoroughly with soap and water. Fill it with drinking water and drink it up. How much water did you drink? _____

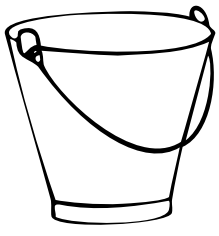
Open out the bottom fold, flatten the pack and put it in your pocket. You can carry your measuring cup with you!

Fill up the cup again with drinking water and drink it up.

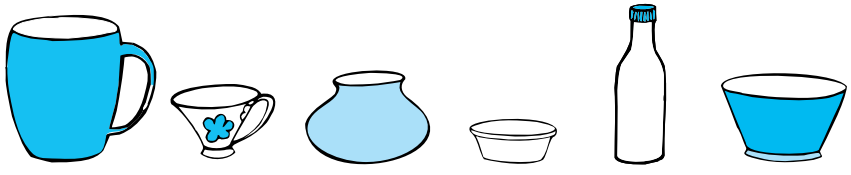
How much water did you drink in all? _____

Whenever you drink water, use the cup. Find out how much water you drink in a day.

There is 1000ml of water in the bucket. You have to completely fill as many of the small containers as you can. Which ones will still be empty?



1000ml



400ml 100ml 150ml 50ml 200ml 250ml

Measuring by the litre

Get an empty mineral water bottle (bisleri bottle), which can hold one litre of water.

Fill the mineral water bottle with your 100ml measuring cup and find out how many millilitres it will hold.

Guess: How many millilitres make a litre?_____

Milk bags come usually in two sizes: one litre and half litre.

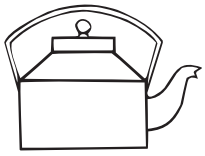
The one litre milkbag contains _____ ml of milk.

The half litre milkbag contains _____ ml of milk.

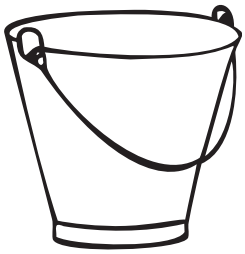
How many millilitres?

1 litre = 1000 ml

10 litres = _____

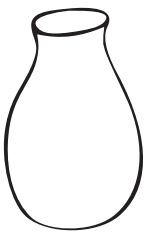


2 litres = _____

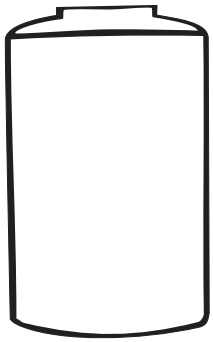


20 litres = _____

4 litres = _____

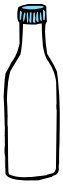


5 litres = _____

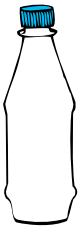


50 litres = _____

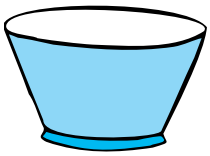
How many litres?



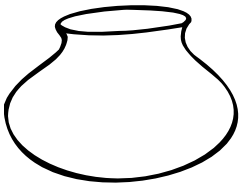
1000ml = ☐



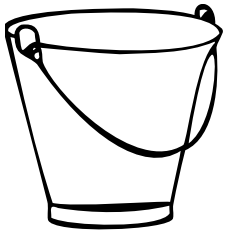
3000ml = ☐



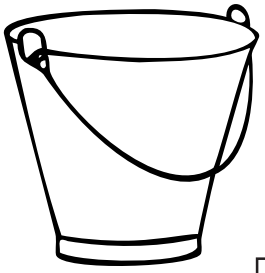
8000ml = ☐



10000ml = ☐



11000ml = ☐



18000ml = ☐

500ml = ☐

Activity

Step 1

Get a bucket.
Guess how many litres it will hold.

My first guess: _____

Step 2

Fill your one litre bisleri bottle with water and pour it into the bucket. The bucket now contains one litre of water. Make a second guess of how many litres the bucket will hold.

My second guess: _____

Step 3

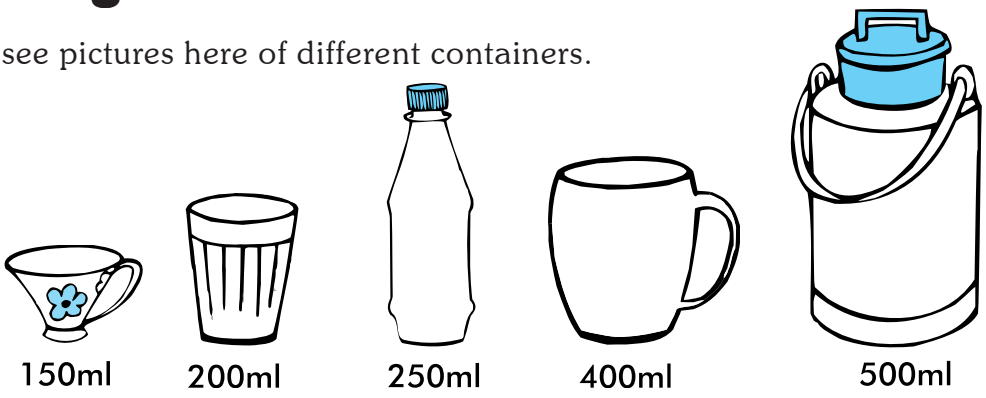
Fill the bucket with the bisleri bottle and measure how many litres it will hold.

My measurement: _____

How many ml will the bucket hold? _____

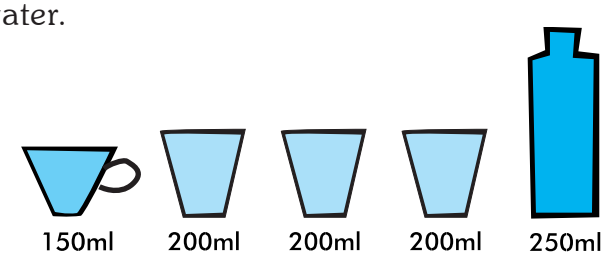
Making a litre

You see pictures here of different containers.



Using these containers find **five different ways** in which you can fill a bottle with exactly one litre of water.

Example

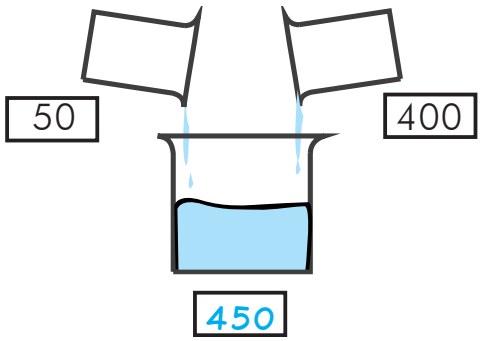


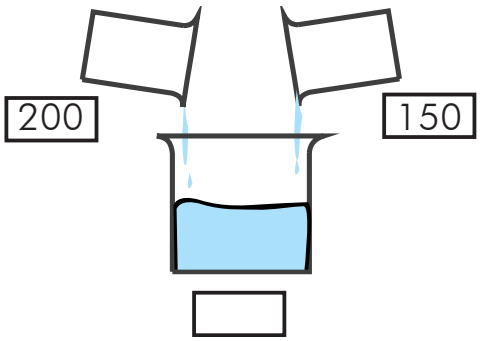
Think, think!

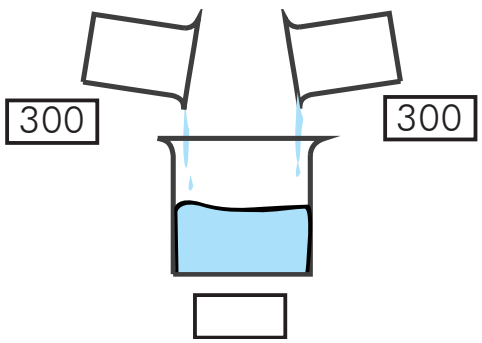
Can you fill exactly one litre using only the small tea cup in the picture? Why or why not?

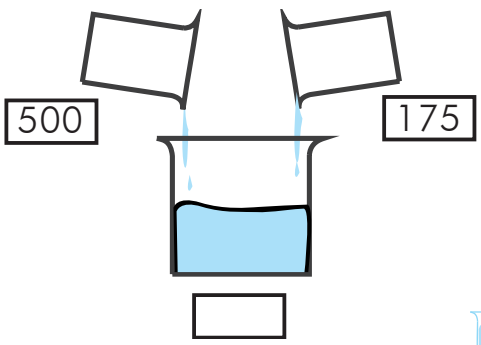
Find how much.

How many ml of water will there be in the big container after pouring out from the small containers?

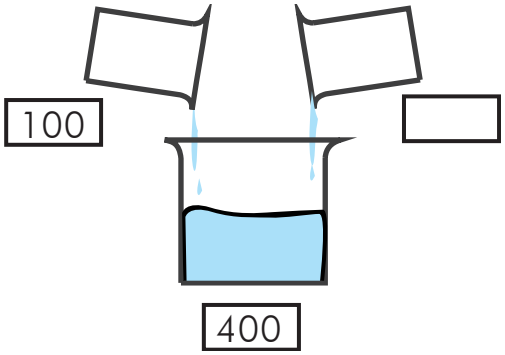


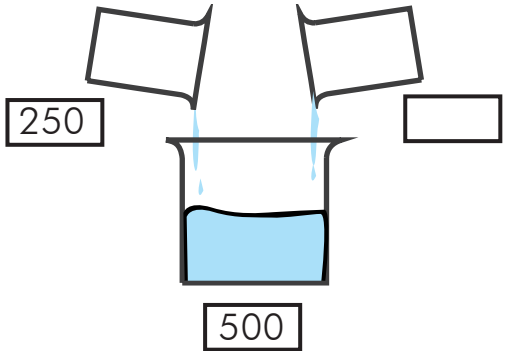


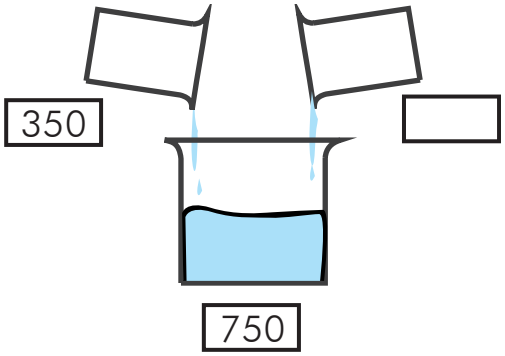


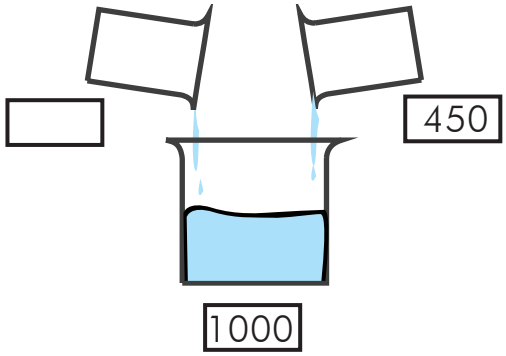


How much water was in the smaller container with the blank before it was poured out?

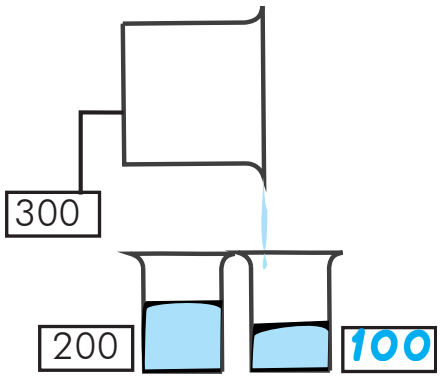


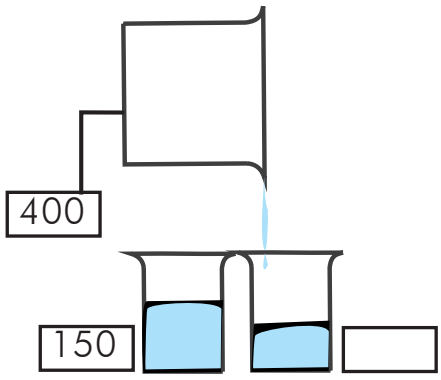


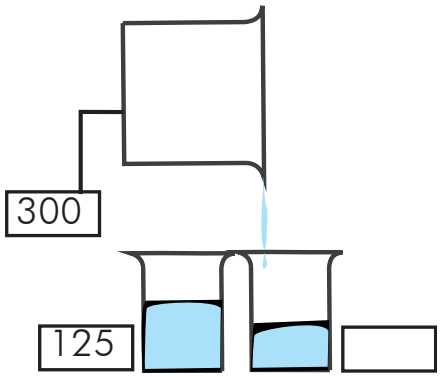


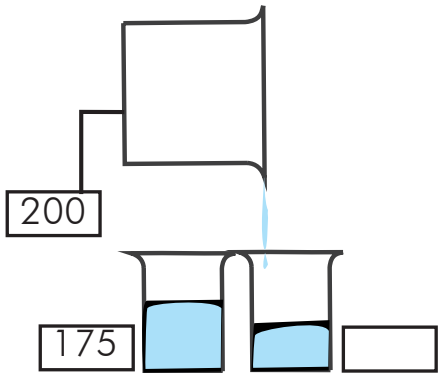


How many ml of water is in the small container with the blank?



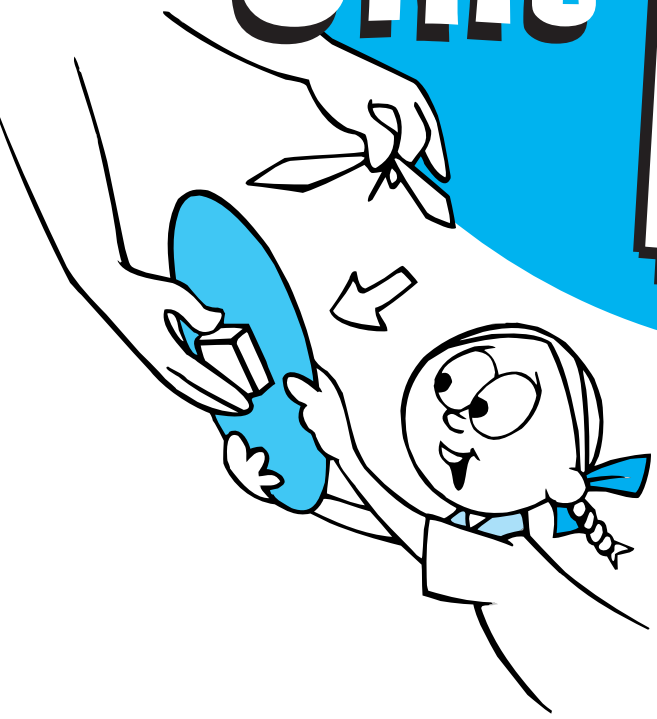






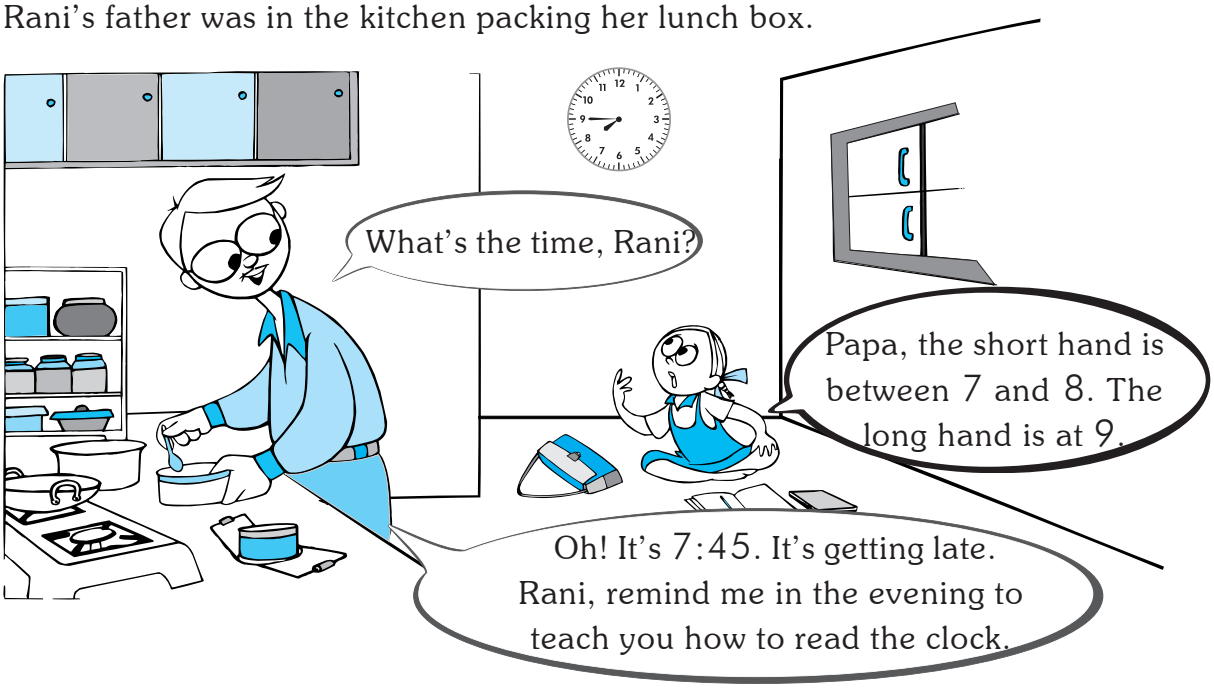
TIME

Unit 13



The clock

Rani's father was in the kitchen packing her lunch box.

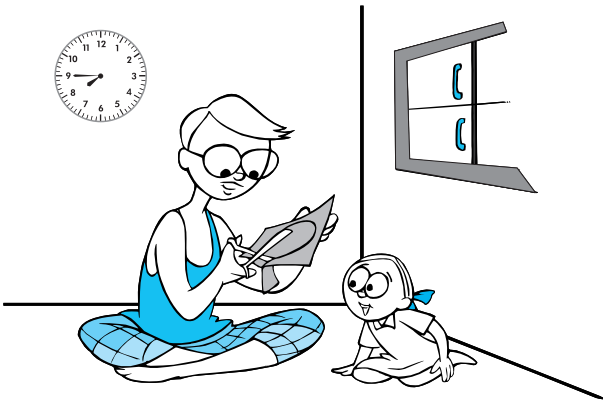


Rani was excited and looked foward to the evening.

In the evening Rani and her father made a cardboard clockface.

You can make one too.

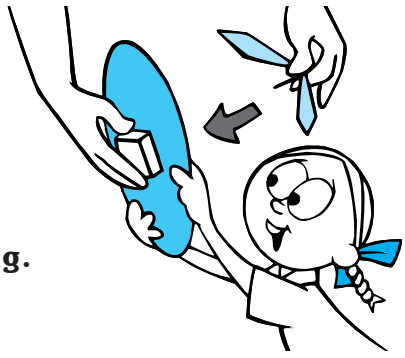
Draw a clock face on thick card paper and cut it out. Stick a piece of eraser at the back in the centre.



Make two hands from card paper. Pin them at the centre of the clock using a drawing pin. The eraser at the back helps to hold the drawing pin.

The hour hand is short. It shows hours.

The minute hand is long. It shows minutes.

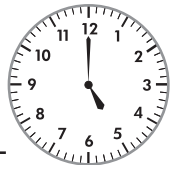


Telling the time - 1

The hour hand is on 8.
The minute hand is on ____
The time now is 8 o'clock or 8:00.

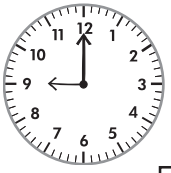
The hour hand is on ____
The minute hand is on ____
The time now is ____

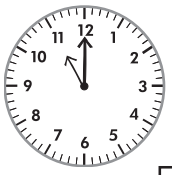
The hour hand is on ____
The minute hand is on ____
The time now is ____



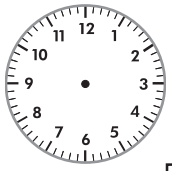
The hour hand is on ____
The minute hand is on ____
The time now is ____

Write the times shown.

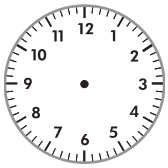




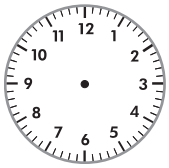
Show the time by drawing the hour and the minute hand.



6:00



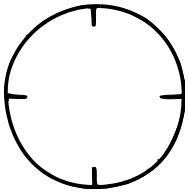
3:00



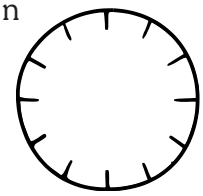
12:00

Practice drawing a clock in your notebook.

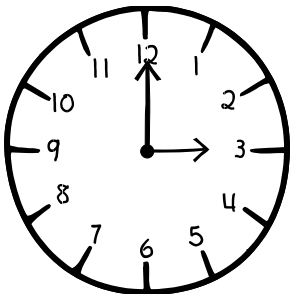
Draw a circle using a small bangle. Make four marks on the circle like in the picture.



Now carefully put two more marks between each pair of marks. Check to see if the space between the marks is equal.

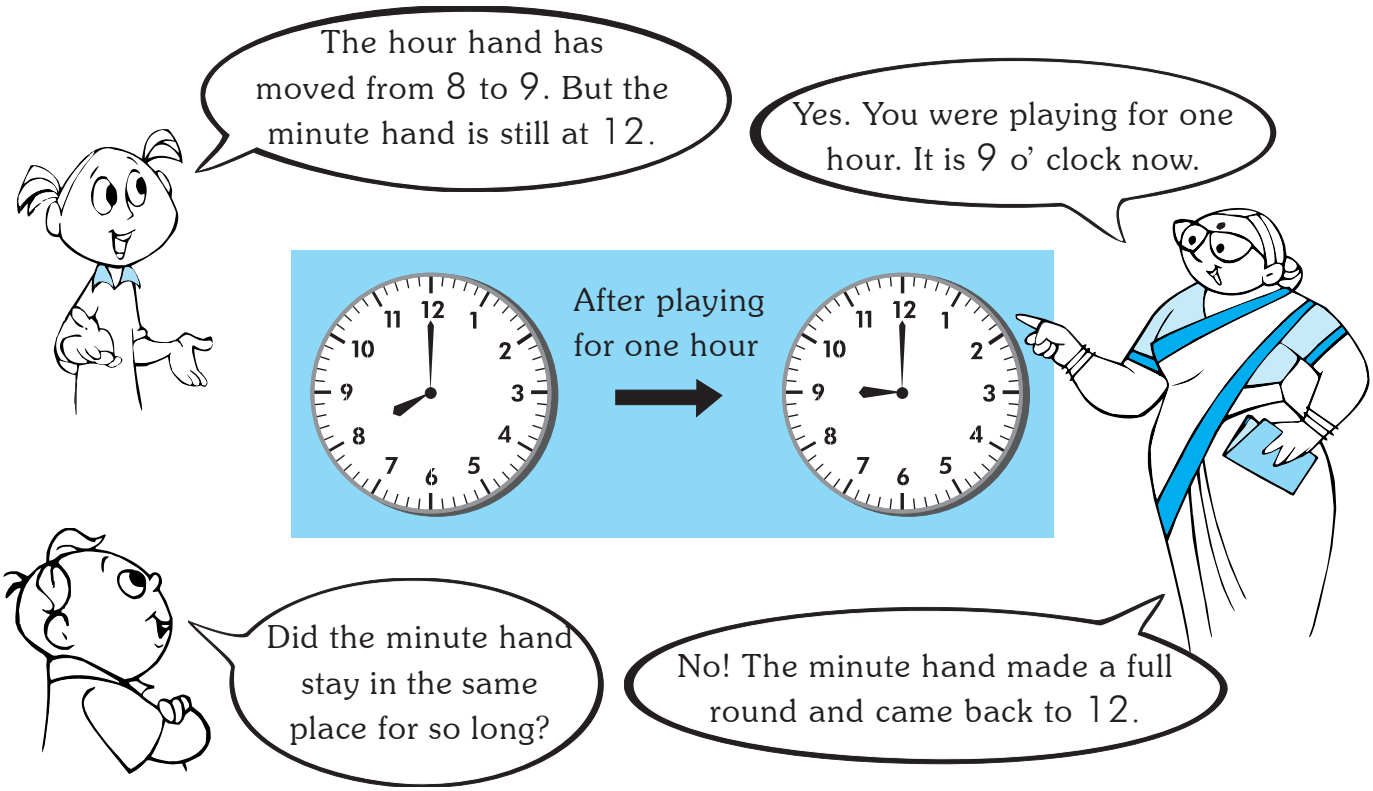


Write the numbers 1 to 12 as in the picture.
Draw the hour hand and the minutehand.
Draw arrows on the hands.

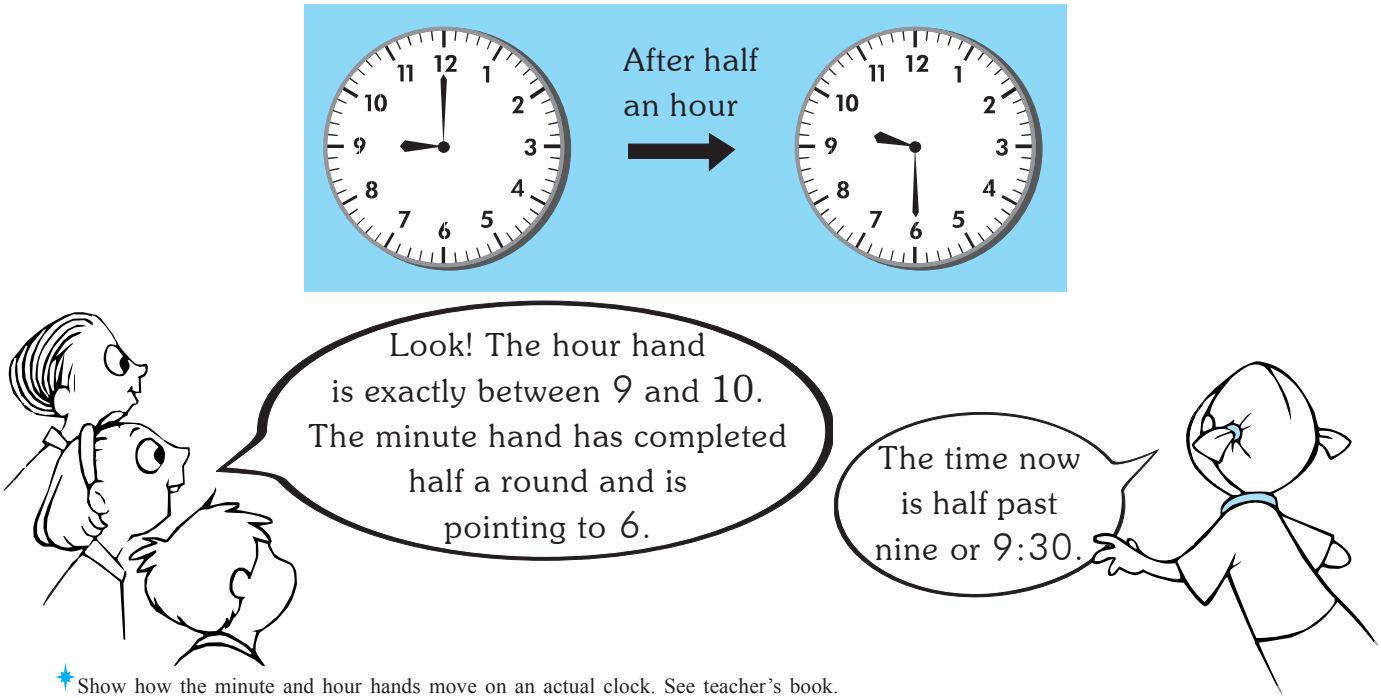


Half past the hour

When the children went out for PT, they checked the time. It was 8 o' clock. When they came back, their teacher asked, "Have the hands changed their position?"

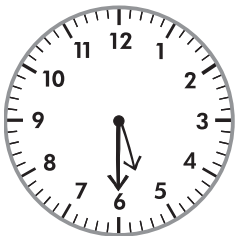


After some time the teacher asked the children to look at the clock again. Now the minute hand was at '6' and the hour hand was between '9' and '10'.

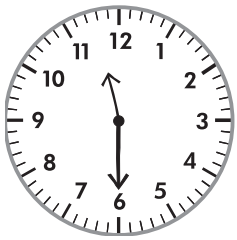


✦ Show how the minute and hour hands move on an actual clock. See teacher's book.

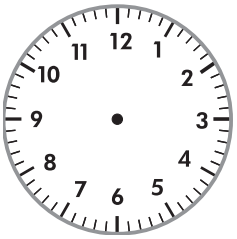
Write the times shown.



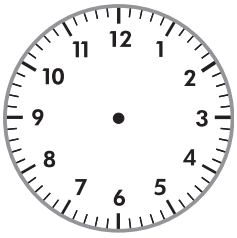
5:30



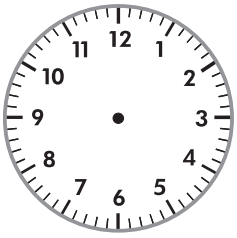
Draw the hands to show the time.



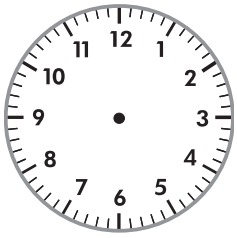
3:30



10:30



6:30

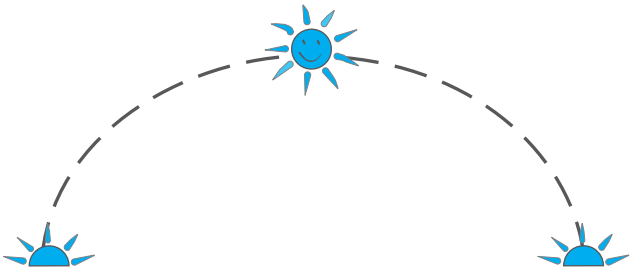


12:30

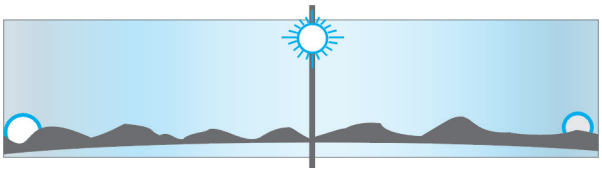
Did you know?

In the olden days people found the time of the day by looking at the sun.

The sun rises in the morning in the East.
At noon the sun is high in the sky.
The sun sets in the evening in the West.



Noon



Midnight

The middle of the day, when the sun is high in the sky, is called noon.
This happens at 12:00 noon.

The middle of the night is 12:00 midnight.

For the times before noon we write 'am', e.g. 7:00am, 8:30am.

For the times after noon we write 'pm', e.g. 2:00pm, 7:00pm.

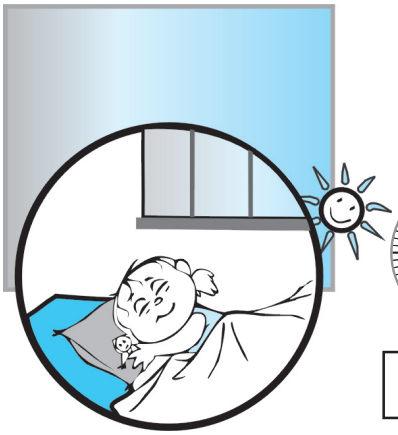
One day

These two pages show you what Mini did one day.

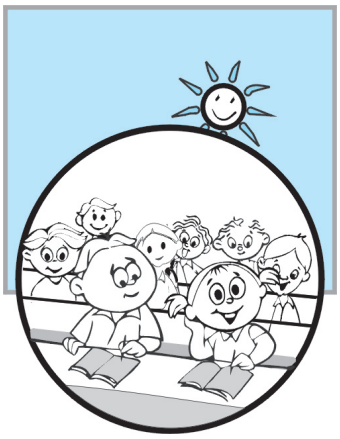
Write down the time for each picture.

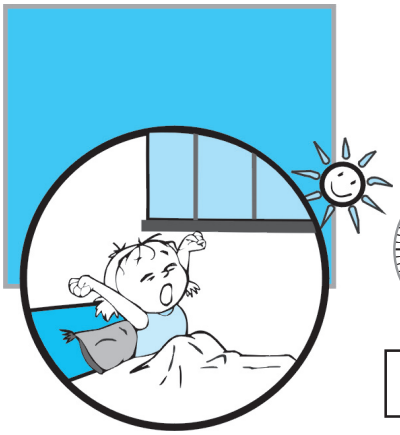
For some pictures, the time is written and you must draw the hands on the clock.

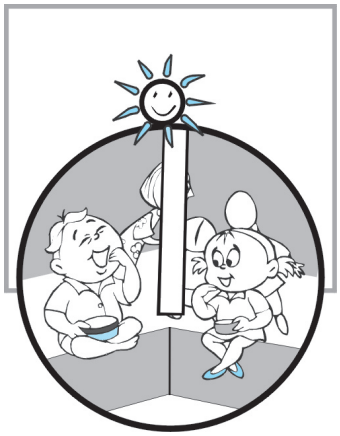
West East

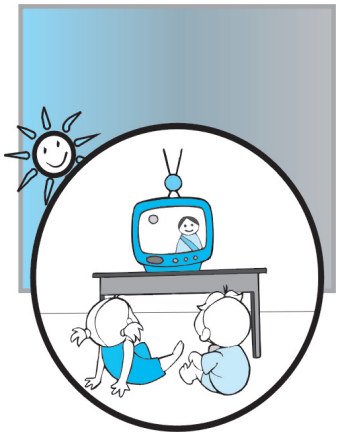


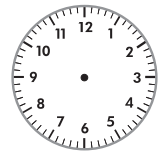
7:00am



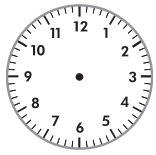




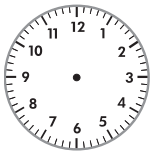




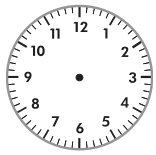
7:00pm



10:00pm

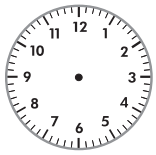


8:00pm



1:00am

8:30pm



4:00am

Think, think!

What is the date today? At what time did 'today' begin?

7 o' clock comes twice in one day, once in the morning (7 am) and once in the evening (7 pm). Do all 'times' come twice in one day?

Telling the time - 2

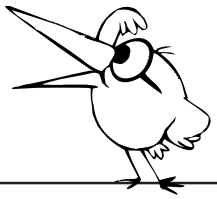
How long is a minute?

Get a clock with three hands. Can you find the hour and the minute hands? The extra hand which is long and thin moves very fast.

When this thin hand makes one full round, one minute has passed.

When the long, thin hand is exactly at '12', raise your hands. Wait till it completes one full round. When it comes back to '12' exactly, put your hands down. You kept your hands up for one minute.

Look carefully and find out how much the minute hand moves in one minute.



Using a big bangle draw a clock in your notebook and mark the numbers from 1 to 12 inside the circle. Now carefully make four small marks between each mark.

You should have a total of 60 marks on your clock.

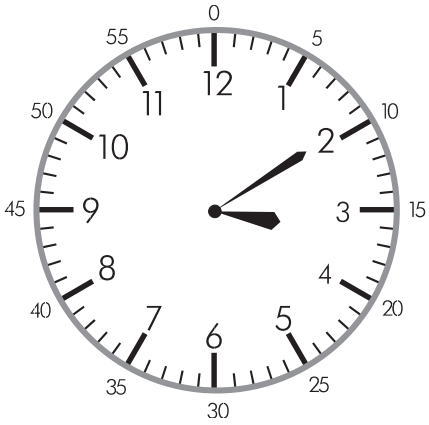
Write the numbers 1 to 59 next to the marks *outside* the circle. Write '0' for the top mark instead of 60.

Each mark shows one minute, so 60 marks show 60 minutes.

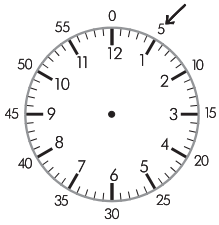
Look at the clock. The hour hand has crossed 3 and the minute hand is showing 10 minutes. So the time is 10 minutes past 3 o'clock or 3:10.

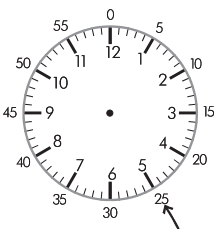
One hour has sixty minutes. So when the minute hand makes a full round, it is 60 minutes or one hour.

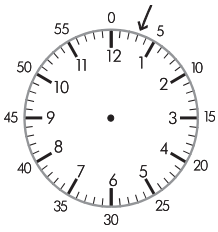
It is difficult to write numbers for all the minute marks. So we write only 0 minutes, 5 minutes, 10 minutes and so on upto 55 minutes.

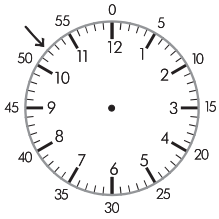


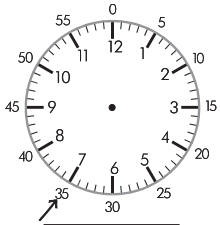
How many minutes does the arrow show?


5 min

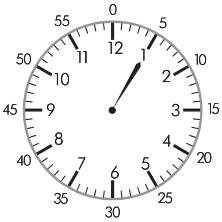


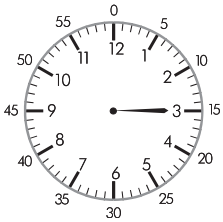


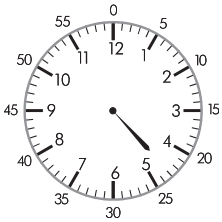


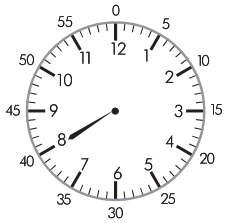


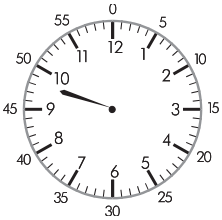
Write the minutes shown by the minute hand.



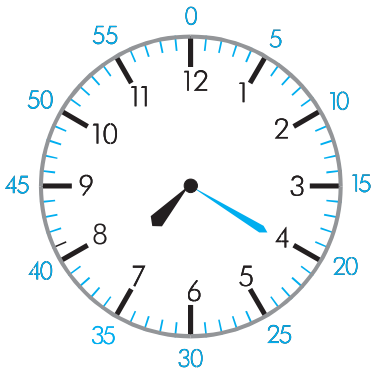








To tell the time, read the inside numbers for the hour hand and the outside numbers for the minute hand.

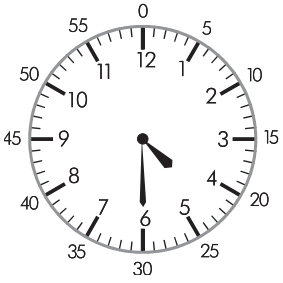


The hour hand is between 7 and 8

The minute hand is at 4

The time is 7:20

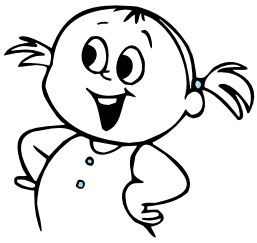
Notice that the hour hand is not exactly at 7.
It has left 7 and is moving towards 8.



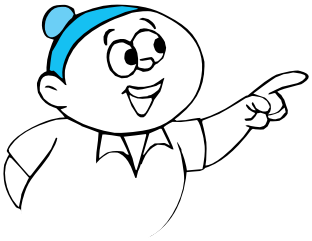
The hour hand is between ____ and ____

The minute hand is at ____

The time is ____



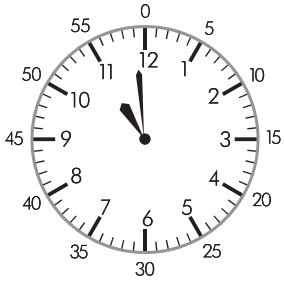
Notice that the hour hand is exactly in the middle between 4 and 5. It has left 4 and is half way towards 5.



The hour hand is between ____ and ____

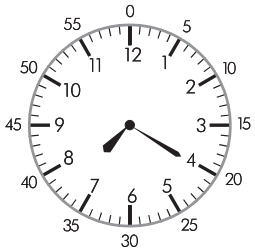
The minute hand is at ____

The time is ____

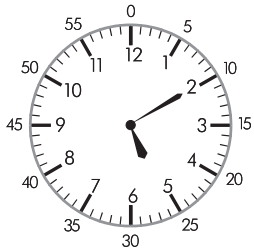


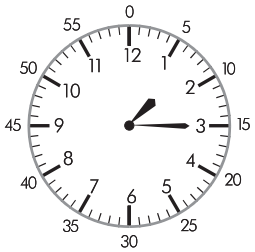
Take care! The hour hand is very close to '11'. But the time is 10:59. The hour hand has not yet reached '11' because there is still one minute left for 11 o' clock. (The minute hand is at '59'.)

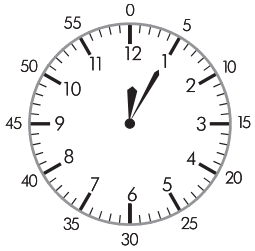
Write the times shown.

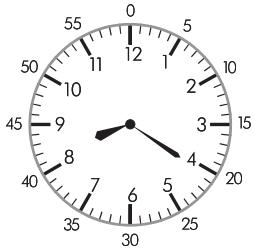


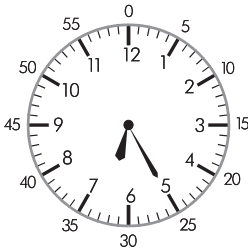
7:20



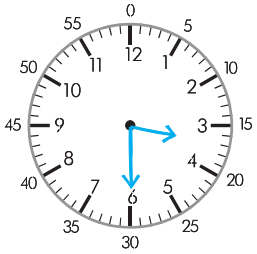








Draw the hands to show the time.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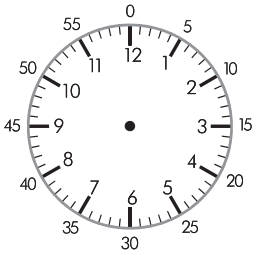
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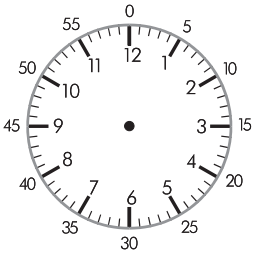
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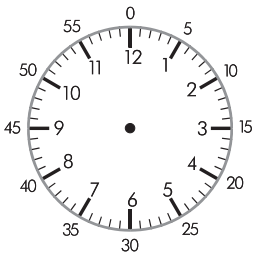
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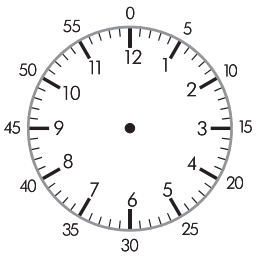
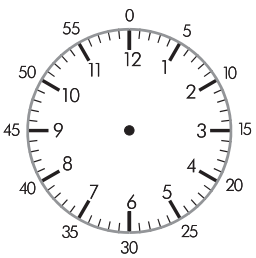
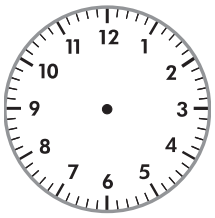

5:20


3:45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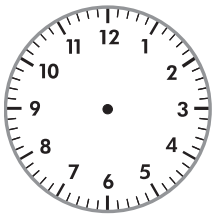
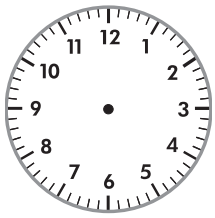

10:05


12:59

How long?

Geeta started eating breakfast at 7:00 am. She finished at 7:20 am. How many minutes did she take to eat her breakfast?

Tuttu started batting at 5:00 pm. He was out at 5:30 pm. How long did he bat?

Lucy started doing her homework at 8:10 pm. She finished it at 8:30 pm. How long did she take to do her homework?

Notebook Exercise

My day

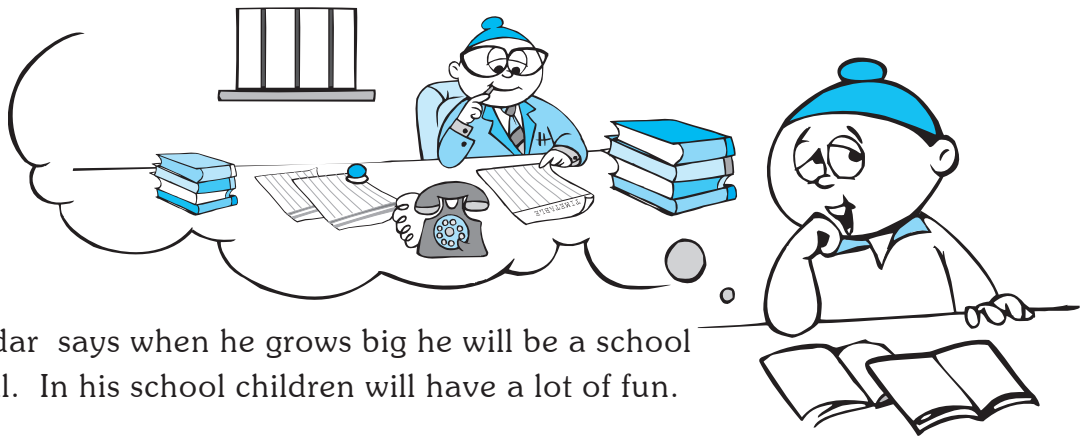
Write down the times at which you do different things during the day. Show the times on the clock.

A fun timetable

Look at your school timetable.

When does school start? _____ When does school end? _____

How long are you in school? _____ How long is the Maths period today? _____



Chunindar says when he grows big he will be a school principal. In his school children will have a lot of fun.

Look at the timetable for Monday that Chunindar has made.

TIME	MON	TUE	WED	THU	FRI
9:00 to 9:45	Music				
9:45 to 10:30	Music				
10:30 to 11:15	Art				
11:15 to 11:30	B	R	E	A	K
11:30 to 12:15	Maths				
12:15 to 1:30	History				
1:30 to 2:00	L	U	N	C	H
2:00 to 2:45	Science				
2:45 to 3:30	PT				

How long is the Maths period on Monday? _____

How long is the PT period? _____

How much time do the children spend on music on Monday? _____

How much time do they spend eating lunch? _____

Complete the timetable for the other days of the week.

Tell your friend to ask you questions about your timetable.

The calendar

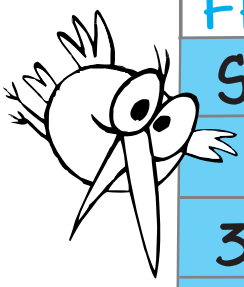
How many days are there in a week? _____

How many days in a year?_____

How many months in a year? _____

Write down the names of all the months in your notebook and the number of days for each month.

Look at a calendar and see how the dates are written down.



FEB 2008

S	M	T	W	T	F	S
					1	2
3	4	5	6	7	8	9
10	11	12	13	14	15	16
17	18	19	20	21	22	23
24	25	26	27	28	29	

Notebook Exercise

Make a calendar for this month in your notebook.
Colour Sundays and other holidays red.

Write down the dates of all the Sundays in this month.

1st Sunday: 3rd Sunday: 5th Sunday:

2nd Sunday: 4th Sunday:

Think, think!

Can any month have six Sundays? Why or why not?

Can any month have exactly four Sundays? Why or why not?

Can any month have only three Sundays? Why or why not?

Learn the short forms for the names of the month:

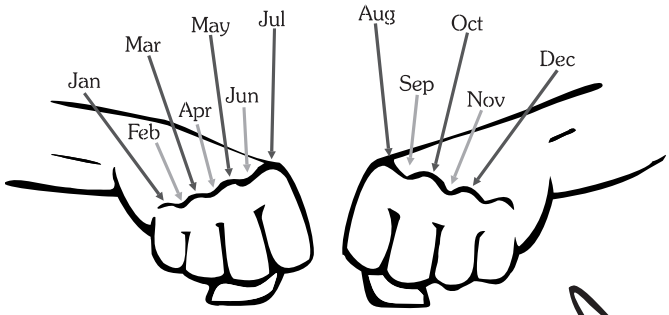
Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec

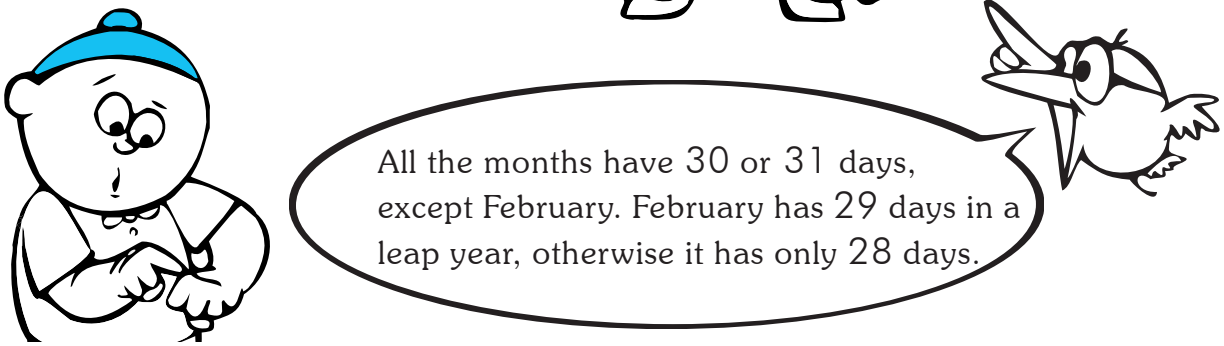
How many days?

How many days are there in a month?

You can easily find out if a month has 30 days or 31 days.

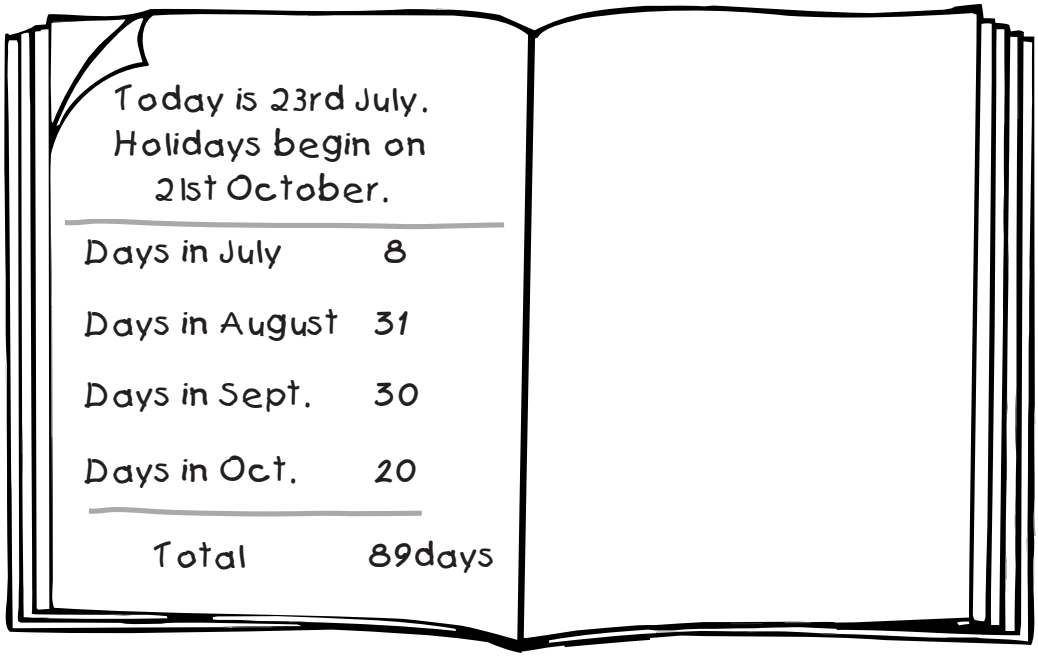
Make mountains and valleys on your fist. Start counting the months from the little finger. All the mountains have 31 days. The valleys have 30 days except for February.





How many days?

Find out how many days are left before your next break for holidays.
In your notebook show how you found this out.



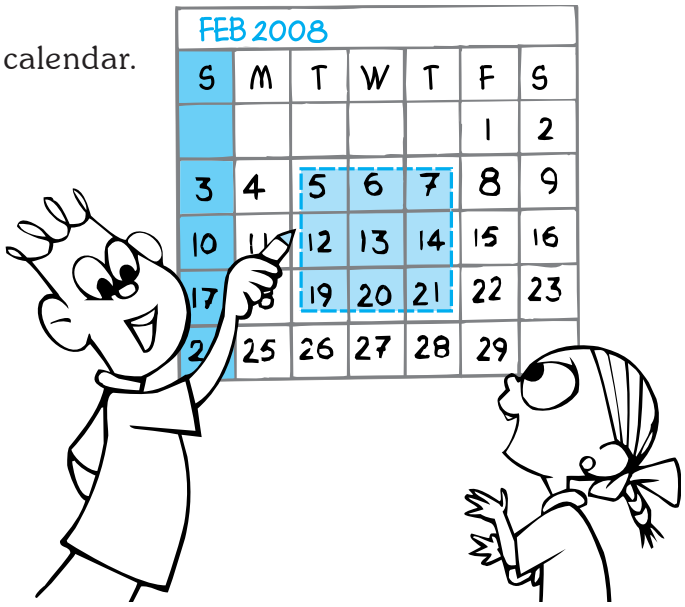
How many days have passed this year from January 1st?_____

How many days are left before the year ends? _____

Calendar magic

Here is the calendar for the month of February 2008.

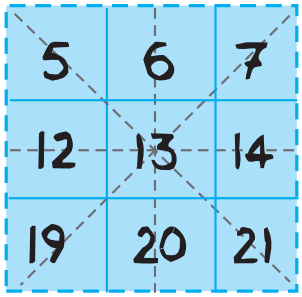
Eti has marked a square on the calendar.



Which is the number in the centre of the square?____

Join three numbers by drawing a line. The line must pass through the centre number.

How many such lines can you draw?



Add the three numbers on each of these lines.

What do you notice?

$5 + 13 + 21 =$

$6 + 13 + 20 =$

$19 + 13 + 7 =$

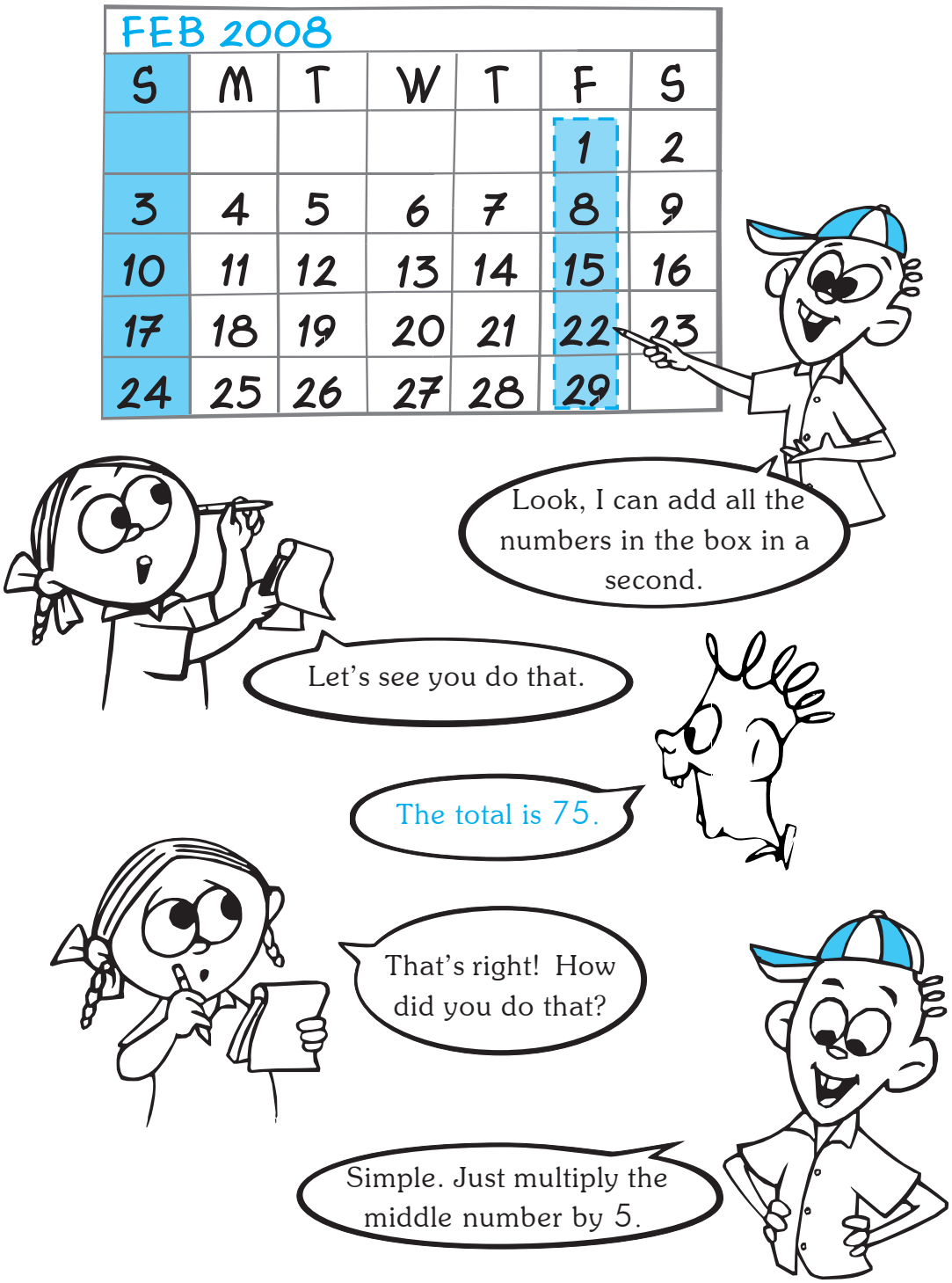
$12 + 13 + 14 =$

Notebook Exercise

Draw similar squares on the calendar you made in your notebook.
Does the magic work?

Why does this happen?

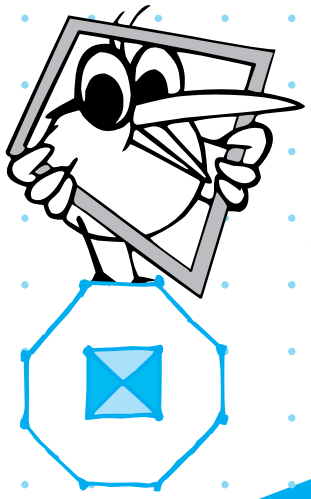
Some more magic!



See whether this magic works for other lines of 5 numbers. What about 5 numbers on a slanting line?

Can you find other magic patterns in the calendar?

GEOMETRY



Unit 14

1

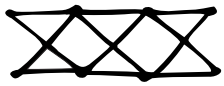
Rangoli shapes

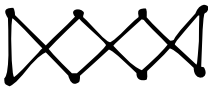
It was festival day and Mini was making lovely rangoli shapes.

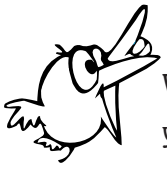
Here are 4 dots in a square pattern.
Copy the pattern of dots in your notebook.

You can draw simple rangoli shapes on the dots.
Try copying these shapes in your notebook.

By drawing more dots in two rows, you can continue some of the patterns.

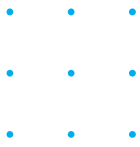




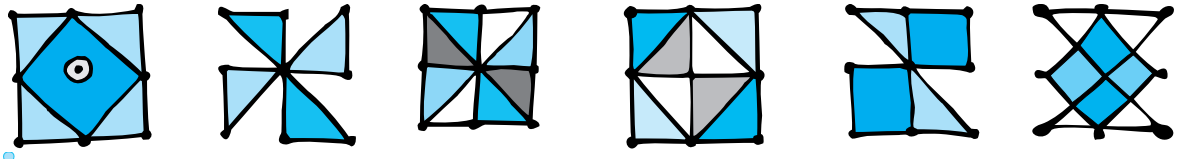


Which of the rangoli shapes above can you draw without lifting your pencil and without drawing a line twice?

Here are dots in a 3 × 3 dot grid (3 rows and 3 columns).
How many dots do you see?

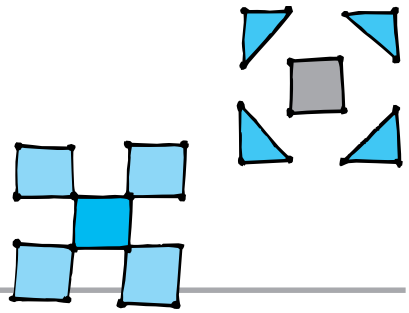


Here are some rangoli patterns drawn on a 3 × 3 dot grid.



Which of the rangoli patterns above can you draw without lifting your pencil and without drawing a line twice?

How many dots would be there in a 4 × 4 square dot grid? Think of rangoli patterns you can draw on a 4 × 4 dot grid.

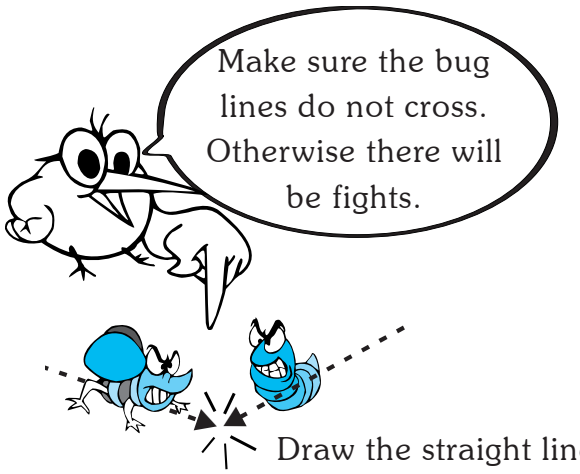


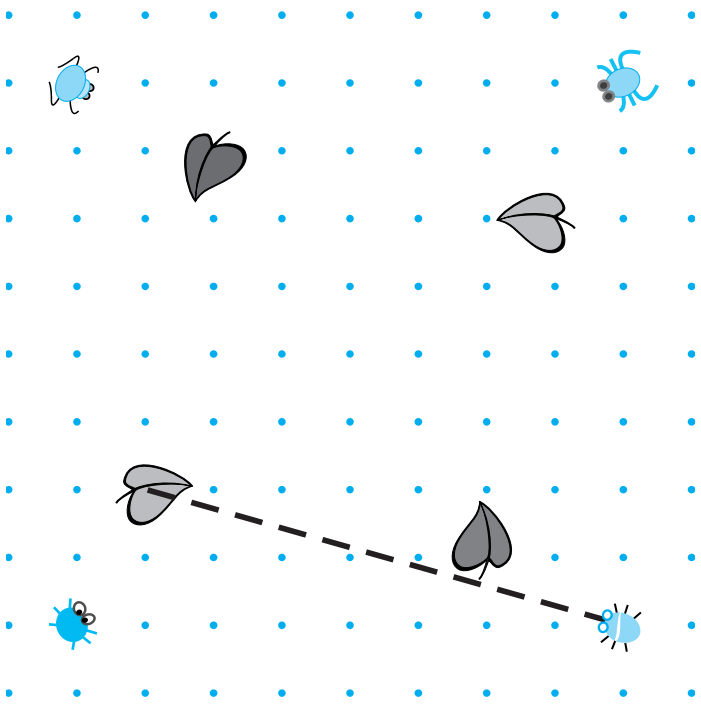
Use the dot space below to draw your own rangoli patterns.

Meet the straight line bugs

The line bugs crawl in exact straight lines.

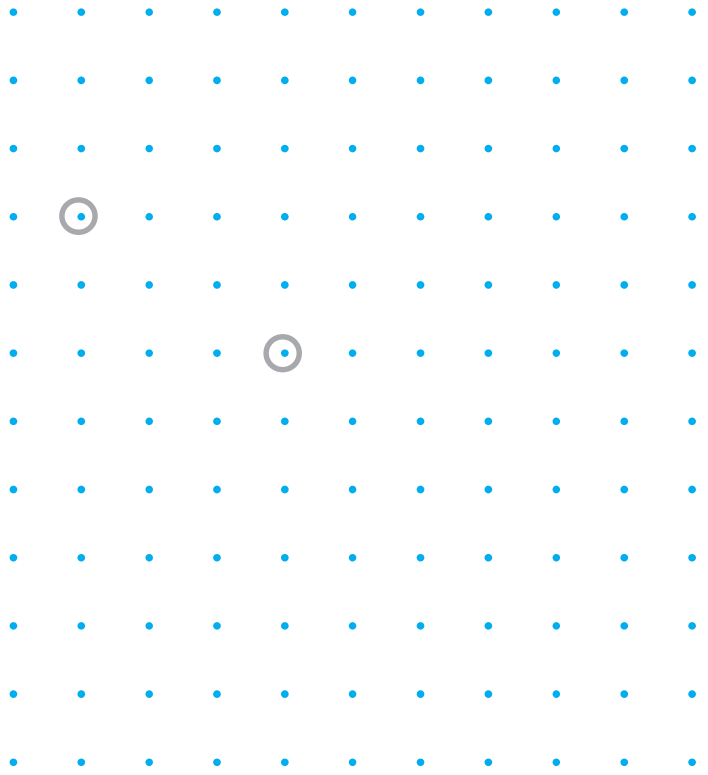
Each bug must eat a leaf. Draw a line connecting each bug to a leaf. (One line is already drawn for you.)





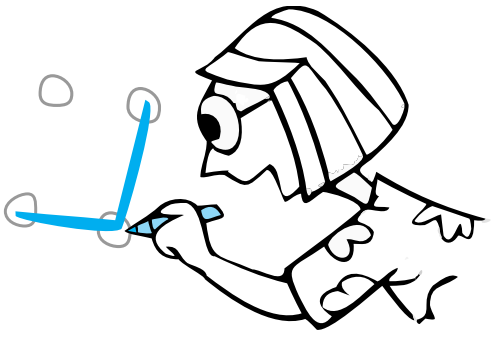
Draw the straight lines as straight as you can, but don't use a ruler.

How many straight lines can you draw which pass through both the marked dots shown here?



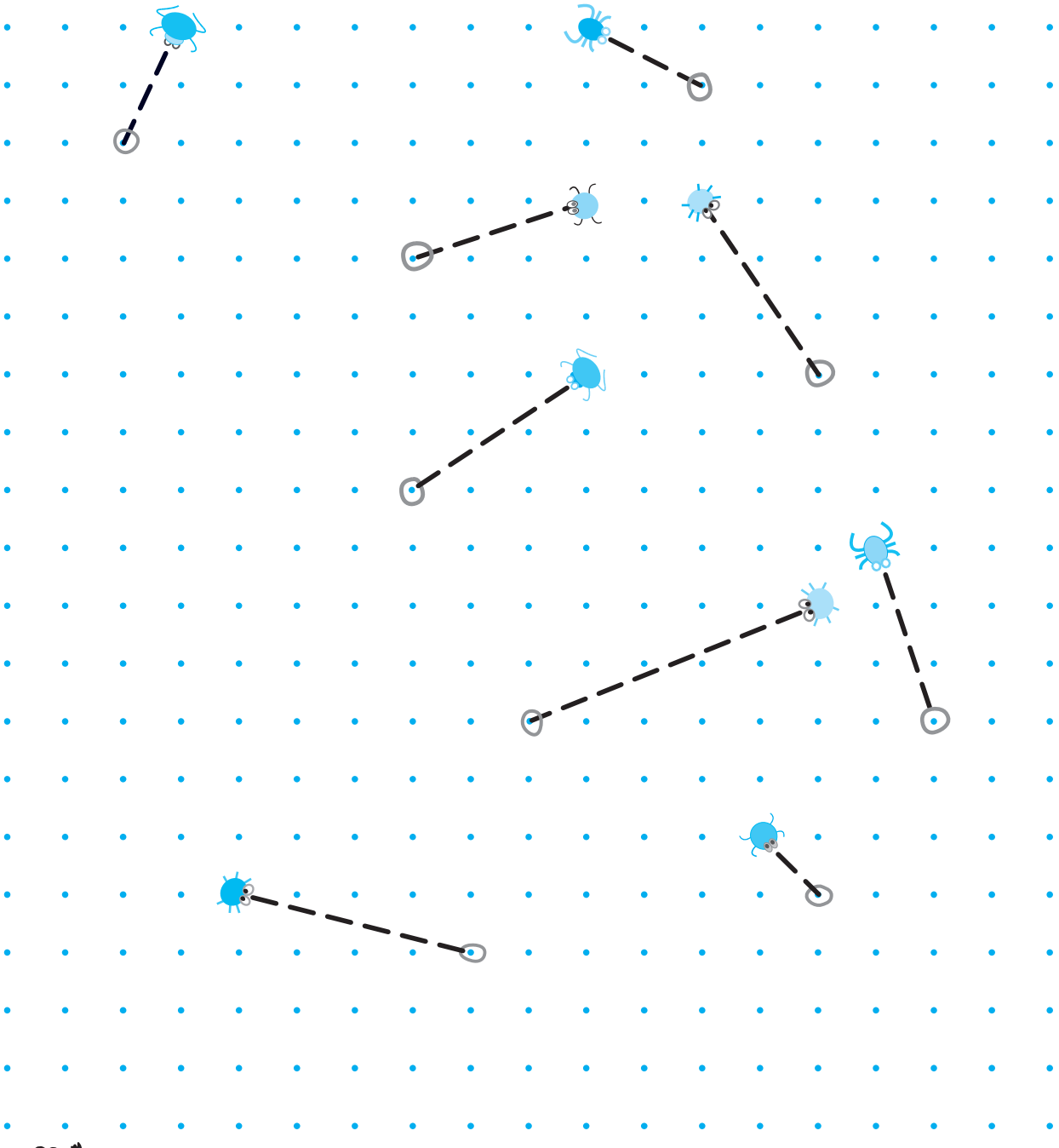
Mark two more dots outside the line you have drawn. (Mark a dot by drawing a small circle around the dot.)

How many straight lines in all can you draw which touch atleast two of the marked dots? ____



If the bugs travel further on the line shown which dots would they touch?

Without drawing a line, mark the dots that you guessed.
Then check by drawing a line with the ruler.

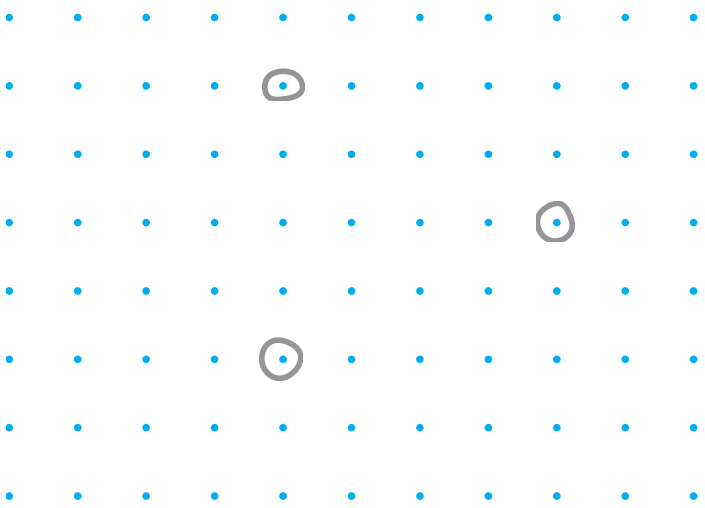


Know these words

vertical horizontal slanting

On the dot space above draw examples of vertical, horizontal and slanting lines.

Drawing shapes

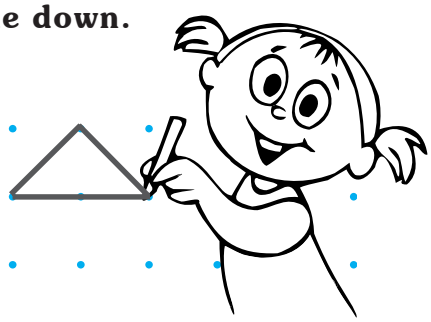


You can see three dots marked in the dotspace.

Draw as many straight lines as you can which touch at least two dots which are marked. How many straight lines did you draw?

Do you see a closed figure? The figure that you get is a _____

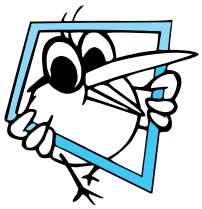
Draw as many triangles of different sizes and shapes as you can. Draw them standing up, slanting and upside down.



Join the four dots marked below with straight lines so that you get a closed shape.

Did you get a figure with four sides?

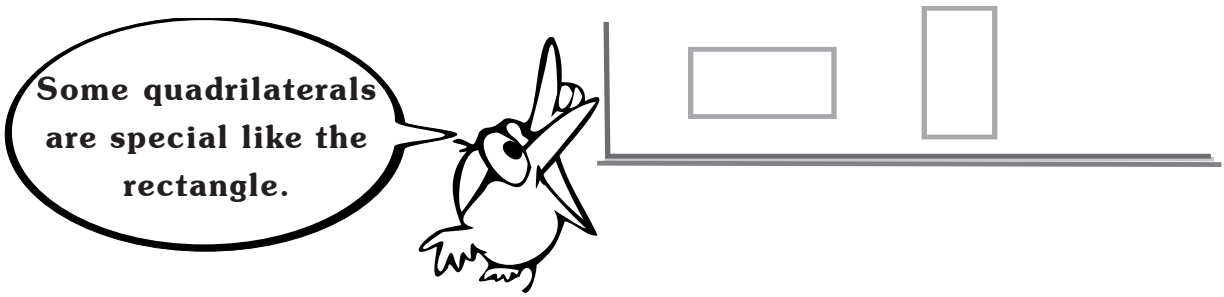
A figure with four sides is called a quadrilateral.



Draw as many quadrilaterals as you can of different sizes and shapes.

Draw them standing up, upside down and slanting.

Right angles

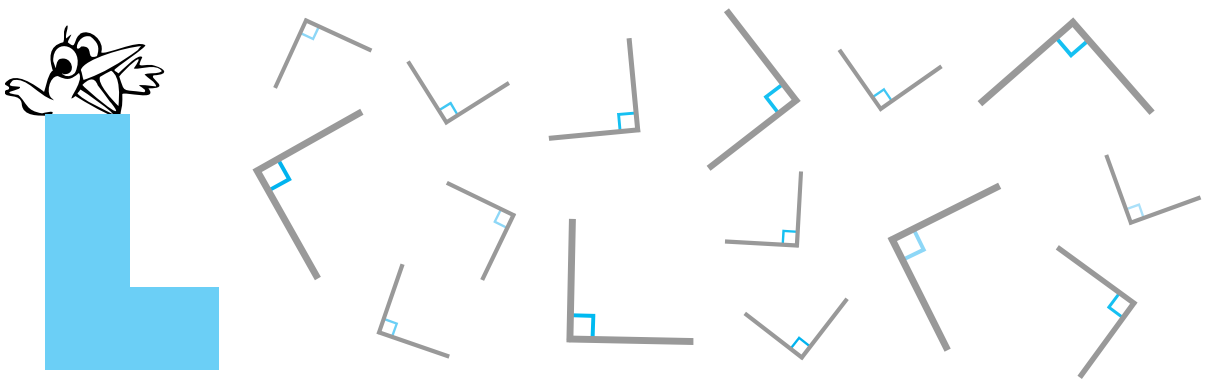


Draw as many rectangles as you can in the dotspace in different sizes.

Some of them can be tall, some long. Try to draw some of them slanting.

What is special about a rectangle?

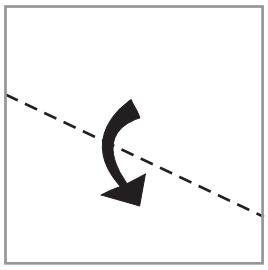
When a corner is shaped like a straight L, we say that the corner is a right angle. All of these are right angles.



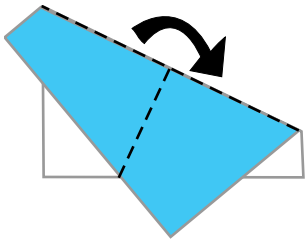
Classroom Activity

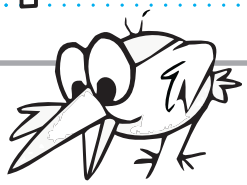
How to make a right angle:

Fold a piece of paper and get a straight line.

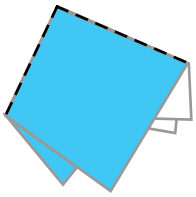


Fold the paper again so that the line falls exactly on itself.



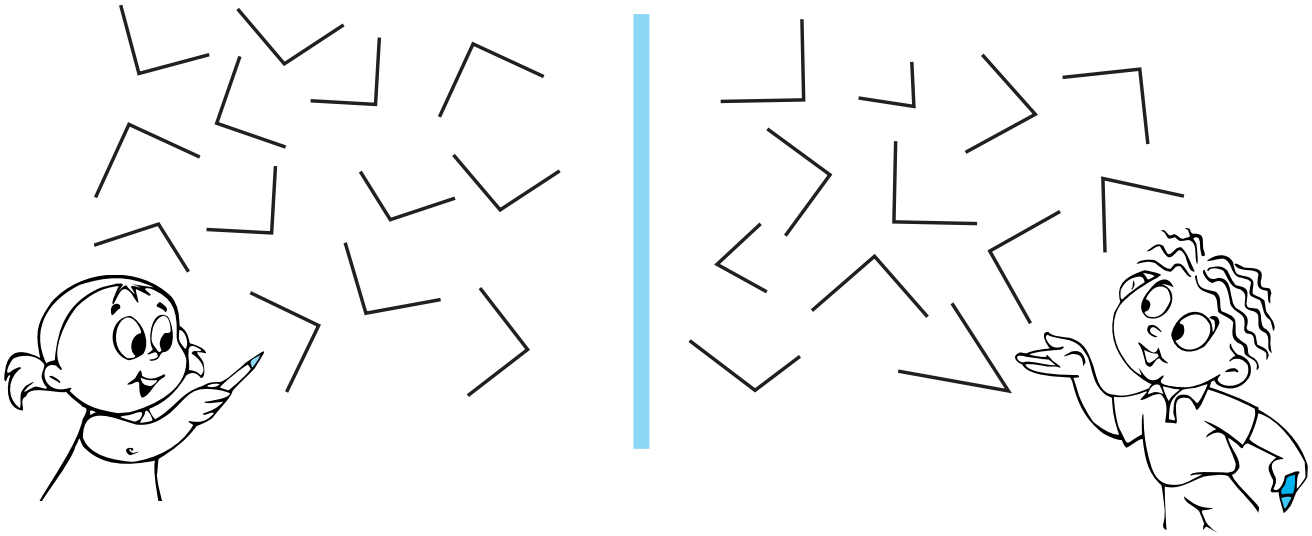


The corner which forms is a right angled corner.

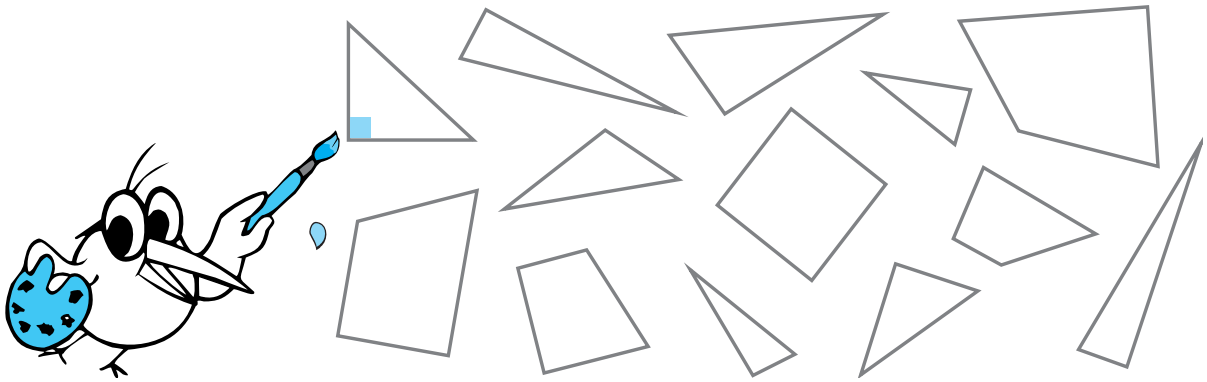


Pinky and Javed have drawn right angled corners. Find out if they have made any mistakes.

Use the right angle you have made out of paper to check.



Colour all the right angled corners with the same colour.

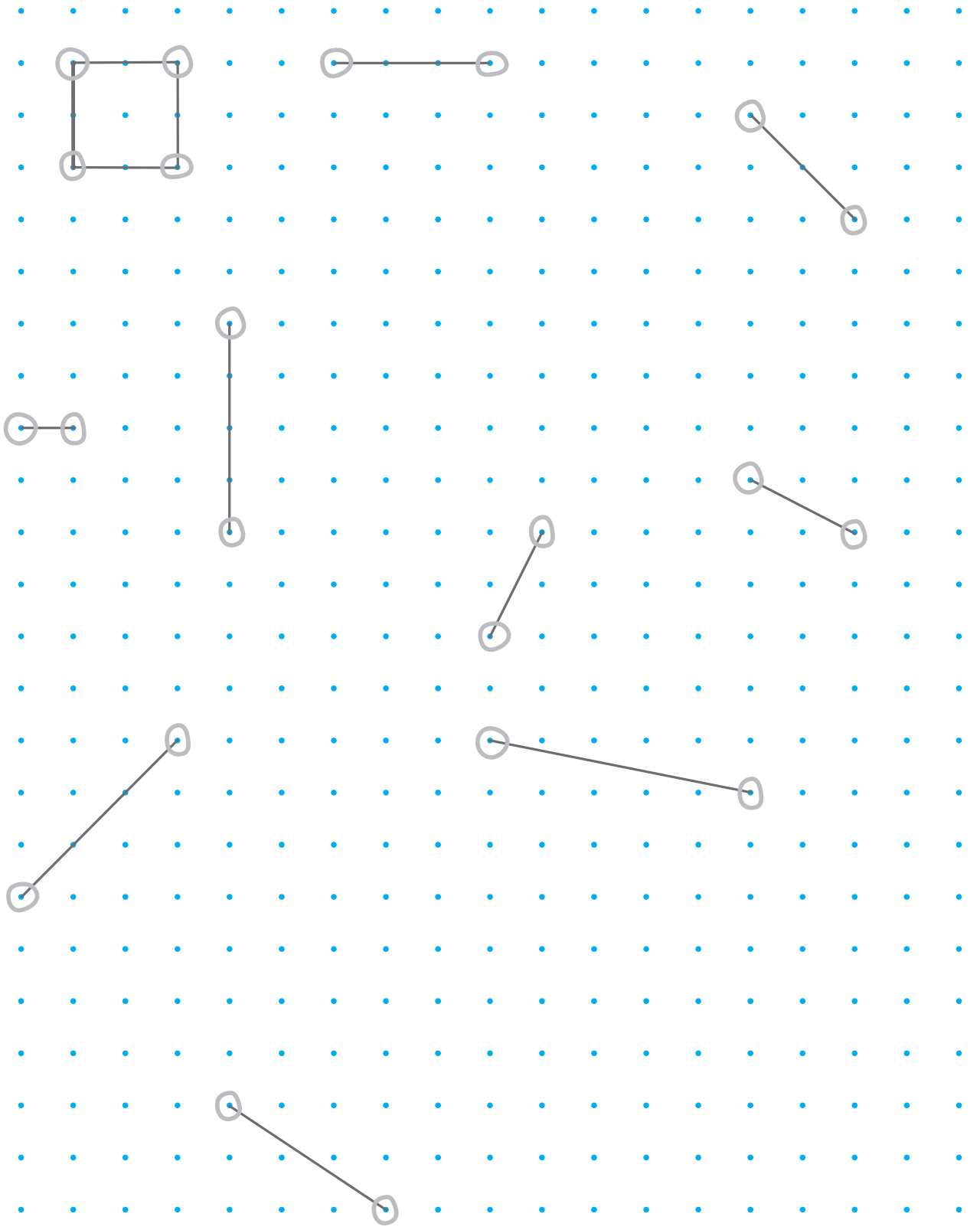


5

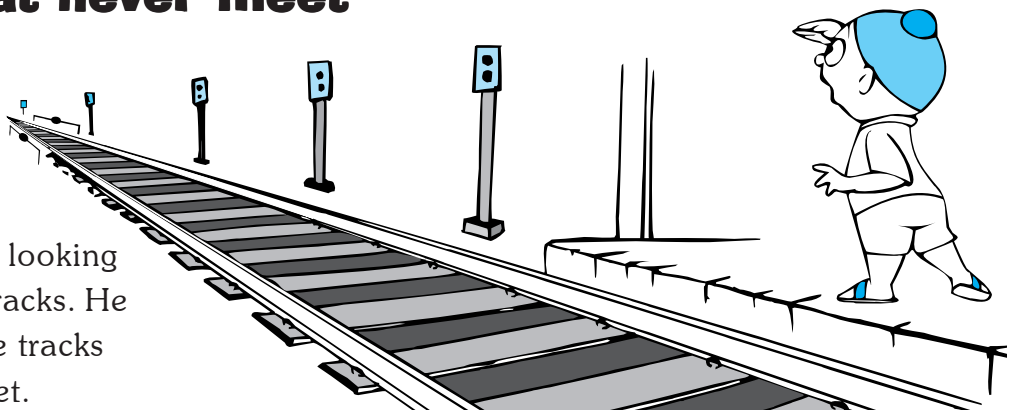
Drawing squares

What is the difference between a rectangle and a square?

Make squares from the lines shown.



Lines that never meet



Chunindar was looking at the railway tracks. He wondered if the tracks would ever meet.

Draw two horizontal straight lines on the dotspace. If the lines are made longer, much longer than the paper, will they cross? Why?

Draw two vertical straight lines on the dotspace and imagine them made longer. Will they cross? Why?

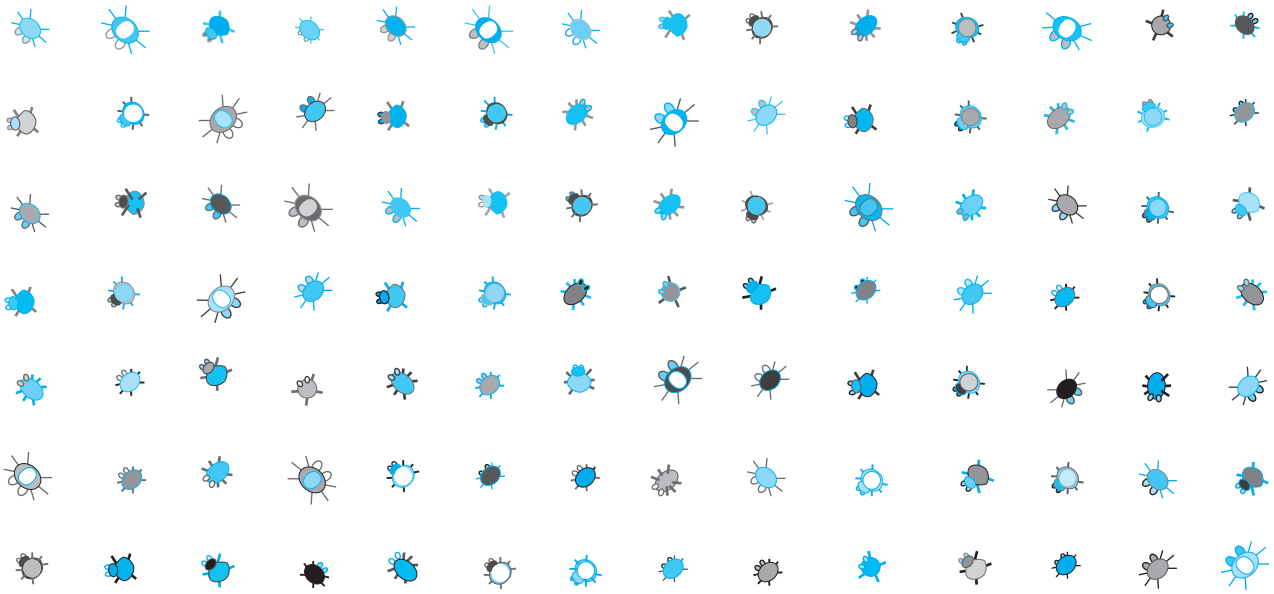
Lines which never cross even if they are made as long as you please are called parallel lines.

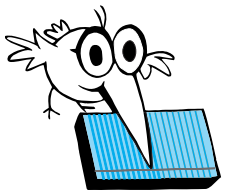
Try to draw some slanting parallel lines by joining dots on the dotspace.

6

Parallel lines

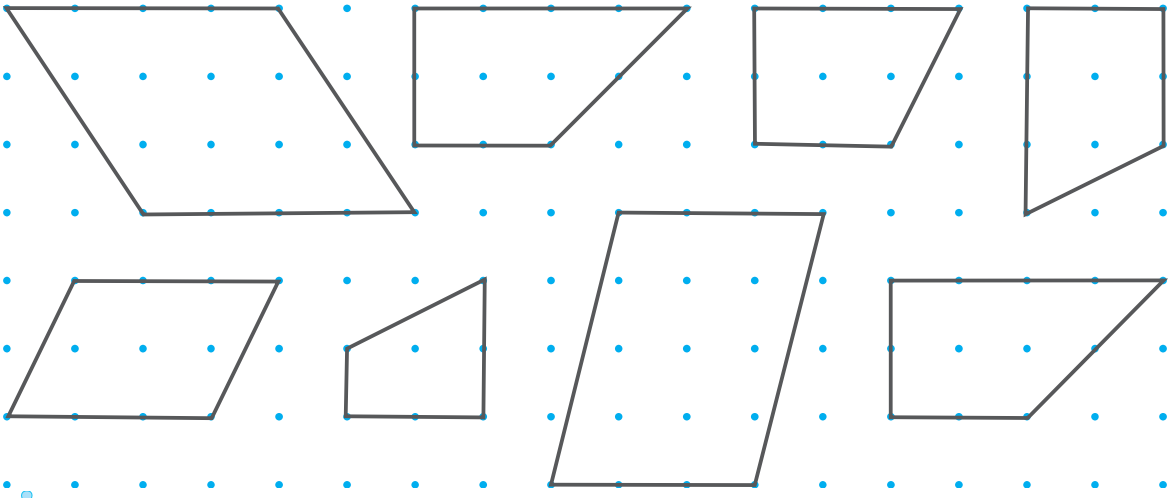
Try and draw slanting parallel lines which run between the bugs **without** touching any of them. (Make sure the lines are straight!)





Your notebook has many parallel lines drawn on the pages. How many lines do you find on one page?

Do any of these quadrilaterals have opposite sides that are parallel? Do any of them have both pairs of opposite sides parallel?

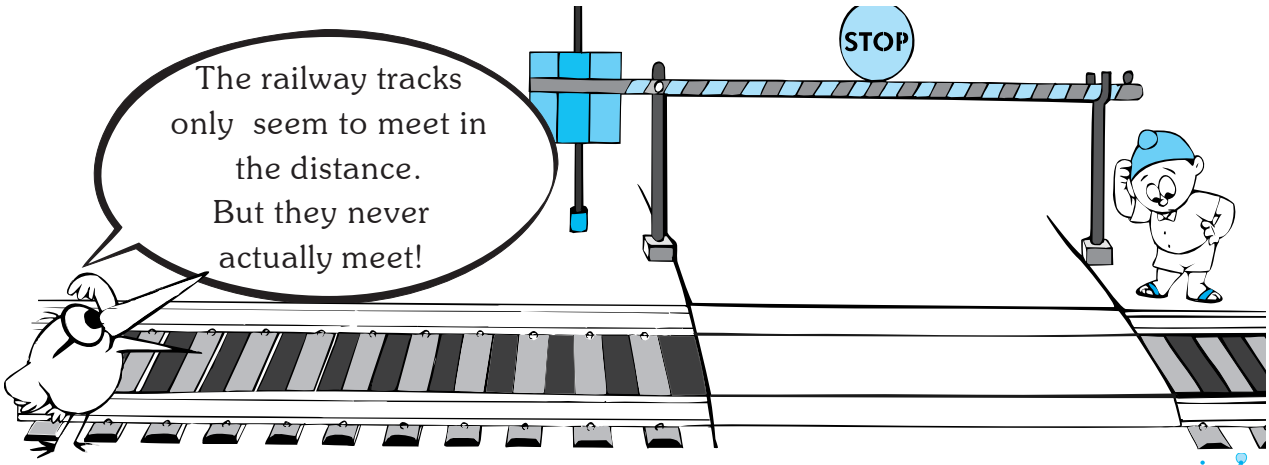


In the dotspace shown here, draw two vertical lines. Draw two slanting parallel lines so that they cross the vertical lines.

Where the lines cross you can see a quadrilateral.

This quadrilateral is special beacause it is made up of two pairs of parallel lines. It is called a **parallelogram.**

Draw as many parallelograms as you like in the dotspace below. Draw atleast one parallelogram which does not have horizontal or vertical sides.

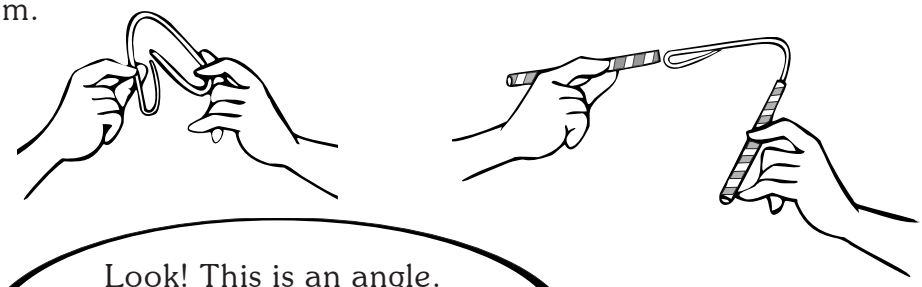


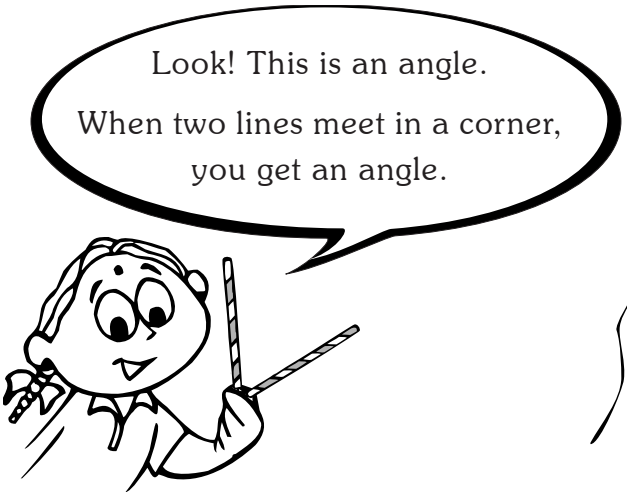
7

Looking at an angle

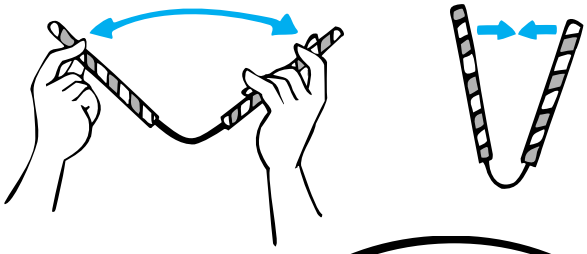
Geeta is explaining what an angle is to Eti and Lucy.

Take a paper clip. Open the two arms. Pinch the curved ends and put straws over them.

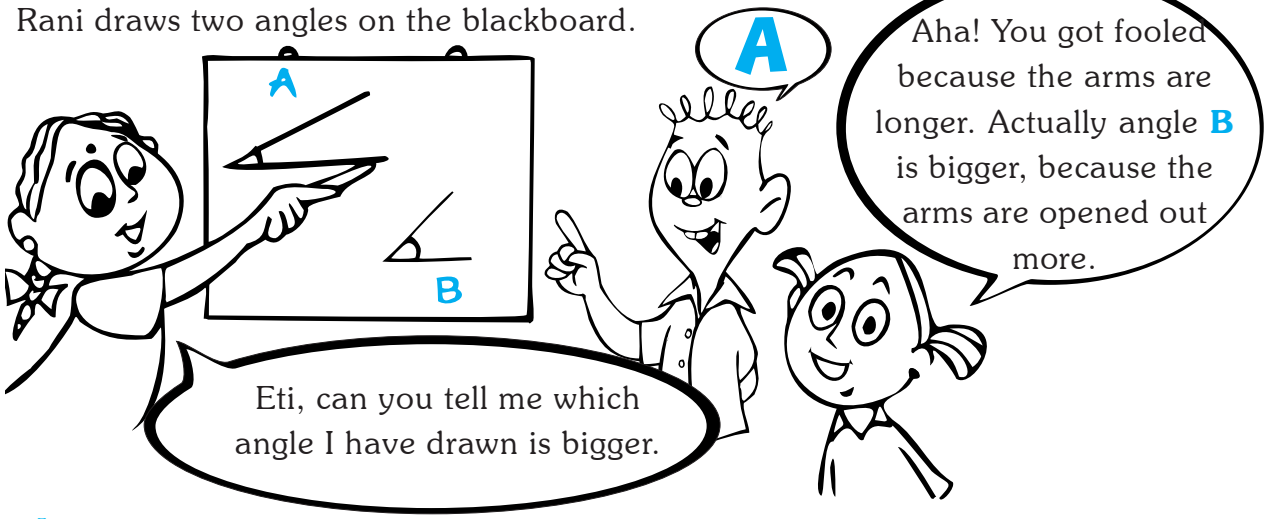




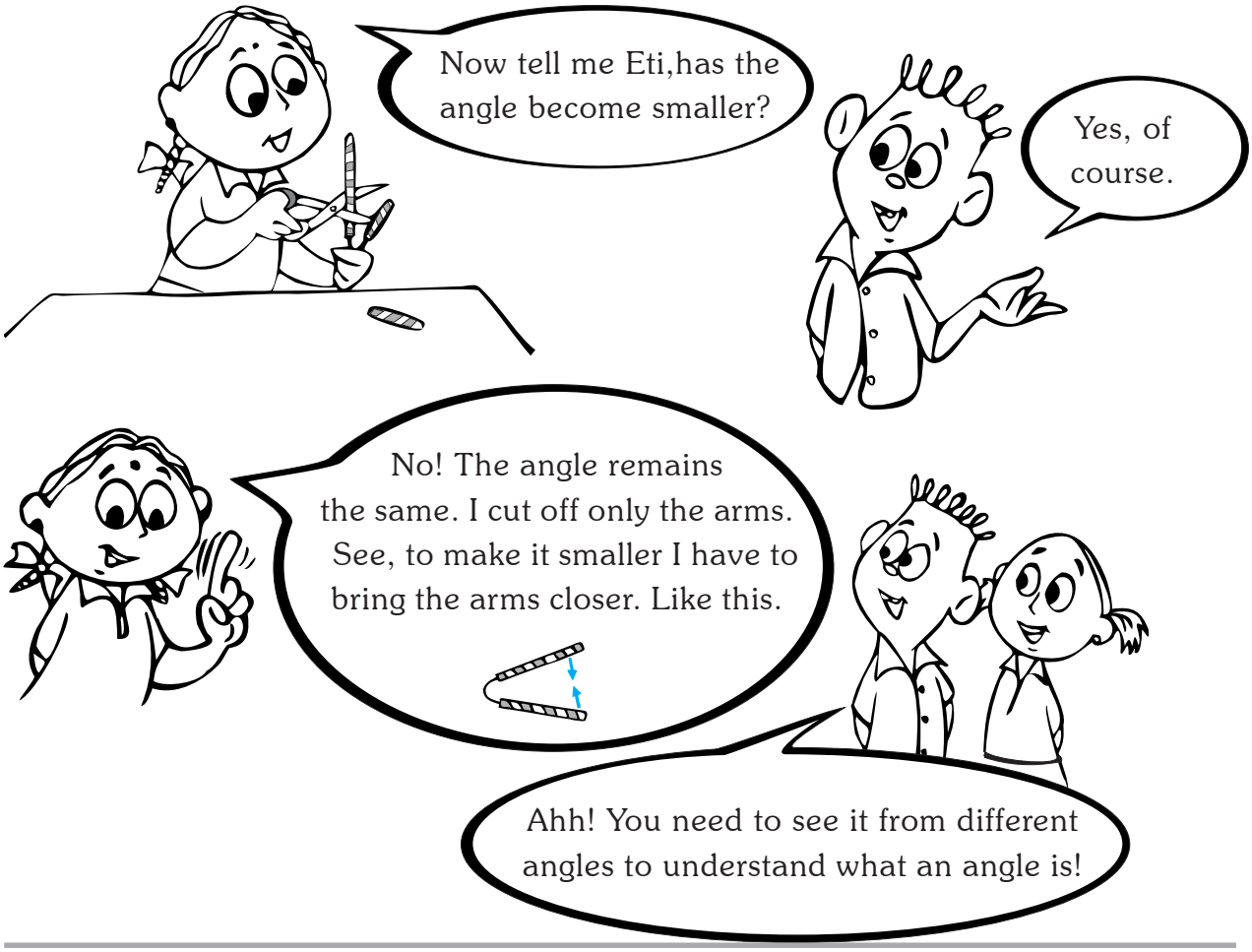
I can make the angle bigger and smaller.



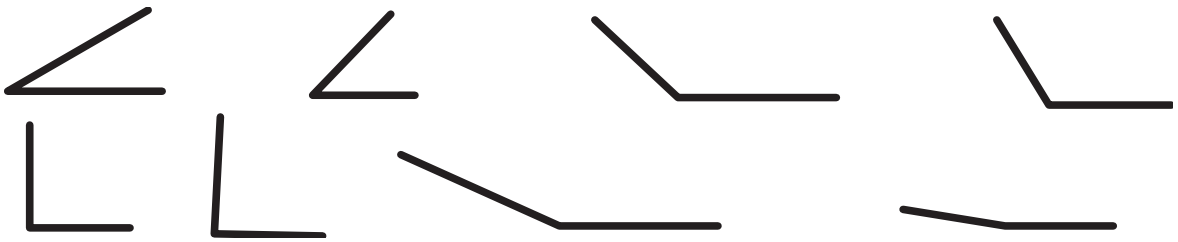
Rani draws two angles on the blackboard.



Geeta chops off some length of straw from the angle she made.

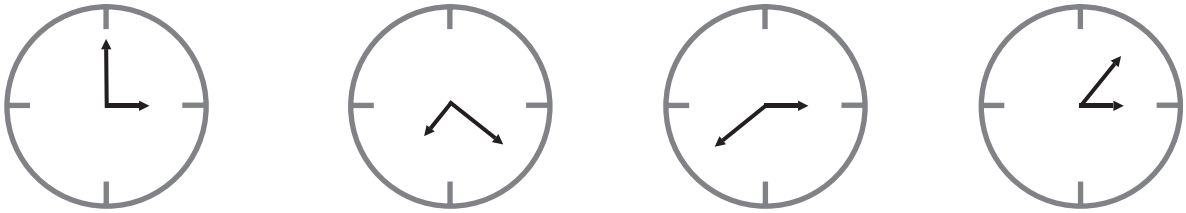


Rank the angles from 1 to 8, starting from the biggest.

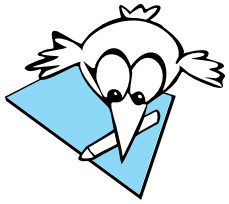


Remember! An angle which is shaped like a straight **'L'** is a **right angle**.

Look at the clock faces. Tick the ones where the arms form a right angle.

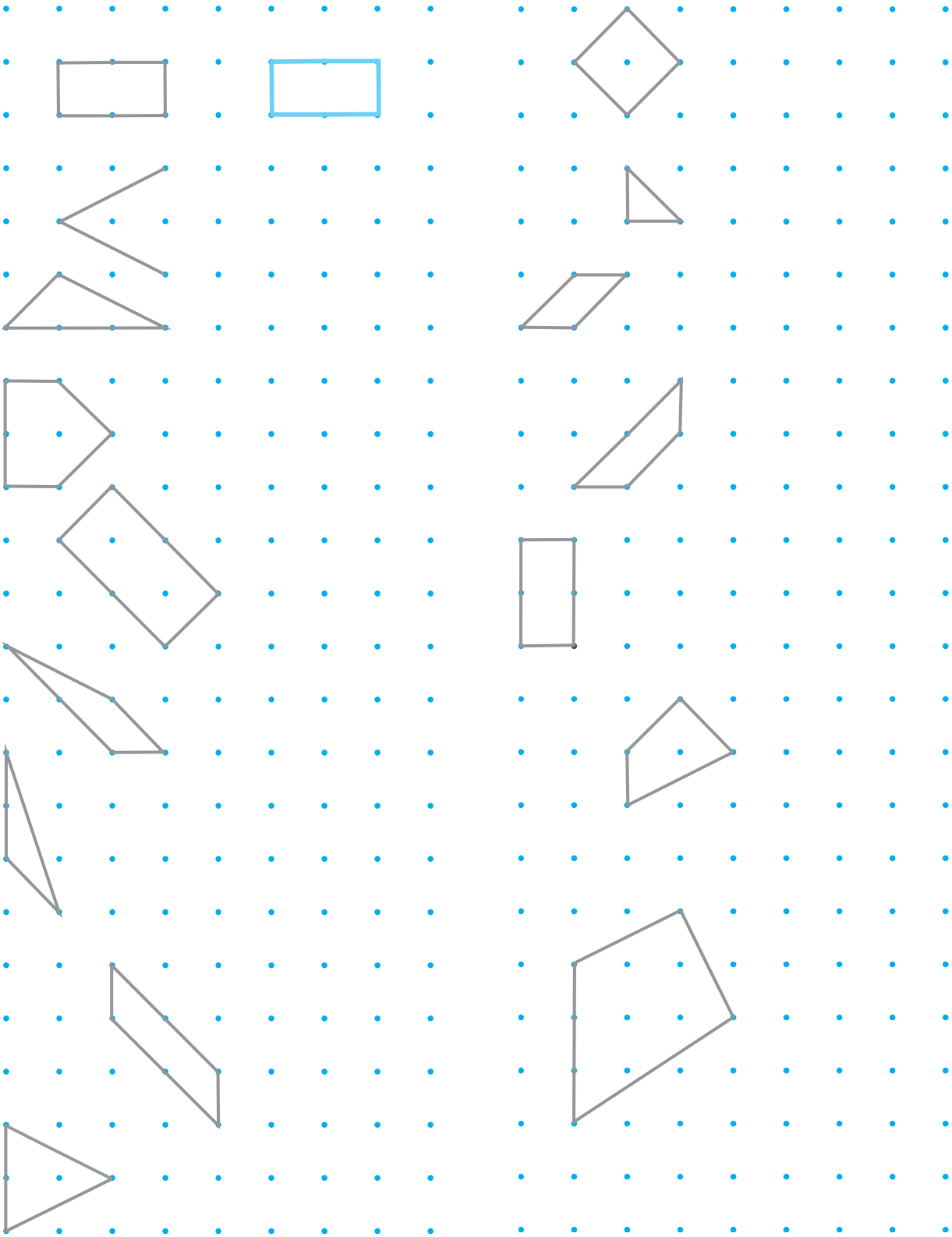


More shapes



Make a copy of each figure like in the example.

Which of the shapes can you name?



Mirror work

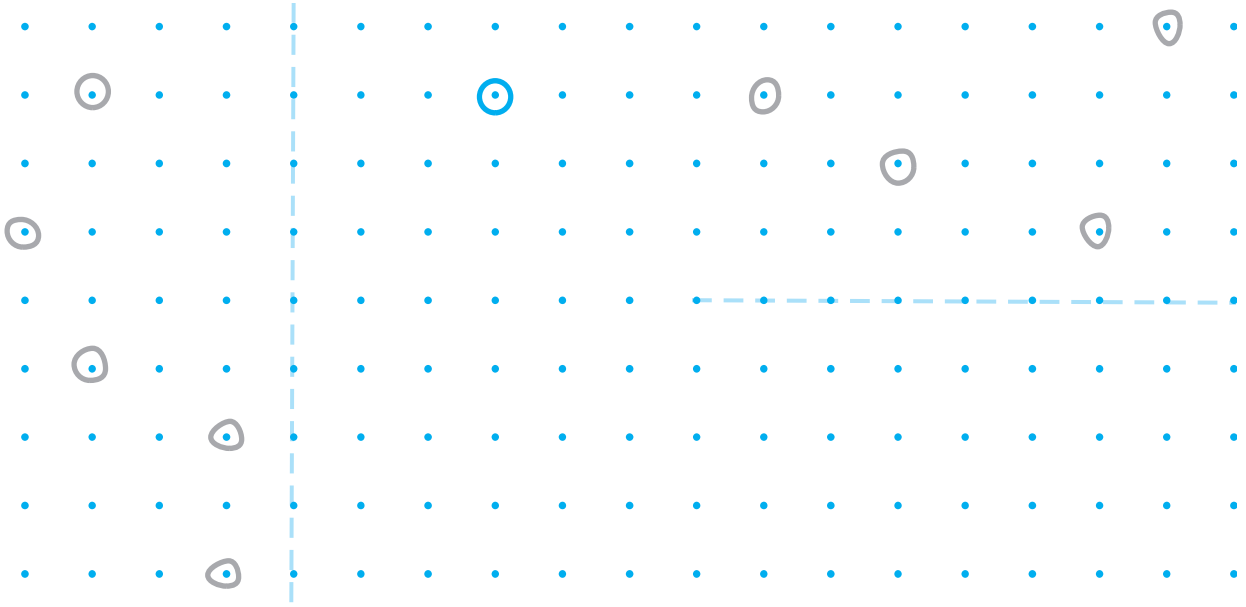
Get a small mirror for this activity.

Write down some capital letters. Hold the mirror next to the letters. Draw how the reflection of each letter looks.

Which letters look the same as their reflections?

Reflecting a point

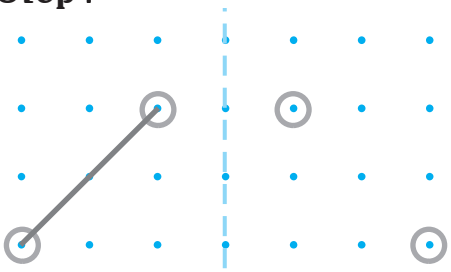
Imagine that the vertical and horizontal lines drawn on the dotspace are mirrors. Mark the reflection of the points shown.



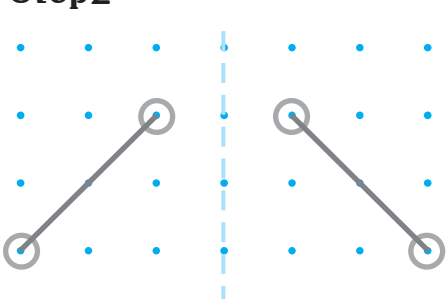
How to show the reflection of a line:

Mark the endpoints of the line. Show the reflection of the endpoints about the mirror line. Join the reflected points. The line you get is the reflection of the original line.

Step 1



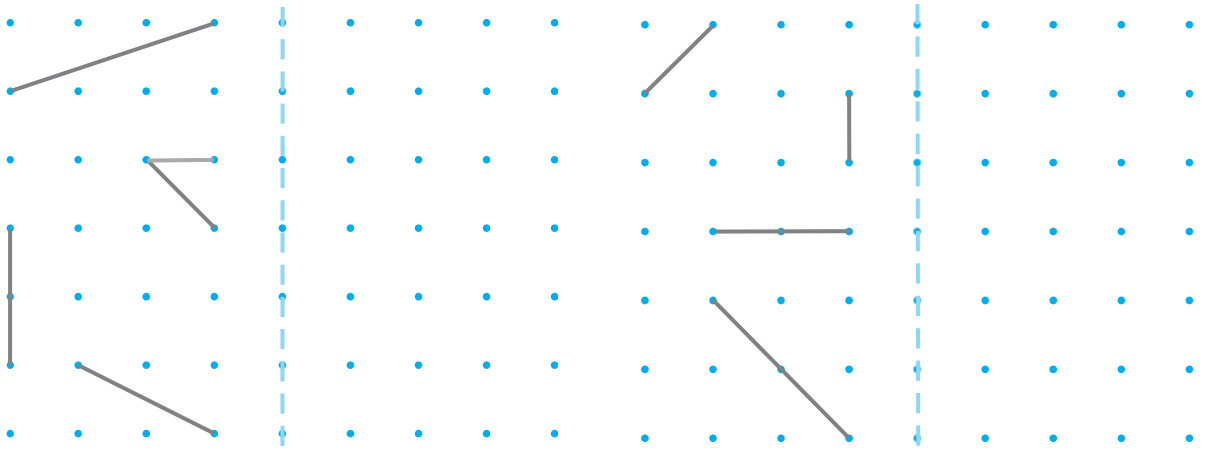
Step 2



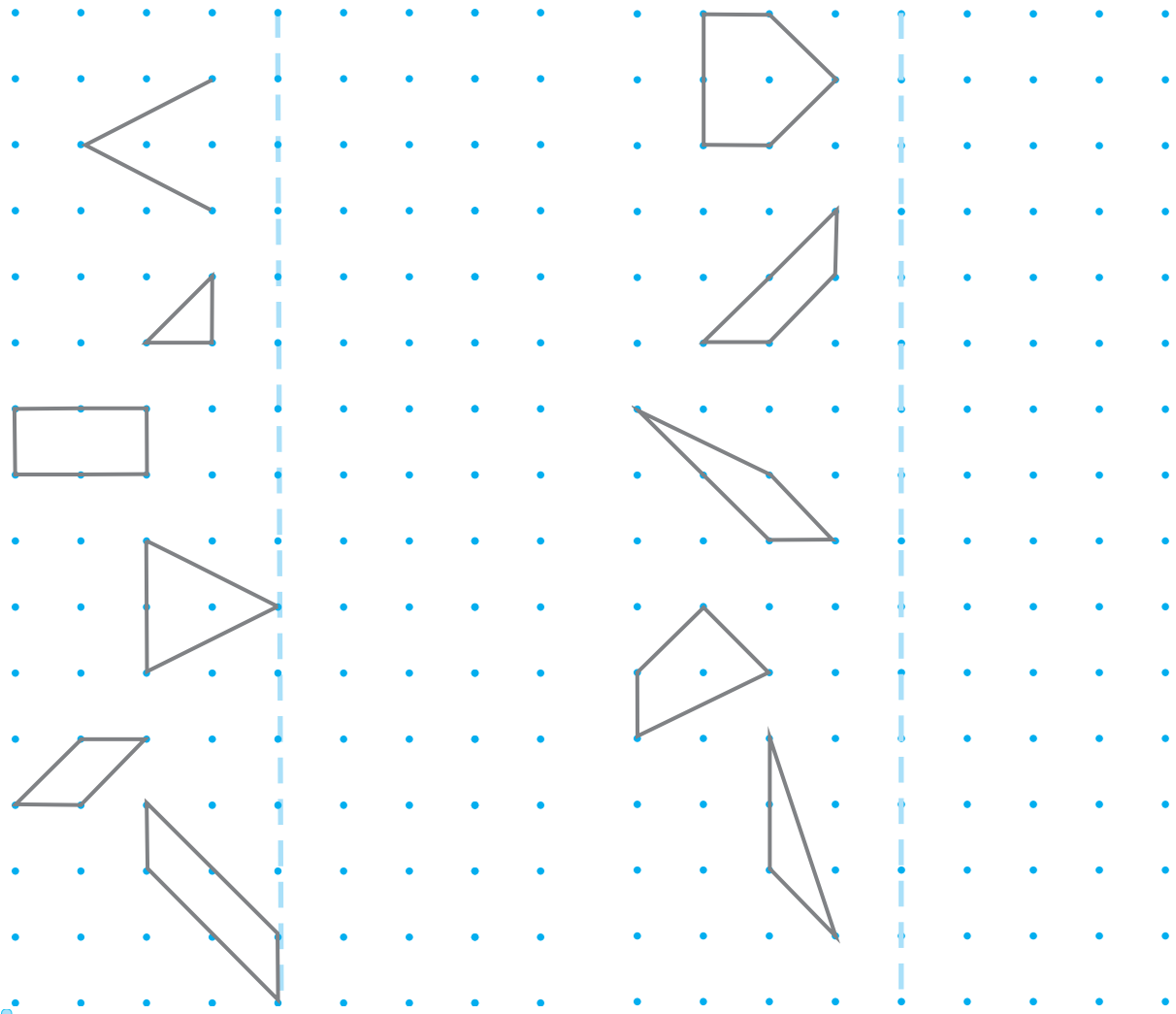
9

Reflections of shapes

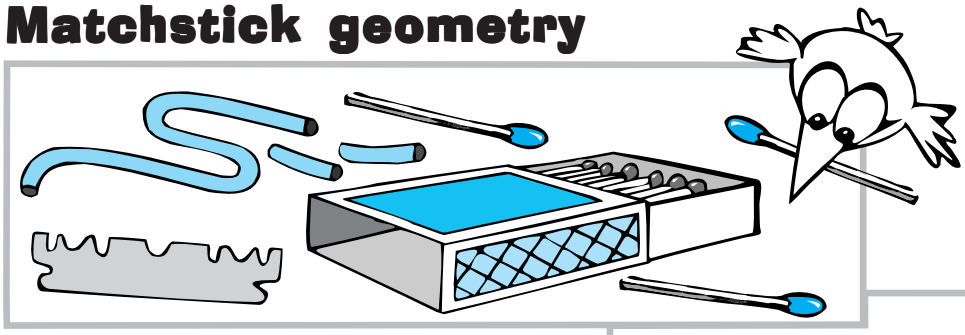
Show the reflections of these lines about the mirror line.



Show the reflections of these shapes about the mirror line. First reflect the corner points and then join them to get the shape.

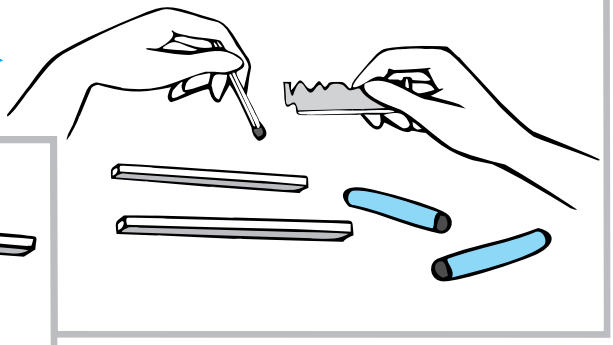


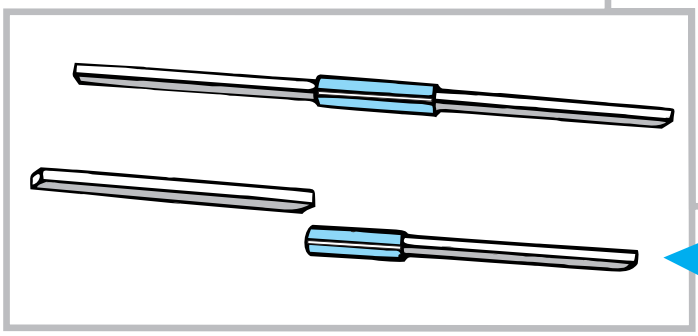
Matchstick geometry



You will need matchsticks, a blade and a piece of bicycle valve tube.

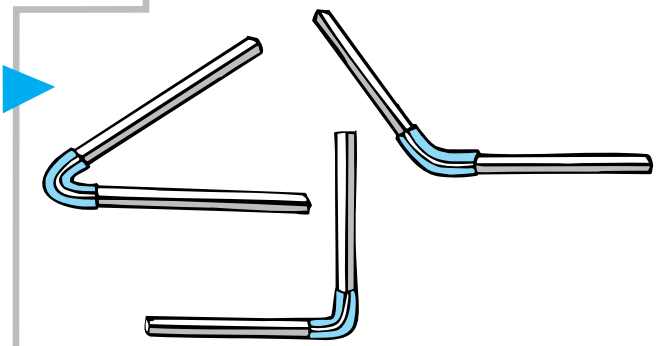
Cut a 1.5 cm long piece of valve tube for joining two matchsticks. Scrape out the sulphur from two matchsticks with a blade.





Push one end of each matchstick into the valvetube.

You can bend the angle to make it bigger or smaller.



Cut more pieces of valve tube. By joining more matchsticks, you can make different shapes like the ones shown in the figure.

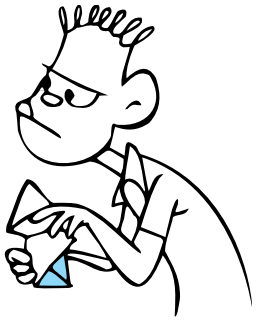
Adapted from Arvind Gupta, *Matchstick Mecanno and Other Science Experiments*

Paper folding

Paper folding is a lot of fun!

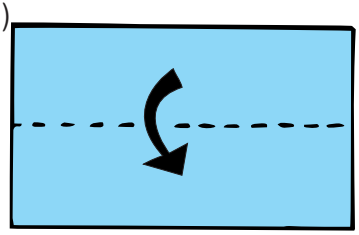
Here is a simple toy you can make by folding paper.

Clapper

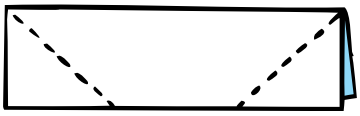


1 Take a rectangular sheet of paper. (Old xerox papers or a page from an old magazine will do.)

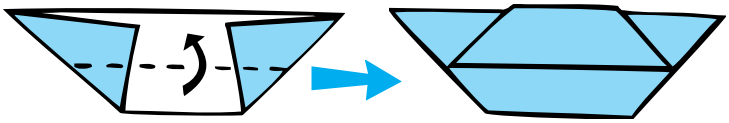
2 Fold the paper in the middle along the longer side.



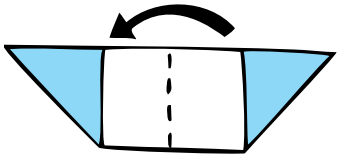
3 Fold the corners up. Turn the paper over and repeat.



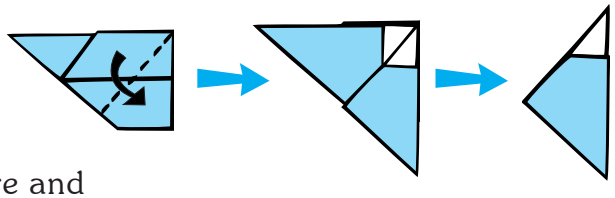
4 Fold only the top layer up.



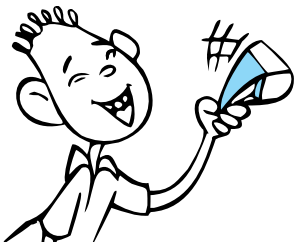
5 Turn the paper over and fold up along the middle.

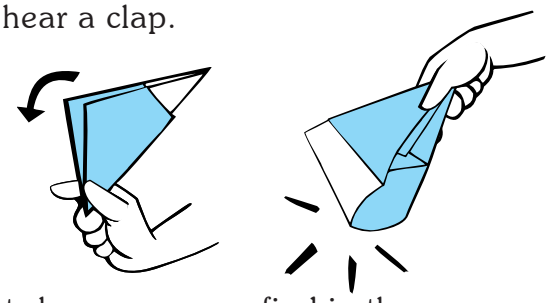


6 Fold down from the corner. Turn the paper over and repeat.



7 Now hold the points shown in the figure and bring your hand down quickly. You should hear a clap.

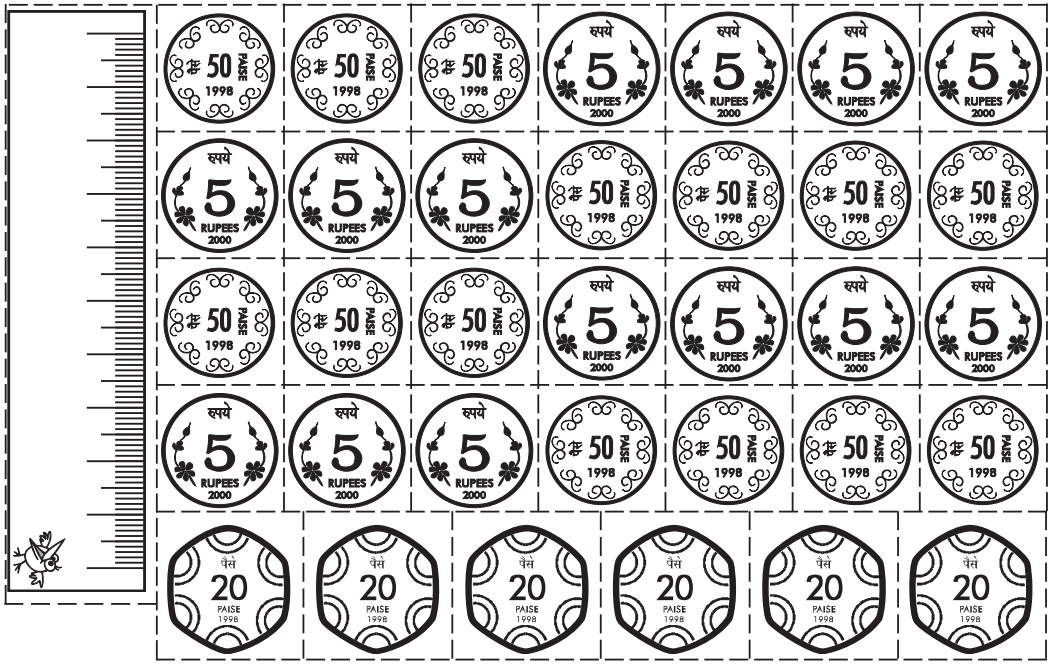


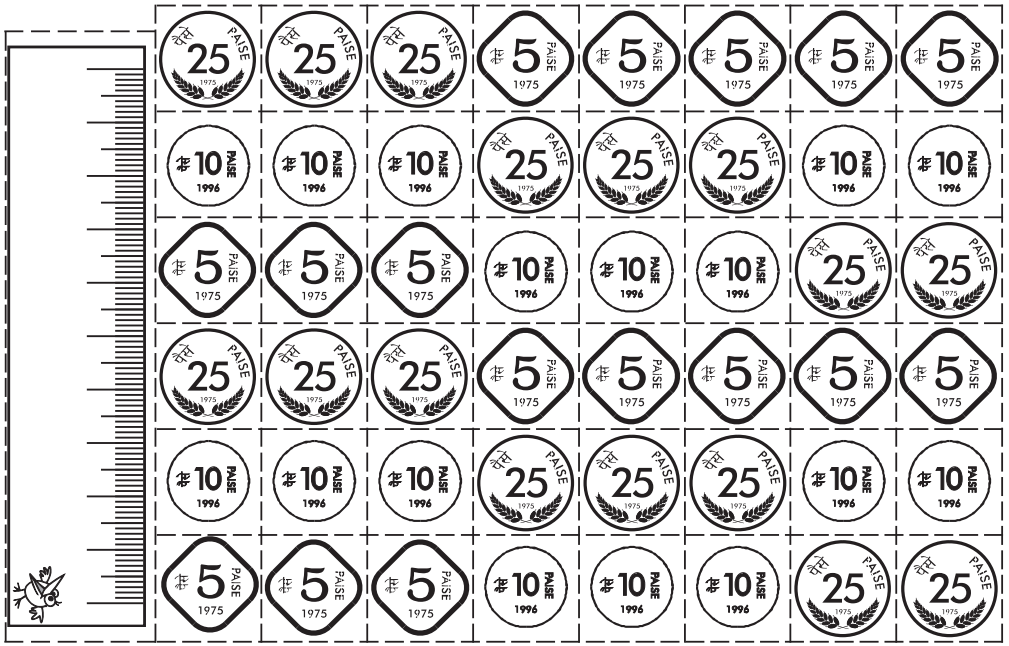


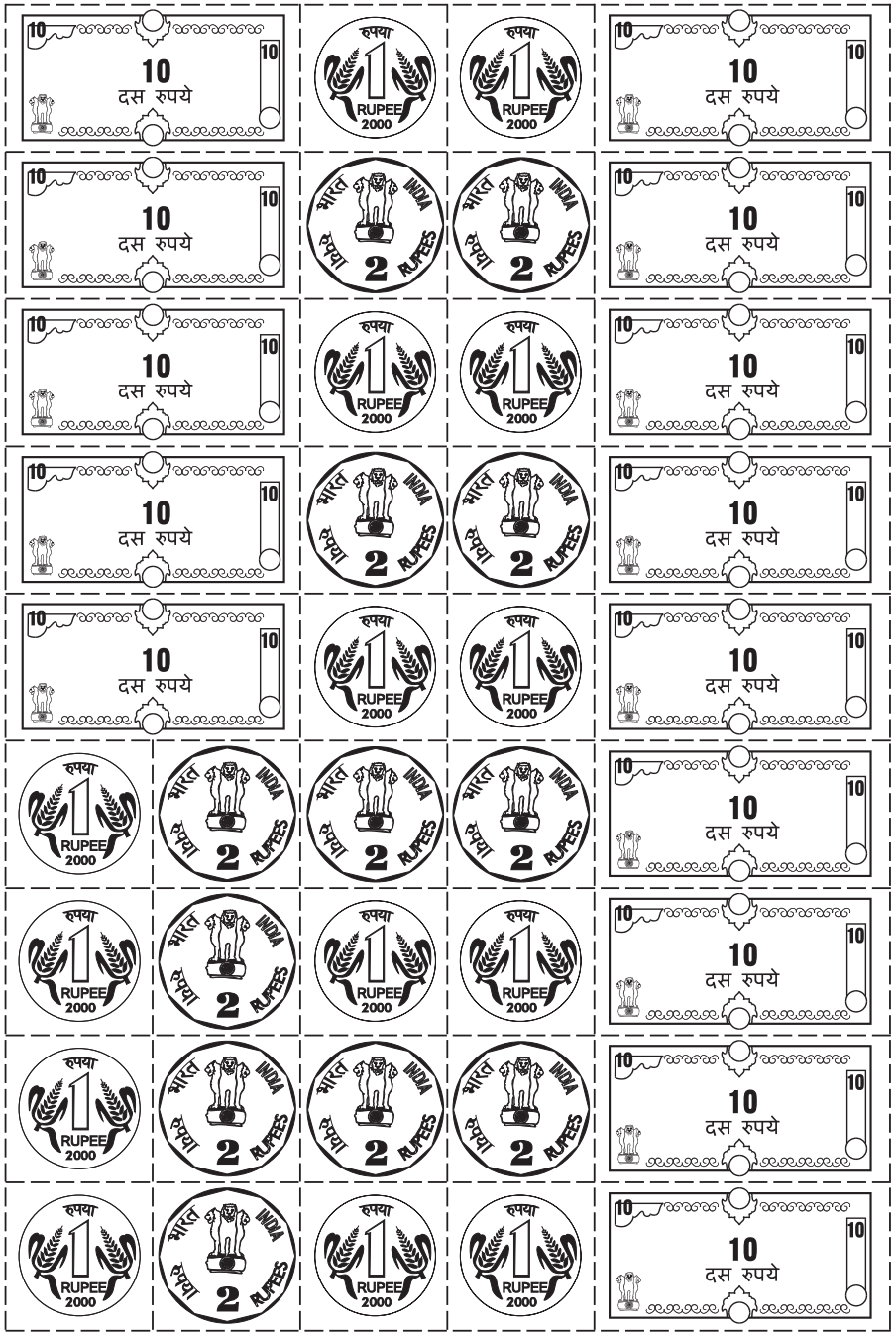
Open out the folds of your clapper and see what shapes you can find in the creases. Can you see any parallelograms?

Try this exercise, it will improve your skill at paper folding!

Mark two points on a sheet of paper. Try and fold a line which passes exactly through the two points. Does this show you that only one line can pass through two points?


50 PAISE 1998
5 RUPEES 2000
20 PAISE 1998


25 PAISE 1975
5 PAISE 1975
10 PAISE 1996


10
दस रुपये
RUPEE 2000
INDIA 2 RUPEES