

Exploring Mathematics

Mathematics Textbook for Class IV



Education Department
Government of Sikkim



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State Council of Educational Research and Training, Sikkim
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Foreword

Since the development of the primary level state term books in the year 2012 and subsequent revisions, a need to revisit our books was felt to align with the developments that have emerged in the ensuing years. For this, a series of intensive exercises were initiated by SCERT which included consultative engagements with practicing teachers and users of the textbooks; strengthening of a core textbook writing team and collaborating with external academic partners. The revised textbooks of Math, Language and Environmental Studies (EVS) are the successful outcome of these initiatives.

The new textbooks are aligned to the following:

- the Learning Outcomes of the National Council of Educational Research and Training (2017)
- the integration of education for sustainable development (ESD) for the implementation of UN's 2030 agenda for sustainable development goals of education for peace and sustainable development

The content of the books is embedded in the socio-cultural context and experiences of the children who come to our government schools. Care has been taken to represent the social, cultural and linguistic diversity of Sikkim. The National Curriculum Framework 2005 emphasizes the need for connecting school learning to the real lives of children and providing a fearless environment where every child feels safe to ask questions, explore and experiment without the fear of being wrong or judged. It is hoped that the schools will nurture this while providing opportunities to work collaboratively with each other.

From the perspective of education for sustainable development, the lessons encourage children to care for and respect the natural environment and people. It encourages children to think critically and creatively about what is happening in their local as well as the global community, connect with their community and to take action for improving it.

SCERT thankfully acknowledges the successful effort of the text book development team of writers, academic partners and reviewers. It also thanks the school heads and officials from Education Department, Govt. of Sikkim for their continuous support.

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It also thanks the team from UNESCO, MGIEP, New Delhi for their contribution in the capacity development of authors for embedment of the concept of peace and sustainable development in textbooks.

SCERT would also like to thank the following for their resources and content: NCERT for their reference materials and documents; UNESCO MGIEP for their publication Textbook for Sustainable Development (www.mgiep.unesco.org) which was used as a key resource for embedding of Sustainable Development.

SCERT expresses its gratitude to the Hon'ble Minister of Education, Govt of Sikkim, Shri Kunga Nima Lepcha, for his continuous support during the development of the text books.

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It also acknowledges the contribution of Echostream Design Pvt. Ltd. for designing the textbooks and providing suitable illustrations.



SCERT-Sikkim

"Empowering society through education"

Note to Teachers and Parents

This textbook titled *Exploring Mathematics* is based on the recommendations of the National Curriculum Framework (NCF) 2005 and the Learning Outcomes suggested by the NCERT. It has been inspired by the NCERT textbook which situates mathematics in the world of the child, rather than situate the child in the world of mathematics. The approach used is for children to observe their surroundings as well as incidents from their day to day life through a mathematical lens. By bringing their understanding and recall of mathematical concepts into the picture, they construct their own knowledge and think mathematically.

The textbooks in this series focus attention on local culture and environment in Sikkim by using stories and contexts relating to sustainable development following the United Nations' Sustainable Development Goals (SDGs). When children's mathematics develops through problems relating to peace, health, hygiene, food security, and other social and environmental concerns, they learn that mathematics is a set of tools developed and used by humans to address their concerns. They will develop sensitivity to the needs and practices of diverse people in Sikkim (gender, religion, etc.) and honour the dignity of labour through stories of real people who do mathematics. In this age of information overload, children will learn to take responsibility in their communities and their environment through validating data and with dialogue in problem solving.

Topics are introduced with local context (both rural and urban) so that children can relate well to the textbook and see both the need as well as the benefit of what they are learning. The illustrations, dialogues, activities, games, puzzles and stories are designed with this goal in mind. They will use local games, celebrate special days, notice mathematics done traditionally with local forms of measurement, and use local materials to extend their mathematics. In class IV, manipulatives have been used to illustrate concepts but the students are gently guided to abstract their mathematical understanding by drawing, documenting and analysing. Estimation and approximation, checking by using a variety of methods and validating solutions are emphasized. As in earlier classes, students build algorithms by understanding concepts and procedures and learning to select the most effective and efficient operation. Practice problems are provided, however, children are encouraged to make more problems on their own and of course, discuss correct methods of solving them.

The textbook provides autonomy to the teachers to design activities and suitable assessment. The teacher notes and teacher pages for selected chapters provide suggestions for the same as well as guidance for suitable materials and manipulatives. Suggestions for embedding sustainable development to achieve the related goals have also been given in the teacher pages.

In class IV and V, the chapters have been roughly classified into three themes:

1. Understanding Shape and Space
2. Quantitative Reasoning
3. Pattern Recognition and Generalization

Mathematics beyond numeracy looks at the child's environment. What does the child see? What does the child experience? Shape and space define the child's life to a large extent. How does the child make sense of these concepts? The theme of Understanding Shape and Space attempts to address these questions. Quantitative Reasoning goes beyond number crunching. The approach is to develop the skills of logic and reasoning in children so that they focus not just on product (the correct answer) but on process (the reasoning which they adopted).

Patterns are observed in shapes and in numbers. The theme of Pattern Recognition and Generalization, arches over the other two themes, the structure of the themes is spiral and cumulative. They are not in silos but topics presented in each theme will have elements of other themes in them; they will provide different lenses by which the content of mathematics is studied and mathematical skills developed. The boundary between chapters is also permeable and students view learnt concepts through different lenses at different times. For example, in class IV, Data Handling is not a separate chapter, it is found across chapters, highlighting its relevance to different topics.

Assessment

Both formal and informal assessment can easily be embedded in all the themes. Open ended questions will help students exercise their creativity and teachers to assess their conceptual understanding. Students may be encouraged to develop questions for their peers and to informally assess their responses. Of course, it is important that a culture of mutual respect is built into such discussions. Some samples of activities are given in the teacher pages, they are intended to encourage the teacher to develop similar and better activities to assess and improve learning. The activities include different achievement levels which can help both teacher and student understand what the student can do and what the student should be able to achieve next.

The authors of this book would like to express their deep gratitude to Padmapriya Shirali for her Pullouts in At Right Angles (<http://azimpremjiuniversity.edu.in/SitePages/resources-at-right-angles.aspx>)

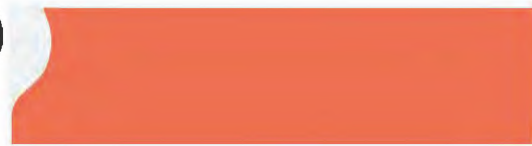
Class IV: Learning Outcomes

- Identifies 2D and 3D-shapes (square, rectangle, triangle, circle, cone, cylinder, cuboid, cube) from the objects around him/her.
- Describes and differentiates between 2D shapes by the number and type of sides and corners.
- Composes and decomposes known 2D-shapes using an intuitive understanding of their properties.
- Identifies and draws front view, top view and side view of the above 3-D shapes.
- Understands that an object looks smaller from a distance.
- Understands that when viewed from top or bottom the entire object is not visible and that shapes will change.
- Plans a route given a map.
- Draws a simple map of a room or an enclosed space.
- Estimates distance, length etc. for a given real world scenario and uses appropriate units (cm, m, km) for one dimensional measurement.
- Converts units: Relates metre with centimetre and kilometre and uses a combination of units.
- Solves simple word problems on length and distance.
- Measures and compares the length of the border of a shape in terms of given non-standard uniform units (such as toothpicks, counters) or standard units of length.
- Draws different known 2D shapes given the length of the border.
- Counts the number of square units that fill a rectangular or square space and compares different such spaces based on this.
- Counts and approximates how many squares are required to fill a given polygon and compares different polygons based on this.
- Differentiates between bordering and tiling a region.
- Reasons that a larger area does not mean a larger perimeter and vice-versa.
- Estimates perimeters and areas.
- Explains basic properties of a circle and the role played by centre and radius.
- Connects intuitively the shape of a circle to its symmetries.
- Identifies the centre, radius and diameter of a given circle.
- Draws a circle by tracing and with compass.
- Recognises various wholes -both continuous (a single object) and discrete (collection of objects) - and understands that the whole can be different in different contexts.
- Identifies 'less than a whole', 'parts of a whole' and 'equal parts of a whole'.
- Identifies half, one-fourth and three-fourth of a whole.
- Completes a whole given half of the whole.
- Demonstrates understanding of the symbols $\frac{1}{2}$, $\frac{1}{4}$, $\frac{3}{4}$, connects them with pictorial representations and identifies the remaining part when these fractions are removed.
- Finds fractions which are equivalent to $\frac{1}{2}$.
- Reads four digit numbers and writes them in words.
- Understands the magnitude of a thousand using contexts related to their surroundings.
- Compares, adds and subtracts numbers up to four digits using place value.
- Observes and uses patterns to construct the tables such as those of 11 and 12.
- Finds the pattern of multiplication by tens and hundreds.

- Applies the multiplication algorithm for a given problem.
- Demonstrates understanding of the process of division visually & by recalling multiplication tables (up to table of 12).
- Identifies patterns in multiplication and division – and applies divisibility rules for 10, 5, 2, (Through colouring 10 x 10 grid and identifying patterns).
- Demonstrates an understanding of place value in the process of division.
- Applies the division algorithm for division by a single digit and then by a double-digit number.
- Uses currency notes with an understanding of their value.
- Converts rupees to paise and vice-versa.
- Uses arithmetic operations to find totals, change, multiple costs and unit cost and checks against estimates.
- Recognises the significance of weights in their surroundings, estimates weights and quantifies their understanding of heavy and light using *kg* and *g*.
- Converts *kg* to *g* and vice versa.
- Demonstrates understanding of the working of a balance and makes standard units using pre-determined weights (such as soap-cakes or packed masala powders).
- Determines sums and differences of weights (without regrouping of units).
- Estimates the volume of a liquid contained in a vessel and verifies by measuring using containers marked with standard units – *l* and *ml*.
- Converts units of volume (litres to *ml* and vice-versa).
- Solves problems based on sums and differences of volumes.
- Recalls the number of weeks in a year, days in a month and months in a year.
- Explains what a leap year is and finds out which years are leap years.
- Computes the number of days between 2 dates and estimates the duration of familiar events.
- Finds approximate time elapsed (to the nearest hour).
- Reads clock time in hours and minutes.
- Expresses time, using the terms, 'a.m.' and 'p.m.' as well as the 24-hour clock.
- Reads and draws a timeline or a schedule and draws inferences from it.
- Draws inferences from a table, pictograph or bar graph.
- Collects data and represents in the form of tables or pictographs.
- Explains line symmetry.
- Reflects an object in a line.
- Explore reflections of familiar 2D shapes and makes border strips (repeating patterns with objects that are reflected).
- Describes (using the governing rule), extends or creates a pattern (with numbers or shapes).
- Represents odd/even numbers, triangular numbers, square numbers, composite numbers visually and extends them using pattern recognition.



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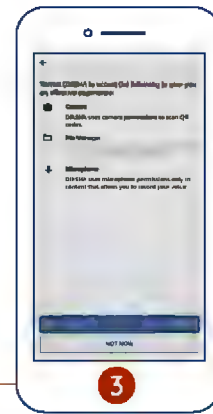
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Contents



Foreword	iii
Textbook Development Team.....	iv
Acknowledgement	v
Note to Teachers and Parents.....	vi
Learning Outcomes.....	viii
How to use QR Code.....	x
1. Looking at Shapes.....	2
2. Bigger Numbers	16
3. How Long? How High? How Wide?.....	34
4. Borders and Tiling.....	54
5. Parts of a Whole	70
6. Here We Go Round.....	90
7. Scaling and Sharing.....	104







8. Patterns, Patterns Everywhere.....	130
9. Heavy and Light	146
10. Pouring and Filling.....	158
11. Trip to Talkharka	172
12. Tick-Tock!.....	190
13. Rupees and Paise	214
Teachers' Page	232

1. Looking at Shapes



Students of class IV of Jorethang Senior Secondary School are going to Namchi, for a field trip to study and understand different geometrical shapes. On the way to Solophok hill, Namchi they happen to see different objects with various geometrical shapes. Look at the following pictures which they have taken and help them to fill the names of the shapes in the given crossword.

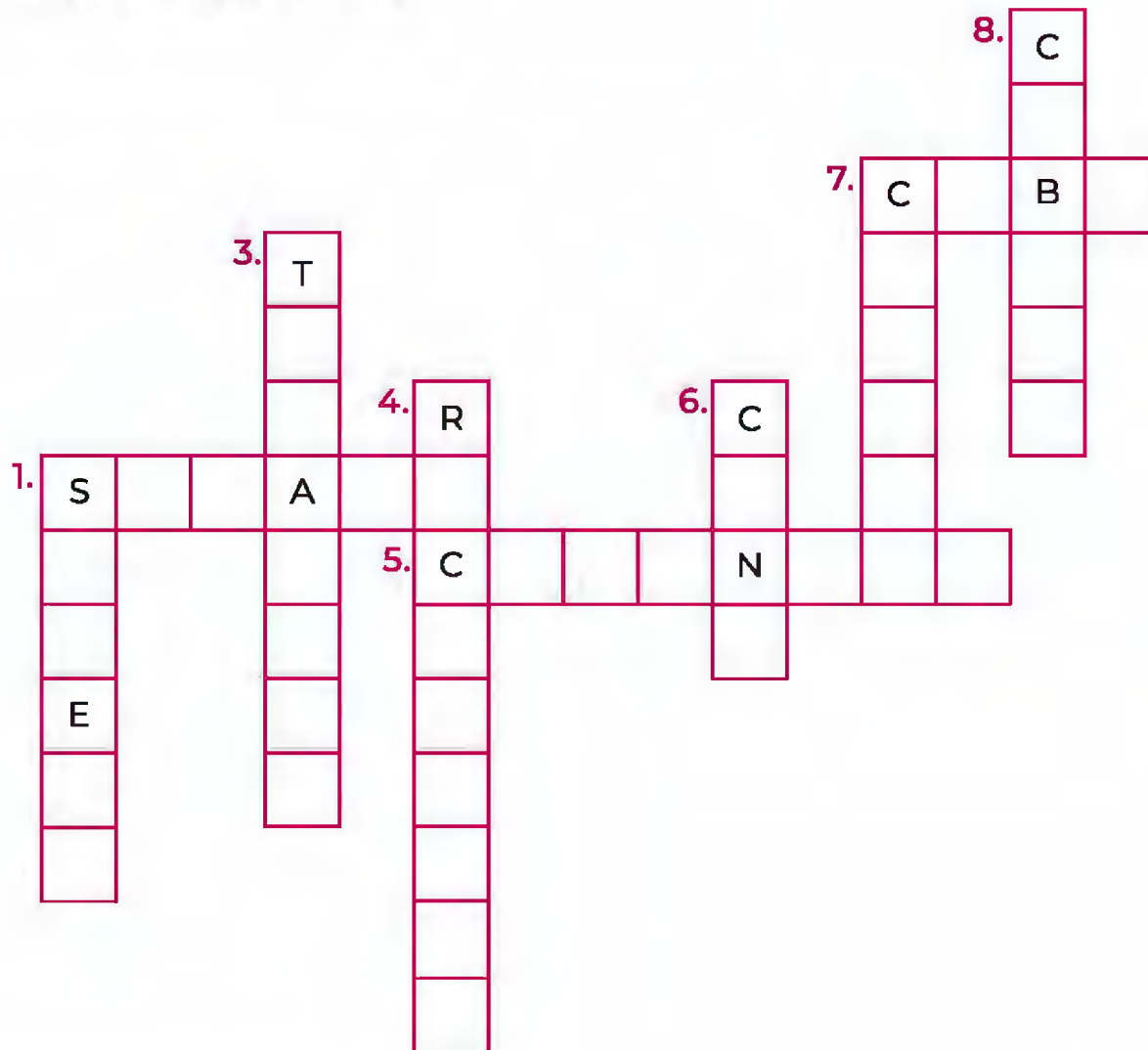
CLUES DOWN

		
<p>1. Shape of the bush</p>	<p>3. Shape of the part in red</p>	<p>4. Shape of the face of this sign board</p>
		
<p>6. Shape of the traffic cone</p>	<p>7. Boundary of this sign board</p>	<p>8. Shape of the brick</p>

CLUES ACROSS ¹

		
<p>1. Boundary of this floor tile</p>	<p>5. Shape of the pillar</p>	<p>7. Shape of the slab</p>

CROSS WORD PUZZLE



1. S

3. T

4. R

5. C

6. C

7. C B

8. C

E

A

N

¹**Teacher's Note:** Allow the child to write surface of the triangular road signboard as triangle, trace of a ring as circle, etc.

Shape Hunt

Look around you and fill in the table with the names of objects having the following shapes.¹

<i>Solid Shapes</i>	<i>Names of Objects</i>
<i>CUBOID</i>	
<i>CUBE</i>	
<i>SPHERE</i>	
<i>CONE</i>	
<i>CYLINDER</i>	

<i>Flat Shapes</i>	<i>Names of Objects</i>
<i>RECTANGLE</i>	
<i>SQUARE</i>	
<i>CIRCLE</i>	
<i>TRIANGLE</i>	

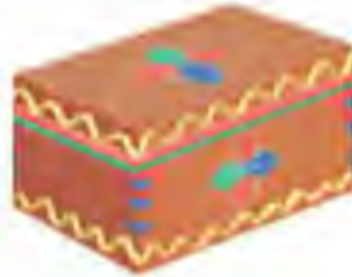
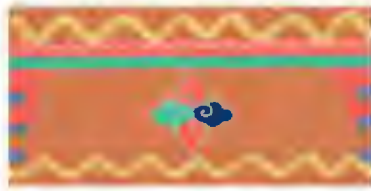
Dawa's Box

While returning from Solophok hill, Prerna madam took the students to the Handicraft and Handloom Training Centre, Namchi where Tashi bought craftwork prepared there. They also met Dawa the carpenter who was making a wooden box which looked like this:



Dawa

1. Circle the picture showing three of the faces of the box.



2. Tick mark (✓) which of these solid shapes matches Dawa's wooden box?



3. Tick mark (✓) which of the following shapes show the faces of Dawa's box?



4. Look at the shapes that you have selected in question 3. How many such shapes does the box have?
5. Look at the shapes given below. Write their names on the shapes.



Select the statements which are true.

- a. All of them have 4 sides each.
 - b. All of them have 4 corners each.
 - c. All of the given shapes have all their sides equal.
6. Which of the following statements is true for the shapes shown? ²



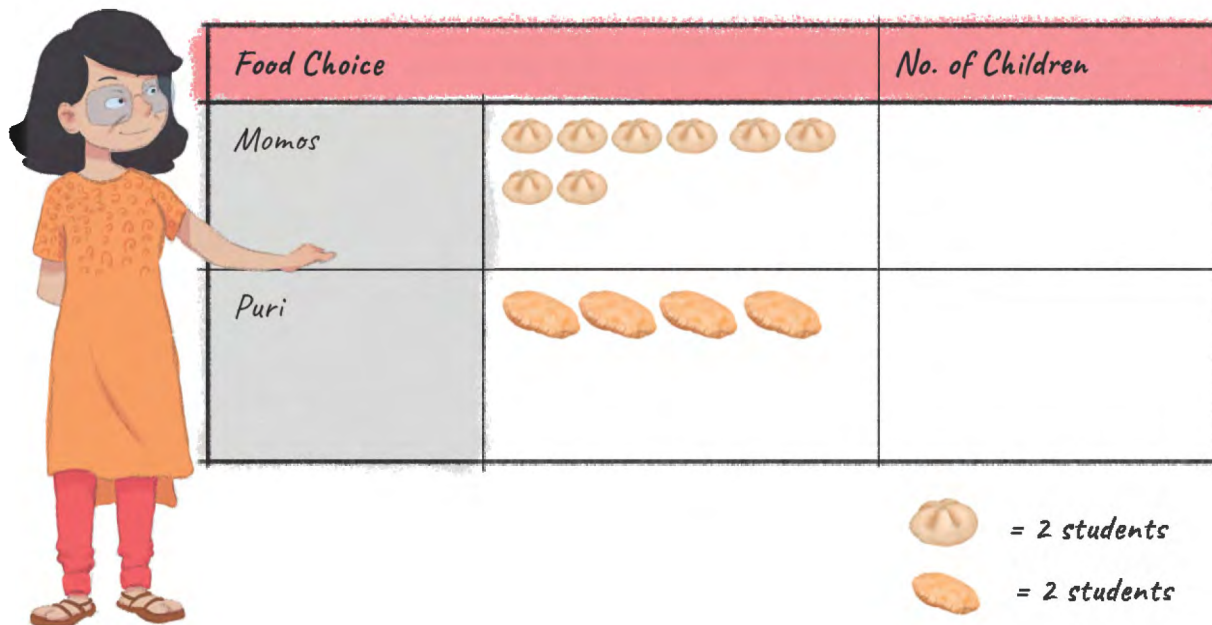
- a. All of them are squares.
- b. All of them are triangles.
- c. Some of them are triangles


² **Teacher's Note:** Get the children to give the reasons for their answers. Reasons may be intuitive and in their own words.

Lunch Time

After visiting the Handicraft and Handloom Training Centre, Prerna madam took the children to Rock Garden, an ideal dry picnic spot. There were 30 children and she had made a pictograph of their food choices.

Look at the pictograph and fill in the number of children who chose each type of food.



1. How many students chose momos?
2. Which was the more popular choice of food?
3. How many students' food choices were  in the pictograph?
4. The remaining children also wanted puri, change the pictograph to show this.

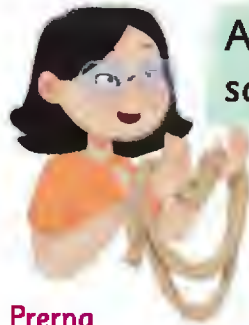


WHAT IF?

Your elder brother is busy making a dough for preparing tasty parathas for you. Can you help him? Observe and list out the different shapes that you come across during this process.

A Free Rope

After enjoying lunch together, Prerna madam handed a looped rope to Anisha. It looked like this:



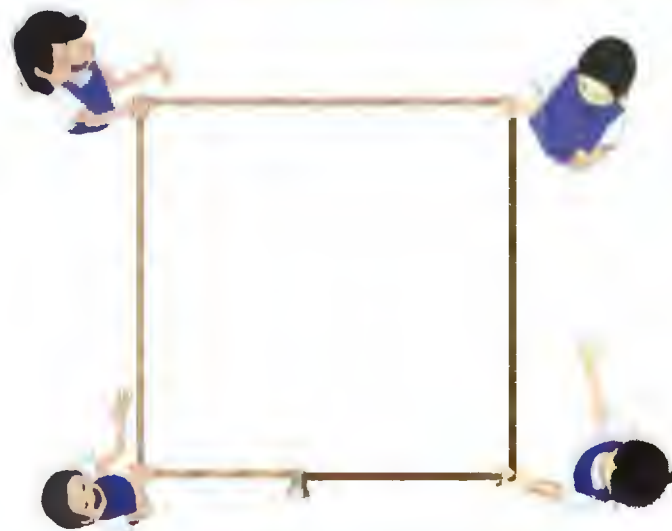
Prerna
Madam

Anisha can you form a square shape using this rope?

Yes, if I have four friends, I can show you how to form a square.



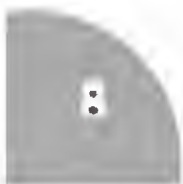
Anisha



Wow that's great! Let us clap for them.

Let Us Discuss:

If you were given that looped rope and asked to make a rectangle with it, then how would you do that? What if you were asked to make a triangle?



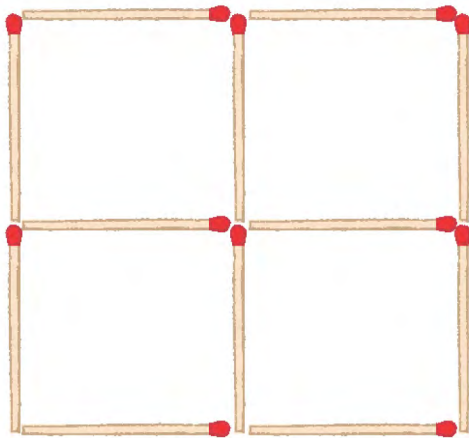
PUZZLE TIME



Leezum, here are twelve matchsticks. Can you remove exactly two sticks so that two squares remain?



Find how Leezum can solve this puzzle!

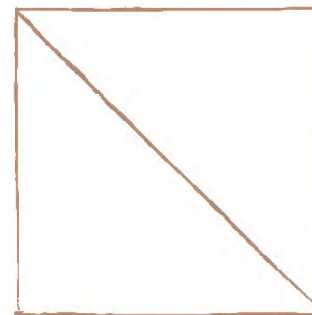


Answer to this puzzle is on page 15.

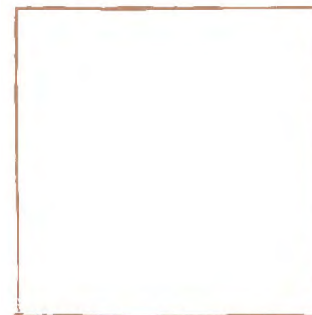
Try this!

1. The diagonal inside the given square shows how you can make the square into two triangles. Do these two triangles overlap exactly on each other?

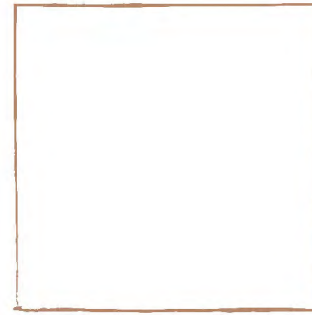
Here, the diagonal forms the line of



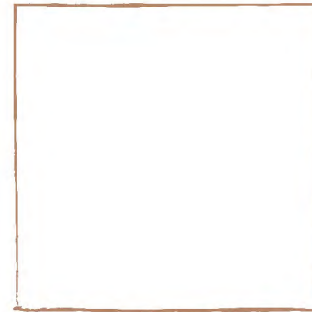
2. By drawing lines inside the square show how you can make it into four triangles.



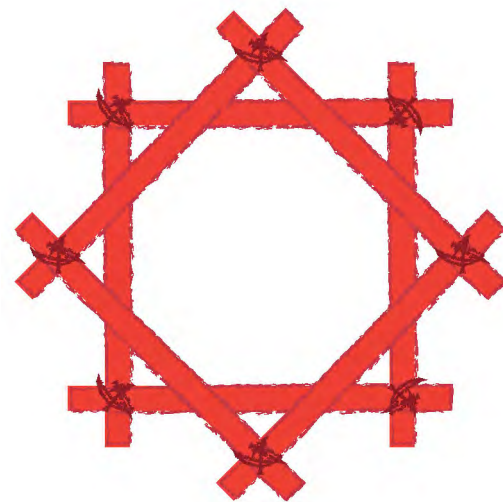
3. By drawing a line inside the square show how you can make it into two unequal rectangles.



4. By drawing lines inside the square show how you can make it into two squares and two rectangles.



Tashi was looking at the craftwork he bought from the Handicraft and Handloom Training Centre, Namchi.



Can you help him to draw and count the different shapes that he observes in the craftwork?

Composing Shapes

Marmith is wondering how she can make the following bigger shapes with the smaller shapes provided in the table given below. Can you help her?



[Hint- Trace the shapes, cut them out and place them in different possible ways to get the result.]³

a. Make this



with



b. Make this



with



c. Make this

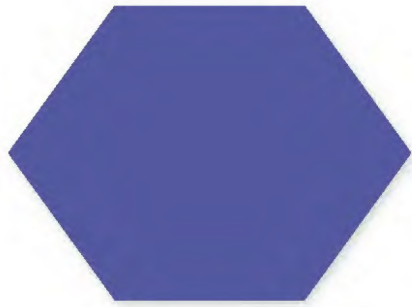


with

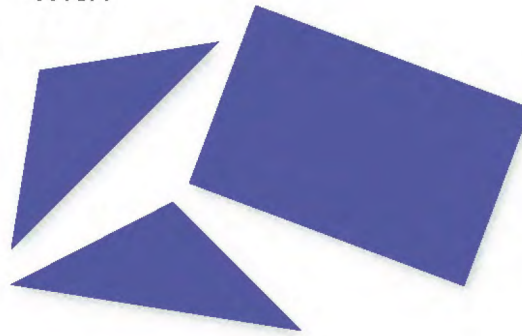


³ **Teacher's Note:** Students can draw lines inside the bigger shape, make sure that they keep the dimensions of the shapes in mind when doing this.

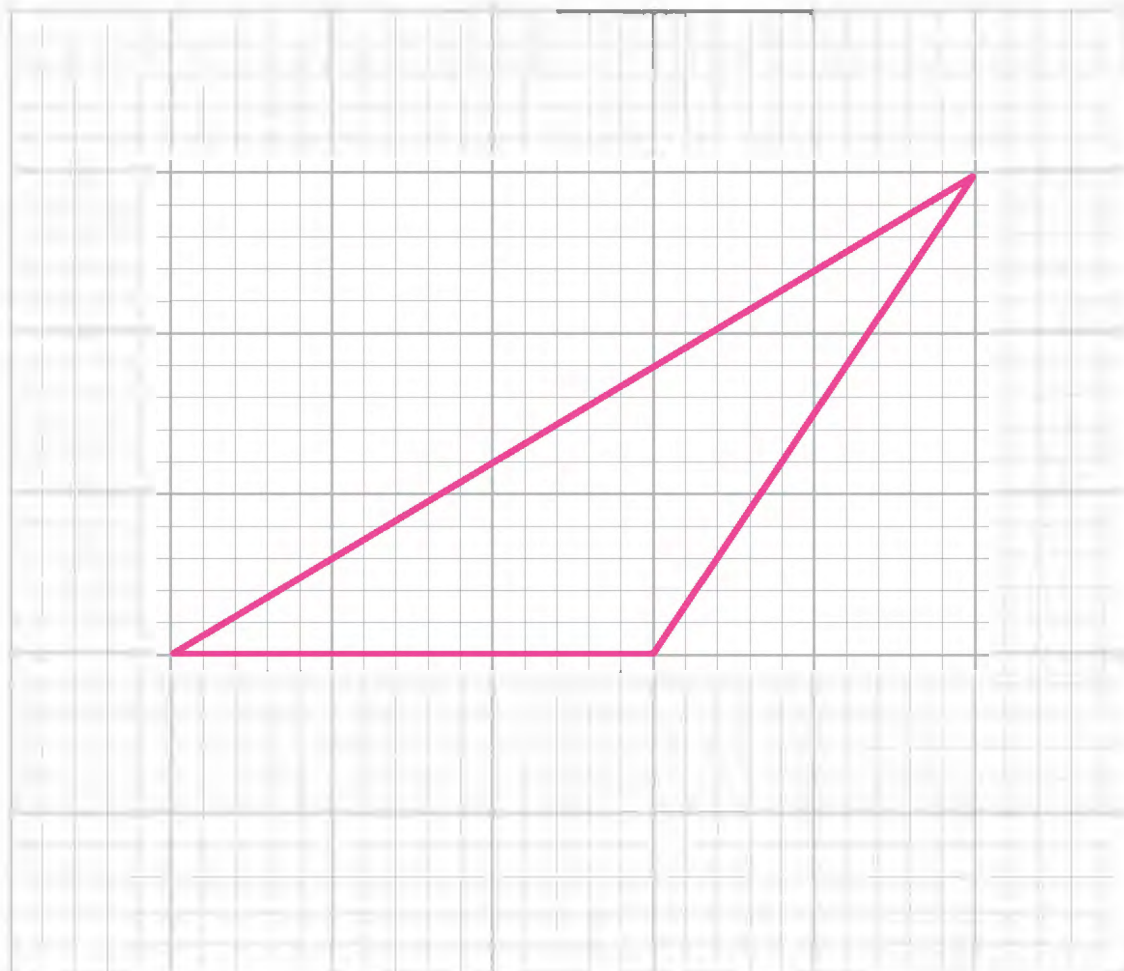
d. Make this



with



-
1. Draw a rectangular frame for this triangle. At least two of the corners of the triangle should be on the corners of the rectangle. What all shapes do you see? ⁴



⁴ **Teacher's Note:** This activity will help children later to understand how to find the area of an obtuse angled triangle. They can also try the same activity with an acute angled triangle.

2. Rabin was looking through the window of the bus on the way back to Jorethang from Samdruptse hill. Suddenly, he noticed a beautiful field.



Rabin showed it to Kunal sitting near to him.

Wow! It looks like the pieces of a Tangram which we studied in class III. Rabin, do you remember what a tangram is?



Kunal



Rabin

Yes of course! A Tangram is a Chinese Puzzle consisting of five or seven geometrical pieces that can be arranged in different shapes.



These seven pieces of Tangrams are used to make different shapes. *

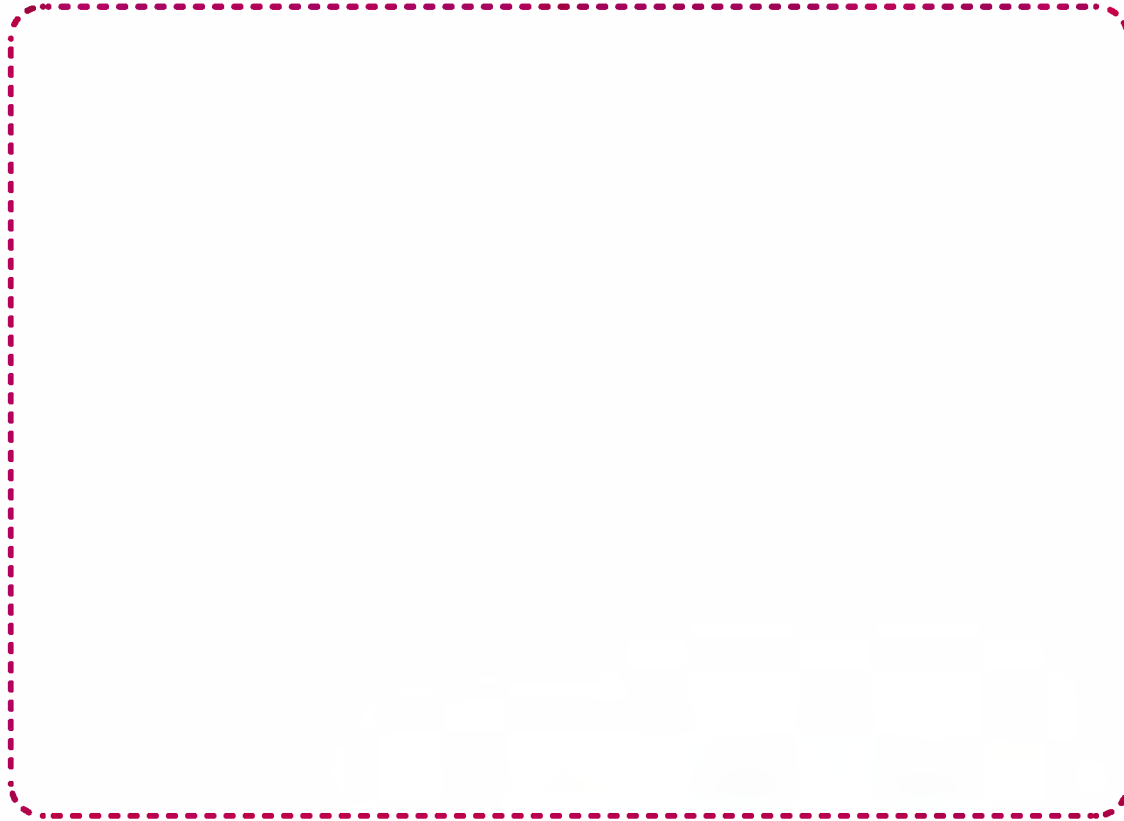
Trace around each shape on paper and cut out your traces.

- On each shape, draw the lines of symmetry. How many lines of symmetry does each shape have?
- Which are the triangles which have the same shape and size?
- Which are the triangles which have the same shape and different size?
- In how many different ways can the triangle 1 be made using the other pieces? Show your ideas in sketches.
- Make a square from any two pieces. How many different squares can you make?
- Use the cutouts of the traces of the shapes to fit the seven tangram pieces into this square.

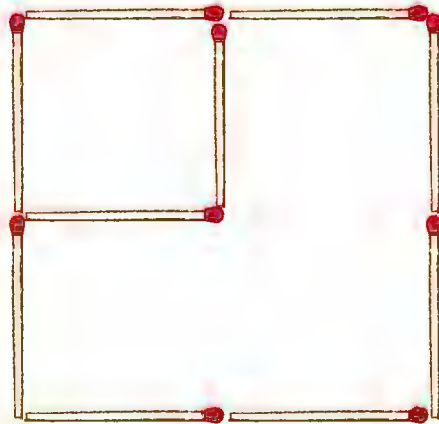
* Teacher's Note: let children create their own tangrams from a sketch drawn to scale so that they can play freely and explore the shapes and hence discover many properties and relationships. Help them to record these in sketches and notes.

Accepting a Challenge is Fun

Draw a rectangle on a cardboard. Draw the diagonals and cut it along the diagonals to create two pairs of identical triangles. These four triangles can be rearranged in different ways to make different shapes. Can you figure out ways? Sketch them in this space.



One possible solution
to matchstick puzzle:

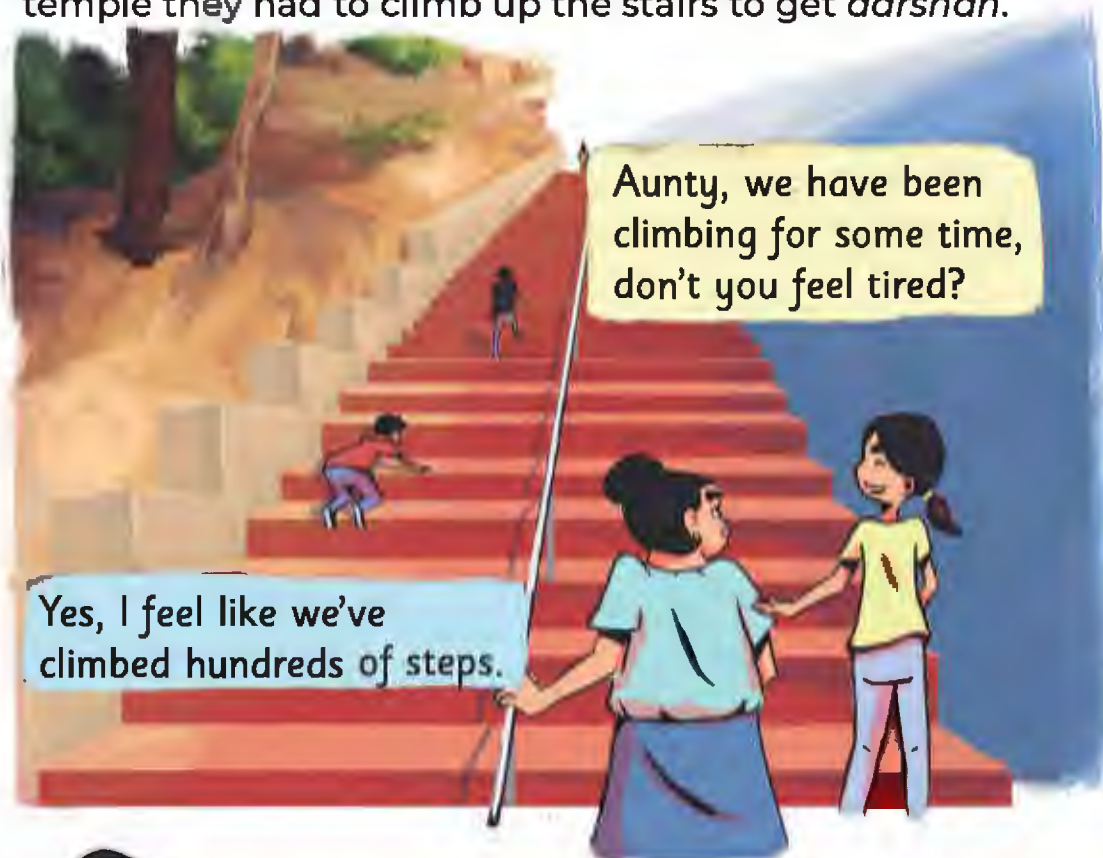


2. Bigger Numbers



Visit to Tirupati

Anita and her Aunty went to visit the temple in Tirupati in South India during her vacation. When they reached the temple they had to climb up the stairs to get *darshan*.



Anita

Oh! Aunty, I think we have climbed about 400 steps and we are less than half way up. 500, 600, 700, 800, 900...What next? What will come after 999 steps?

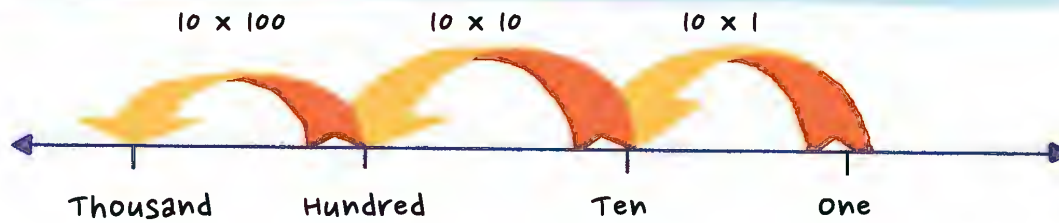
Anita, let's take a rest and think about this. We know that when we count, we begin at 1 and after 9 is 10 (which is 1 more than 9). Continuing, after 99 is 100 (which is 1 more than 99).



Aunty



Last year, you studied 3 digit numbers for which 999 was the largest number. The number after 999 is one thousand, which is written as 1000. It is a four-digit number.



How many hundreds make a thousand?

More than 1000

1. Let us make a number chart starting from 1001 moving downwards. When you reach the bottom continue from the top of the next line, in the same way.¹

Table A

1001									
1002									
									1099
									#

- a. As I move from top to bottom, the numbers are increasing by _____.

¹**Teacher's Note:** Students should have practice in reading and writing these numbers, particularly in handling the transition from 1009 to 1010. Arrow cards will give them good practice in writing these numbers.

b. As I move from left to right, I find numbers increasing in _____ s.

c. The number marked with # is _____. It has _____ in the thousands place, _____ in the hundreds place, _____ in the tens place and _____ in the ones place.


 In the next chart, as you go down, increase the number as per the pattern you see. When you reach the bottom continue from the next line, in the same way.

Table B

5013									
5023									
5033									
				#					

a. As I move from top to bottom, the numbers are increasing by _____ .

b. As I move from left to right, I find numbers increasing in _____ s.

c. The number marked with # is _____. It has _____ in the thousands place, _____ in the hundreds place, _____ in the tens place and _____ in the ones place.

 Fill in the next table, by using the given numbers to guess the pattern.

Table C

2200	3200						
							9300
2600							
			6100				#

- As I move from top to bottom, the numbers are increasing by _____ .
- As I move from left to right, I find numbers increasing in _____ s.
- The number marked with # has _____ digits.
It has _____ in the thousands place, _____ in the hundreds place, _____ in the tens place and _____ in the ones place. ²

2. Write five 4 digit numbers between:

- 2345 and 2355
- 3561 to 3661

²**Teacher's Note:** Five digit numbers are not to be tested, this is just to see if students understand how numbers increase. More of this will be addressed in standard 5.

3. Write two 4 digit numbers less than

a. 7000

b. 4001

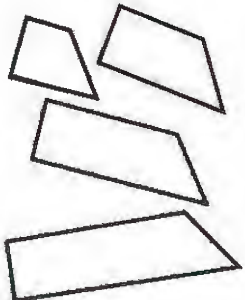
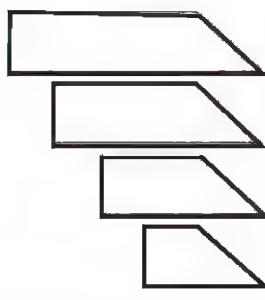

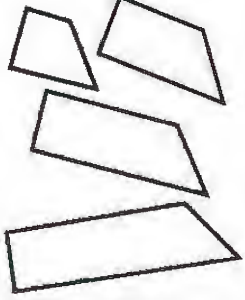
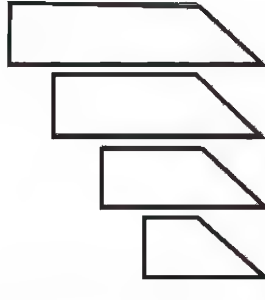

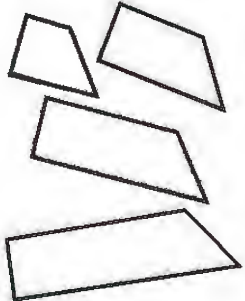
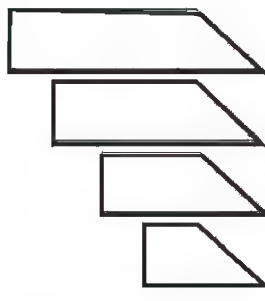

Activity:

Make 4 digit numbers using the digits 1, 4, 3 and 5 and write them in words. Now arrange these four-digit numbers using arrow cards.



One example is done for you. Try more numbers!

S.No	Number on Arrow card	Arrangement in Sequence of number on arrow card	4 - digit number
Example			
1			

2			
3			
4			

 Using any of the digits 2, 1, 0 and 3:-

1. Write two numbers having the same digit in the thousands place and in the hundreds place.
2. Write two 4 digit numbers having the same digit in the hundreds place and in the tens place.
3. From the numbers you made, choose one which you think would be:
 - a. The cost of a cricket kit.
 - b. A year before you were born.
 - c. The capacity of the overhead tank in your house. ³

³Teacher's Note: Answers to these questions can vary as they are open-ended.

Himalayan Zoological Park, Bulbulay



In the year 2018, the tourist register entry book to the Himalayan Zoological Park, Bulbulay showed the number of tourists as 1024.



Students, can anyone tell me using arrow cards how the number of 1024 was arrived at?

Yes ma'am, it can be shown by using a one thousand arrow card, a twenty card and a four card.



Teacher



We observe that 1 is in the thousands place, 2 is in the tens place and 4 is in ones place.

Here, we didn't use any arrow cards for hundreds place. So, we can put zero in the hundreds place.

We can write 1024 in the place value chart as shown below. Can you fill in the digits in each place for the other numbers ?

S. No	Numbers	Thousands	Hundreds	Tens	Ones
1	1024	1	0	2	4
2	3810				
3	2301				
4	6005				
5	9090				

Activity:

Make sentences with these numbers. One has been done for you.⁴

S.No.	Numbers	Sentence
1	2015	Two thousand and fifteen trees were planted across South Sikkim on New Year's day.
2	6324	
3	4571	
4	5505	

***Teacher's Note:** This is to help students practise writing four digit numbers in words, to practise their language skills and to understand the magnitude of the numbers.

School Library Centre

Abdul from Tashi Namgyal Senior Secondary School or TNSSS and Habib from Enchey Senior Secondary School or ESSS are friends of the same age from the same village. During the holidays, they meet up.

Abdul, how many books are there in your school library?

We have around 3150 books in our school library. What about your school library?

We have around 2900 books in our school library.

Now, which school library has more books?

3150which means 3 thousands, 1 hundred and 5 tens

2900 which means 2 thousands and 9 hundreds, so TNSSS Library has more books.



Habib



Abdul



Which of these numbers are bigger?

[Hint: Thinking of how many thousands, how many hundreds, how many tens and how many ones will help you!]

- a. 879 and 1422
- b. 5134 and 5298
- c. 4031 and 4301
- d. 6674 and 6547

Practice Time

1. Compare the following numbers and estimate the difference between them. One has been done for you.

a. 9999 and 6734

9999 has nine thousands and 6734 has six thousands.
The difference should be around three thousand.⁵

b. 4567 and 2417

c. 5413 and 5498

2. Write the number which is smaller than the given number by the given amount.

a. 2000 : smaller by 100
is 1900

b. 6679 : By 1000

c. 7891 : By ten

d. 3498 : By one

3. Write the number which is greater than the given number by the value given. The first is done for you.

a. 6677 : Greater by hundred. So it will be 6777

b. 8919 : By one

c. 5604 : By ten

d. 8923 : By hundred

⁵**Teacher's Note:** The exact answer is not important at this stage. But students can discuss some points once they are comfortable with the basic difference. For example in this problem they can then compare the hundreds digits and see if the difference is more than three thousand or less than three thousand.

Ordering four digit numbers

Miss Chunkila, mathematics teacher asked each of her students to write any four-digit number on the board.



Miss
Chunkila

Now students, you know how to compare numbers two at a time. Which is bigger: 1386 or 6381?

Miss, 6381 is greater than 1386.



Very good. Now which is the biggest: 1386, 6381 or 4450?

6381. But 4450 is bigger than 1386.



Neeta



What about 1386, 4450, 6381 and 7767.

7767 is greatest followed by 6381, 4450 and 1386.



Rehan



Gopal



Correct, we use ' $<$ ' to show smaller than and ' $>$ ' to show greater than.

We can write $7767 > 6381 > 4450 > 1368$.

Here, the numbers are arranged from biggest to smallest. We say that they are in decreasing or descending order.

Or, we can write $1368 < 4450 < 6381 < 7767$

Now the numbers are arranged from smallest to biggest and we say that they are in increasing or ascending order.

Practice Time

1. Write the given numbers in ascending order.


a. 5098, 7765, 989, 4331

b. 6016, 616, 6106, 6610

2. Write the given numbers in descending order.

a. 3098, 6687, 1001, 9999

b. 5387, 5783, 5738, 5378

 The Government Food Preservation Factory, Singtam produces different items as shown below:

S.No.	Items	Items produced per day (in bottles)
1	Passion fruit squash	2373
2	Orange squash	2191
3	Chilli Pickle	1200
4	Kiwi Jam	1050
5	Sauce	1300



How many bottles of squash (passion fruit and orange) are produced by the factory in one day?

Gopal has solved this problem like this:

Item	Number	Meaning
Passion fruit squash bottles	2373	2 thousands 3 hundreds 7 tens and 3 ones
Orange squash bottles	2191	2 thousands 1 hundred 9 tens and 1 one
Adding the ones		3 ones + 1 one = 4 ones
Adding the tens		7 tens + 9 tens = 16 tens which is 10 tens + 6 tens Or 1 hundred and 6 tens
Adding the hundreds		3 hundreds + 1 hundred + 1 hundred = 5 hundreds
Adding the thousands		2 thousands + 2 thousands = 4 thousands
Now adding it all up	4 thousands + 5 hundreds + 6 tens + 4 ones = 4564	



In class III, I learnt how to add three digit numbers by grouping.

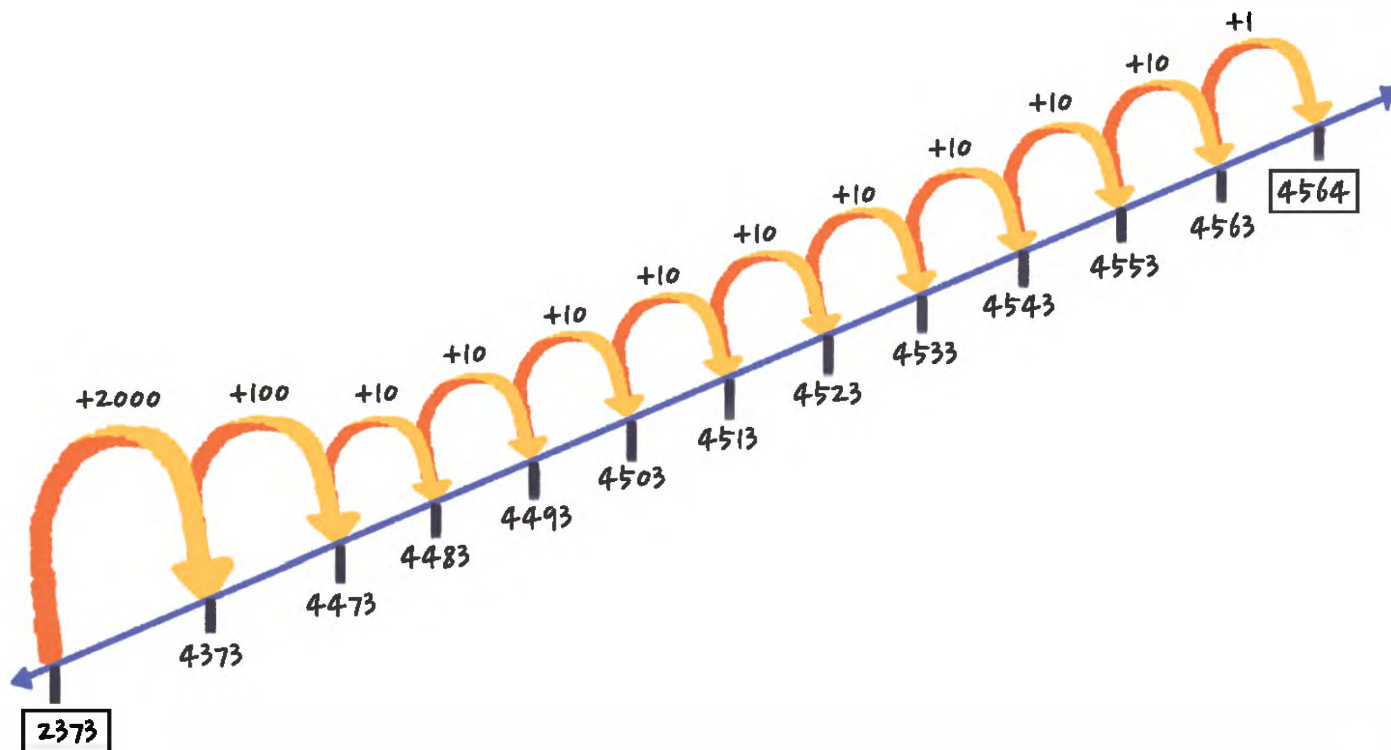
Peter

Peter has solved the same problem through this process. He arranged numbers in columns and then added:

$$\begin{array}{r} 1 \\ 2373 \\ + 2191 \\ \hline 4564 \end{array}$$



Neeta did the addition on the number line:



Let us find how many more pickle bottles were manufactured than jam bottles.

For this, we subtract 1050 from 1200.

Can we use the same methods with subtraction instead of addition?



Rehan

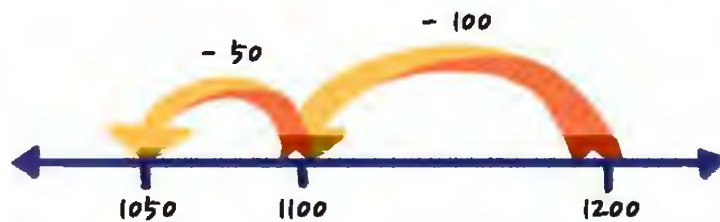
Gopal did the problem like this:

Item	Number	Meaning
Pickle bottles	1200	1 thousand 2 hundreds 0 tens and 0 ones
Jam bottles	1050	1 thousand 0 hundred 5 tens and 0 ones
Subtracting the ones		$0 - 0 = 0$ ones
Subtracting the tens		0 tens - 5 tens = Regroup 1 hundred into 10 tens and then 10 tens - 5 tens = 5 tens
Subtracting the hundreds		1 hundred - 0 hundred = 1 hundred
Subtracting the thousands		1 thousand - 1 thousand = 0 thousands
Now adding it all up		0 thousands + 1 hundred + 5 tens + 0 ones = 150

Peter arranged the numbers in columns and then subtracted:

$$\begin{array}{r} 120 \\ - 1050 \\ \hline 150 \end{array}$$

Neeta did the subtraction on the number line:



Can anyone tell me how to check if the answer is correct?

I can! If you count forward from 1050 to 1200, you will go through 150 steps.



Neeta



Correct! $1050 + 150 = 1200$

Can you find and check the difference between the number of orange squash bottles and the number of passion fruit squash bottles in the same way?

Practice Time

1. Add the following:

- a. 3379 and 4579 b. 5576 and 2124 c. 6629 and 1110

2. In April, the Flower Exhibition Centre, Gangtok sold 670 tickets on Monday, 590 tickets on Tuesday and 720 on Wednesday. Find the total number of tickets sold by the Flower Exhibition Centre over the three days.

3. Subtract

a. 3214 from 9999

b. 5555 from 8882

c. 4444 from 7756

Can you check your answers? Show how.

4. Find the missing digit:

		4	2	3
+	3		6	5
	8	7		

	7	2	6	
+	2	1		5
	9		8	7

	4		6	8
-		6		5
	2	7	4	

			6	
-	6			5
	1	0	2	2

5. In a survey the total population of Jorethang town was found to be 9879 people. Out of this 5621 are men, find the number of women in Jorethang town.

6. In a factory there are 8890 workers. 3211 workers work in the morning shift, 4520 workers work on the evening shift and the rest work on the night shift. Find the number of workers who work on the night shift.⁶

⁶**Teacher's Note:** Let the students try these problems in different ways and verify their answers by adding up to get the given total.

7. A Survey was conducted for the vaccination of Stray Dogs in Sikkim under the SARA H Programme. The following information was obtained:

Year	Number of stray dogs picked up
2003	277
2004	60
2005	1188
2006	1014

- In which year was the most number of dogs picked up?
- In which year was the least number of dogs picked up?
- What is the difference in the number of stray dogs picked up between the years 2005 and 2006?
- In which years were the number of dogs less than thousand?
- How many dogs were picked up over the last four years in Sikkim?

Good to Know

Stray dogs are picked up and vaccinated under SARA H. They even take the unhealthy dogs to their centre for treatment and keep them there till they have recovered fully. They are then released in the same spot where they were picked up from. Pet dogs can also be vaccinated once a year under SARA H.

3. How Long? How High? How Wide?

Playing With Marbles (Ghuchi Venda)



Some children of class IV had decided to play with marbles (*ghuchi venda*) during the Games period. As they played, they began discussing who was closer to the *ghuchi*.¹



Deepika

Friends, I think I am to play first as my marble is closest to the *ghuchi*, But Dawmit's and Nagma's marble positions also seem to be at the same distance from the *ghuchi*, so please decide who will play first.



Dawmit

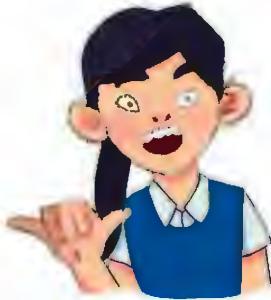
Nagma, look here, my marble is closer to the *ghuchi* than yours, so I will play first.

¹**Teacher's Note:** Rules of playing *ghuchi venda*: Players are allowed to shoot the marbles to the *ghuchi* from a fixed distance. Order of play depends upon the closeness to the *ghuchi*.



Nagma

No Dawmit, I will play first as my marble position is closer to the ghuchi than yours.



Deepika

See Nagma's marble is more than 1 handspan away from the ghuchi. My marble is exactly 1 handspan away from the ghuchi.



Nagma

Dawmit's marble is more than 1 handspan away from the ghuchi. So both our marbles are at the same distance from the ghuchi.



Rabita

Listen my friends, the discussion between Dawmit and Nagma will continue and we won't solve their problem, so shall we call Gyamtso sir to settle the argument?

Everybody thought that this was a good idea.

YES!

LET'S DO THAT

GOOD IDEA

OK!



Deepika



Dhiraj



Nagma



Dawmit

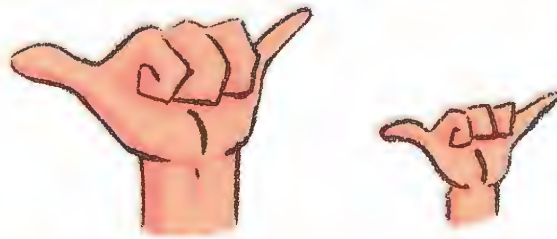


Grace



Gyamtso Sir

Children, don't you remember from class III that hand span is a non-standard unit of measurement because the length of a hand span varies from person to person? So you can't compare measurements made with two different people's hand spans.



We have to use a ruler which has standard units to get the actual distance. Grace, do you have a ruler in your pencil box.

Yes Sir, I will bring it.



Grace



Now let us measure the distance of their positions from the ghuchi using this ruler and record it into tabular form.



Guess, Measure, Check! ²

Name	Your guess in cm	Actual measure in cm
Deepika		
Rabita		
Grace		
Nagma		
Dhiraj		
Dawmit		

²Teacher's Note: The students can guess the distances and record their guesses. Then measure the actual distances in their textbooks and record the answers in the table below.

1. Now, who is closest to the *ghuchi*?
2. Who is farthest away from the *ghuchi*?
3. Draw a marble that is:
 - a. 1 cm from the *ghuchi*.
 - b. 8 cm from the *ghuchi*.
 - c. 3 cm from Nagma's marble.










1. In the picture given below³

- a. Draw a ladder 5 *cm* long from the tree to the ground.
- b. Draw a bamboo 3 *cm* shorter than any of those shown in the picture.
- c. Draw a hose pipe from the tap to the tree.
The length is _____ *cm*.
- d. Fill the pot with 2 *cm* mud.
- e. Draw a door 1 *cm* wide. What is its height?



³Teacher's Note: Some of these questions are open ended and give a good opportunity for formative assessment.

2. Measure the following

	In cm	In m
 your desk		
 teacher's table		
 classroom		
 skipping rope		
 blackboard		
 flower garden		
 door		

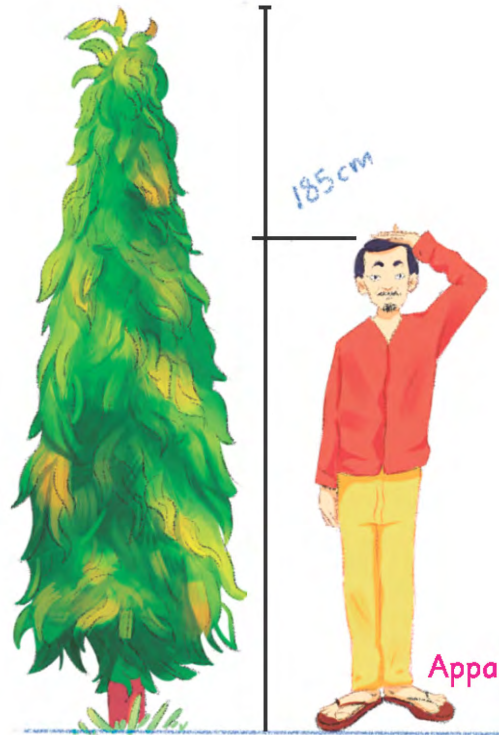
3. Measure in centimetres and rearrange them from smallest to biggest.

- Length of an eraser.
- Length of chart paper displayed in the classroom.
- Distance from the floor of the classroom to the window sill.
- Length of your pencil box.
- Length of your Mathematics textbook.
- Height of the teacher's table in your classroom.
- Height of your table in your classroom.

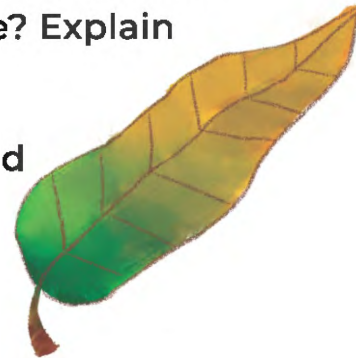
Visit to Saramsa Garden

Yangchen went to visit Saramsa Garden along with her Appa and Amma on Father's Day.

When they reached the garden, they found that bushes of pines, different types of orchids, bamboo and many more varieties of plants were located at different places of the garden. Since it was a sunny day, after some time, Yangchen's *Appa* felt tired. So, he stood near a tree which was about half a metre above his height. *Appa's* height was 185 *cm*.



1. What was the height of the tree?
2. What unit would you use to describe the height of bamboo plants? Explain your choice.
3. Would you use the same unit to describe the distance travelled to reach the park from your home? Explain your answer.
4. Yangchen picked up a leaf. What unit would you use to measure its length?



Let us find out:

1. How long is a football field?
2. What is the distance of the nearest hospital from your school?
3. How far is the post office from your school?
4. How wide is a sari?

Let us learn more about standard units of length.



Length of one metre is equal to length of 100 centimetres.

We write it as $100\text{ cm} = 1\text{ m}$



Let us do:

- a. Take 3 strings which are 2 m , 3 m and 4 m long.
- b. Measure each of these strings using metre scale and write it in terms of centimetre.

	String length in cm
2m	
3m	
4m	

- c. Now, without measuring, fold the 2 m string into 2 equal parts, the 3 m string into 3 equal parts and the 4 m string into 4 equal parts.
- d. Write in the table:

String of	Length in cm	Number of parts	Measure each part in cm (use a scale)
2 m		2	
3 m		3	
4 m		4	

Since $1\text{ m} = 100\text{ cm}$,
 $2\text{ m} = 200\text{ cm} = 2 \times 100\text{ cm}$
 $3\text{ m} = 300\text{ cm} = 3 \times 100\text{ cm}$



Yangchen

Appa, I know how to convert 3 cm to 300 cm. But, if I have measured a string in cm, how would I say the length in metres?

Let us look at how many 100 cm in 500 cm.

$$500 \text{ cm} = 100 \text{ cm} + 100 \text{ cm} + 100 \text{ cm} + 100 \text{ cm} + 100 \text{ cm}$$

$$\text{Which is, } 500 \text{ cm} = 1 \text{ m} + 1 \text{ m} + 1 \text{ m} + 1 \text{ m} + 1 \text{ m} = 5 \text{ m}$$

$$\text{or } 500 \div 100 = 5 \text{ m}$$



Appa



Yangchen

Appa, if your height was 200 cm, then your height in metre would be 2 m.

My height is 185 cm

185 cm = 100 cm + 85 cm = 1 m and 85 cm or I could just say 1m 85 cm.



Appa, look at that neem tree. The height of that tree is written there.

How would you read it?



It is 320 cm. So now I know that the other way of saying it would be 3 m 20 cm.



Practice Time

1. Convert the following measurements into centimetre:

a. 6 m

c. 24 m

b. 9 m

d. 13 m

2. Convert the following measurements into metre:

a. 600 cm

c. 1200 cm

b. 900 cm

d. 2500 cm

3. Fill in the blanks:

a. 250 cm = _____ m _____ cm

b. 565 cm = _____ m _____ cm

c. 3 m 30 cm = _____ cm

d. 4 m 15 cm = _____ cm

4. Sosongmit went to market and bought a piece of *gaadha* of length 400 cm during the *Namsoong* Festival. Her mother told her that she would need half a metre. Did she buy enough?

5. In a game of Hide and Seek, Rahim, Sunil and David decide to stay within 4 m of the post. Rahim hides 384 cm away from the post and David hides 4 m 1 cm away from the post. Who is breaking the rule?

Addition and Subtraction of Length

In the art and craft class, teacher asked the class to get materials like ribbon, old cloth or newspaper to make mats.



Sahil brought $2\text{ m } 50\text{ cm}$ red ribbon and Rehana brought $3\text{ m } 75\text{ cm}$ blue ribbon. Nita and Veena brought old newspapers.



Teacher

Let us find out how much ribbon we have in all.

How do we do it?



Sahil



Let us add the metres first.
Then the centimetres.

So it is $2\text{ m} + 3\text{ m}$ and $50\text{ cm} + 75\text{ cm}$
 $= 5\text{ m}$ and 125 cm



Nita



Teacher

Look at 125 cm, you can write it as 1 m and 25 cm or just 1m 25 cm.

Neeta



Then, should we add 1m to 5m?

I found it. It is 6m 25 cm



Sahil



This can be done as,

$$2 \text{ m } 50 \text{ cm} + 3 \text{ m } 75 \text{ cm}$$

$$= 5 \text{ m } 125 \text{ cm}$$

$$= 5 \text{ m} + 100 \text{ cm} + 25 \text{ cm}$$

$$= 5 \text{ m} + 1 \text{ m} + 25 \text{ cm} \text{ [because } 100 \text{ cm} = 1 \text{ m]}$$

$$= 6 \text{ m } 25 \text{ cm}$$

How do I know how much more ribbon I have than Sahil?



Rehana



It is simple. We need to find out the difference.

$$\begin{array}{r} 3 \text{ m } 75 \text{ cm} \\ - 2 \text{ m } 50 \text{ cm} \\ \hline 1 \text{ m } 25 \text{ cm} \end{array}$$



Environment Day

On World Environment Day, the Headmaster of Manul Secondary School, North Sikkim has decided to give 6 saplings (flowering plants) of different types to be planted around the school.



CHECK THE GROWTH

Chimi Ma'am, class teacher of class IV asks the students to measure and note down how high the saplings are when planted and how much it has grown after exactly two months.

Observations recorded:

	Name	Height (when planted)	Height (2 months later)	Growth (in cm)
1.	<i>Jharul</i>	89 cm	102 cm	
2.	Bottle brush	1 m 20 cm	1 m 30 cm	
3.	<i>Gulmohar</i>	97 cm	110 cm	
4.	<i>Paari jaaz</i>	1 m 60 cm	160 cm	
5.	<i>Asareyful</i>	91 cm	98 cm	
6.	<i>Sita Ashoka</i>	85 cm	91 cm	

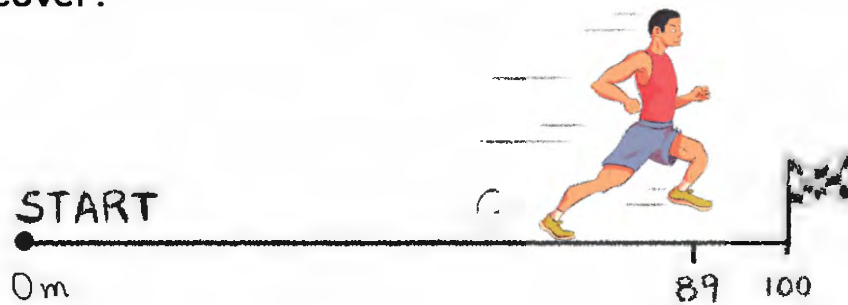
1. The plant which has grown the most is _____.
2. The plant which has grown the least is _____.
3. The plant which has not grown at all is _____.
4. The plants which have grown more than 10 cm after two months are _____.
5. The difference between the tallest and shortest plant after two months is _____.
6. If the bottle brush plant grows _____ centimetres longer, then it will reach a height of two metres.

Good to Know

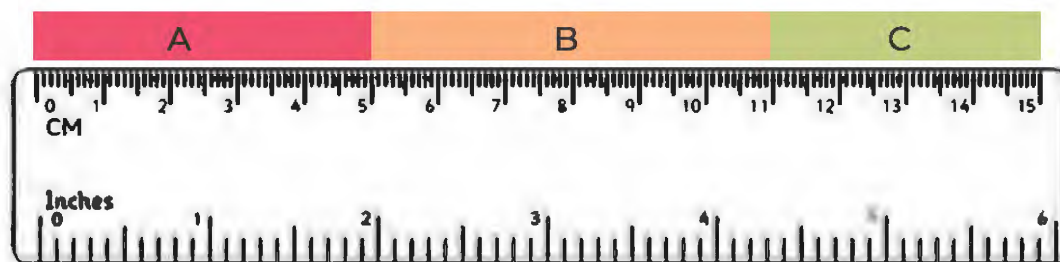
Efforts to plant more trees are undertaken by the school to enhance greenery in the surroundings. ECO Clubs in schools raise awareness about the need to plant more trees and organise such events with the support of officials from the Department of Forest, Environment and Wildlife Management, Ward Panchayat, S.M.C members, school staff and students. By planting more trees, natural disasters such as landslides are averted. Trees purify the air and provide coolness and shade.

Practice Time

1. Tenzing has participated in a 100 m race. He had already covered 89 m, what is the remaining distance that he has to cover?



2. Wooden pieces A, B, and C are placed along a 15 cm long scale as shown in the figure. Find out which one of them is longest.



3. David, Ranjeeta, Vishal and Sonam Ongmu, students of Class VIII, are members of the Health Club of the school, who participate in a 1000 *m* marathon organized to raise awareness about Tuberculosis (TB).



Sonam Ongmu was 10 *m*, Ranjita was 13 *m*, David was 15 *m* and Vishal was 29 *m* away from the end point.



Draw a picture showing where they are and answer the following:



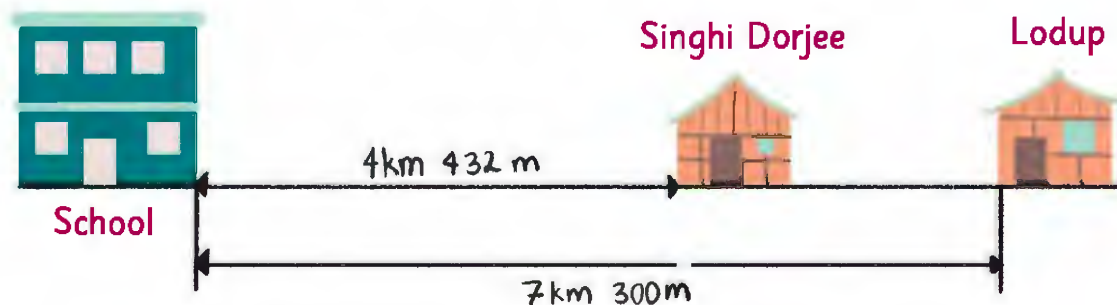
a. Find out how far David was from Ranjita.

b. What distance had Vishal covered? _____

✎ Have you ever heard about a 1500 m or 2000 m race? Such distances which are more than 1000 metres are expressed in terms of kilometres.

1000 metres makes one kilometre and it is written as 1 km.

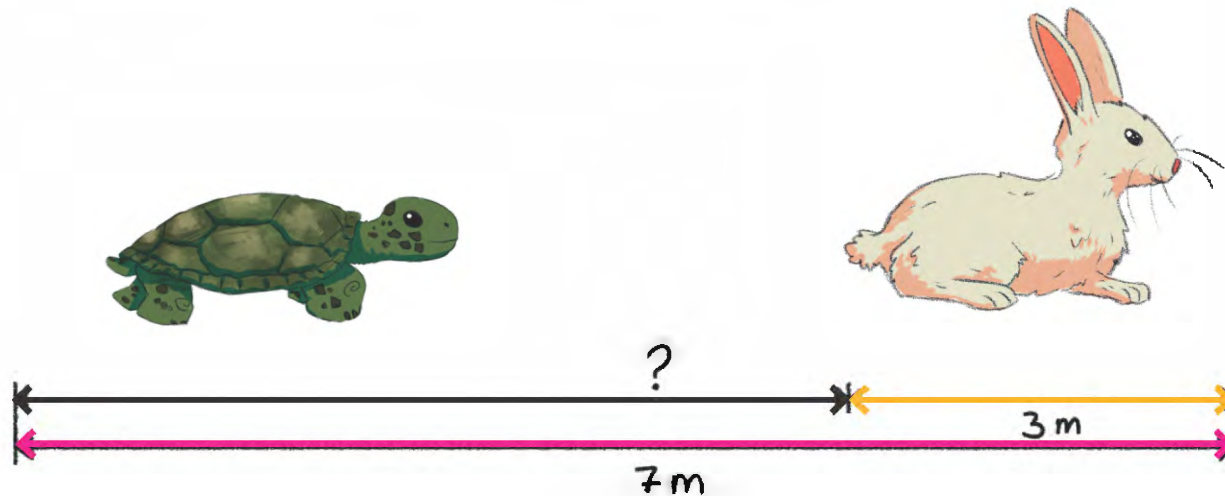
4. Lodup's house is 7 km 300 m away from school and Singhi Dorjee's house is 4 km 432 m away from school. Whose house is farther and by how much?



5. Which is a better unit to measure these?
Put a tick in the best box.

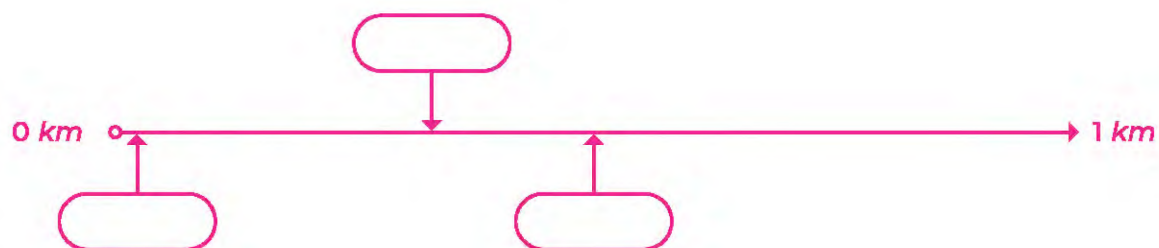
Object to be measured	Centimetre	Metre	Kilometre
Length of a pin			
Length of a car			
Height of a cricket bat			
Width of your school ground			
Diagonal of a ₹2000 note			
Distance between Jorhang and Pelling			
Height of a TV tower			
Distance from school to your home			

6. A hare and a tortoise are having a running race.
By how many metres is the tortoise behind the hare?



7. What is:
- 25 cm less than 4 m 54 cm? _____
 - 35 cm more than 3 m 80 cm? _____
 - 85 cm less than 675 cm? _____
8. Ram used to walk 4 km on his daily morning walk, what is the distance that he covers in a week?
9. The height of the stumps above the ground in cricket is found to be 71 cm and the length of the cricket pitch is 22 times this height. How long is the cricket pitch?
10. Passangkit wants to visit the State Level Science Exhibition which is located 21 km 410 m away from her home. She travelled 15 km 380 m by bus and the remaining distance by taxi, find the distance travelled by taxi?

11. If Pema Lhamu travelled 7 km 80 m by car and 2 km 30 m by foot to reach her home at Hee Gyathang from Mangan, what distance did she travel to reach her home?
12. In a walking race, Abdul walked 400 m, Rita walked 20 metres and Sujit walked half a kilometre. Write their names in the boxes below to show how far each of them walked.

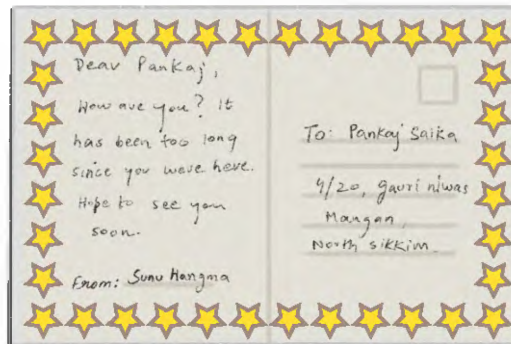


4. Borders and Tiling



Borders: Math in Art class

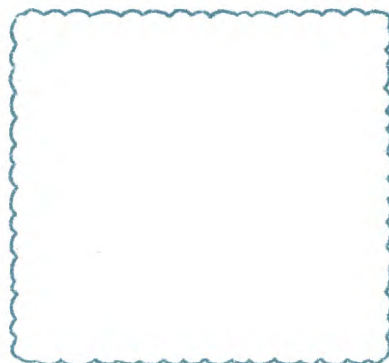
During Art class, the teacher showed the whole class how to make postcards. Sunu Hangma prepared a postcard in a rectangle shape decorated with stars on the border.



Teacher tells Sunu Hangma that by counting the stars she can know how long the border of the postcard is.¹ So she counts all the stars that lie along the border and writes her answers below.

Total boundary = _____ stars

Below is a handkerchief. How many of your thumb prints can you place along the border?²

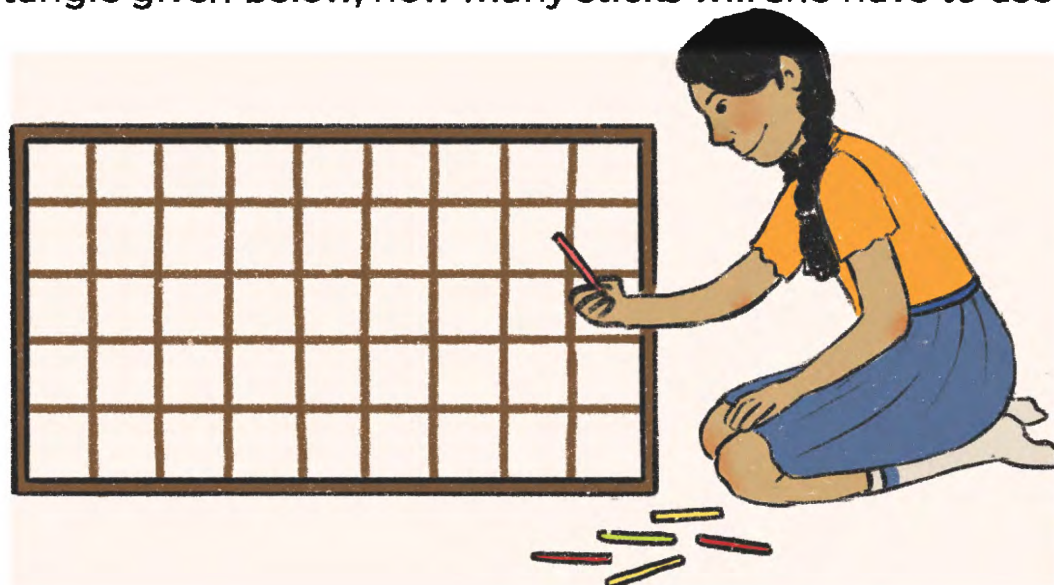


¹**Teacher's Note:** Emphasize that **all stars are of same size** and that stars at the corners have to be counted only once.

²**Teacher's Note:** Teacher can use chart paper instead of handkerchief.

The number of thumb prints you count along the four sides show how long the border of handkerchief is (in thumb prints!)

- a. Are all sides of the handkerchief equal?
 - b. How did you find out?
 - c. How much is the total border (counting all the thumb prints)?
 - d. If the same handkerchief was bordered by your parent's thumb print instead of yours, would there be more, less or the same number of thumb prints?
- ✂ If Aditi wants to put sticks of the same length on the border of the rectangle given below, how many sticks will she have to use?



Activity:

1. If you put your feet one after another without any gap, how many steps will you take to walk along the edges around the class?

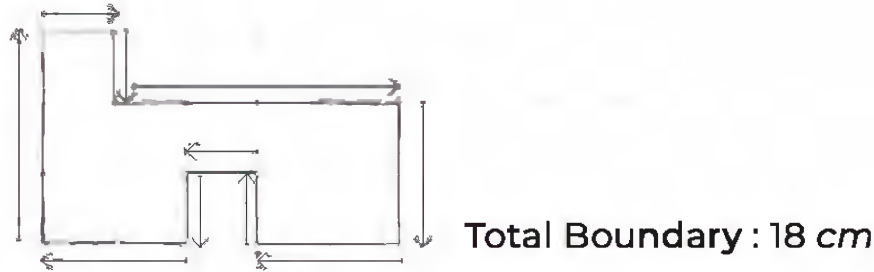
Number of steps : _____

Compare with your friends' total number of steps. Why equal or why different? ³

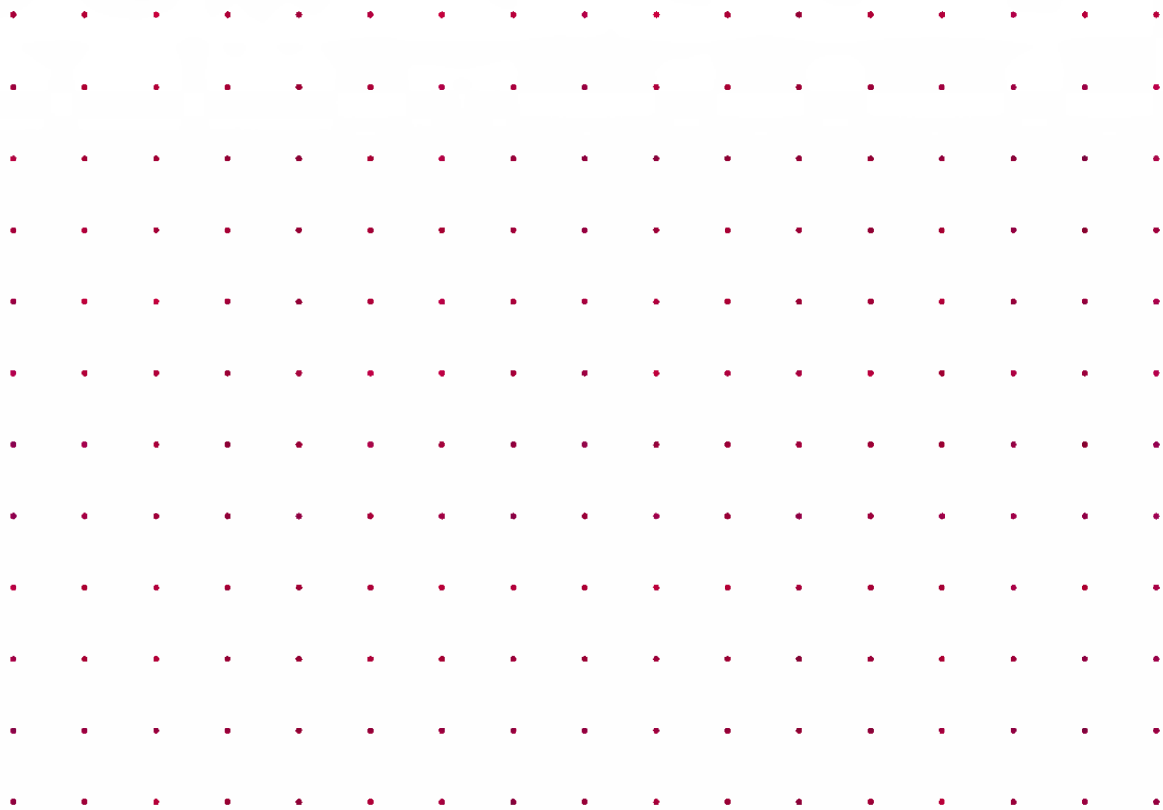
³ **Teacher's Note:** Encourage students to use different non-standard units like hand span, notebook and also to use standard units (by using ruler) to find the total boundary of blackboard

 **Dot sheet Activity:**


Let's draw different shapes on the 1 cm dot sheet given below and find the total boundary of the shape. The first one is done for you: ⁴



Now you draw some shapes here and write the total boundary below each shape.



⁴ **Teacher's Note:** The shapes should be made only with horizontal or vertical lines, not oblique lines.

 In the maths class, students have to attach lace to the boundary of a table cloth. Teacher asks them to bring the lace to the class the coming week.



Diki

We will need half a metre of lace.

How did you know that?
Let me first measure the total length of my table cloth.



Sahid

After measuring, Sahid finds that the total length of the

border = _____ + _____ + _____ + _____

= _____ cm

By measurement, I shall buy _____ cm



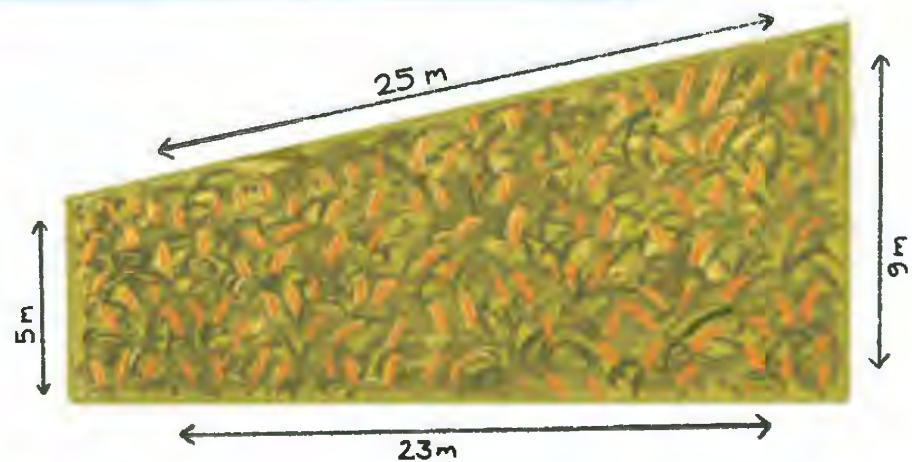
If Diki buys as per her guess, how much lace will remain?

Tomtuk's field

Tomtuk is a farmer. He grows millet (*kodo*) in his field. He is worried about his field as the cows and goats enter his field and eat up the crop everytime.



I need to fence my field so that I can keep these grazing animals out.



1. Look at the picture and find the total boundary that he needs to fence.
2. Tomtuk bought a roll of 80 metre wire for the fence. Is this roll enough for him to fence his field?

Seeing this another farmer Aryum also wants to fence his field.

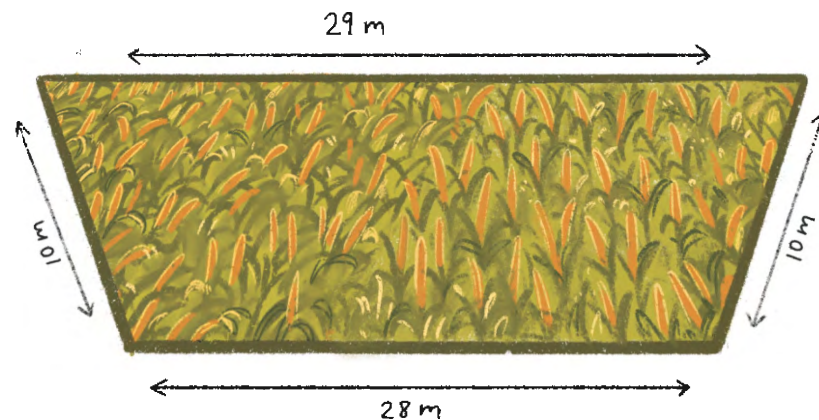


I will also do the same and save my crops.

Aryum asks Tomtuk to give him the remaining wire to fence his field.

3. _____ m of wire was given away by Tomtuk to Aryum.

Aryum thanked Tomtuk and started fencing his field. But he needed more wire.

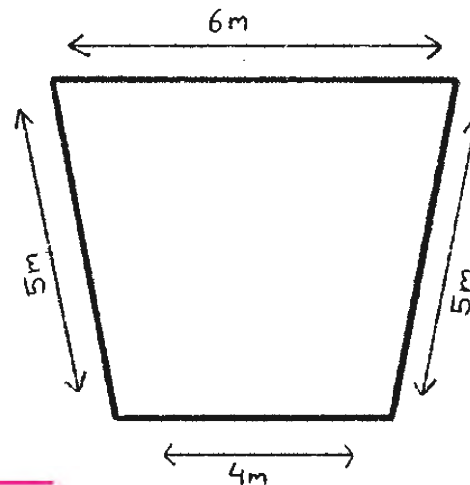


- a. How long is the boundary of Aryum's field? _____
- b. How much more wire will Aryum need for his field? _____

Let's do it:

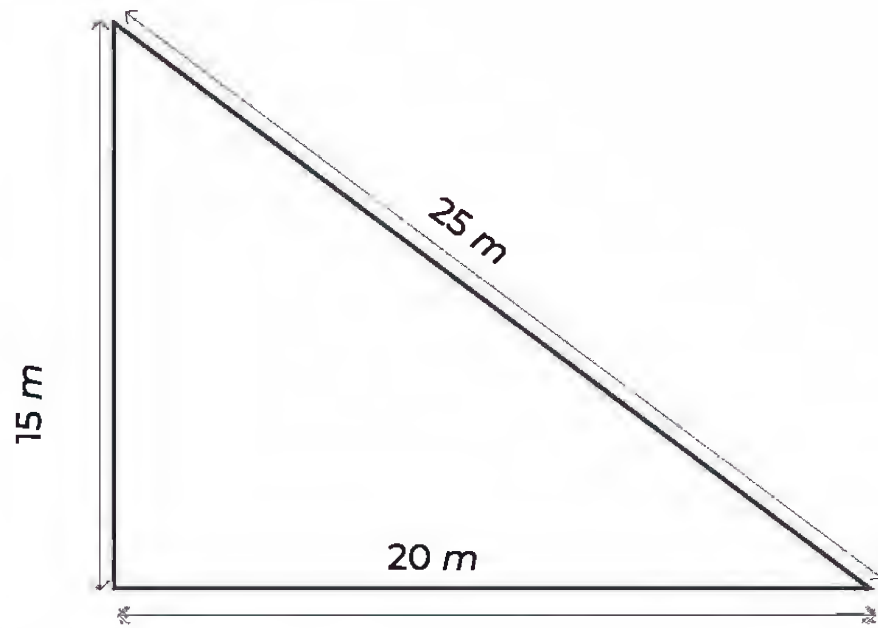
Find out which of the figures has the larger boundary?

Figure a.



Boundary: _____

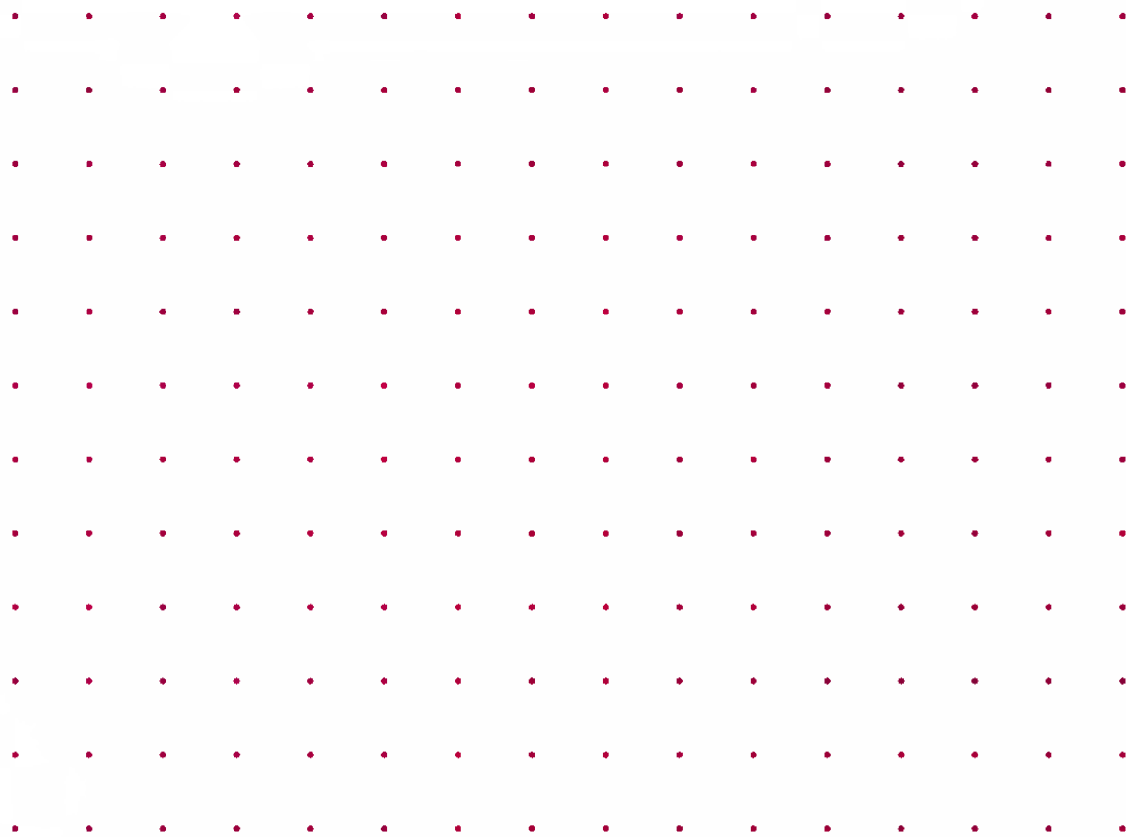
Figure b.



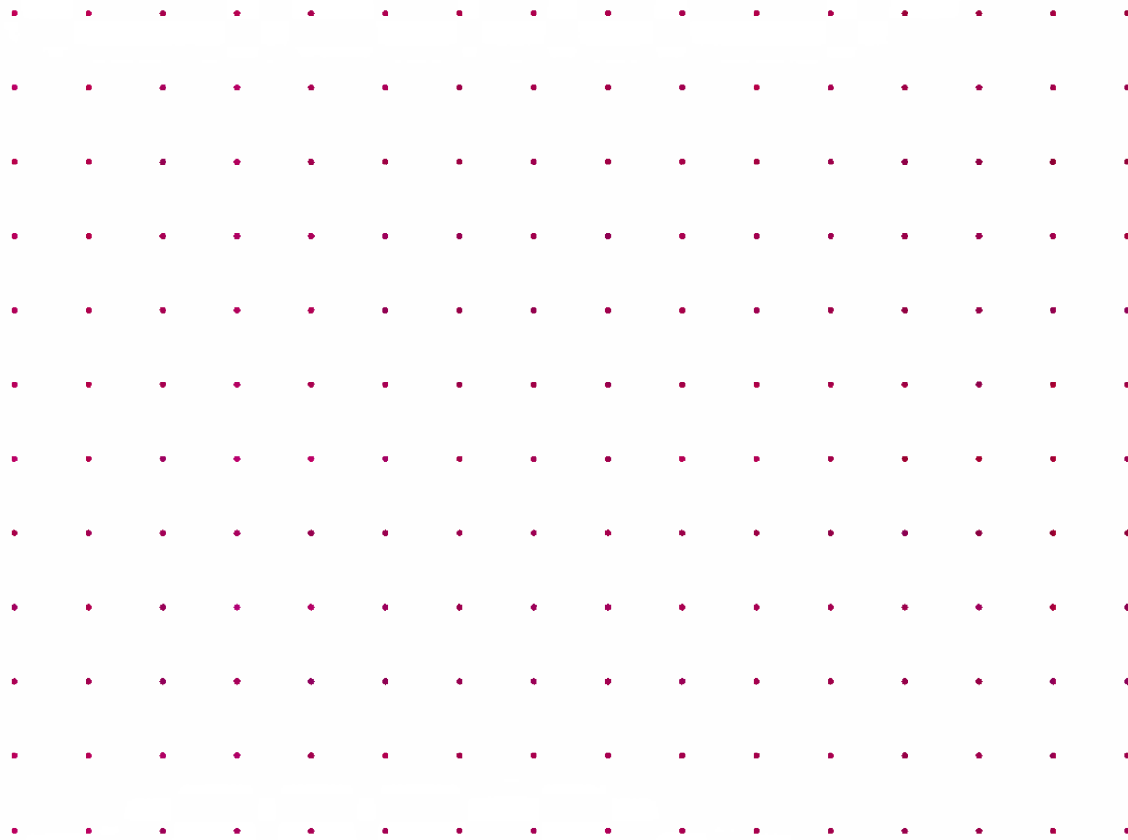
Boundary: _____

Figure _____ has the larger boundary.

1. Use the 1 cm dot grids given below:
 - a. Draw a rectangle with a boundary of 12 cm

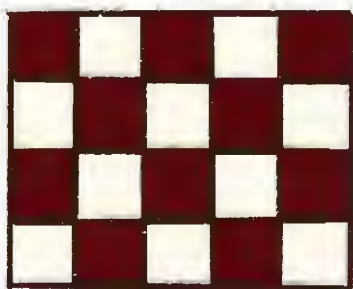


b. Draw a rectangle with a boundary of 20 cm.



Tiling: Math in floor designs

Here are some images of the tiling design used on the floor of Chaar Dhaam, Solophok, Namchi. Look at the designs carefully. What shapes can you see here?



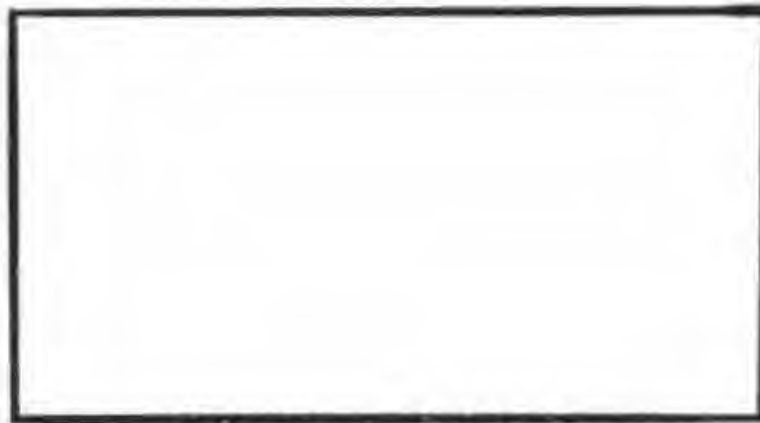
 **Let's design:**


Rishi wants to become an interior decorator. He made a floor tile design for his dream house.



Activity:

Fill in the rectangle below with the given floor tile. Colour it and make a floor design for your dream house.



 The students of classes IV A and IV B were taken for a picnic to Saramsa Garden, Ranipul.



Sarah

Last year we visited Water Garden. I notice it is smaller than this garden. Saramsa Garden has total 23 trees planted at the same distance around it.

Water Garden has 21 trees planted around it. They were also planted at the same distance from each other.

I think these two gardens are equal.



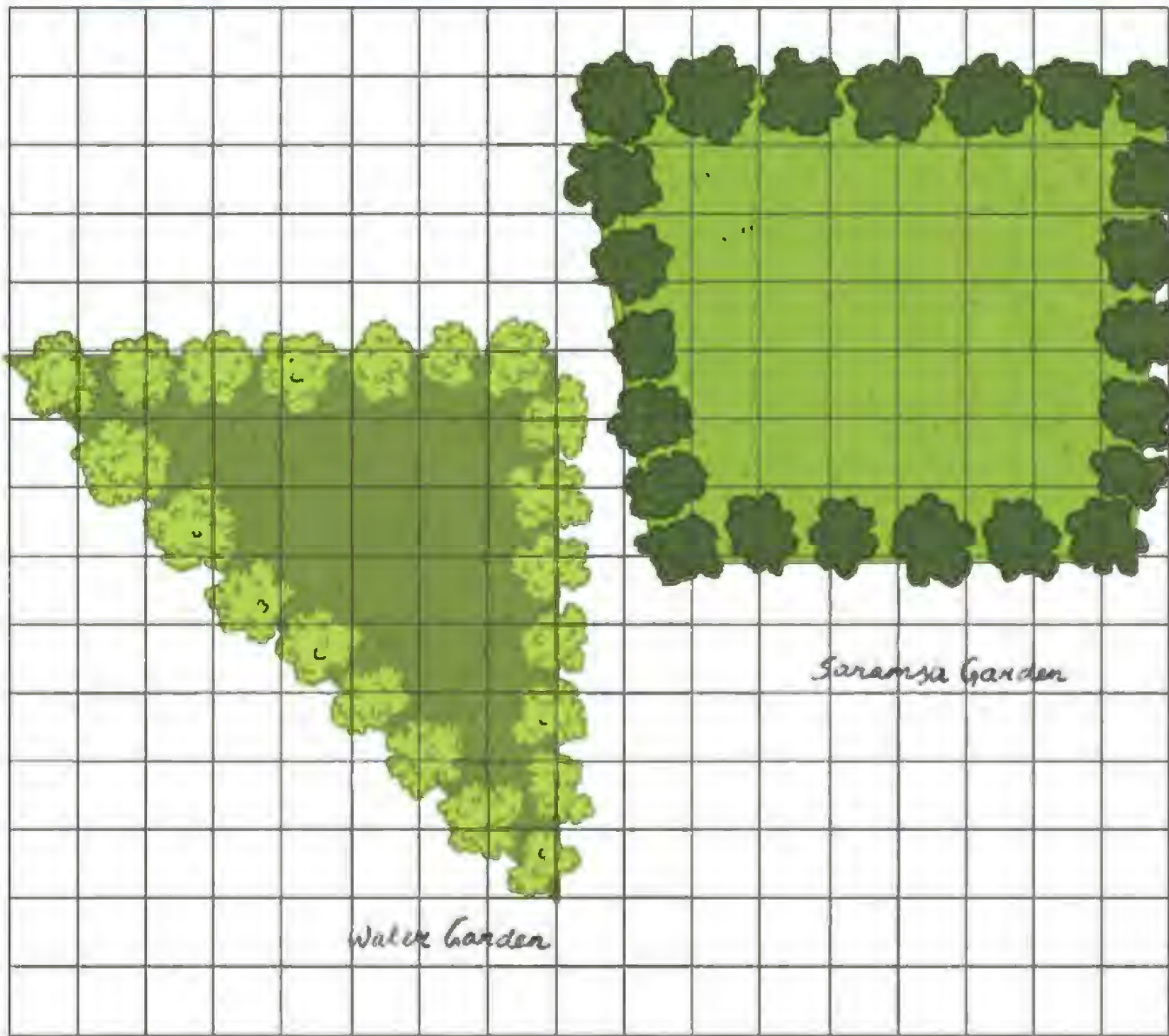
Kongchen

Quite possible! Let's find out.



How will we find out which garden is bigger?

We will do an activity to understand this picture.



Activity: ⁵

Children today we will do an activity using square and rectangular cards.



Yes ma'am!



Teacher distributes square cards and one rectangular card to each group.

Take square cards and fill up your rectangular card.

Students place square cards on the rectangular card without gaps and overlaps.

We have placed 6 square cards ma'am!



Sarah

Good Sarah! Who else has done the activity?



Kongchen



Kongchen, look at your rectangle and tell me how many square cards you used to cover it?



Ma'am, I have 8 square cards covering the rectangle.



Teacher's Note: Teacher can get the children to prepare square cards and rectangular cards



Good! The answer is correct.
Who has the larger rectangle?



Kongchen

Now using the square grid provided on page 63,
find out which garden is bigger.

- ✦ During summer vacation Sumnima visited her uncle's village at Gerethang, West Sikkim. It was paddy (*Dhaan*) cultivation month of June-July (*Asaar*). People of the village had gathered early morning for ropai (transplanting of paddy saplings). Her uncle Bal Hang Subba owns a big paddy field.

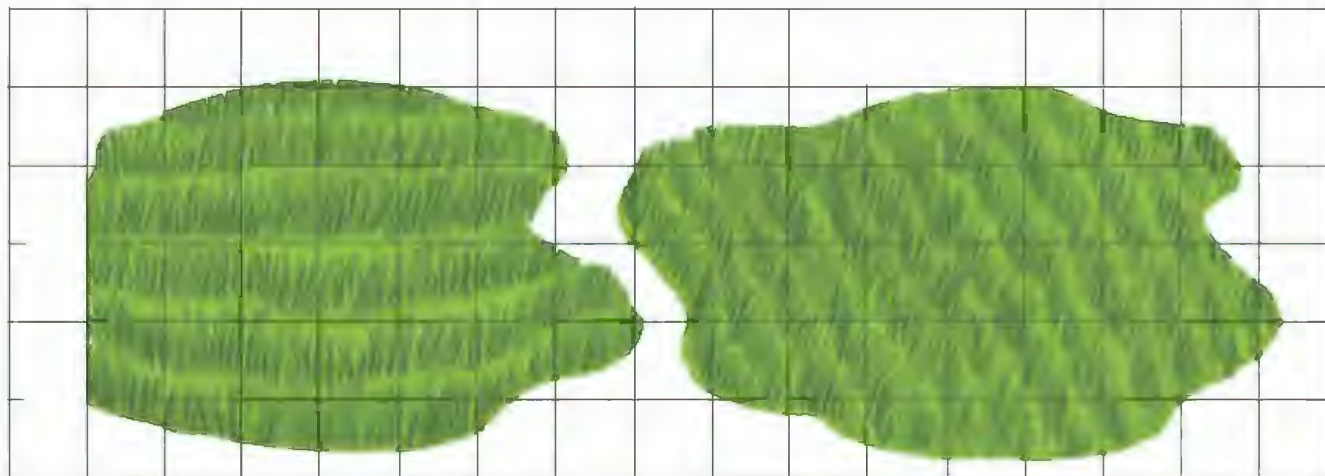


Do you own this
whole field, uncle?

No! Sumnima, the other part is
owned by my neighbour.



How big is my uncle's field?
And how big is his neighbour's field?



Bal Hang's field

Neighbour's field



Let's Discover: ⁶

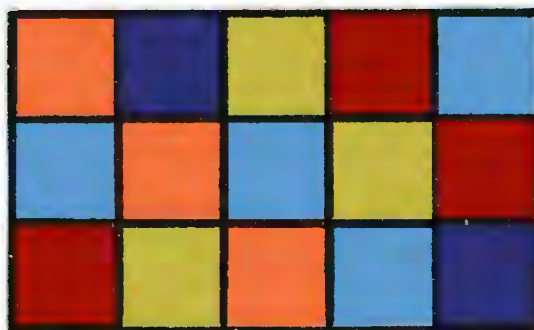
From the square grid provided,

Find out the total field owned by Bal Hang: _____ squares

How much field is owned by his neighbour? _____ squares

Practice Time

1. Shoumya arranges square counters in the following way:



a. What shape is it? _____

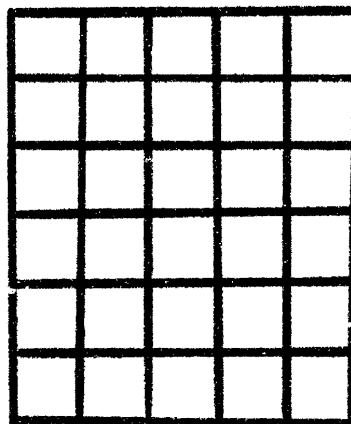
b. What is the boundary length of this figure? _____

c. How many tiles are used to cover it? _____

⁶**Teacher's Note:** Ask students to count only the complete squares and find approximate area of the fields.

2. Find the following: ⁷

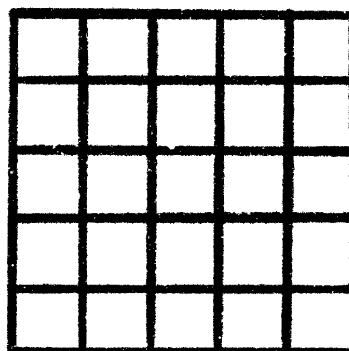
a.



Boundary: _____

Number of squares inside the figure: _____

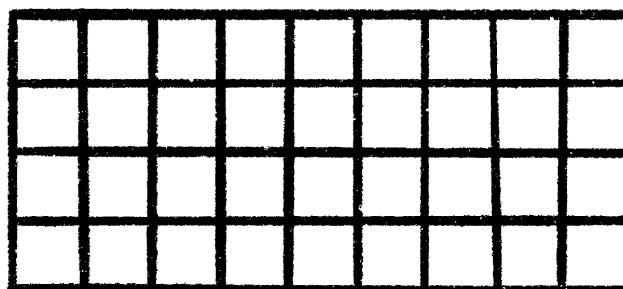
b.



Boundary: _____

Number of squares inside the figure: _____

c.



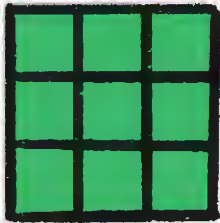
Boundary: _____

Number of squares inside the figure: _____

⁷ **Teacher's Note:** In all the questions where the squares are to be counted, only single squares are to be counted so as to find out the total number of unit squares inside the rectangle.

3. Jamaal has a few square counters. He put them together to make the following shapes.

a.



Name of shape: _____

Number of counters: _____

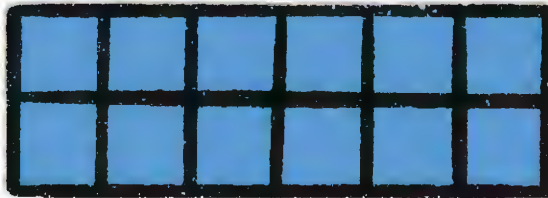
b.



Name of shape: _____

Number of counters: _____

c.



Name of shape: _____

Number of counters: _____

Smallest shape is _____

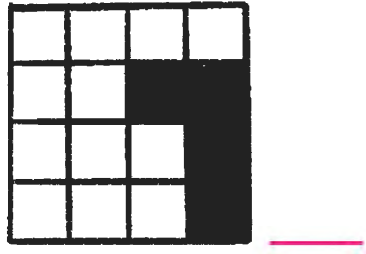
Biggest shape is _____

4. Can you guess how many such  can fill this green rectangle?

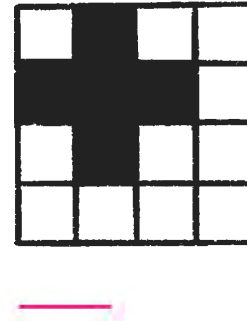


5. How many squares are shaded in each shape? ⁸

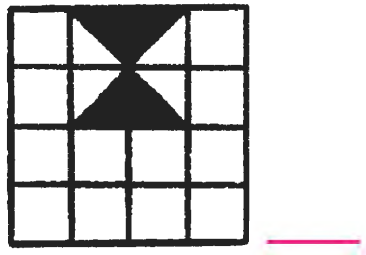
a.



b.



c.



6. How many squares make the rectangle?

a.



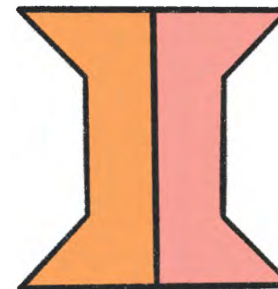
b.



c.



7. Why is the boundary of the pink half of this design more than half of the boundary of the whole design?



⁸ **Teacher's Note:** Consider 2 half squares as equal to 1 square.

5. Parts of a Whole

What is a Whole? What is a Part?



Ama, what are you giving me for my short break tiffin today?

Will you take instant noodles?
You like that, don't you?



No Ama, Ma'am told us to avoid junk food. It is not good for our health.



Is that so? Then, what healthy food has teacher suggested I pack for you?

She told us to bring natural and healthy foods from home like banana, vegetable rice, suntala, roti, nuts and so on.



All the food that you have taken out from the shelf are wholes, but if you cannot eat it all, what will you do, Chhori?



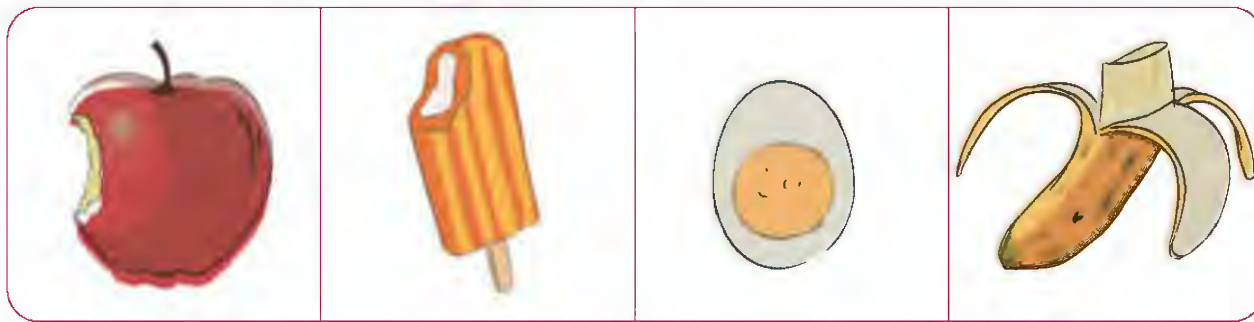
Ama, I will share it with my bestie Nimkit.

Chhori, then you must share equally with your friend.

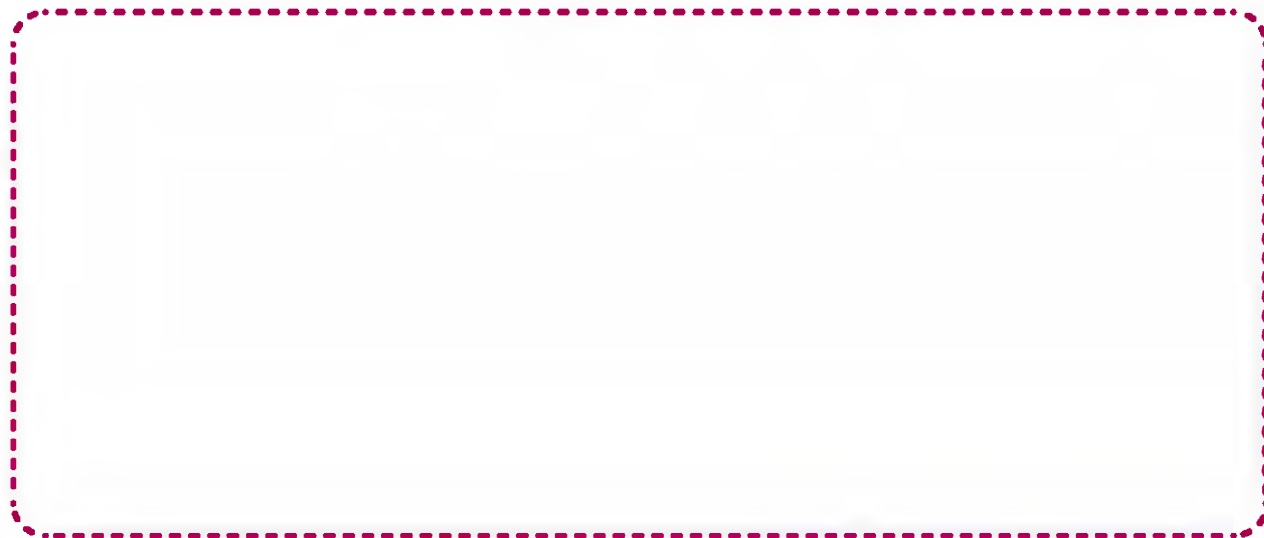
But Ama, Nimkit always wants more.



Here are some foods that are less than whole: ¹



Draw some more whole and less than whole items which you can find in your surroundings.



¹ **Teacher's Note:** Students can name objects which they use as a whole and those which they use only a part of. Students will need guidance in this as the whole can vary. For example, they can bring a whole pack of biscuits, or a whole biscuit. It is important for them to understand the concept of whole in different contexts.

Equal Shares

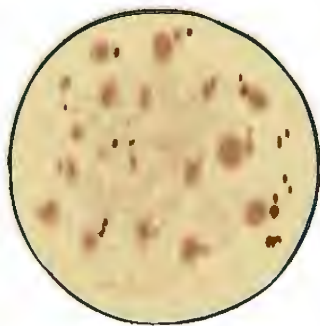
Are these two portions of bread equal shares?



Can you draw a picture showing both portions of the slice of bread the same?



Whole And Half

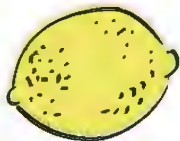


Whole Roti



Half Roti

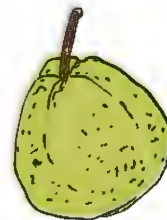
There are two equal parts and each part is called a half. It means 1 part out of 2 equal parts. We call this 'adha'. It is denoted by $\frac{1}{2}$



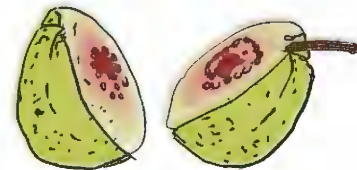
Whole lemon



Half lemon



Whole guava



Half guava

Half of many

Cheten got a *chikki* bar in class today from her friend Anmol. She gave half to her best friend Suraj.

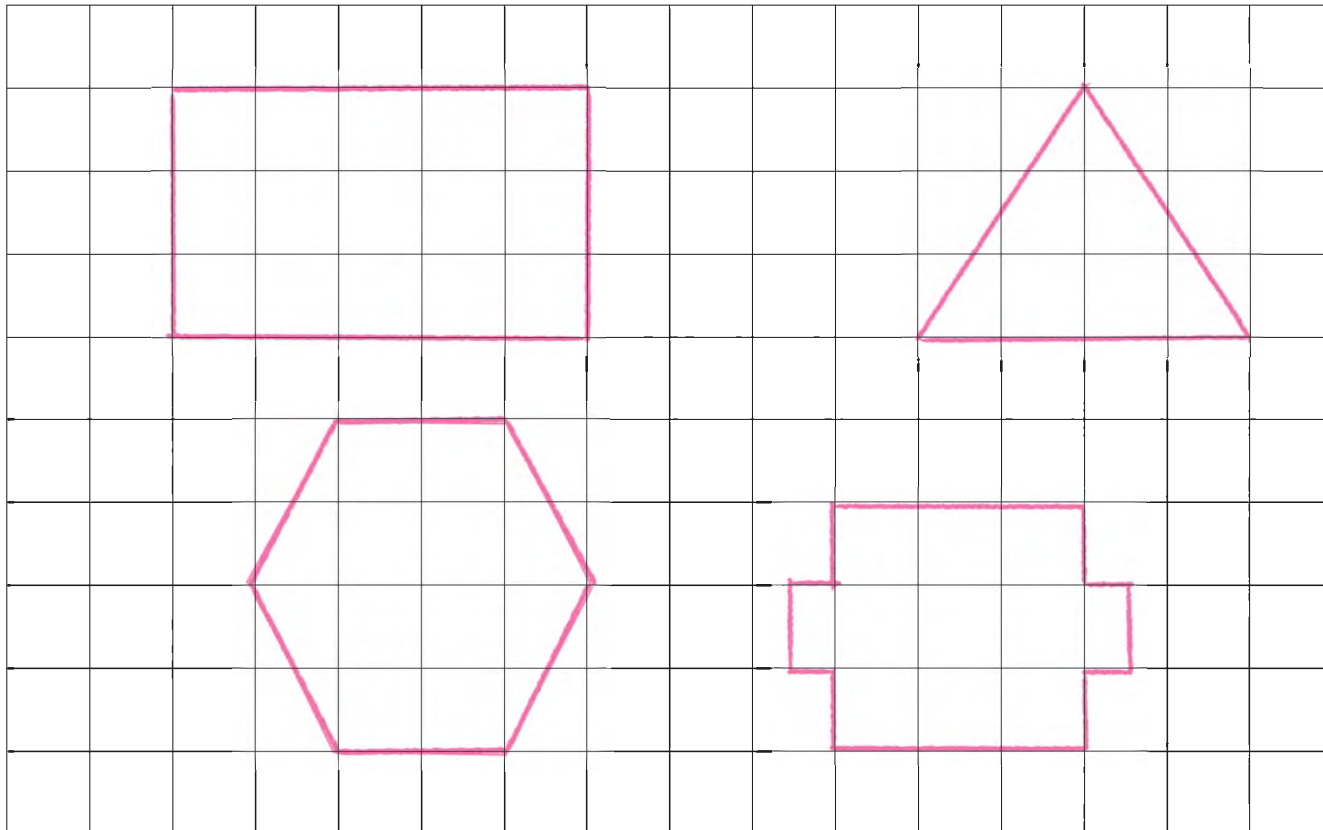
- How many pieces are there in the whole *chikki* bar?
- Circle the portion that Suraj got.
- How many pieces did Suraj get?

- How many pieces were left with Cheten?

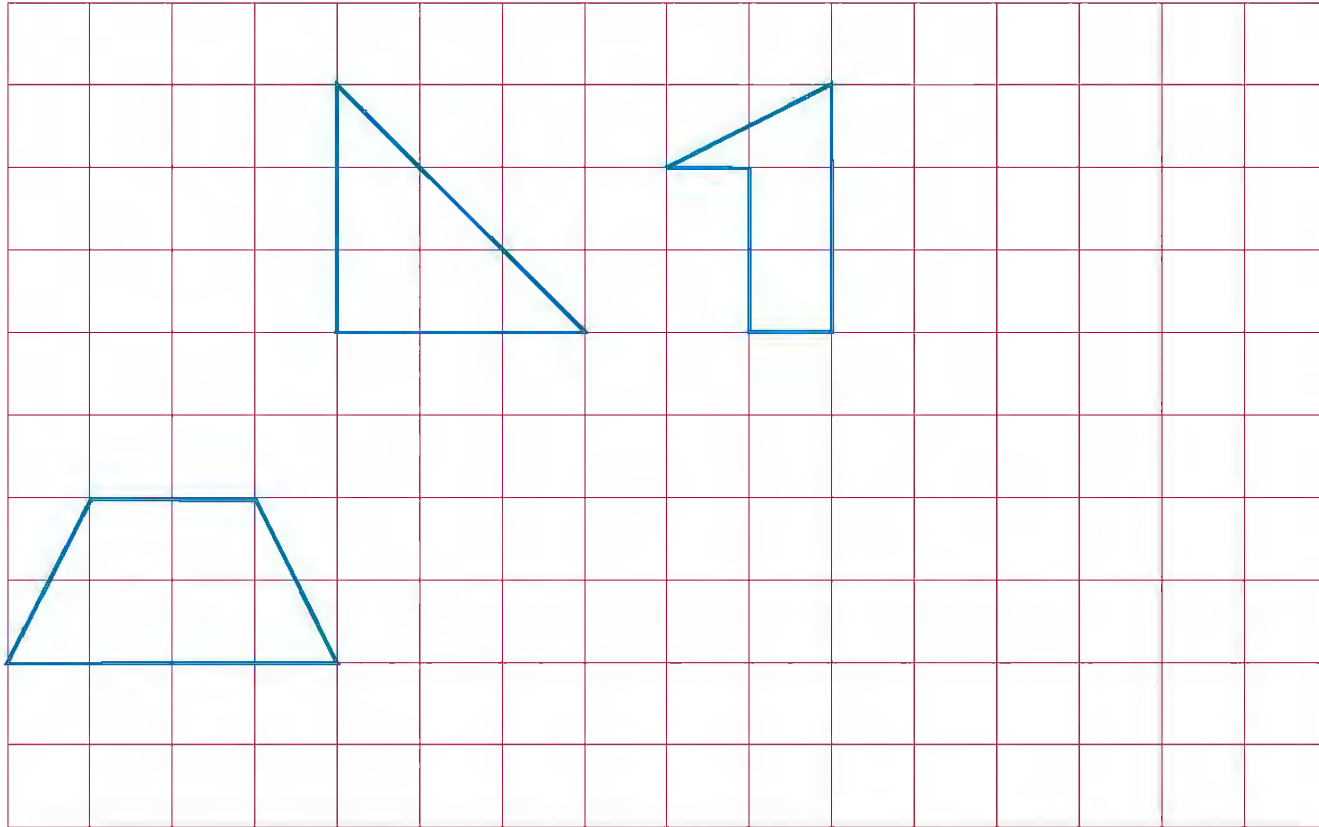


Practice Time

- Divide the shapes into two equal parts and colour half the shape.



2. Complete the half to make it whole



3. Grandmother gave me a bag of 12 oranges when I went to visit her. I gave my brother half the oranges.²



- a. How many were left with me?
- b. If there were 16 oranges in the bag, how many should I give my brother if we shared these equally?
4. Salima brought 8 *famfal* from her farm and told me that her father shared the fruits of one tree equally between her and her sister. How many fruits were on the tree?



² **Teacher's Note:** Let the students come up with their own problems and pose it to the class. This is a good opportunity for formative assessment. Please check the teacher page for the same.

Many Shapes from Half a Sheet

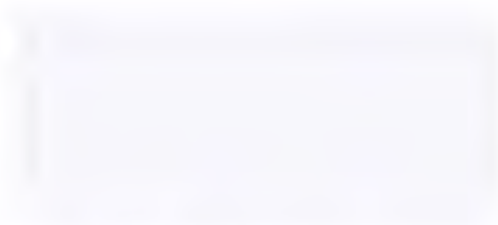
Take a square piece of paper. Cut the sheet into two equal triangles so that each triangle is equal to half of the sheet. Shade the two triangles with two different colors.

Draw different shapes using these triangles. One such shape is shown here:



Many Ways to Cut into Half

Think of at least 4 different ways in which you can cut a rectangle into half. How do you know that the two parts are equal? ³



Here is a rectangle that has been cut into two equal parts like this.



Trace the above rectangle as well as the cut. Now cut along the lines that you have traced and place one part exactly on top of the other part to check if the 2 parts are equal.

³ **Teacher's Note:** Discuss with the students why each triangle is exactly half the sheet.

Half of Half



Anu has two friends, Bruno and Lucy. They are stray dogs who live on the road near her house. Anu and her mother have made sure that they have had the anti-rabies vaccine and that they do not starve. Anu has two bowls in which she divides the dogs' food equally.

One day, Anu has only 1 roti for Bruno and Lucy. She decides to give each dog $\frac{1}{2}$ a roti. Suddenly two more dogs come for food. Anu feels sorry for them.



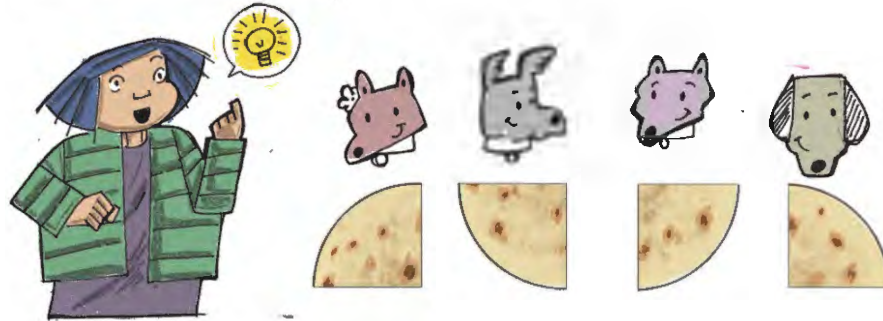
How will she divide the roti equally for four dogs?



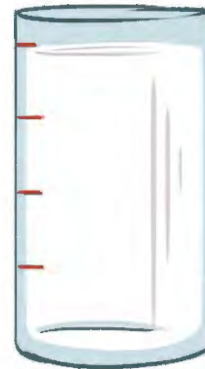
Anu gave the first new dog half of Bruno's roti and the second new dog half of Lucy's portion. Now there were four equal portions. Each dog got the same portion: one part out of four. ⁴

⁴ **Teacher's Note:** Students should understand the meaning of one part out of four and three parts out of four. They should be able to use the symbolic representation correctly. Paper folding (strips and circles) will help them in this. Please make sure that all the parts are equal.

We call this a 'pawa' or $\frac{1}{4}$.



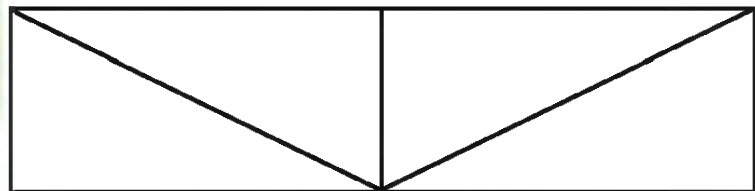
If Anu had a glass of milk to share, how would she share it between the four dogs?



Many ways to make quarters



Here is a rectangular sheet, I have made four equal parts like this.....



In how many different ways can you cut a rectangle into four equal parts? Draw below. ⁵

A large rectangular box with a dashed pink border, intended for students to draw different ways to cut a rectangle into four equal parts.

⁵ **Teacher's Note:** These questions are open ended questions and students can come up with different ways to solve them. Encourage them to check by superposition if all the parts are equal. Reinforce their understanding of the total number of equal parts and the number of parts taken.

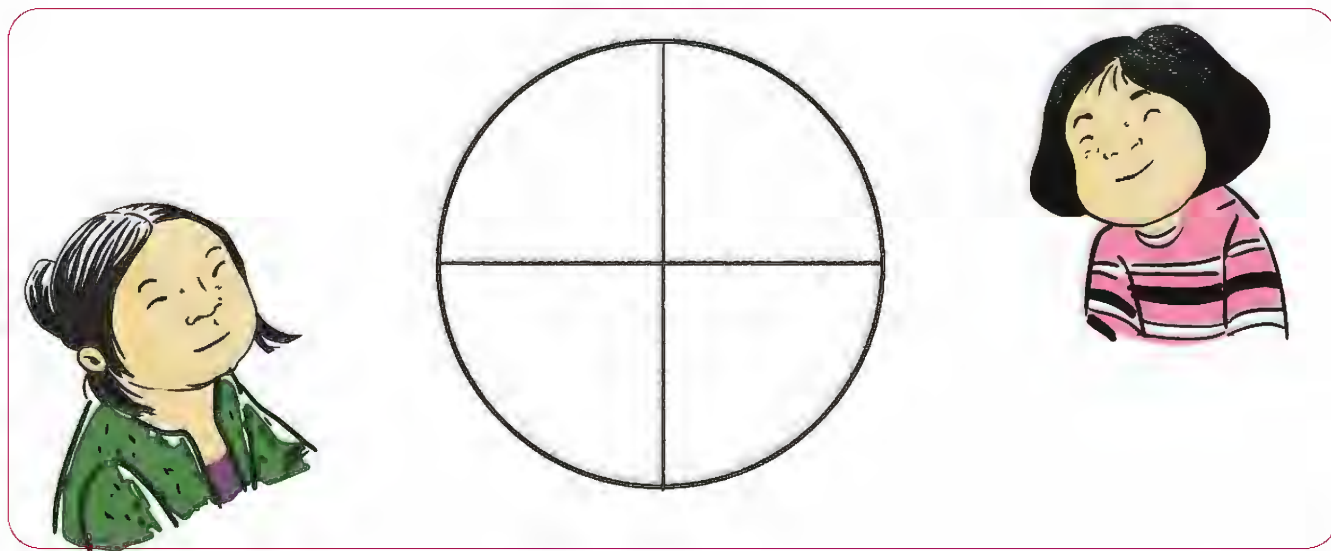
Cutting the Cake

It's Tshering's birthday today. Her father brought a cake. She divided the cake into 4 equal parts: for herself, her brother (Prashant), her father and mother.

How much does each get? _____



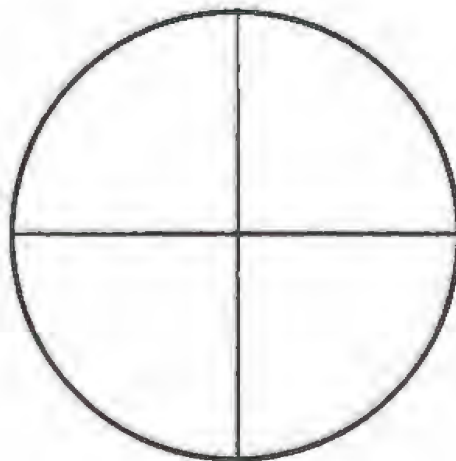
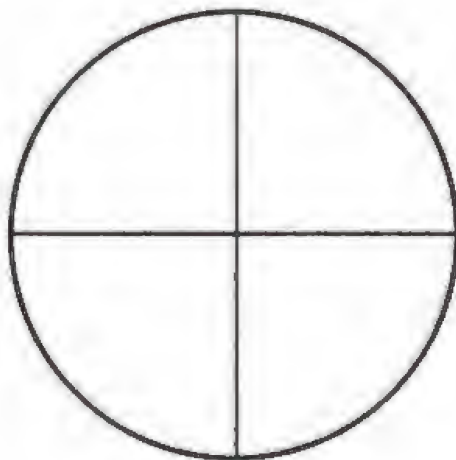
Mother gave up her share of cake to Tshering.



Out of 4 parts Tshering will get _____ parts, which is equal to half of the cake. So she can write it as _____ or $\frac{1}{2}$.

Before mother gave up her share to her, she had only half of 'half the cake', which was $\frac{1}{4}$ of the whole cake.

Colour the share that Prashant got.



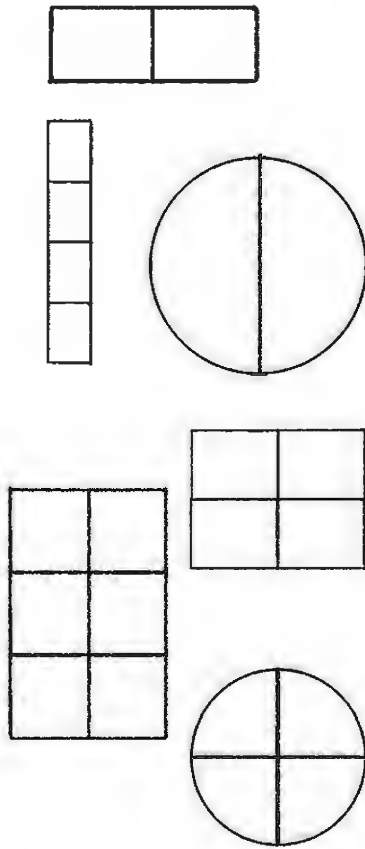
How much of the cake do Tshering and Prashant together get? Colour their total share.

Altogether they get 3 parts out of 4, so we can write it as $\frac{3}{4}$.

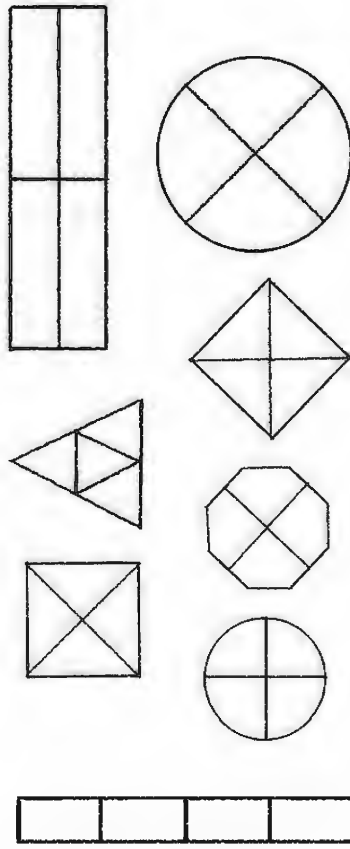
Practice Time

1. Colour as directed

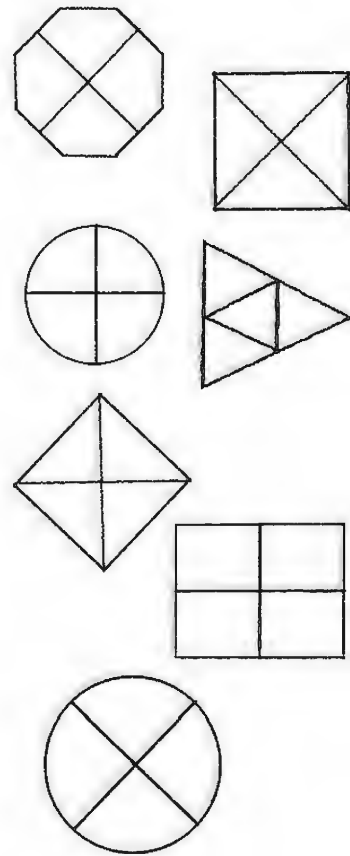
$$\frac{1}{2}$$



$$\frac{1}{4}$$

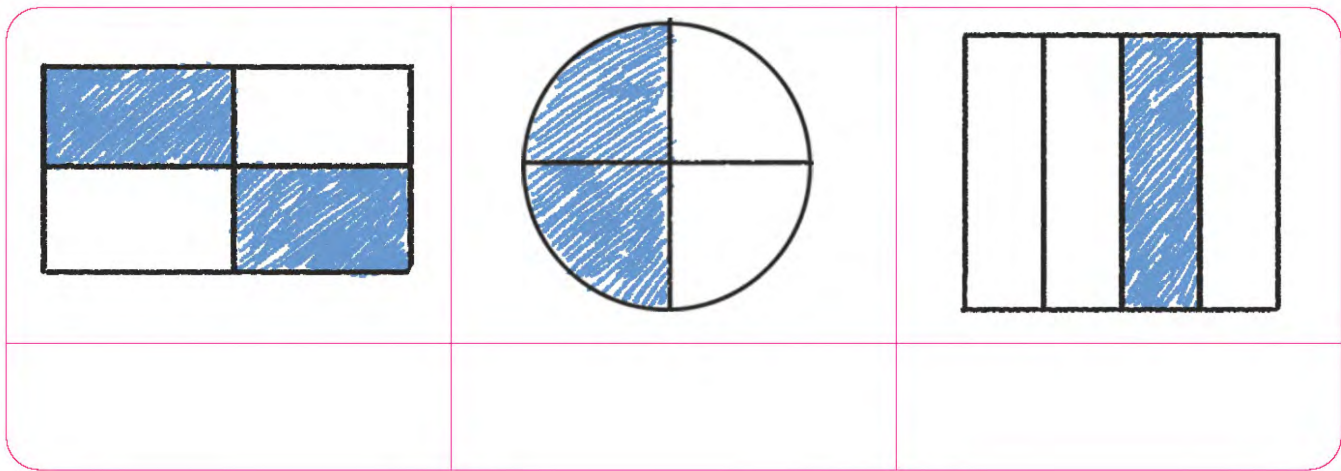


$$\frac{3}{4}$$

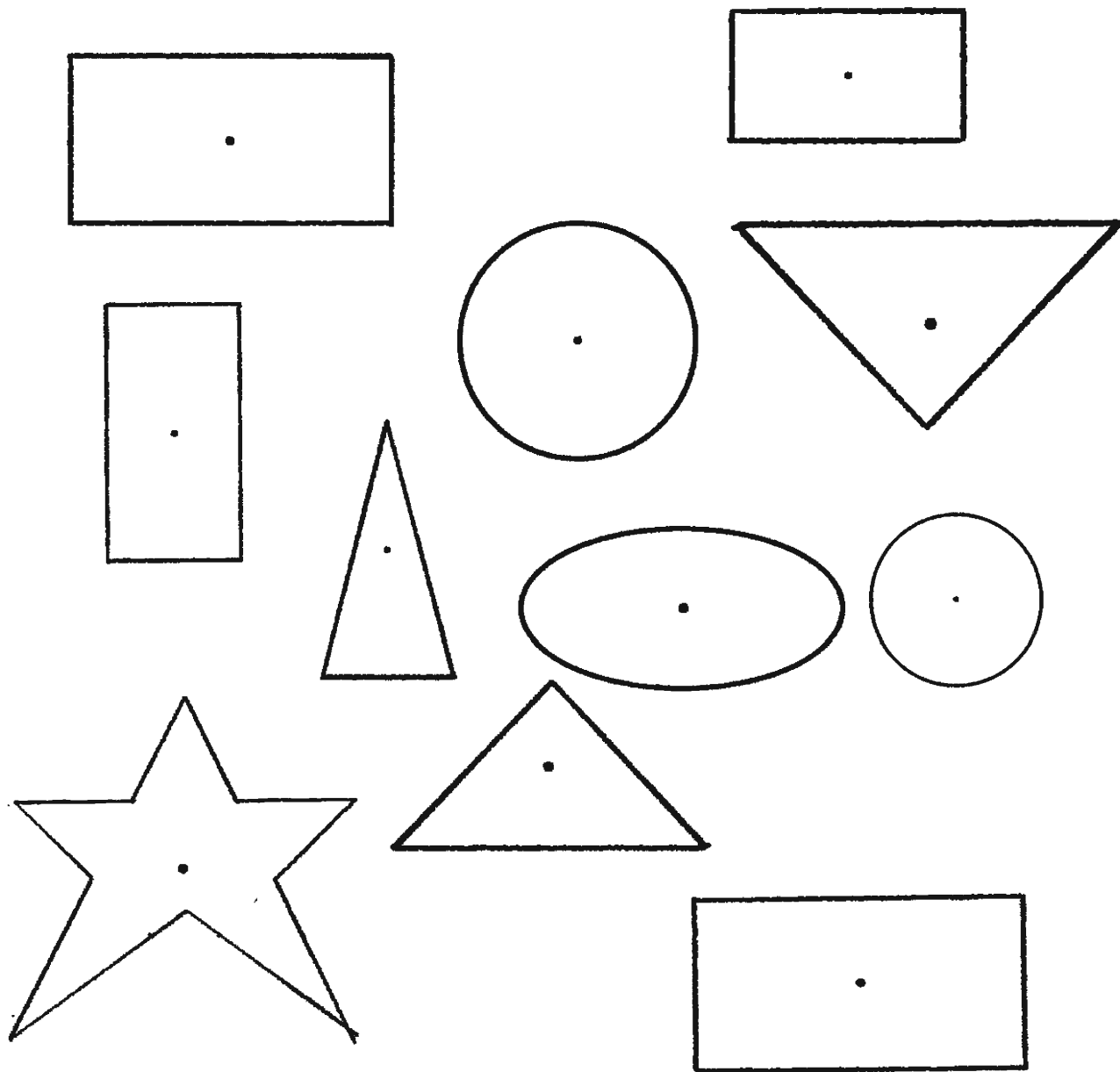


2. Which part of the whole is **NOT** coloured?

Write below each shape.



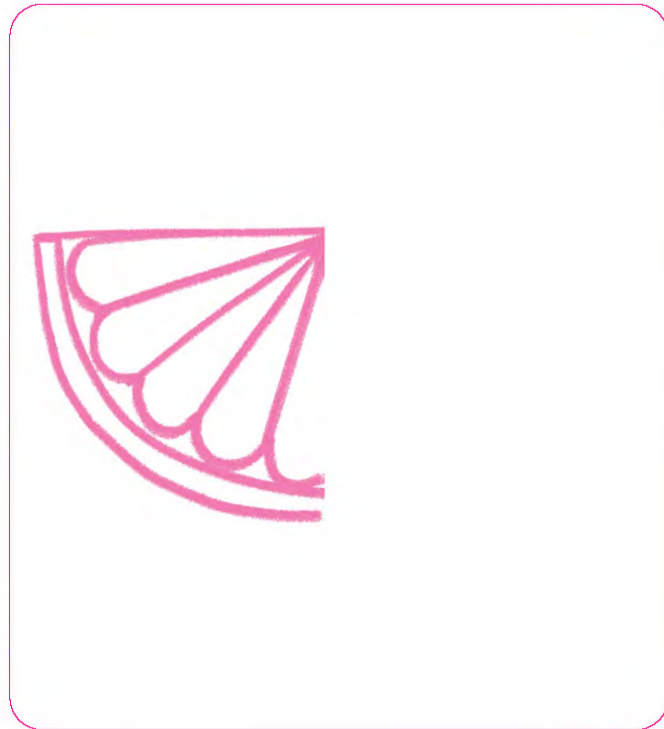
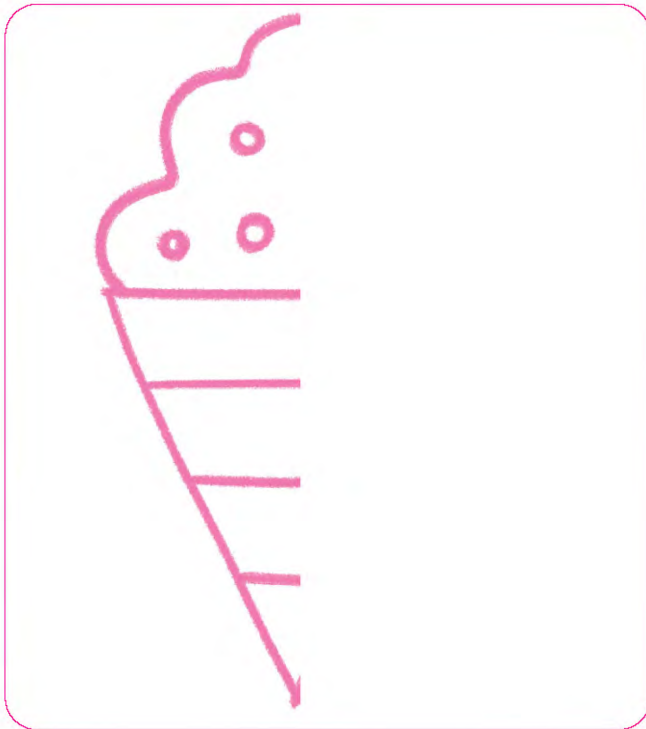
3. Divide each shape in half and colour one half of the shape:

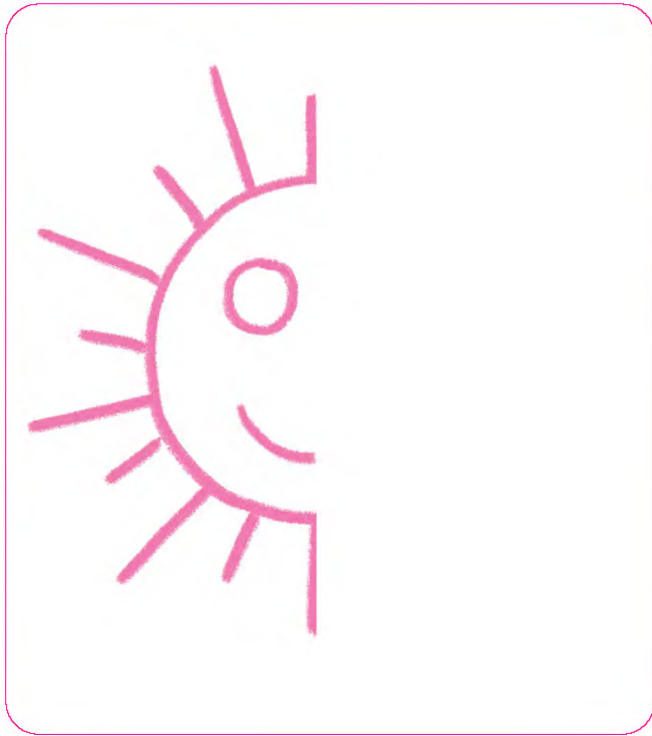


4. Match the following shapes

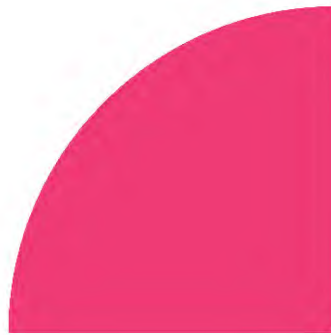


5. Draw the other half and colour them



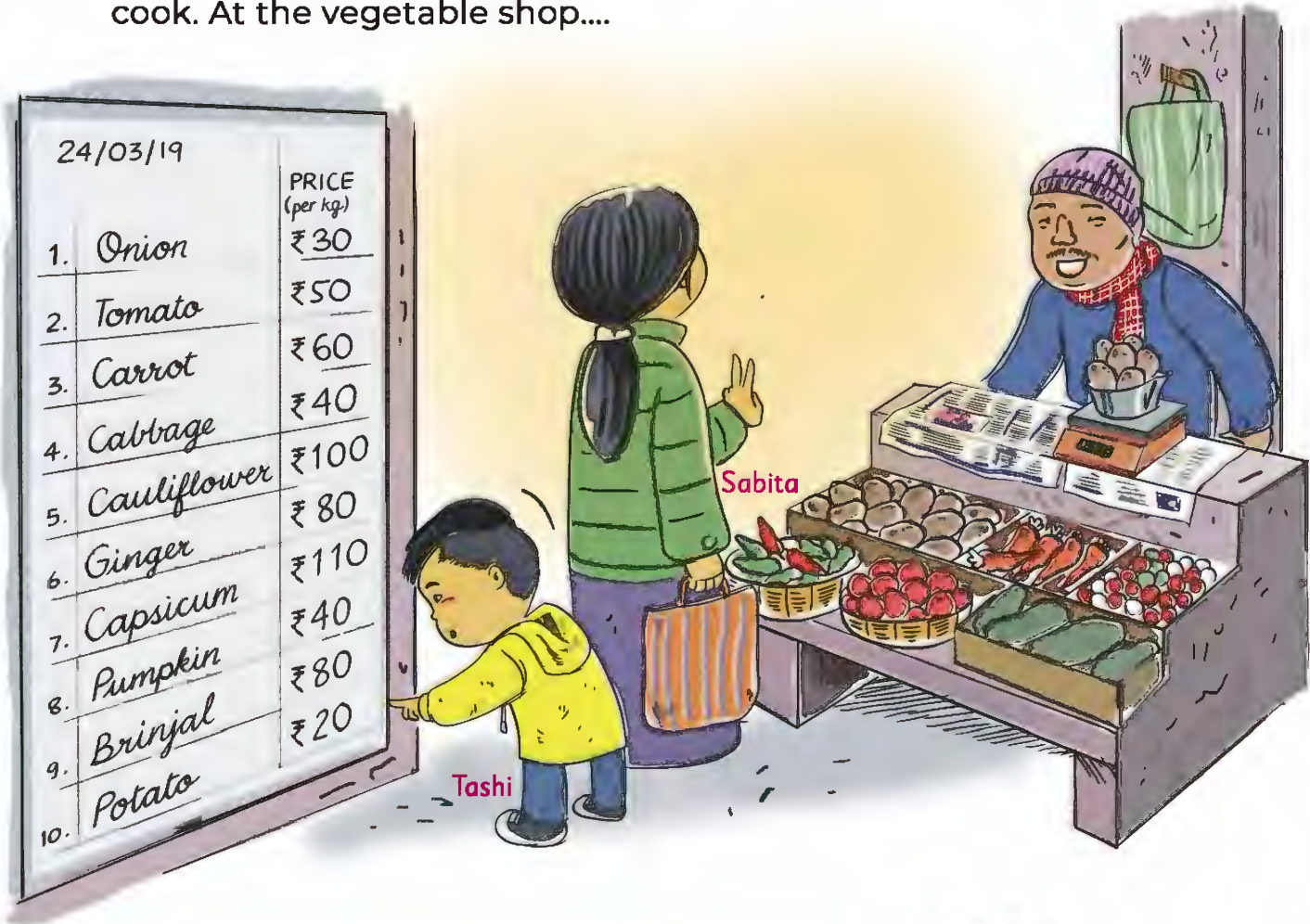


**This is one quarter of a roti. Can you complete it?
How many more quarters are needed to complete it?**



Measurement - Half and Quarter

Tashi accompanies his *Ama* Sabita to market to buy some things to cook. At the vegetable shop....



We have learnt fractions, but what is half kg equal to and how much would it cost?



1 kg is 1000 g. If this is made into 2 equal parts, then each part would be _____.

So, if price of 1 kg potato is ₹ 20, then half kg potato would be half of ₹ 20. That is ₹ 10.



Yes. You are right.



1. $\frac{1}{2}$ kg pumpkin costs _____
2. $\frac{1}{4}$ kg pumpkin costs _____
3. Which costs more $\frac{1}{2}$ kg of pumpkin or $\frac{1}{4}$ kg of Brinjal?
4. What is the price of $\frac{1}{4}$ kg of ginger?
5. What is the price of $\frac{3}{4}$ kg of ginger?
6. Sabita has ₹ 100 with her. She has to buy tomato, carrot and ginger. What are the possible choices of weights of these items that she can buy, if she chooses to buy only $\frac{1}{2}$ kg, $\frac{1}{4}$ kg or $\frac{3}{4}$ kg of all the items.

Fill in this table to help you make your choices.

General Store

Items	Cost of $\frac{1}{4}$ kg	Cost of $\frac{1}{2}$ kg	Cost of $\frac{3}{4}$ kg
1. Tomato			
2. Carrot			
3. Ginger			

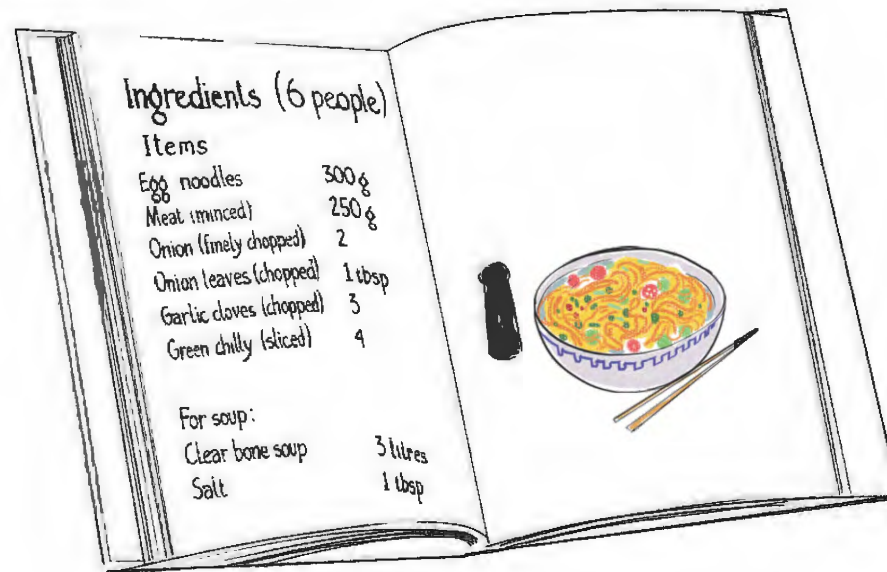
In your notebook, write Sabita's bill.



Can you all frame two questions of your own?

Tashi loves cooking so he invited his six friends to play together in his home after school. Today he is very eager to have his favorite *Thukpa* dish with his friends after playing Hide and Seek together.

Thukpa/Gya-thuk is a typical **Tibetan style noodles in soup**. It is a very popular local cuisine.



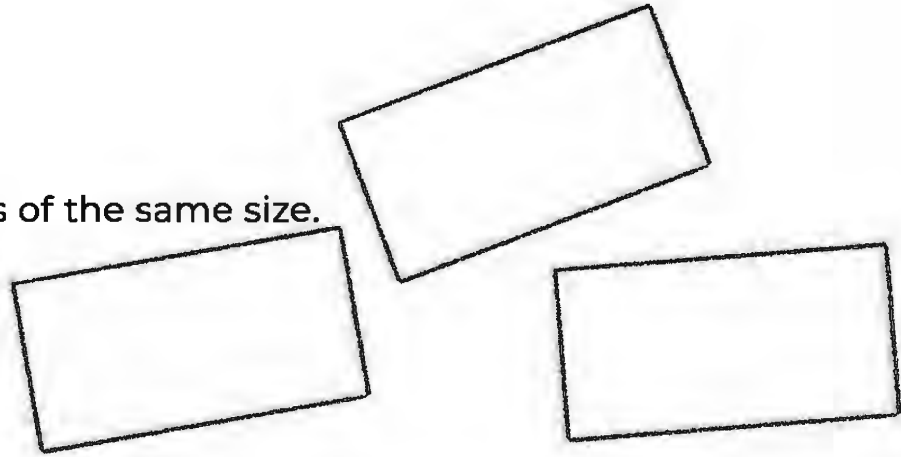
Tashi is very sad as only two of his friends came; the others didn't come due to a test in school the next day.

Now can you all help him to make the estimate of the list of the items for the three of them?

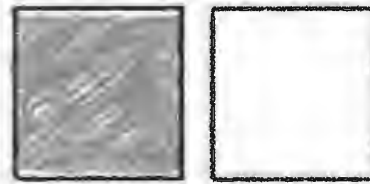
Ingredients (Items)	Quantity (for 6 people)	Quantity (for 3 people)
Egg noodles		
Meat		
Onions		
Garlic		
Green chilly		
Clear bone soup		
Salt		

Activity:

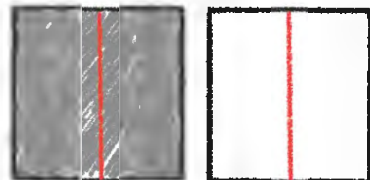
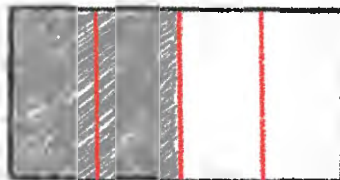
Cut three rectangles of the same size.



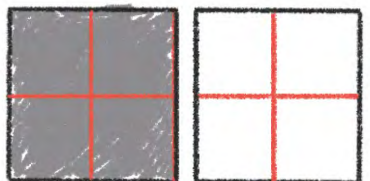
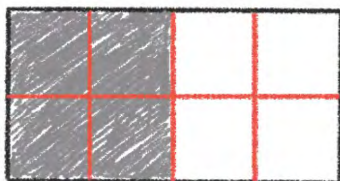
Fold the first rectangle into two equal parts and shade one part as shown. Cut out the shaded part.



Fold the second rectangle into four equal parts and shade two parts as shown. Cut out the shaded part.



Fold the third rectangle into eight equal parts and shade four parts as shown. Cut out the shaded part.

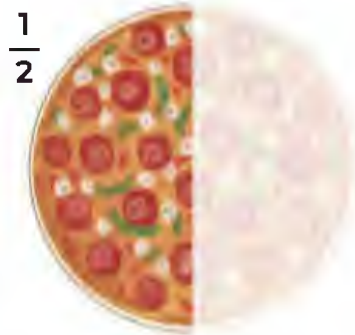


Now put all the parts that were cut out one over the other and see what comes out.

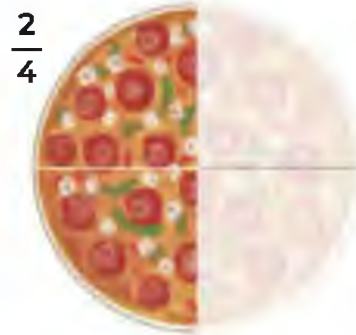
You will find that they are of the same size. Can you explain why?

Do you love pizza?

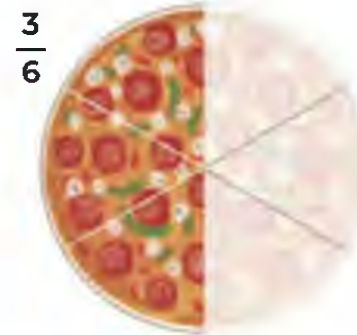
A pizza is like a round piece of bread baked with many different things on top. If you make pizza with wholewheat flour and lots of vegetables, it will be healthier and very tasty too!



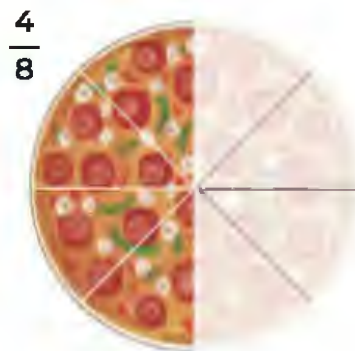
2 slice pizza



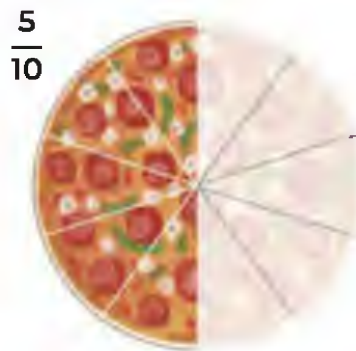
4 slice pizza



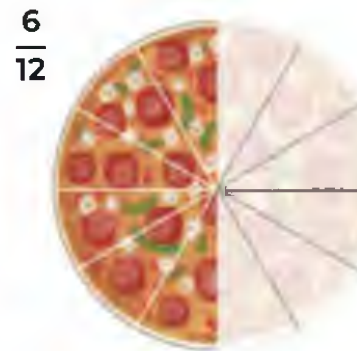
6 slice pizza



8 slice pizza



10 slice pizza



12 slice pizza

No matter the number of slices, you can still eat the same amount!

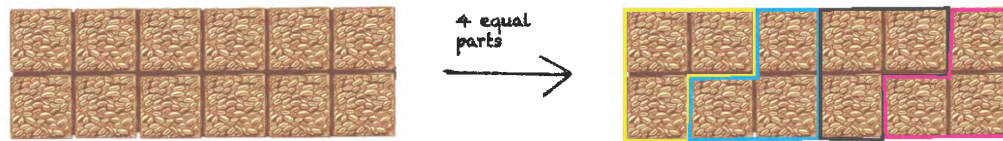
Are the following the same fractions?

i. $\frac{1}{4}$, $\frac{2}{8}$, $\frac{4}{16}$

ii. $\frac{1}{3}$, $\frac{2}{6}$ and $\frac{4}{12}$,

Can you show it with the help of shading in rectangles/circles of the same size in your notebook?

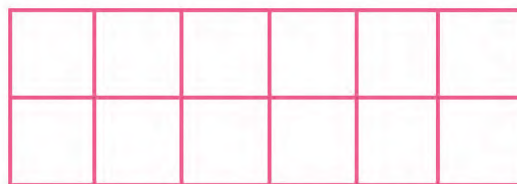
 There are 12 pieces in the *chikki*. This needs to be made into 4 equal parts.



Each part has _____ pieces.

Therefore _____ of whole *chikki* is 3 pieces of the whole *chikki*.

In the *chikki* below think of other ways of cutting to show $\frac{1}{4}$ of the whole *chikki*.



Here is $\frac{3}{4}$ of the *chikki*.



This represents 3 parts of the 4 parts of the *chikki*.

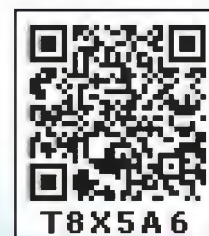
Therefore $\frac{3}{4}$ of the *chikki* is _____ pieces.

Practice Time

1. There are 30 children. $\frac{1}{2}$ of them are girls. How many children are boys?
2. There are 60 mangoes. $\frac{1}{4}$ of them are ripe. How many mangoes are ripe?
3. Sikkim Junior football team has 12 players. $\frac{3}{4}$ of them are from North district. How many are from other districts?



6. Here We Go Round

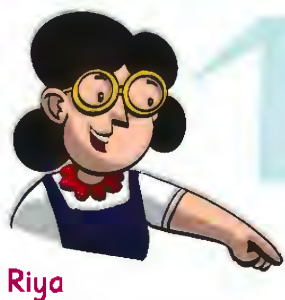


A Day at Palzor Stadium

Riya's father takes her with him to Palzor Stadium where he works. She notices that her father is painting the big round shape in the middle of the ground.

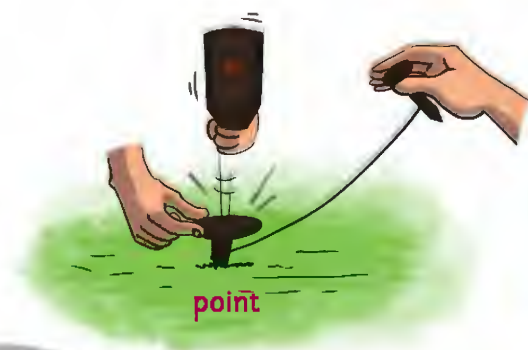


She wonders how her father was able to make it and after a while she runs down from her high seat to get a closer look.



Papa, I have seen this shape in my school textbook. It is a circle! But how did you make it so big?

Riya



Well, I used a special rope with metal tips at both ends and placed one tip in the soil and fixed it there. This fixed position (point) is called the **centre of the circle**.



My friend stretched the rope and moved around the fixed position, using the metal tip on the other end to draw a line in the ground.



Oh! It sounds quite easy Papa - can I try making one now?

You can repeat what we did, you can even make a smaller circle with a shorter rope.



Papa, why is this circle drawn in the centre of the football ground?

The football game starts with a kick-off from inside this circle.





You know papa, we play many games like the 'Naming Game' at school in which we have to stand in a circle.

If the topic is 'Nouns', the one who is in the middle throws the ball to any person standing in the circle and that person has to name a noun or get out of the game.

I now know how to draw circles of different sizes.

Sounds fun to me. But how do you know that you are all standing in a circle during the game?



Well, we begin by holding the hands of the person next to us and then we spread out.

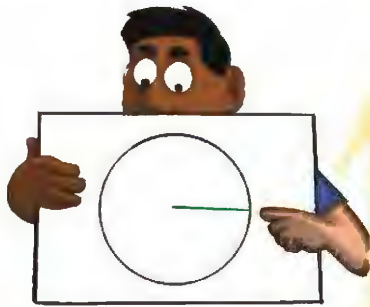


Sometimes, it leads to fights between us because some friends stand too close to the one who throws the ball.



Standing in a marked circle with a fixed centre will make our game fair and fun.





That's a very good idea Riya! The distance from the player in the centre to the others is the same for all, that makes the game fair. This distance is called the radius.



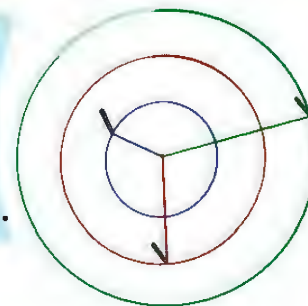
Oh! So, the distance between the centre and any point on the circle is the **radius** of a circle.



Yes, you are right. In fact, many radii can be drawn for a circle but all of them will have the same length.¹



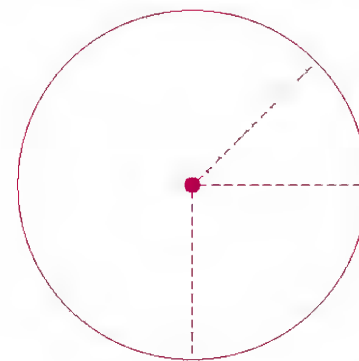
That means that the length of rope that you used is the radius of this circle. I can make different sized circles with ropes of different lengths.



How will the game be fair if Riya makes a circle the way her father did, and all others have to stand on the marked circle with one person standing in the centre of it? ²

Let us do:

Riya has drawn some radii in the circle below. Draw more radii in it and measure them.



¹ **Teacher's Note:** Children should be introduced to the plural form of radius. The expectation here is that the child identifies the radius using a coloured line and not by letter representation.

² **Teacher's Note:** Discuss with the students if the game will be fair if all the students stand in a line and one person is on a point outside the line.



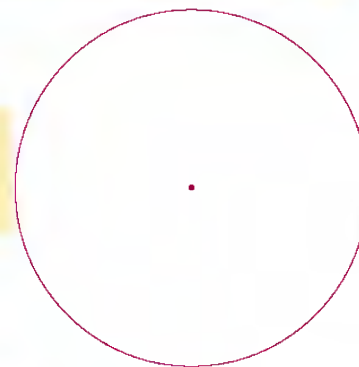
Papa, here I see that the radius of the circle goes straight on and joins the point opposite to it on the circle.



Good observation Riya! Every time a radius extends past the centre and joins the opposite point on the circle, you would get a **diameter**.



How many diameters can you draw on this circle?



Papa, I won't finish drawing diameters for a long time!

Ha ha! Let's go home for lunch.
You must be hungry now.



Riya's mummy has made hot *rotis* and *aludum* ready for their lunch.



Papa, this roti reminds me of the circle that we saw at Paljor Stadium.



Yes, it does look like it. Finish your lunch and we'll do something interesting.



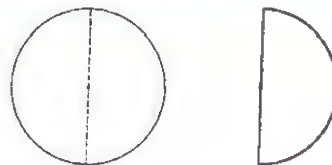
If you have one pancake (*gilo roti*) and you want to share it between you and your friend, how will you divide it so that both of you get equal parts?

After having lunch Papa hands Riya a circular piece of paper.

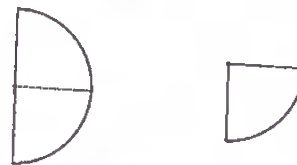
Riya follow my instructions clearly.



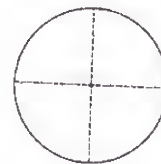
Step 1: Fold this paper in half.




Step 2: Fold this half again into halves.



Step 3: Unfold the paper and tell me what you see.

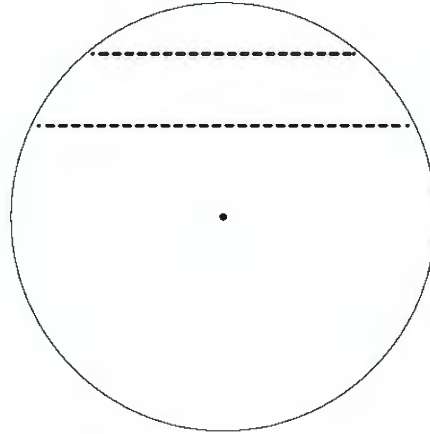


 Now mark the radius in red, the centre in black and the diameter in green.³

³ Teacher's Note: Conduct the paper folding activity by providing the children with paper and letting them experiment with drawing circles and identifying the diameter and radius. Let them see that the diameter divides the circle into two equal halves. They can also explore and find the centre of the circle as well as make more radii and diameters.

Let's explore more.

1. Look at the lines drawn in this circle. Draw some more lines like this. Measure them and find out which is the longest. What did you notice?



2. Look at the circle in the football ground. Now mark the following in it: Centre, radius, diameter

- center
- radius
- diameter



Circles in the Sky

Have you seen a rainbow like this in the sky? It is part of a Halo (rainbow circle).



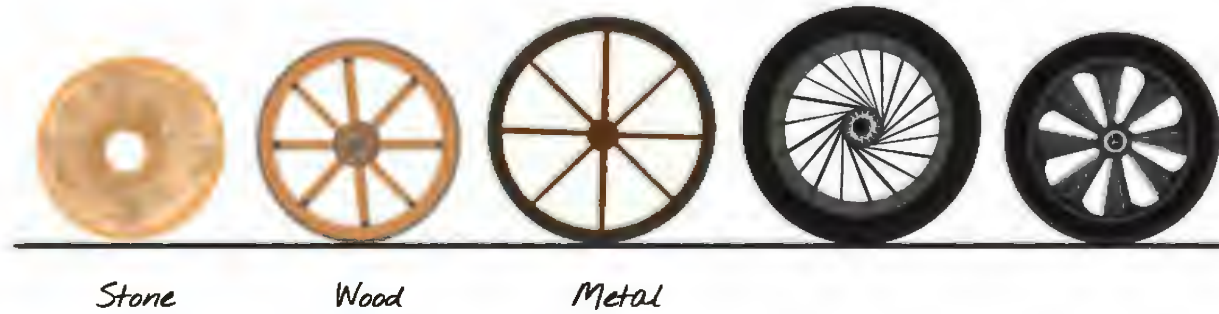
Circles Down the Ages

Good to Know



One of the earliest uses of the wheel was for pottery!

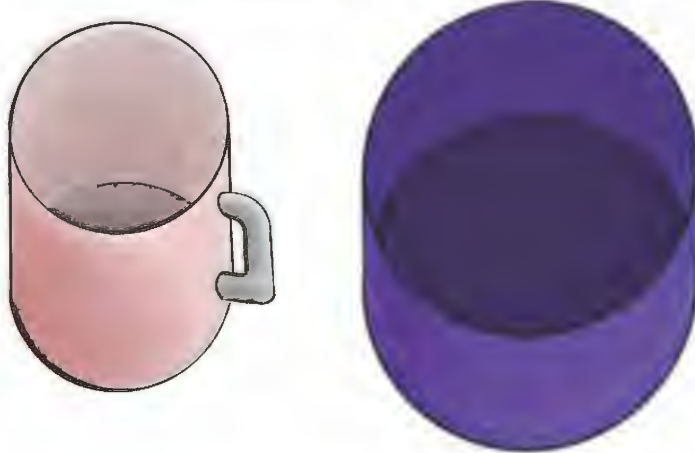
🔍 Look at the picture of wheels from early to present times.



Why do you think wheels have this shape?
Would you enjoy a ride in a car with square wheels?

Let us do this:

1. Tick the vessel with the bigger radius ⁴



2. Tick the bottle cap with the longest diameter



⁴ Teacher's Note: Initiate discussion on circular objects they see in their surroundings



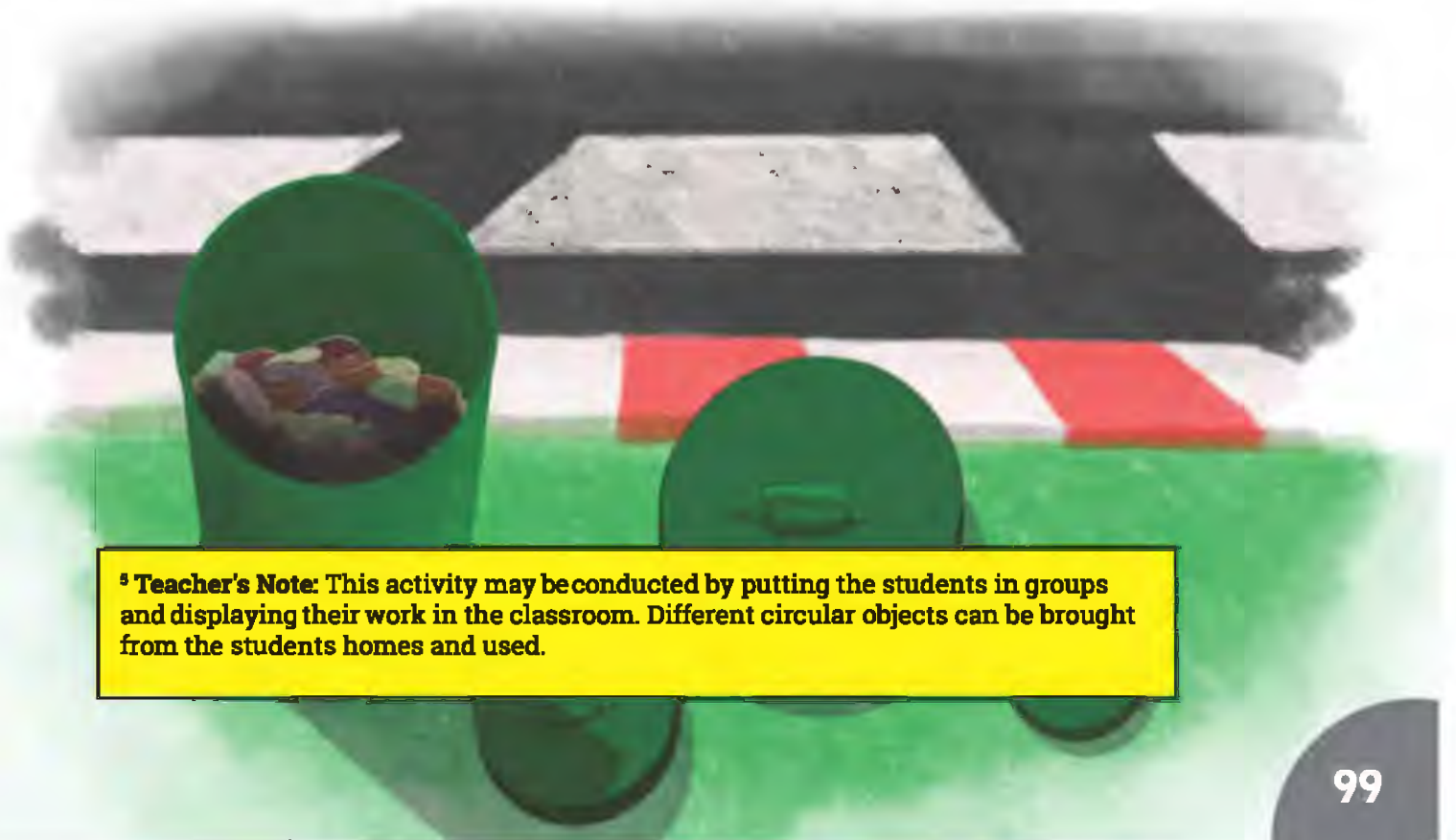
Activity:

Step 1 : Draw circles using different objects like bangles, coins, bottle caps, cups, etc.

Step 2 : Now, measure and record your findings:

1. Biggest circle : _____
2. Smallest circle : _____
3. Longest radius : _____
4. Shortest radius : _____
5. Shortest diameter : _____
6. The biggest circle always has the longest _____ and _____
7. Radius is _____ the diameter.
8. The middle point of a diameter is the _____ of the circle.

 Which lid will fit the mouth of the dustbin?



Teacher's Note: This activity may be conducted by putting the students in groups and displaying their work in the classroom. Different circular objects can be brought from the students homes and used.

Little David and Giant Goliath.

There is a wonderful song “*ghuma ghuma kay mara*” about the fight between David and Goliath. Let’s sing it with actions. ⁶



Look at the picture below. What path is the slingshot taking as David swings it in the air?



Drawing a circle with a compass

Riya’s father made a big circle at Paljor Stadium using a rope and metal tool to fix the radius. We can draw circles with the help of an instrument called a compass.

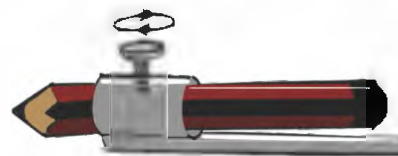
⁶ **Teacher’s Note:** Please refer to the Teacher Page for the words of this chorus.

Below are the steps to draw a circle of radius 3 cm with a compass :

Step 1 : Take a short sharp pencil and insert it in the pencil holder of the compass.



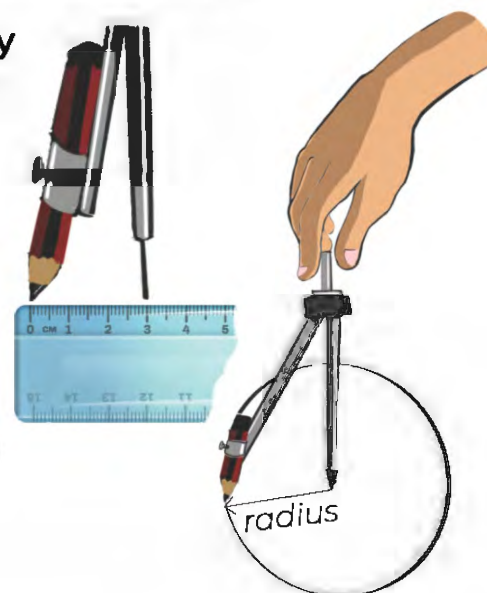
Step 2 : Tighten the screw to fix the pencil firmly.



Step 3 : Make sure the tips of the pencil and the needle are on the same level (straight line)



Step 4 : Open the compass to radius 3 cm by using a ruler. The distance between the needle tip and the pencil tip is the radius of 3 cm .



Step 5 : Now keep the needle of the compass fixed at a point on the paper (this is the centre of the circle). Hold the top of the compass and move the pencil around the needle, keeping it fixed.

This way, we draw a circle whose radius is 3 cm . You can use a ruler to measure the radius of the drawn circle. You will find that it is equal to 3 cm .

What will the length of the diameter be?

Practice Time

1. Draw circles of the following radii:

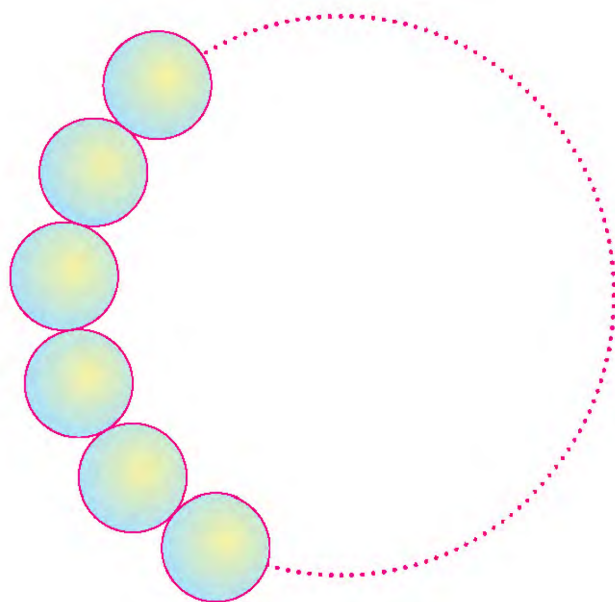
a. 4 cm

b. 6 cm

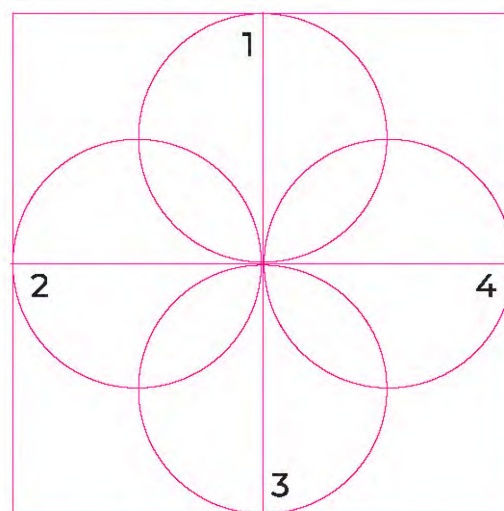
2. In your notebook, draw a rectangle and a square and then draw the biggest possible circle inside them.

Let's make designs using circles

1. Complete the necklace.



2. If you want to make this design, use a compass and give it a try!



Colour the following parts of the design you have made:

Red : The part which is in circle 1 and circle 2.

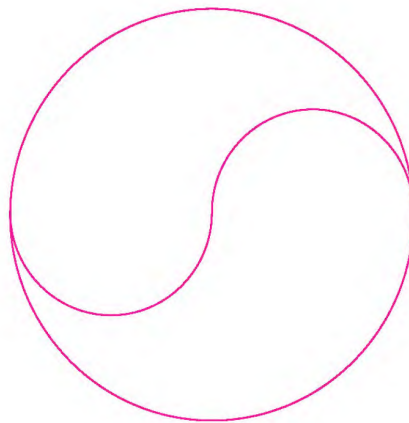
Green : The part which is in circle 1 and circle 4.

Purple : The part which is in circle 4 and circle 3.

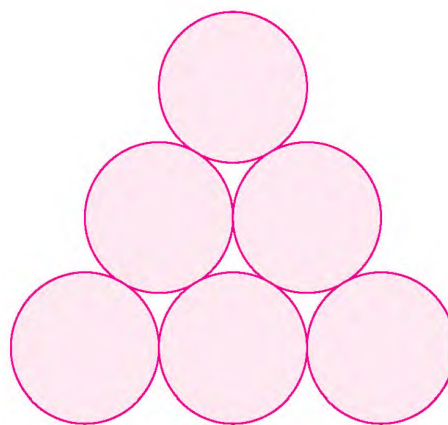
Blue : The part which is in circle 2 and circle 3.

Yellow : The parts which are not in any circle.

3. Guess how this design has been made. Use a compass to make a similar one in your notebook.



4. Draw and arrange 10 circles similarly as shown below.⁷



⁷ **Teacher's Note:** The above activities are intended as a challenge activity for children. Encourage children to explore their own designs with a compass. This will also give them more practice in drawing circles with a compass.

7. Scaling and Sharing



Multiplication:

Do you remember your multiplication tables from Class III?
Let's review them!

Complete the following grid by multiplying the numbers on the **top row** with the numbers in the **first column**. Some have been done for you:

x	1	2	3	4	5	6	7	8	9	10
1		2		4	5	6			9	
2	2							16	18	20
3			9	12			21	24	27	30
4										
5										
6	6									
7										
8										
9	9									
10										

The number in green is _____ = _____ x _____

If you had 9 beads, can you arrange them in an array? How many beads across and how many down?

How many different arrays can you get with 9 beads?

Make all possible dot arrays for 5 and 6.

Do you remember how you have formed the tables from 2 to 9.
Here are some more tables that you can make! ¹

Form the table of 11 using table of 10 and 1 since $10 + 1 = 11$

Table of 10	Table of 1	Table of 11 is Table of 10 + Table of 1
$1 \times 10 = 10$	$1 \times 1 = 1$	$1 \times 11 = 1 \times 10 + 1 \times 1 = 10 + 1 = 11$
$2 \times 10 = 20$	$2 \times 1 = 2$	$2 \times 11 = 2 \times 10 + 2 \times 1 = 20 + 2 = 22$
$3 \times 10 = 30$	$3 \times 1 = 3$	
$4 \times 10 = 40$	$4 \times 1 = 4$	
$5 \times 10 = 50$	$5 \times 1 = 5$	
$6 \times 10 = 60$	$6 \times 1 = 6$	
$7 \times 10 = 70$	$7 \times 1 = 7$	
$8 \times 10 = 80$	$8 \times 1 = 8$	
$9 \times 10 = 90$	$9 \times 1 = 9$	
$10 \times 10 = 100$	$10 \times 1 = 10$	

¹**Teacher's Note:** Get students to observe patterns seen in the multiplication tables of 11, of 5 (either 0 or 5 in the ones place) and of 9 (sum of digits is 9).



Which of the following questions can you answer using the information in the given statement?

Rohan and his family weave 8 small baskets from bamboo strips in a day.










- a. How much money do they make in a day?
- b. How many baskets can they weave in 7 days?
- c. How much bamboo do they need for 2 days of weaving?
- d. How many baskets can they weave in 4 weeks?

Practice Time ²

1. Phurmit practices boxing for 4 hours every day of the week. How many hours does she practise in June?
2. In a nursery, there are plants in 8 rows and each row has 7 plants. How many plants are there in all?
3. Dilip and his friends volunteer at 4 adult literacy centres. At each centre, they help 9 adults. How many adults do they help?
4. Roshan is playing with a rubber band of length 5 cm. She stretches it to 3 times its length. Find the length of the stretched rubber band.

***Teacher's Note:** Encourage students to make and solve their own word problems using the tables they know. The students should be able to build a problem using a situation that requires the operation of multiplication to solve the problem. Encourage them to describe with words or pictures how they solved the problem.

5. These are Mariam's outfits.

	 <p>With a red coat and black skirt, 4 choices of shirts</p>	   
	 <p>With a red coat and brown skirt, another 4 choices of shirts</p>	<p>Totally $2 \times 4 = \underline{\quad}$ choices with the red coat</p>
 	<p>Similarly, $2 \times 4 = \underline{\quad}$ choices with the brown coat and $\underline{\quad} \times \underline{\quad} = \underline{\quad}$ choices with the blue coat</p>	<p>So Mariam has $\underline{\quad} \times \underline{\quad} \times \underline{\quad} = \underline{\quad}$ choices of outfits!</p> <p>Which one do you like?</p>

Mariam has 3 coats, 2 skirts and 4 blouses of different colours. She loves wearing a different coat, skirt and blouse each day. How many different sets can she make?

How Many Tens

Anand had a small flower shop. On a day when he was feeling unwell, his niece Bindu, and her daughter Samya, who were visiting him, said that they would help in the shop so that he could rest at home.



Bindu, a bunch has 10 flowers. See to it that a bouquet has 20 flowers and a basket has 30 flowers.





10 is 1 bunch of 10
20 is 2 bunches of 10 i.e. 2×10
30 is 3 bunches of 10 i.e. 3×10

Do you see a pattern?

1×10 is 1 ten which is 10



2×10 is 2 tens which is 20



3×10 is 3 tens which is 30



4×10 is 4 tens which is 40



What is 10×10 ?



10×10 is 10 tens which is 100.

When we multiply a number by 10, we take that many tens!

Practice Time

Can you fill in the blanks? The first one has been done for you.³

$9 \times 10 = 9 \text{ tens} = 90$

$12 \times 10 = \underline{\hspace{2cm}} \text{ tens} = \underline{\hspace{2cm}}$

$21 \times 10 = \underline{\hspace{2cm}} \text{ tens} = \underline{\hspace{2cm}}$

***Teacher's Note:** Encourage students to see how many tens there are in the product and then convert it using their understanding of place value. Encourage them to verbalize their answers and use them in sentences such as '12 bundles of 10 sticks is 120 sticks'

At Samya's School- Counting in another way:

How many flowers?

There are 2 pots, with 3 bunches of flowers -red, pink and yellow - in each pot.



Samya

I see $2 \times 3 = 6$ bunches and 4 flowers in each bunch. And $6 \times 4 = 24$ flowers.



$$6 \times 4 = \boxed{2 \times 3} \times 4 \text{ and } 2 \times 12 = 2 \times \boxed{3 \times 4}$$

$$\text{So } \boxed{2 \times 3} \times 4 = 2 \times \boxed{3 \times 4}$$



Pankaj, we can make the table of 12 using tables of 3 and 4.

How?

See for example

$$\begin{aligned} 5 \times 12 &= 5 \times \boxed{3 \times 4} \\ &= \boxed{5 \times 3} \times 4 = 15 \times 4 = 4 \times 15 \\ &= 15 + 15 + 15 + 15 = 60 \end{aligned}$$



Let us exchange 3 and 4. Then we will

$$\begin{aligned} \text{have to add less. So, } 5 \times 12 &= 5 \times \boxed{4 \times 3} \\ &= \boxed{5 \times 4} \times 3 = 20 \times 3 = 20 + 20 + 20 = 60 \end{aligned}$$



Good idea!



Pankaj



Making new tables

Making the multiplication table of 12 using the tables of 3 and of 4.

$12 = 3 \times 4$, so if we write the table of 4 and then multiply each number by 3 we get the table of 12.

Table of 4	3 times table of 4	Table of 12
$1 \times 4 = 4$	$3 \times 4 = 12$	$1 \times 12 = 12$
$2 \times 4 = 8$	$3 \times 8 = 24$	$2 \times 12 = 24$
$3 \times 4 = 12$	$3 \times 12 = 12 + 12 + 12 = 36$	$3 \times 12 = 36$
$4 \times 4 = \underline{\quad}$	$3 \times 16 = \underline{\quad} + \underline{\quad} + \underline{\quad} = \underline{\quad}$	$4 \times 12 = \underline{\quad}$
$5 \times 4 = \underline{\quad}$	$3 \times \underline{\quad} = \underline{\hspace{2cm}}$	$5 \times 12 = \underline{\quad}$
$\underline{\quad} \times 4 = \underline{\quad}$	$3 \times \underline{\quad} = \underline{\hspace{2cm}}$	$6 \times 12 = \underline{\quad}$
$\underline{\quad} \times 4 = 28$	$3 \times \underline{\quad} = \underline{\hspace{2cm}}$	$\underline{\quad} \times 12 = \underline{\quad}$
$\underline{\quad} \times 4 = 32$	$3 \times \underline{\quad} = \underline{\hspace{2cm}}$	$\underline{\quad} \times 12 = \underline{\quad}$
$\underline{\quad} \times 4 = \underline{\quad}$	$3 \times \underline{\quad} = \underline{\hspace{2cm}}$	$\underline{\quad} \times 12 = \underline{\quad}$
$\underline{\quad} \times 4 = \underline{\quad}$	$3 \times \underline{\quad} = \underline{\hspace{2cm}}$	$\underline{\quad} \times 12 = \underline{\quad}$

Can you make the multiplication table of 8 using tables of 2 and 4?



I can write the table of 4 and then double every number. That will give me the table of 8.

$1 \times 4 = 4$	$2 \times 4 = 8$	i.e. $1 \times 8 = 8$
$2 \times 4 = 8$	$2 \times 8 = 8 + 8 = 16$	i.e. $2 \times 8 = 16$
$3 \times 4 = 12$	$2 \times 12 = 12 + 12 = 24$	i.e. $3 \times 8 = 24$



I can write the table of 9 using only the table of 3

$1 \times 3 = 3$	$3 \times 3 = 9$	i.e. $1 \times 9 = 9$
$2 \times 3 = 6$	$3 \times 6 = 18$	i.e. $2 \times 9 = 18$
$3 \times 3 = 9$	$3 \times 9 = 27$	i.e. $3 \times 9 = 27$
$4 \times 3 = 12$	$3 \times 12 = 12 + 12 + 12 = 36$	i.e. $4 \times 9 = 36$

The next day



If there are 20 flowers in a bouquet, how many flowers would you need to make:

2 bouquets: $2 \times 20 = \boxed{2 \times 2} \times 10 = 40$

3 bouquets: $3 \times 20 = \boxed{3 \times 2} \times 10 = 60$

Hey! This looks like the same pattern! I multiply the two numbers and then get that many tens.



Right! Well 20 flowers is 2 bunches of 10 flowers each or simply 2 tens.

3 bouquets will be $\boxed{3 \times 2}$ flowers.

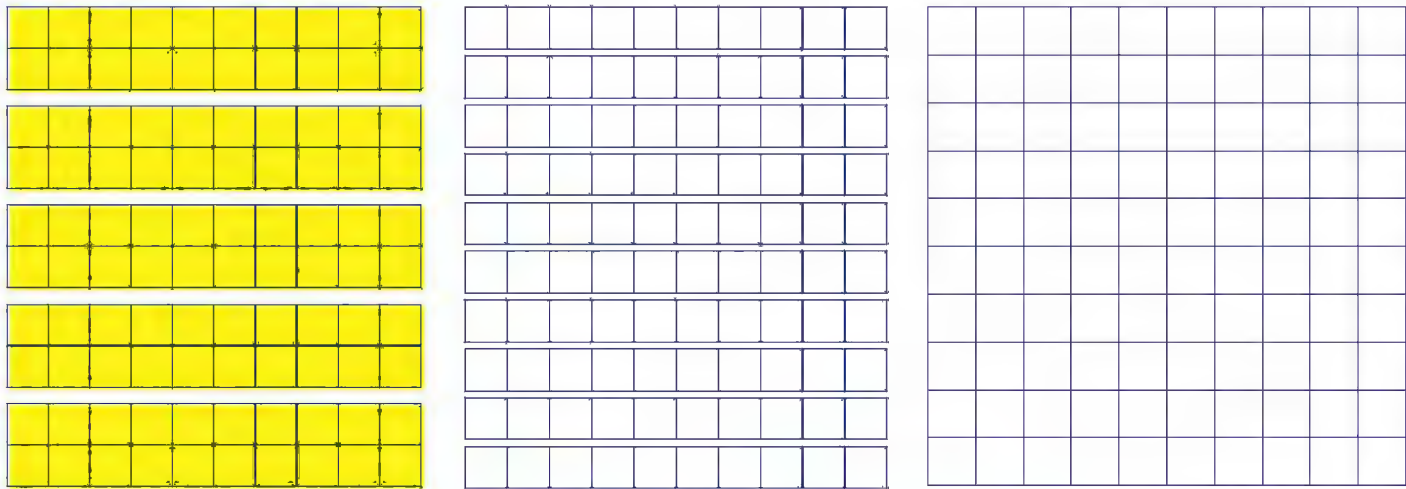
So $3 \times 20 = 3 \times 2 \times 10$



And that is $\boxed{3 \times 2} \times 10 = 6$ tens
or 6 bunches of tens.



Let us find 5×20 :



$$5 \times 20 \text{ is } 5 \times 2 \times 10 = 10 \times 10 = 100$$



Anand

What if I made baskets with 30 flowers or bigger baskets with 70 flowers?

Well, then for 2 baskets of 30 flowers each, I need $2 \times 30 = 2 \times \boxed{3 \times 10} = 6 \text{ tens} = 60 \text{ flowers}$.



Samya



For 5 bigger baskets, I need $5 \times 70 = 5 \times \boxed{7 \times 10} = \boxed{5 \times 7} \times 10 = 35 \text{ tens} = 350 \text{ flowers}$! Yes, I see the pattern! I find the answer by multiplying the other numbers and then seeing how many tens I need!

Practice Time

- Can you write down the multiplication that you see here and then give the answer.

The first has been started for you.

a. 3 bundles of 40 : $3 \times 40 = 3 \times \boxed{4 \times 10} = \boxed{3 \times 4} \times 10 = 120$

b. 6 bundles of 90: _____

c. 4 bundles of 30: _____

d. 9 bundles of 60: _____

2. Fill in the blanks: 4

a. $6 \times 20 = 12 \text{ tens} = 120$

b. $7 \times 20 = \underline{\hspace{2cm}} \text{ tens} = \underline{\hspace{2cm}}$

c. $9 \times 20 = \underline{\hspace{2cm}} \text{ tens} = \underline{\hspace{2cm}}$

d. $2 \times 30 = \underline{\hspace{2cm}} \text{ tens} = \underline{\hspace{2cm}}$

e. $5 \times 30 = \underline{\hspace{2cm}} \text{ tens} = \underline{\hspace{2cm}}$

f. $8 \times 30 = \underline{\hspace{2cm}} \text{ tens} = \underline{\hspace{2cm}}$

3. One hour has _____ minutes. How many minutes are there in 12 hours?

Other Ways to Multiply

Anand gets ₹ 19 for each bunch of flowers. Bindu makes 4 bunches on that day. She knows that she has to multiply 19 by 4 and is struggling to find out how much she has earned for her uncle.



I can do 19×4 easily.



$19 = 20 - 1$



How?



So?

Teacher's Note: Encourage the students to draw blocks of 20, 30, etc. and see how many blocks of 10s there are in all. They should slowly start doing this multiplication automatically without needing to draw it each time.



$$\begin{aligned}\text{So, } 19 \times 4 &= 4 \times 19 \\ &= 4 \times \boxed{20 - 1} \\ &= 4 \times 20 - 4 \times 1 \\ &= 80 - 4 \\ &= 76\end{aligned}$$

Yes! Since you saw how easy it was to multiply by 20, you used a helpful trick.



Can you use this clever trick to find out :

- 29×3
- 38×5
- 79×6
- If you read 40 pages of a story book in a day, how many pages could you read in 15 days?
[Hint: 15 can be thought of as $10 + 5$]

How many Hundreds?

In the small village of Kabi where Bindu comes from, Mr. Passang wanted to construct a cow farm.

I collect 200 stones per week to build a wall. How many such stones can I collect in 4 weeks.



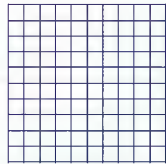
My daughter can help you

If 100 is 1 bundle of 100;
200 is 2 bundles of 100 i.e. 2×100 .
So $4 \times 200 = 4 \times 2 \times 100$ which is
8 bundles of 100 i.e. 800

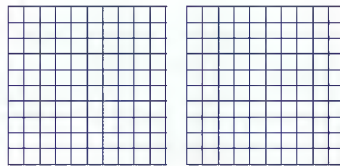


Do you see a pattern?

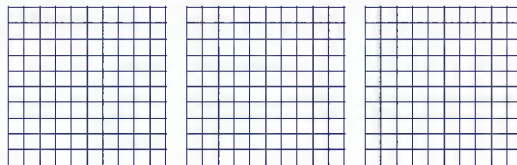
1×100 is 1 hundred
which is 100



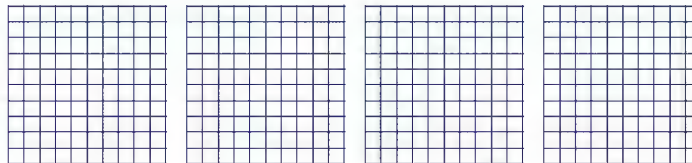
2×100 is 2 hundreds
which is 200



3×100 is 3 hundreds
which is 300



4×100 is 4 hundreds
which is 400



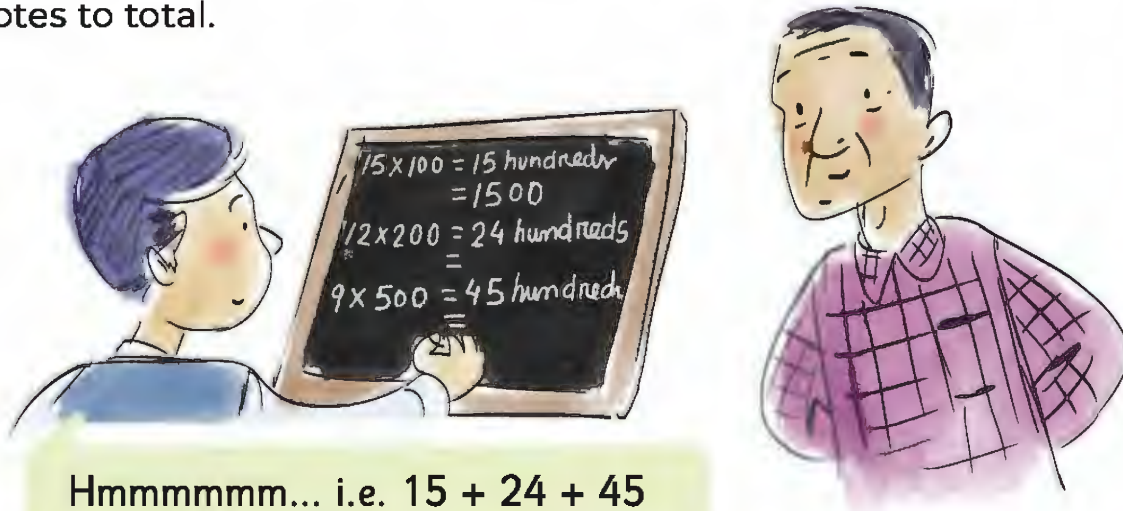
What is 10×100 ?

It is 10 bundles of 100 which is a thousand.

10×100 is 10 hundreds which is 1000.

**When we multiply a number by 100,
we get that many 100s!**

Chandan's father counts the day's earnings when he closes his shop at night. Chandan helps him to do this. His father gives him fifteen ₹ 100 notes, twelve ₹ 200 notes and nine ₹ 500 notes to total.



Hmmmmmm... i.e. $15 + 24 + 45$
which is $60 + 24$ or 84 hundreds.

Appa, that is ₹ 8400 which you have given me!

That was quick Chandan, I'm glad that what you are learning in school is helping you in the shop!⁵



Practice Time

What is: a. $4 \times 300 = 4 \times 3 \times 100 =$ _____

b. $9 \times 700 =$ _____ $=$ _____

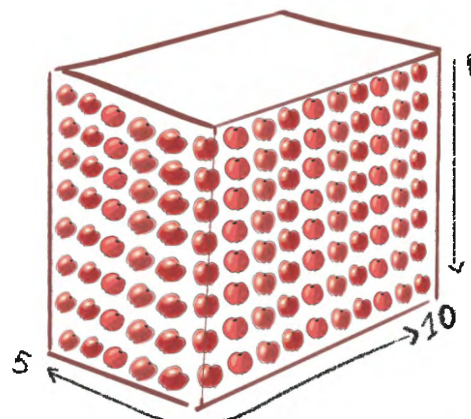
c. $6 \times 800 =$ _____

***Teacher's Note:** Encourage students to see how many hundreds there are in the product and the sum and then convert it using their understanding of place value. Let them say the answers out loud. They may need practice in reading 84 hundred as 8 thousand 4 hundred.

Can you use what you learnt to solve these problems?

1. In the construction of a dam, 700 bags of cement are used in a week. How many bags are used in 3 weeks?

2. One day Sonam Rabden went to Phodong *bazaar* with his son. In the *bazaar*, Sonam Rabden purchased one carton of apples. There are 8 layers of apples in one carton and each layer has 50 apples.



a. How many apples are there in one carton?

b. The cost of one apple is ₹ 12.
What is the cost of 1 carton?

c. If each student gets 2 apples then how many apples are required for 300 students. How many cartons is that?

Multiplying Bigger Numbers



In class III to multiply 15 by 4 we wrote 15 as $10 + 5$.

x	10	5	
4	$4 \times 10 = 40$	$4 \times 5 = 20$	$40 + 20 = 60$

This is called the grid method of multiplication.

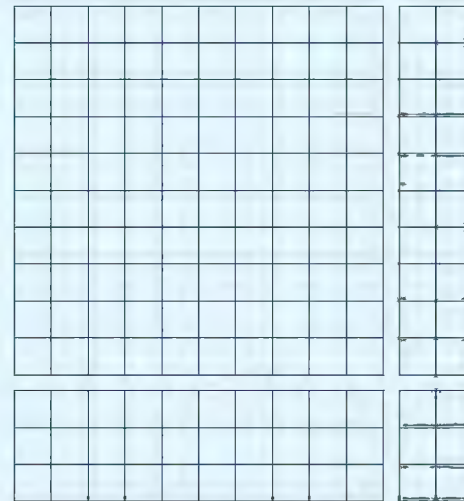
Can we use the grid method to multiply bigger numbers like 12 and 13?

Here, 12×13 is written as

$$\boxed{10 + 2} \times \boxed{10 + 3}$$

This can be written as:⁶

x	10	2
10	100	20
3	30	6



$$12 \times 13 = 100 + 30 + 20 + 6 = 156$$

Let us look at another example: 26×35

x	30	5
20	600	100
6	180	30

$$26 \times 35 = 600 + 100 + 180 + 30 = 910$$

Now, let us try to solve this

23×246 (fill in the blanks)

x	200	40	6
20			
3			

$$23 \times 246 = \underline{\quad} + \underline{\quad} + \underline{\quad} + \underline{\quad} + \underline{\quad} + \underline{\quad} = 5658$$

⁶ **Teacher's Note:** Please refer to the class III book to show how to demonstrate this with flats, longs and units.

Practice Time

a. Multiply 14×84

b. Samya and Suraj were multiplying 36 by 42. Look at their notebooks.



Samya

x	30	6
40		
2		

x	40	2
30		
6		



Suraj

Are their answers the same? Why do you say this?

c. 6×85 :

Step 1: Multiply 5 by 6

Step 2: Multiply 8 by 6

Step 3: Add the answers you got in Step 1 and Step 2.

Is the answer correct?

d. 20×72 : Will your answer be the same as 2×720 ?

e. 21×48 : Can you do this sum in two different ways?



Look at how 728 is multiplied by 5 below. Is this like the grid method?

This is:

$\begin{array}{r} 14 \\ 728 \\ \times \quad 5 \\ \hline 3640 \end{array}$	→	$\begin{array}{r} 728 \\ \times \quad 5 \\ \hline 5 \times 8 \longrightarrow 40 \\ 5 \times 20 \longrightarrow 100 \\ 5 \times 700 \longrightarrow + 3500 \\ \hline 3640 \end{array}$
---	---	---

Just like the grid method, since $728 = 700 + 20 + 8$, we multiply 8 by 5, then 20 by 5 and finally 700 by 5 and add all the products to get the final answer.

26 X 34

Step 1:

We multiply
30 + 4 by 6

$$\begin{array}{r} 2 \\ 34 \\ \times 26 \\ \hline 204 \end{array}$$

We begin with 6×4 is 24. So we write 4 in the ones place, and take the 2 tens to the tens place.

We multiply 3 tens by 6 and get 18 tens. To this, we add the 2 tens and get 20 tens which is 200. We write 2 in the hundreds place and 0 in tens place.

34×6 is 204.

Step 2:

We multiply
30 + 4 by 20

$$\begin{array}{r} 34 \\ \times 26 \\ \hline 204 \\ 680 \end{array}$$

4×20 is 80, we write 0 in the ones place and take the 8 tens to the tens place.

We multiply 3 tens by two tens and get 60 tens. When we add the 8 tens, we get 68 tens or 680. We write 6 in hundreds place and 8 in tens place.

34×20 is 680.

Step 3:

Add the
products

$$\begin{array}{r} 34 \\ \times 26 \\ \hline 204 \\ + 680 \\ \hline 884 \end{array}$$

34×26 is 884.

Step 1:

$$\begin{array}{r} 2 \\ 54 \\ \times 67 \\ \hline \end{array}$$

First we multiply
_____ by _____

Then we add 2
tens when we
multiply 50 by 7.

Step 2:

$$\begin{array}{r} 2 \\ 54 \\ \times 67 \\ \hline \end{array}$$

Here we are actually
multiplying
_____ by _____ not by

Step 3:

Now we add

$$\begin{array}{r} 2 \\ 54 \\ \times 67 \\ \hline + \quad \quad \quad \\ \hline \end{array}$$

Now, let us try this:

1.

x	2	3	4
6			

2.

			7	2
x			2	5
				0
	1		4	
				0

3.

			6	5
x			3	4
		2	6	

Find the error in the multiplication and correct it ⁷

		6	9
x		9	6
	4	1	4
	6	2	1

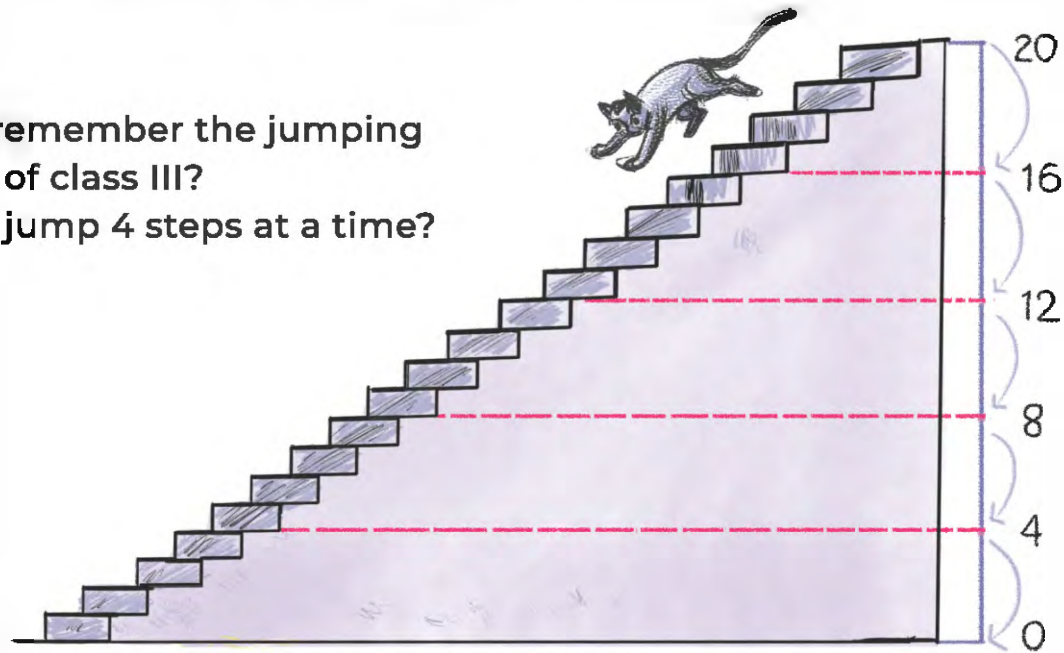
Answer: 1035

⁷**Teacher's Note:** Let the students discuss the errors and also discuss the approximate answer. For example 69×96 will be close to 69×100 which is 6900.

Division (Sharing equally)

Recall


Do you remember the jumping animals of class III?
Can Cat jump 4 steps at a time?



So the jumps Cat has taken are $20 \div 4 = 5$

Cat would have taken _____ jumps, if she was at the 40th step and came down to ground level. ^a

Cat would have been at _____ if she reached the ground after taking 9 such jumps.

-  Sushma has just had an eye operation. Her husband Norbu had to put the drops for her.

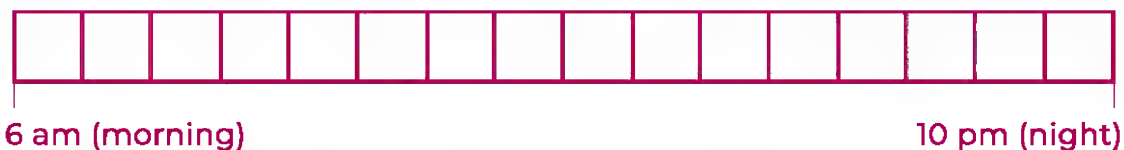
I will put the eye drops for you.



Put the drops at least 4 times during the day, with equal gaps in between.

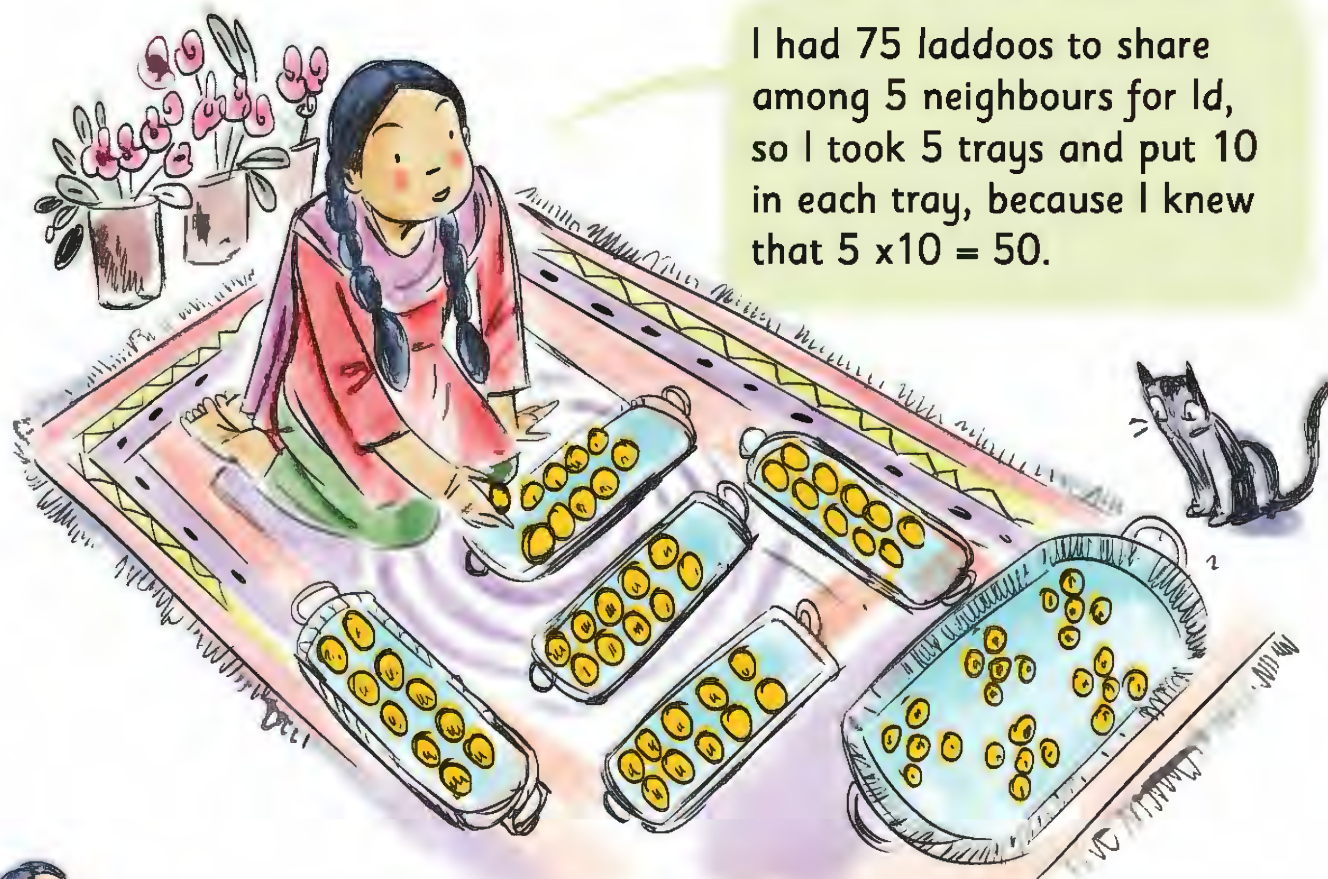
***Teacher's Note:** Please use the open number line with skip counting to help students answer these questions.

Sushma sleeps from 10 pm to 6 am. Can you make a timetable for Norbu to put the drops?



Explore:

What are the different ways in which you can divide 75 by 5? Here are some ideas.



Then I had $75 - 50 = 25$ laddoos left. So I put 5 more on each tray because I knew $5 \times 5 = 25$. Now all the laddoos were shared out. ⁹

How many laddoos did Sameera get in each tray?

Teacher's Note: Let the students try this out for themselves, making crosses on 5 plates and saying how many are left behind each time.



Sangeetha

Oh that is very quick!
I had thought of putting
1 in each tray,

$$75 - 5 = 70$$

$70 - 5 = 65$I would
have finished much later.

70 left over

65 left over

Sameera, you have given me an
idea! Why not write 75 as $60 + 15$.

60 divided by 5 is 12 and
15 divided by 5 is 3.



Sharad

So the first time each tray gets 12 laddoos and the next
time each tray gets 3 laddoos. Then each tray gets a total of
15 laddoos at the end.

Can you think of other ways?

Your ideas are great, but can you tell me
how you would do this if you have 52
laddoos and 4 trays?



Teacher



52 can be written as $40 + 12$, now
we can easily divide 40 and 12 by 4.

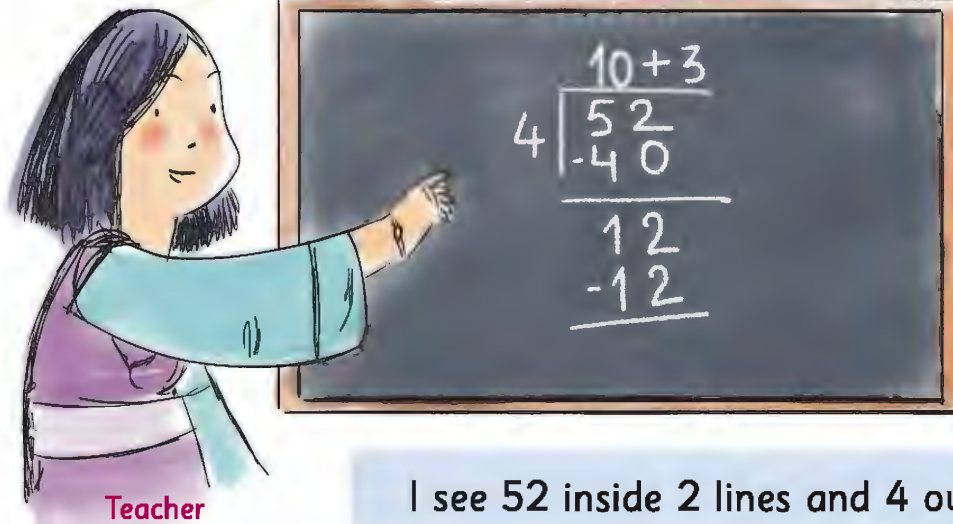
Hence, $52 \div 4 = \boxed{40 + 12} \div 4$

40 divided by 4 is 10 and 12 divided by 4 is 3.

So the answer is 13.

$$52 \div 4 = 13 \text{ so } 52 = 4 \times 13$$

I am going to write down what you said, here is 52 divided by 4.



The chalkboard shows the long division of 52 by 4. The quotient is 13, which is written as 10 + 3. The steps are: 4 goes into 52 to give 10, with a remainder of 12. Then, 4 goes into 12 to give 3. The final result is 10 + 3 = 13.

$$\begin{array}{r} 10 + 3 \\ 4 \overline{) 52} \\ \underline{-40} \\ 12 \\ \underline{-12} \\ 0 \end{array}$$

Teacher

I see 52 inside 2 lines and 4 outside.



That means that we are dividing 52 by 4. I am doing long division.

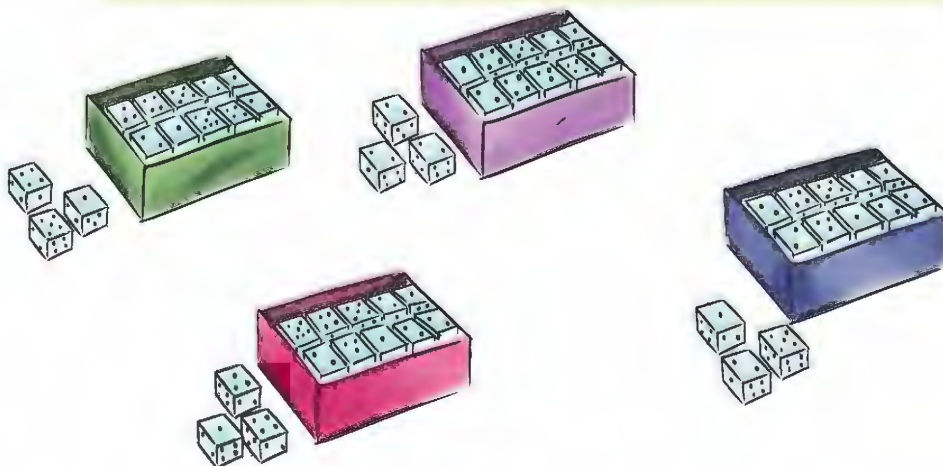



52 divided by 4, then I see 40 and 10. Does this mean that you have taken 4×10 is 40? Then you have taken 40 from 52 and 12 remains.



Oh this is what I said earlier, now 4×3 is 12 so 52 divided by 4 is $10 + 3 = 13$.

Yes, now can you show it with these counters?



 Kalpana, Tashi, David, Amir, and Susmita had to share ₹ 90 equally among them.



I have ₹ 90 in my hand. Tell me how to share this money equally among all of you.

Tashi started writing. Can you complete his sentences?

$$\begin{array}{r} 10 \\ 5 \overline{) 90} \\ \underline{-50} \\ 40 \end{array}$$

→ First I gave _____ to each of them

→ so, I have distributed _____ x _____ = _____

→ ₹ _____ is still left.

Tashi completed it like this. He said he gave _____ rupees more to each one because _____ x 5 = 40

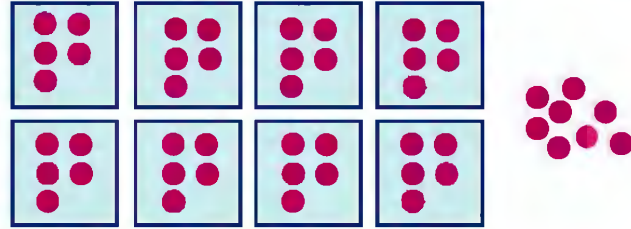
$$\begin{array}{r} 8 \\ 5 \overline{) 40} \\ \underline{-40} \\ 0 \end{array}$$

Now nothing is left and all the money is distributed equally. So, each gets _____ first and _____ second = _____ rupees. Now you can use your own method to divide 90 equally among 5 people.

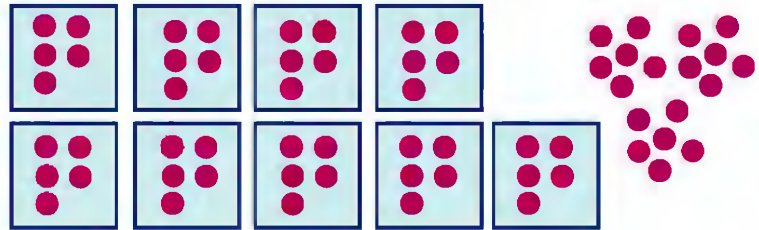
Practice Time

1. Use the boxes given against each problem to do the division:

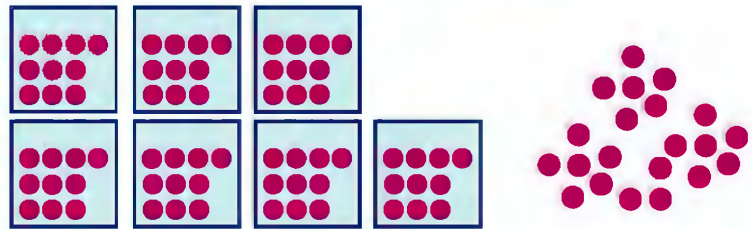
- a. 48 divided by 8. First 40 is given (5 each in 8 boxes) then 8 is left out then one more is put in each box. Each box gets $5 + 1 = 6$



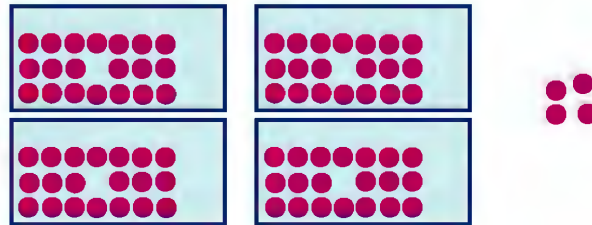
- b. 63 divided by 9



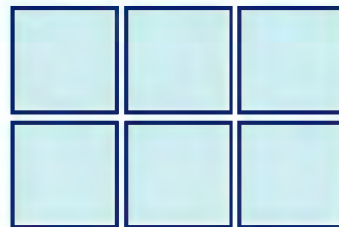
- c. 91 divided by 7



- d. 84 divided by 4



- e. 90 divided by 6



- f. 132 divided by 12



3. Kewal makes 1 glass of orange juice with 1 teaspoon of sugar. His mother tells him to make it sweeter so he adds 2 teaspoons of sugar for each glass of juice. He takes 37 glasses of juice for his friends on sports day. How many teaspoons of sugar will he use?

4. When will I get a bigger answer: when I divide 96 by 6 or when I divide 96 by 4?

5. If there are 19 chalk boxes in the class and each box has 45 pieces of chalk, how many chalk pieces are there in total?

6. Karma was growing cabbage in his garden. He got 12 cabbages from one small patch. He wanted to harvest 156 cabbages. How many patches should he plant?

7. For the school sports, 91 children had to stand in 7 lines. How many children are there in a line?

8. Patterns, Patterns Everywhere

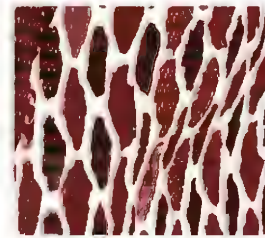


Bhanu Jayanti

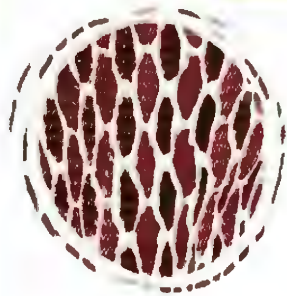
Lakshya children's club, Upper Karek, Namthang, decided to celebrate Bhanu Jayanti. There were traditional dances, poem recitation, Ramayan Path, and other competitions among children of different clubs. During the competition of Ramayan Path all the participants wore traditional dresses. The boys wore *dawra surwal* and *dhaka topi* and the girls wore *faria* and *chaubandi choli*. Observe the colourful picture and see the patterns in the *dhaka topi* and *faria*.



1. Match the patterns which are shown here with those on the traditional dresses on page 130. ¹

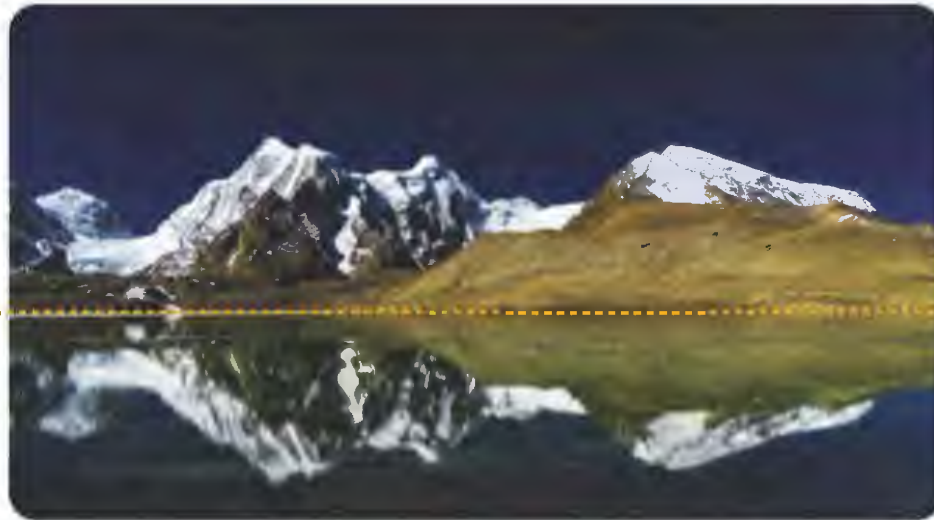


Good to Know



¹ **Teacher's Note:** The objective of this exercise is highlighting traditional dresses and festivals and also pattern recognition (matching common characteristics). Such exercises should not come in assessment, it is just a challenge for the students.

Reflection- A Mirror Image



Line of symmetry

Gurudongmar Lake



Sonam

Suyog, see the above picture of a place in Sikkim, how beautiful it looks.

Wow! It is so nice to have such beautiful places on earth.



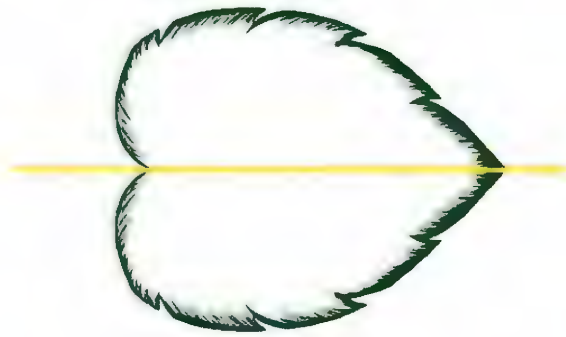
Suyog



Suyog, what do you observe in this picture?

The picture shows the image in water like a mirror. The dotted line which separates the picture into two parts is called the line of symmetry.





line of symmetry



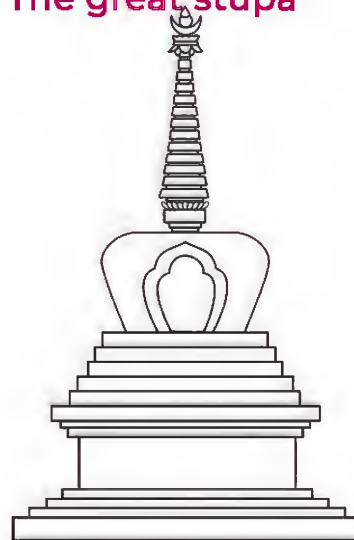
Oh yes, I remember - a line that separates a picture into two identical halves is a line of symmetry.²

Draw lines of symmetry for the following objects.

a. Slice of orange



b. The great stupa



² **Teacher's Note:** Teacher should use mirrors to show how mirror images are formed. The mirror will be the line of symmetry. The teacher should explain that it is a imaginary line.

c. Offering bowl



d. Mangalsutra



Let's make a pattern!



See the pattern on this wall, it is made by using a single block and its mirror image.³

1. If  is the line of symmetry which is the reflection image of  ?



2. Can you make a border pattern by using  and its reflection alternately?⁴

³Teacher's Note: Let the children draw the triangles in the border pattern on dot paper to understand it better.

⁴Teacher Note: The word 'alternately' may be new to the students. So a few examples may be given such as 1 2 1 2 have 1 and 2 used alternately.

3. Can you reflect the other two symbols and make border patterns here?



Pezang Farm

When Aaryum's father Pezang passed away. Aaryum named his farm "PEZANG FARM" and looked after it. Many people got jobs at the farm.

The details of animals and birds seen in Pezang Farm are given in the table on page 136.



Animals at farm	No. of animals	Picture representation of the number
Cow	11	
Sheep	16	
Pig	7	
Buffalo	5	
Calf	4	
Goat	15	
Horse	3	
Cat	8	
Dog	2	
Crow	5	
Hen	21	

The counts of the animals seem to be of two types.

Those animals which can all be grouped in twos have an even count. Those which cannot be grouped in twos have an odd count.

Example: The numbers of cats in the farm are 8 and you can see from the picture in the table that they are in twos, so 8 is an even number.

The number of crows is 5 and in the picture one crow does not have a partner, hence 5 is an odd number.

Observe the table carefully and answer the following questions.

1. Name the animals whose counts are odd numbers.

2. Name the animals whose counts are even numbers.

3. Name the animals whose counts are equal in number.
Group each of these counts into odd and even numbers.

4. If each buffalo has a crow sitting on its back will they be in pairs?
Can you draw a picture?

5. If the cows and calves are in one field, will each animal have a pair?
Can you draw a picture? ⁵



⁵Teacher's Note: Where pictures are required, children may be encouraged to draw dots or crosses, the intention of the exercise is for them to begin to understand intuitively that when two odd numbers are added, the sum is an even number and when an even number and an odd number are added, the sum is odd. This is not for assessment.

Laxmi Puja



Nirav

Supriya

Anudeep



Supriya, see how beautiful the lighted diyas that Nirav has arranged looks.



Wow! it looks so beautiful when it is arranged to form a triangle.



Anudeep

Nirav can you tell me, how you arranged the diyas?



Anudeep

I got this idea from the fruit seller on the road. See how he has arranged the sweet lime in his stall?

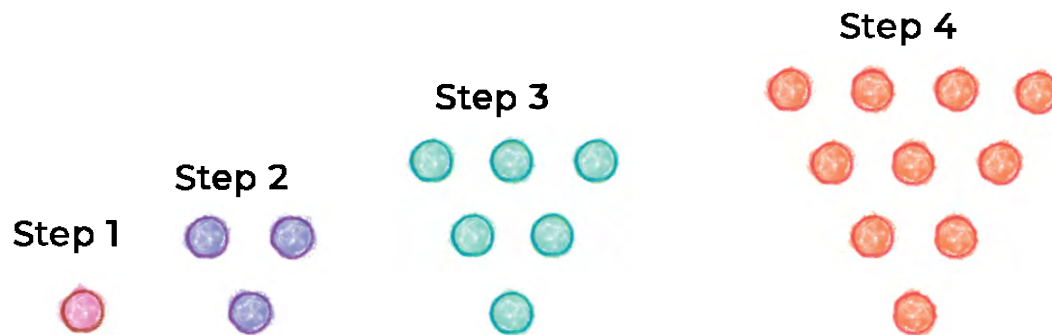


Nirav

Can you count how many sweet limes are in the triangular side of the stall in the picture?



So I arranged the diyas by using
1 diya in the first line, 2 diyas in the second line
and 3 diyas in the third line.



1. Number of dots in Step 1 = 1
2. Number of dots in Step 2 = $1 + 2 = 3$
3. Number of dots in Step 3 = $1 + 2 + 3 = \underline{\hspace{2cm}}$
4. Number of dots in Step 4 = $\underline{\hspace{2cm}}$
5. How is the number of dots increasing in each step?
6. So, what should be the number of dots in the next step?

All such numbers that can form a triangle shaped pattern of dots are called **triangular numbers**.⁶

In triangular numbers, dots are arranged in a triangle with the same number of dots on each side. And the number of dots are arranged in rows in increasing order (1, 2, 3...). The first triangular number is 1, the second triangular number is 3, the third is 6 and so on..

- a. Can you think of some more such triangular numbers?
- b. Which triangular number do you see in the sweet lime stall?

⁶ **Teacher's Note:** Triangular numbers are an interesting set of numbers and many beautiful patterns can be seen with them. Students may be encouraged to find relationships and observe patterns such as the number of dots along the sides of the triangles.



1. Is 8 a triangular number?
2. How many diyas are required if we have 6 diyas in the longest line and they are arranged in a triangular pattern?
3. Lila Hangma decided to arrange 16 diyas in a triangular pattern. Can Lila Hangma manage to arrange them?

Square Pattern



Punam

Nirav, Supriya, Anudeep, see how beautiful it looks when I arrange 16 diyas, so that the number of diyas across (in rows) and down (in columns) are the same. Do you know the name of such an arrangement of diyas?



Yes, such arrangements where number of rows is equal to number of columns are called square numbers.



Anudeep

1. Observe the arrangement of the dots and guess the rule to find the next number.



- Number of dots in Step 1 = $1 = 1 \times 1$
 - Number of dots in Step 2 = $4 = 2 \times 2$
 - Number of dots in Step 3 = $\underline{\quad} = \underline{\quad}$
 - Number of dots in Step 4 = $\underline{\quad} = \underline{\quad}$
 - So the number of dots in Step 5 = $25 = 5 \times 5$
2. Observe the rule of getting square numbers and write the sixth square number.
- Number of diyas in the sixth square number is $\underline{\quad}$.
 - Is it possible to arrange these diyas in a triangular pattern?
3. Can you arrange 15 lighted diyas in a square pattern? If so, how many rows and how many columns will there be?
4. Classify the following numbers as triangular or square numbers and represent them using dots.

Number	Dot pattern Representation	Triangular	Square
4		No	Yes
12			
25			
28			
36			



Exploring More Number Patterns: 7

Complete the number pattern below and write the rule:



1. 2, 4, 6, 8, _____, _____, _____, _____, _____

RULE: Start at 2 and add 2 each time.

2. 7, 14, 21, 28, _____, _____, _____, _____

RULE: _____

3. 28, 24, 20, 16, _____, _____, _____, _____

RULE: _____

4. 100, 90, 80, 70, _____, _____, _____, _____

RULE: _____

5. 1, 4, 9, 16, 25, _____, _____, _____, _____

RULE: _____

6. 400, 350, 300, 250, _____, _____, _____, _____

RULE: _____

7. 110, 180, 250, 320, _____, _____, _____, _____

RULE: _____

7 Teacher's Note: Students should be able to verbalize the rule in their own words.

Number Tower



Paul

I am going to make a number tower!

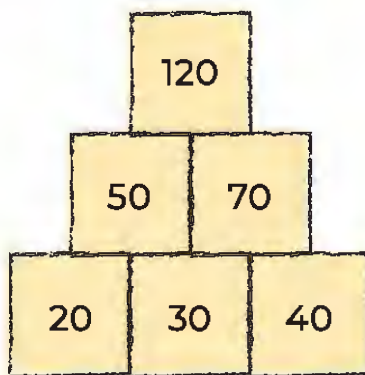
Is that so, how?



Sadrey Alam

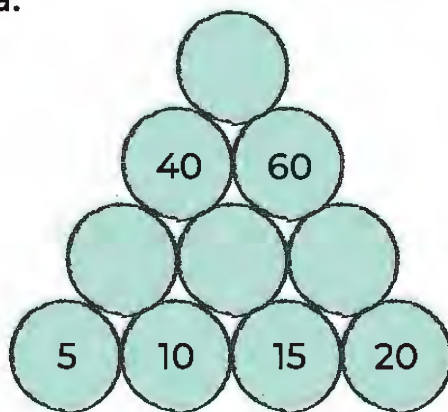


I will start from the bottom and get a number tower pattern like the one below. What is the rule I am using? ⁸

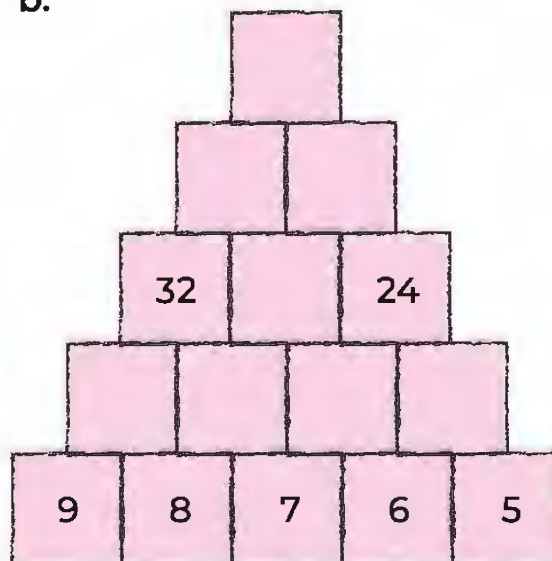


Using the same rule complete these number towers.

a.



b.



*** Teacher's Note:** Students should be able to describe the process and find the rule.

Number Games



Andrew

Let's play a number game

Sure! I know a nice one. Can you guess the number that I am thinking of? I will give you 3 clues.



Ashish



I'm ready! ⁹

Clue	
The number is greater than 50 and less than 100	
The number has 0 in the units place	
The number can be divided exactly by 7	



Andrew

I got it! Did you?

Wow! Drawing the clue really helps



Ashish

Teacher's Note: Students can come up with more games like this, please encourage them to record in pictures or words how they use the clues to come up with the right answer. They should learn to frame clear questions (for example, correct use of the word 'between', 'less than', etc.) so that there is no confusion in the clues given.

Patterns in the Calendar:

Left \longrightarrow Right

SUN	MON	TUE	WED	THU	FRI	SAT
	1	2	3			6
7		9		11	12	
	15		17			20
21		23		25	26	
	29		31			

Top
 \downarrow
Bottom

1. Moving left to right, the numbers are

2. Moving top to bottom, the numbers are

3. Moving along the yellow boxes, the numbers are

4. Moving along blue boxes, the numbers are ¹⁰

¹⁰ **Teacher's Note:** Students should recognize the pattern in which the dates are changing and describe the change in their own words.

9. Heavy and Light



On a Sunday morning, Pushpa accompanied her father to buy their monthly groceries from a nearby shop. She had written down the list that her mother gave her.

Pushpa gave the list to the shopkeeper and told him to give them the goods.



Pushpa, look at how the shopkeeper is weighing each item using his balance. Hold out the shopping bags that we brought from home.



Pushpa helped her father carry the shopping bags home.

Papa, I think my bag was heavier than yours; I carried the salt, sugar, tea leaves, masala and soap powder.



Is it Chhori? Just check the bill, details of weights and their prices are mentioned there.

General Store

	Items	Quantity	Rate	Price
1	Atta	5 kg	₹ 55	₹ 275
2	Masoor Dal	2 kg	₹ 49	₹ 98
3	Moong Dal	2 kg	₹ 160	₹ 320
4	Mustard Oil	3 kg	₹ 120	₹ 360
5	Salt	1 kg	₹ 19	₹ 19
6	Sugar	2 kg	₹ 68	₹ 136
7	Tea Leaves	1 kg	₹ 300	₹ 300
8	Masala	$\frac{1}{2}$ kg	₹ 540	₹ 270
9	Soap powder	2 packets	₹ 60	₹ 120
			Total	₹ 1898/-

Papa, the bill says soap powder 2 packets, how do we find out the weight?



Chhori, the weight is mentioned on the wrapper.



Oh yes, Papa. It is printed 1kg on each packet.



1. Create a pictograph from the list given by Pushpa's mother for the list of items to bring from market. Use a to show 1 kg. From the pictograph can you find out what the total weight carried by Pushpa's father is?
2. Who carried the heavier bag? Pushpa? Or her father?

3. From the pictograph, can you find out how much weight Pushpa carried home from the shop?

In the evening, Pushpa remembered the balance she saw in the shop.

Papa you know last year we have seen a hanger balance in class. I will also try to make my own balance.

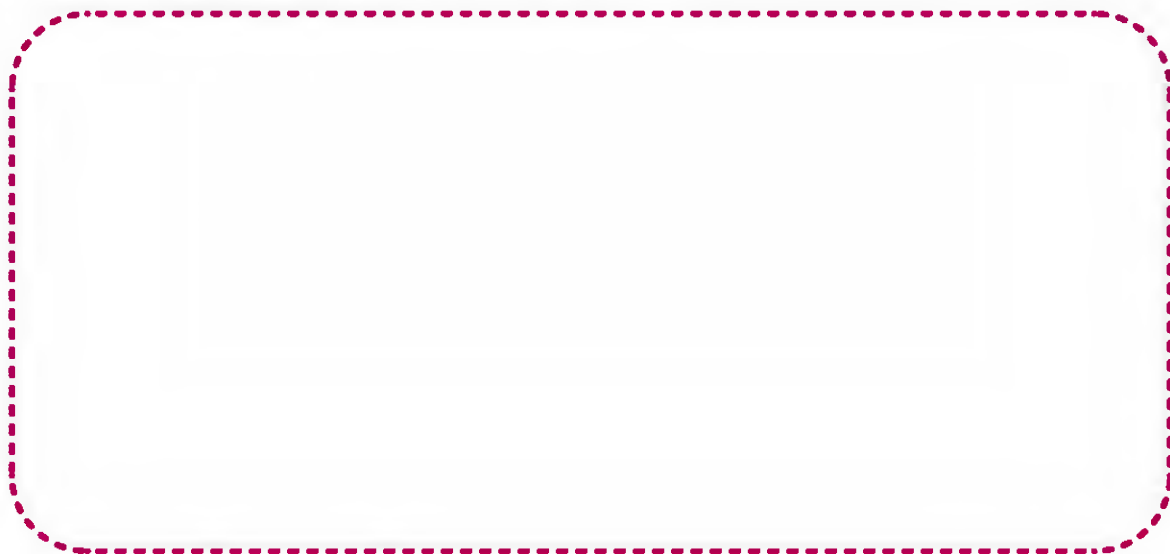


She collected a stick, two containers of the same material and size and a thick thread to make it.



Based on an activity conducted in Ramidham P.S. (West Sikkim)

 Now can you make your own balance and tell us how you made it? Also draw the picture of it below:



The next day, Pushpa took the balance to show it to her Mathematics teacher Ms. Priya. Her teacher was very happy to see her work.

Her friend Rishav wanted to test the balance by keeping his English book and his pencil box in the two pans of the balance.



Which pan do you think will go down? Which do you think is heavier?¹ Draw a picture to show this situation.

All of Pushpa's friends started measuring different objects from their bags and getting excited.



Make a list of things which you may find in your bag and make a table arranging them in order of their weights from lightest to heaviest.

Making weights

With this balance, I can compare the weights of objects and see which is heavier. But how can I know their weights? Teacher, can I make weights like I saw in the shop?



Pushpa, we could make weights using soap cakes, packets, sand, rubber bands and red sticker bindis.

¹ **Teacher's Note:** Students should be able to recall that the pan which goes down will have the heavier object. Please do plenty of practice with different objects to ensure this. They should also understand the concept of equal weights and how to balance the pan.

The class collected soap cakes and also the other materials.



The first soap cake weighs 50 grams (g).²

They took a small packet and put it on one pan and then slowly added sand in the packet to balance it.



So they got the weight of the packet and marked it as _____ g and closed it with the rubber band and labelled it with 1 sticker bindi.

Pushpa's class showed 50 g with 1 red sticker bindi.

Now they put the soap cake and plastic packet together in one of the pans.



² **Teacher's Note** : While grams are often represented by gm, the standard notation is g.

1. How many grams will both these weigh together? _____
2. If they fill sand in a packet placed in the other pan, until both pans balance, how many bindis should they put on it? What is the weight of this packet?

Now they made different weights like 150 g, 200 g, 250 g, 500 g and even 1000 g.

Fill in the table below to show how they made these weights? ³

Weight	Objects used
150 g	
200 g	
500 g	
750 g	
1000 g	



Today, we learnt a new thing.

1. Make a list of food items purchased at your home.

Sl No.	Food items	Quantity	Cost
1	Tomato	2 kg	
2	Chilly powder	50 g	
3			
4			
5			

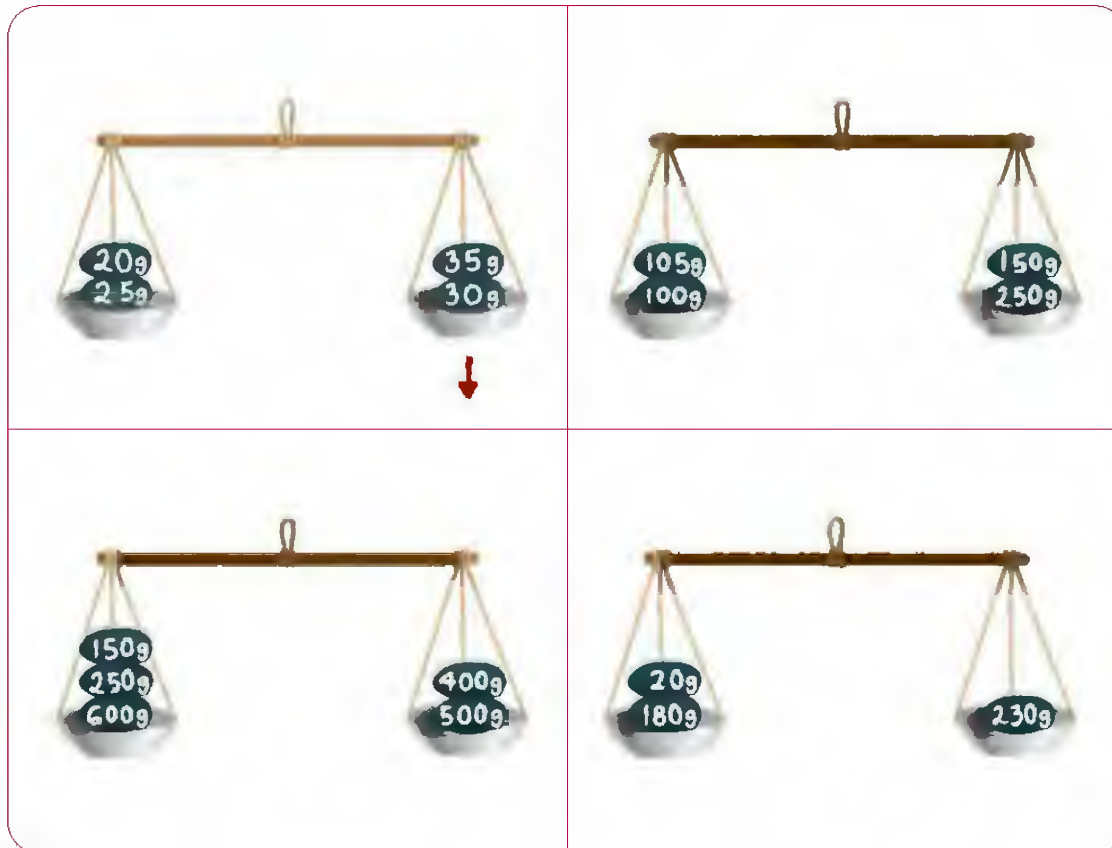
2. Can you make your own weights to weigh different things and note down their weights?⁴

³ **Teacher's Note** : Encourage the students to come up with their own ideas.

⁴ **Teacher's Note** : Discuss with the students what they will use as the unit weight (it need not be 50 g every time)

Practice Time

1. Which pan of the balance will go down, show it by drawing an arrow. The first one is shown here.



2. Find out if the weight on any of the pans in the above figures is equal to 1000 g. Mark it.

1000 grams = 1 Kilogram, We can write Kilogram as *kg*.



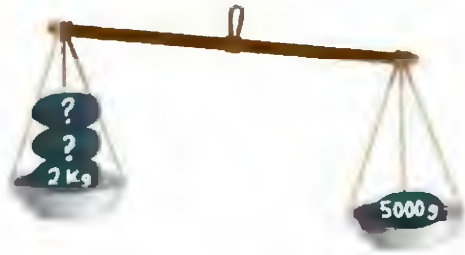
What weight can be placed in the left pan to make it balanced?

3 kilogram = _____ g



What weight should be added in the right pan to make it balanced?






$$2 \text{ kg} + \underline{\hspace{2cm}} = 1000 \text{ g} + 1000 \text{ g} + 500 \text{ g}$$



Right pan = 5000 g

What weights (in kg) should you place in the left pan to make it balanced?

3. In each box, write the unit of weight (*g* or *kg*) that should be used to measure the given objects.

At the Post Office

Asha and Hemlata go to the post office to send parcels.



Weight	Above 2000 Kms.
Upto 50 Gms	₹ 41.00
51 Grams to 200 Grams	₹ 83.00
201 Grams to 500 Grams	₹ 106.00
501 Grams to 1000 Grams	₹ 165.00
1001 Grams to 1500 Grams	₹ 224.00
1501 Grams to 2000 Grams	₹ 283.00
2001 Grams to 2500 Grams	₹ 342.00
2501 Grams to 3000 Grams	₹ 401.00
3001 Grams to 3500 Grams	₹ 460.00
3501 Grams to 4000 Grams	₹ 519.00
4001 Grams to 4500 Grams	₹ 578.00

1. Asha is sending books for her sister who studies in Kolkata through speed post. The books had a weight of $4\text{ kg } 500\text{ g}$. Find the cost of postage.
2. Hemlata is posting *rakhis* to her brother Kiran who stays in Mumbai. Find how much she has to pay for stamps if the weight of her package is 50 grams.

Addition and Subtraction of weights

A zoo in Sikkim had recorded the weights of all the animals. Three of the animals were ill and had to be taken to the veterinary clinic in a van.

Animal	Weight	Meaning
Red Panda	$6\text{ kg } 450\text{ g}$	Almost six and a half <i>kg</i>
Monkey	$7\text{ kg } 200\text{ g}$	Just above seven <i>kg</i>
Peacock	$5\text{ kg } 200\text{ g}$	Just above five <i>kg</i>

Estimate the total weight of the animals to be taken to the clinic.

To find actual total weight:

Add the weights in grams: $450\text{ g} + 200\text{ g} + 200\text{ g} = 850\text{ g}$

Add the weights in kilograms: $6\text{ kg} + 7\text{ kg} + 5\text{ kg} = 18\text{ kg}$

Total weight = $18\text{ kg } 850\text{ g}$

How close was your estimate?

By how much was the Red Panda heavier than the Peacock?

To find the difference in weight:

Subtract the weights in grams $450\text{ g} - 200\text{ g} = 250\text{ g}$

Subtract the weights in kilograms $6\text{ kg} - 5\text{ kg} = 1\text{ kg}$

So the difference in weight was $1\text{ kg } 250\text{ g}$

Practice Time

1. What is the number of weights of each weight needed to make it equal to 1 kg ?

1 kg	250 g	200 g	500 g

2. There are 20 packets of *Atta*. If each packet is 2 kg .
What is the total weight of the *Atta*?
3. Roshan purchased $3\text{ kg } 500\text{ g}$ rice and $1\text{ kg } 250\text{ g}$ sugar.
What is the total weight in his bag?
4. $20\text{ kg } 500\text{ g}$ fruit was collected to donate of which $10\text{ kg } 200\text{ g}$ was donated to the children's hospital and the remaining given to an old age home. How much was distributed to the old age home?

SWACHHATA ABHIYAN 2019

Eco Club students of DEORALI GOVT GIRLS SCHOOL WILL BE CLEANING DEORALI BAZAR SURROUNDINGS, STARTING FROM SCHOOL AREA TO SYARI ROYAL PLAZA, AND FROM PANI HOUSE TO GURDAWARA ON OCTOBER 2. TRASH WILL BE COLLECTED, SEGREGATED AND WEIGHED.

✦ The total trash collected in a week is 12 kg 500 g.

If Plastic bottles is 3 kg

Plastic packets is 4 kg

Cartons and card board is 2 kg,

find out the weight of the paper collected in that week.

✦ Can you think of some initiatives the students can do during their society campaign after this special Swachhata Abhiyan?



10. Pouring and Filling



Inter School Football Tournament

The sub-junior girls football team of Mangshila had gone to Mangan to participate in the inter-school match with Hee Gyathang school.



All the students carried their own water bottles and drank thirstily from them. Soon their bottles were empty. After the match, they got juice in glass bottles.



Sanjana

These bottles have 200 *ml*, 250 *ml* and 500 *ml* written on them. What does that mean?

The capacity of this bottle is 500 *ml*. That means it can hold that much juice.



Anup



Is 500 *ml* less than 1 litre?

The capacity of a container is how much it can hold.

Look! I am pouring the left over juice into my empty water bottle. Two 500 *ml* bottles have completely filled my 1 litre bottle!



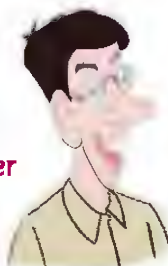
**500 *ml* + 500 *ml* = 1000 *ml*
So 1 litre = 1000 *ml***



Oh, so 200 *ml*, 250 *ml* and 500 *ml* are less than 1 litre.

Since 2 times 500 *ml* is 1000 *ml*, then is 500 *ml* equal to half a litre?

Teacher



Yes. 500 *ml* is $\frac{1}{2}$ litre





How many 250 *ml* bottles will fill a 1 litre bottle? Can you mark the 1 litre bottle in steps of 250 *ml*?

Now, can you write:

250 *ml* = _____ litre and 2000 *ml* = _____ litres

If you have to fill a 2 litre bottle using a 500 *ml* bottle, then how many times will you have to pour from the small bottle into the bigger bottle?



If we pour three times with a 500 *ml* bottle, then we have 1500 *ml*.

Then tell me, 1500 *ml* is how many litres?



Now, $1500 = 1000 + 500$, since 1000 *ml* is 1 litre and 500 *ml* is $\frac{1}{2}$ litre.

1500 *ml* = One and a half litre.

It's correct; Now complete this sentence.

2500 *ml* is _____ litres.



Teacher



Good to Know

These are containers used to measure the quantity of liquids like oil and milk.

Have you noticed the labels on these cans?

The liquids we buy are usually measured in litres and millilitres.



Teacher's Note: Students may need some introduction to the word liquids. Using plenty of examples (water, milk, honey, oil, kerosene) and non-examples (atta, leaves, vegetables) will help them.



If you are sick and you have to have medicine from a bottle, how much do you have at one time? Should you finish 1 litre in a week?



Sanjana, what time do you wake up in the morning? Do you drink water after you wake up?

I usually wake up at 5 o'clock and I take 2 glasses of water before going to school everyday.



Oh you don't drink milk then?

Yes, I do drink 1 glass of milk every day before going to bed.



- Like Sanjana, do you drink water in the morning? If yes, then how many *ml* of water do you drink??
- Like Sanjana do you drink milk? If yes, then how many *ml* of milk do you drink?
- How many litres of milk do you buy at your home every day? Write your answer in *ml*.

Making a measuring bottle

Now let's make our own measuring bottle.

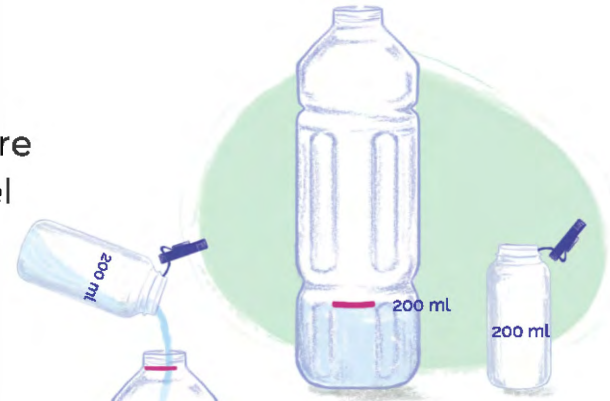
Step 1: Take a one litre bottle and a marker.



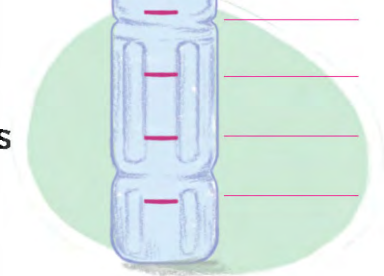
Step 2: Take one small bottle of capacity 200 *ml* and fill it with water.



Step 3: Pour this into the one litre bottle and mark the level using the marker.



Step 4: Repeat this and mark the level each time. Show the measurements on your bottle in the blanks provided here. ²



1. How many 200 *ml* made 1 litre?
2. If you wanted to make 10 marks on the 1 litre bottle, what would be the capacity of the small bottle that you take?

Activity:

1. Look at the buckets, mugs, and other such containers in your house. Guess the capacity of each. Check if your guess is right by filling them with your measuring bottle. Does this measuring bottle work for all the containers you can think of?

²**Teacher's Note:** Students may suggest that all the marks should read 200 ml, help them to understand that the marks are in steps of 200 ml and should be increasing as the water level rises.

	Millilitre	Litre
Jug		
Cup		
Pot		
Watering Can		
Your water bottle		
Spoon		
Water tank		




2. Find your own way to make a bottle which can measure 250 ml and 500 ml. Discuss with your friends and teacher how you made this.






a. You have a 4 litre can and a 5 litre can. How will you measure 2 litres using these cans?

b.  +  = 
Glass *Glass* *Jug*

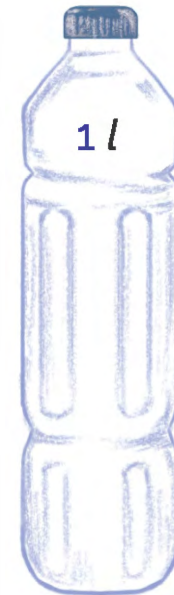
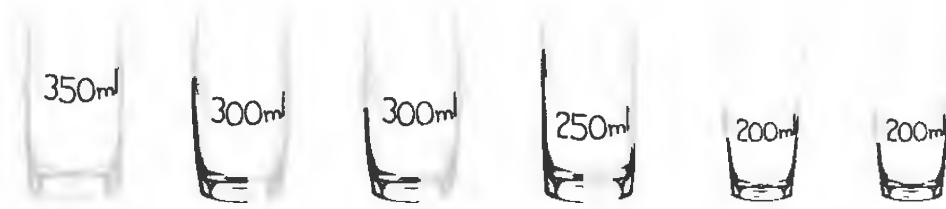
What is the capacity of one glass?

c.  +  = 
Gagro *Jug* *Bucket*

 +  = 
Drum

What is the capacity of the *gagro*?
 What is the capacity of the jug?

- d. Find as many ways as possible to fill the bottle using only these glasses.



Liquids for our Body

- Does your mother take a water bottle to work? An adult should drink about 3 litres a day. What is the capacity of her water bottle? On a day when she is at home, how many glasses of water does she drink per day?³

The following pictograph shows the amount of water which different children drink every day. The capacity of each glass is 200 *ml*.

	Quantity of water
Nima	
Reshmi	
Choden	
Nirmal	

³**Teacher's Note:** The answers to these questions can vary from child to child. Help them build the skills of estimation and approximation as they understand the capacity of the containers they use and the relationship between litre and millilitre.

1. How many *ml* of water does Choden drink?
2. Who drinks 1 litre of water a day?
3. Who drinks more than 1000 *ml* of water?
4. Who drinks more water- Nima or Reshmi? And by how much?

✂ Anish is making a cup of tea. He mixed 50 *ml* of milk with 100 *ml* of water.



1. What should the capacity of the teacup be?
2. Two guests came to his house, now he wants to make two cups of tea. How many *ml* of milk is required?
3. For five cups of tea, how many *ml* of water is required?




✂ For a healthy life style, the monthly intake of cooking oil must be less than 500 *ml* per person. For a four-member family, Anish uses about 5 teaspoon of oil to cook food for each meal. **1 teaspoon = 5 *ml***



1. How many ml of oil is he using?

Morning	Afternoon	Night	1 day	1 month

2. Should this family reduce the oil in their food? ⁴

 Anish is suffering from cough and cold. His sister mixed one teaspoon of honey (*putka ko maha* produced by stingless bee) with 150 ml of water. How much mixture will she get?

Making a Measuring Cup

Passang and his sister Pema help their parents to sweep and water their garden every morning. His father advises him to water the flowers and vegetables like this:



Tomato - 100 ml per plant
Cabbage - 200 ml per plant
Cauliflower - 250 ml per plant
Flower - 50 to 100 ml per plant



Passang! What are you thinking?

I want to make a measuring cup for watering the plants.



Passang

Pema



We can use this empty medicine bottle of capacity 25 ml and this empty cup.



***Teacher's Note:** Students should multiply their daily total by 30 and then check against the prescribed healthy intake for a four-member family. Discuss with them the idea that this is an approximation as the amount of oil can vary from meal to meal. Though they are not used to the idea of average, 5 ml is a rough estimate.



Ok, I filled it twice to mark 50 *ml* and four times to mark 100 *ml*. After I poured 8 bottles, the cup was filled.



1. Write the next 4 terms 25 *ml*, 50 *ml*, 75 *ml* , 100 *ml*,

2. What was the capacity of the cup? _____
3. 1 cup of water is enough for _____ tomato plants.
4. 5 cauliflower plants need _____ cups

Activity:

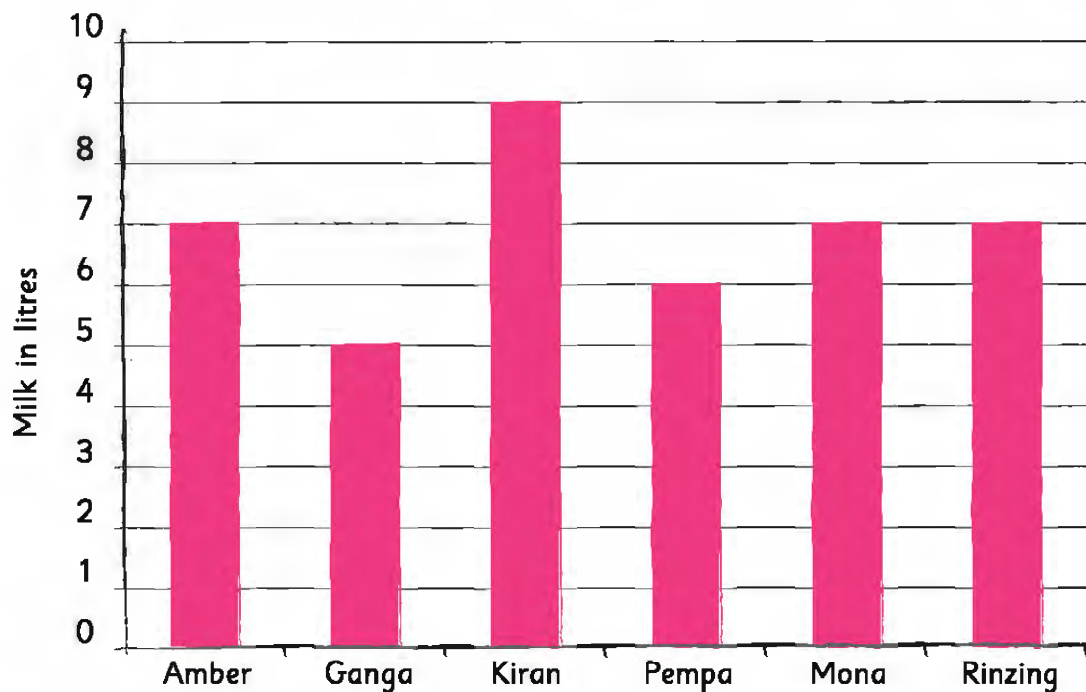
Passang waters the plants with water that he collects from a dripping tap. Collect and estimate the water wasted at your home in one night.

Dairy

The villagers of Timburbung who have cows, sell some of the milk they get to small families and bring the remaining to the dairy.



The graph gives the quantity of milk collected in the Dairy of Timburbung on a particular day.



1. What is the total quantity of milk collected on that day?
2. Who brought the most milk to the dairy?
3. Who brought the least milk to the dairy?
4. How much more milk does Kiran bring than Ganga?
5. A milk can has capacity of 20 litres, choose people who will pour all their milk into this can and fill it up.



If 280 *ml* of water is added to 750 *ml* of milk, will the total quantity be less or more than 1 litre?

Ration shop

We have Ration Shops near our houses where food grains (wheat, rice) sugar, kerosene etc. are available at lower cost for people having ration cards. The quantities that they can buy every month is printed on the cards.



Good to Know

Nowadays, people use cooking gas and electricity for household use. But earlier, kerosene stoves were used to cook food. Villagers still buy kerosene to light twigs and dried grass to cook feed for animals (kholay).

In a ration shop⁵ kerosene is kept in 20 l, 50 l and 100 l containers. All three containers are full. What is the total quantity of kerosene in the shop?



Teacher's Note: Please discuss the concept of ration shops with the children if they are not familiar with it.

- ✂ Each ration card holder can get only 2 litres of kerosene for a month. 30 people buy their quota that month. How much kerosene did the shopkeeper sell?

Draw the three cans and show how much is left in each of them. ⁶




Water Shortage

Due to a large number of tourists and many new hotels coming up, the demand for water is also increasing day by day. The authorities decide to provide water in tankers which bring it from some nearby sources.



***Teacher's Note:** This is an open-ended question and the correct answer should just indicate that 60 l have been sold. This can be taken from one container or some combination of the three containers.

 The capacity of one tanker is 1000 litres. Two tankers come to the city every day. If they provide 500 litres of water to each hotel, then how many hotels can get water every day?



How can a hotel reduce wastage of water?

11. Trip to Talkharka



Rohit and Srijana are visiting Talkharka, a village in East Sikkim with their father, Suraj.

The village has many beautiful homestays.

Rohit and Srijana are going to spend their holidays in a homestay called 'Rato Mato'.

On the way up to the homestay, they passed the river Kalikhola.



Srijana: The river is so clean here - fresh and wonderful!

Suraj: Yes, we take care of the river by not dumping our waste on the bank or in the water.

Rohit: Father! Is that the village we are going to?

Suraj: Yes. That is Talkharka.

Srijana: Oh! It's a tiny village.

Suraj: You might change your mind when you reach there. Have you noticed how things look small when seen from far off? ¹

¹**Teacher's Note:** Discuss with the students their observations after reading this statement. Have they noticed this and where? The questions can also stimulate discussion.



Far view of village

- ❏ If you measured the near end and the far end of the bridge in the picture, would the measurements be the same?
- ❏ If you measured the near end and the far end of the bridge in real life, would the measurements be the same?



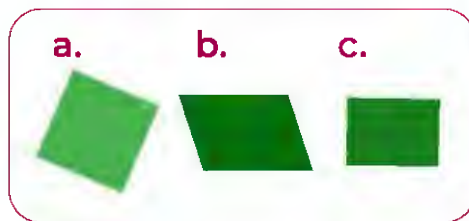
The further end looks narrower.

The children and their father continue on their journey.

Srijana: The roofs are so colourful!

Rohit: Can you tell me the colour and shape of the roof of the houses below the road?

Srijana: I can see a green roof. It looks like:



On walking further,

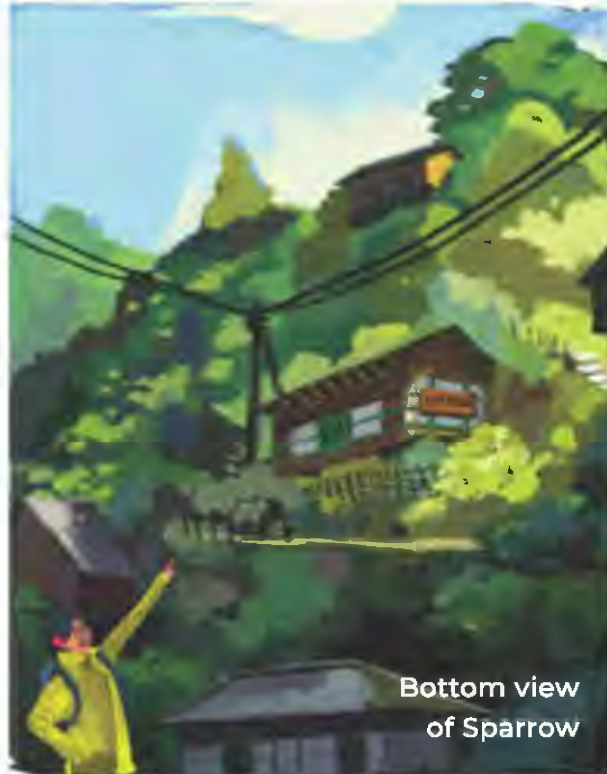
Rohit: Oh! Is that our homestay, Rato Mato?

Suraj: No, that is a homestay called Sparrow.


Suraj: Now, can you tell me the colour of the roof of Sparrow?

Rohit: Oh! We cannot see the roof from here.

Srijana: But why?



Bottom view
of Sparrow

 What do you think? Have you come across this kind of view any time?

They walk further up.

Srijana: Look! I can now see the roof of Sparrow!
It is my favorite color red. There is a nest on the roof
that we could not see from below.

Rohit: I can see many things from here that I could
not see earlier. But their shapes appear flatter,
depending on where I am standing and looking from.



Top view of
Sparrow

❏ Can you see a bench in the garden? Which shape does it look like? Can you see the legs of the bench?

At Rato Mato

Suraj: See children! This is Rato Mato! We have reached.

Rohit: Ambhoo! It looks so big from close up!

Srijana: Exactly!



Why do you think that the village of Talkharkha looked so small before they started climbing?

Front View

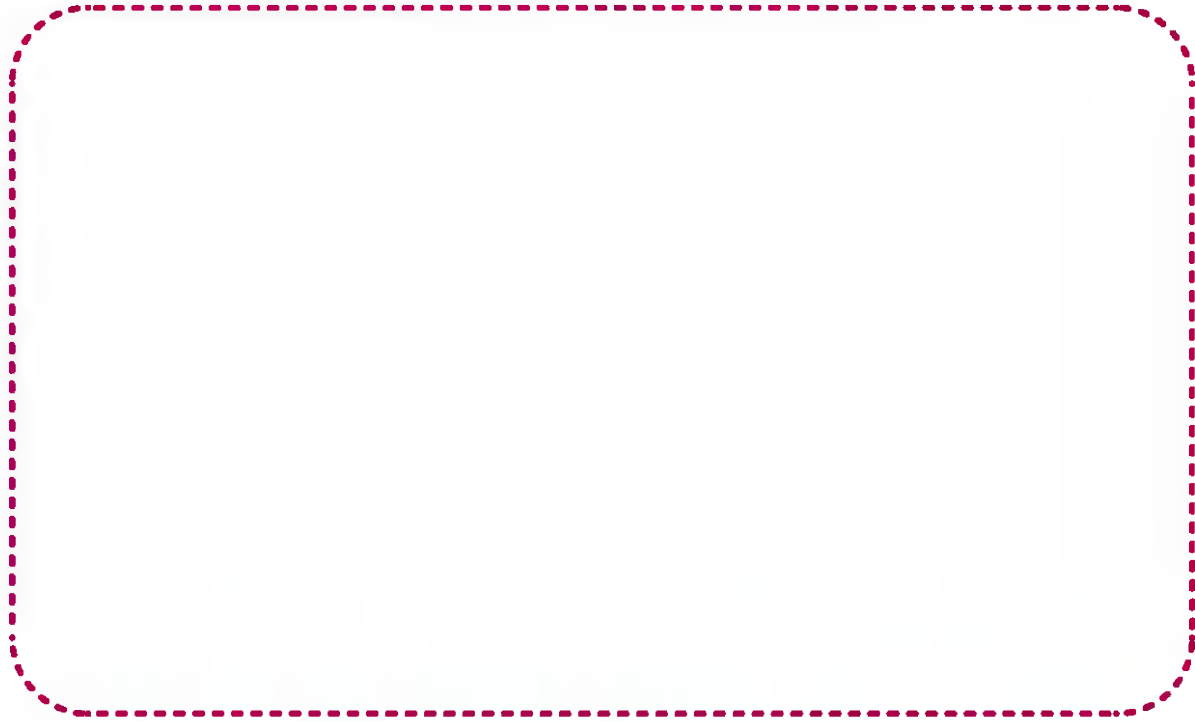
Side View

रतो माटो
RATOMATO

Views of Rato Mato seen from the lowest steps.

Practice Time

Draw the front view and the side view of the Rato Mato house. ²





Sunset at hilltop

Later that evening, the two children and their father climbed to the top of the hill to watch the sunset from the view point.

Suraj: Can you guess which place that is?

Srijana: No! Not at all Appa!

Suraj: That is the Kalikhola river.

Srijana: It looks like a ribbon from here.

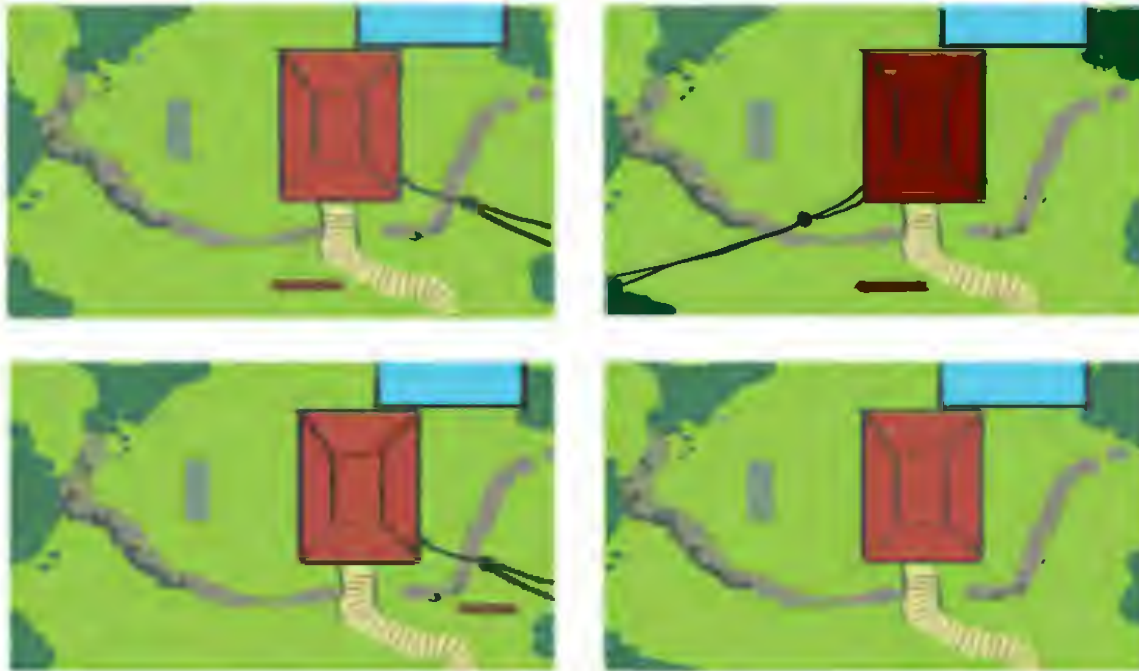
Rohit: What is the rectangular box that we see from here?

Suraj: It is the bridge we saw yesterday while at the river.

Srijana: What! It looks like a little box. It looked completely different yesterday.

Imagine how Rato Mato homestay looks from above.
One of the images given below is correct. Mark it.

[Hint: Notice the position of steps, sign board, entrance gate, shed, footpath and pole.]



Can you match the object with its top view?



Which do you think is the correct way to draw the table? Why?²



(a).



(b).

Do you think the legs of the table in picture (a) are the same?

Do you think that the two ends of the table in picture (b) are the same?

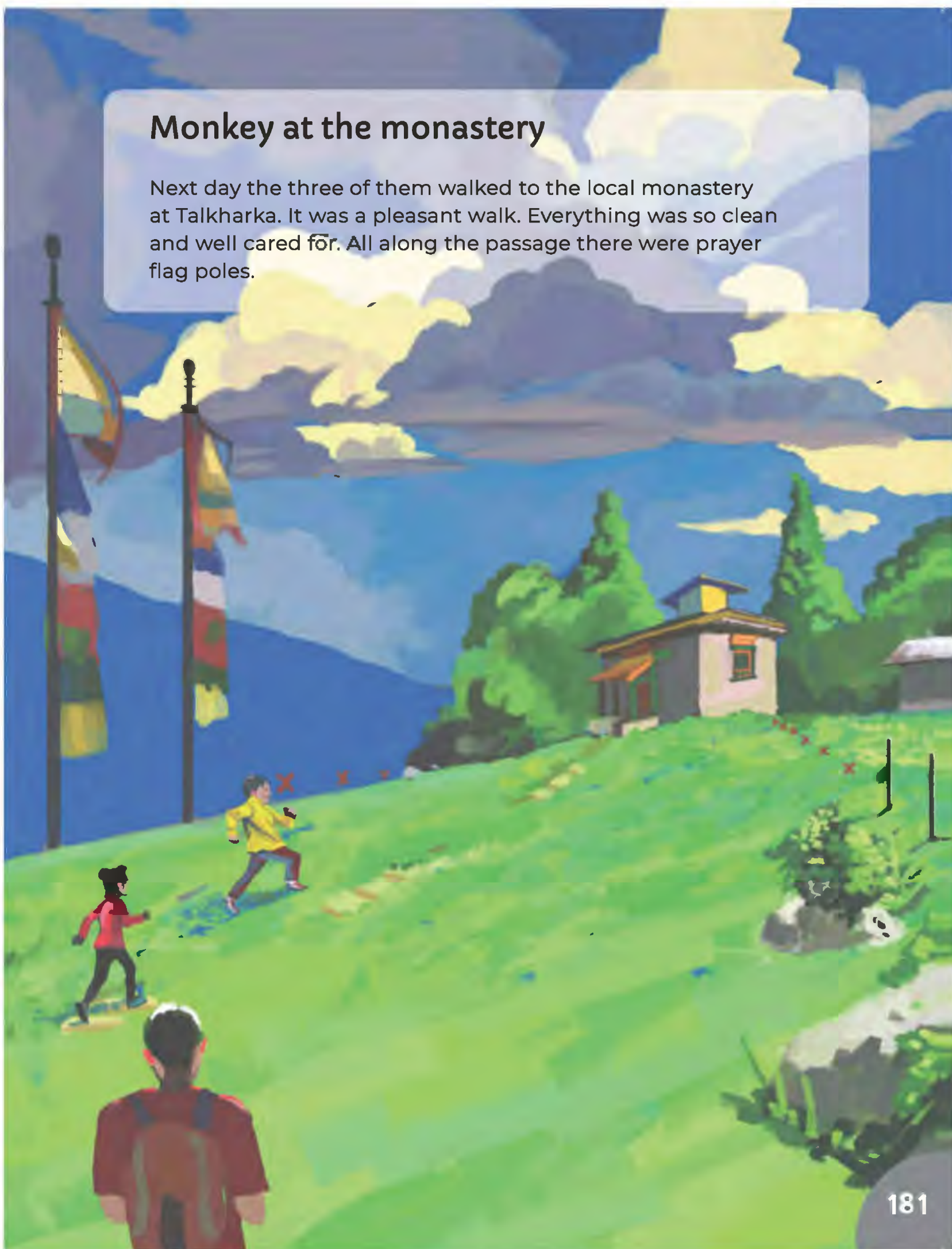
Draw the side view of a desk in your classroom.



²**Teacher's Note:** Students should be able to distinguish between front view (where only one face can be seen) and side view (where the front and one side can be seen) for a big object. Encourage them to draw the front and side view of objects around them.

Monkey at the monastery

Next day the three of them walked to the local monastery at Talkharka. It was a pleasant walk. Everything was so clean and well cared for. All along the passage there were prayer flag poles.



Srijana: What a beautiful monastery!

Suraj: Yes, it is one of the old gumpas in Sikkim. And it has been looked after well.

Srijana: Wow! Old gumpas look so beautiful.


Rohit: Do you see that monkey on that tall tree?

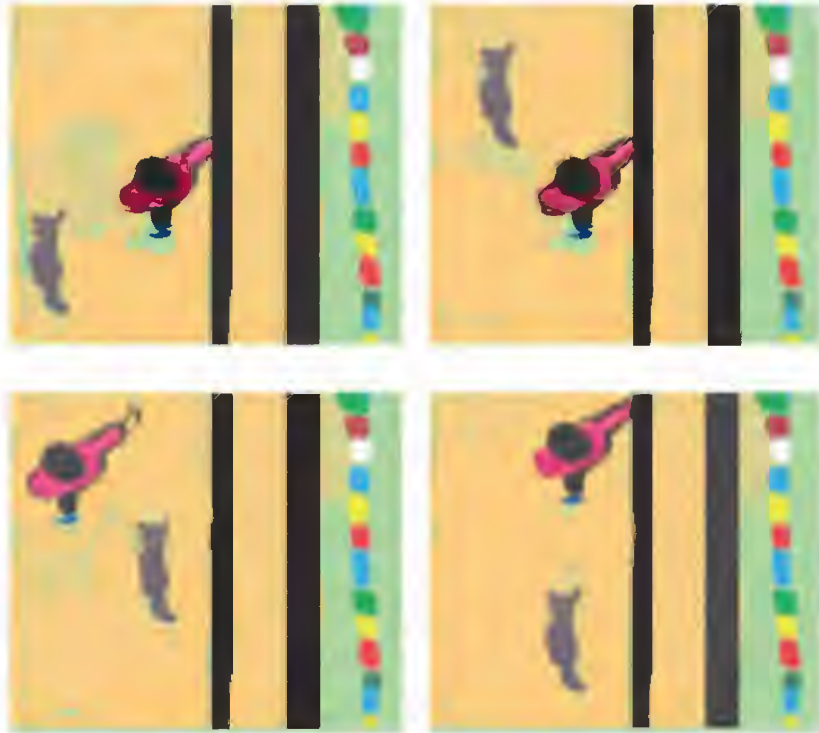
Suraj: What do you think the monastery looks like to the monkey?



Imagine what the monkey sees from the top of that tree. Which one is the correct view?



 This is the side view of Indu rotating *maney*. Only one of the top views below is the correct match. Mark it.



 This is the side view of Indu rotating *maney*, name the other views.



Srijana gets lost!

That afternoon, Srijana wants to see some local crafts and leaves Rato Mato to visit the homestay called Sonahkari, where bamboo craft is practiced.

Mr. Rai, their host, drops her there. After a day of interaction with craftsmen, Srijana forgets the way back. She calls up Rohit. Here are his instructions: From Sonahkari, walk straight on the path till you reach Sparrow, from there take a right turn and walk straight.

1. Do you think he made any mistakes? Can you correct him?
2. Where will she reach if she follows these instructions?
3. What are the other paths that Srijana can take to get back to Rato Mato? Can you give instructions?

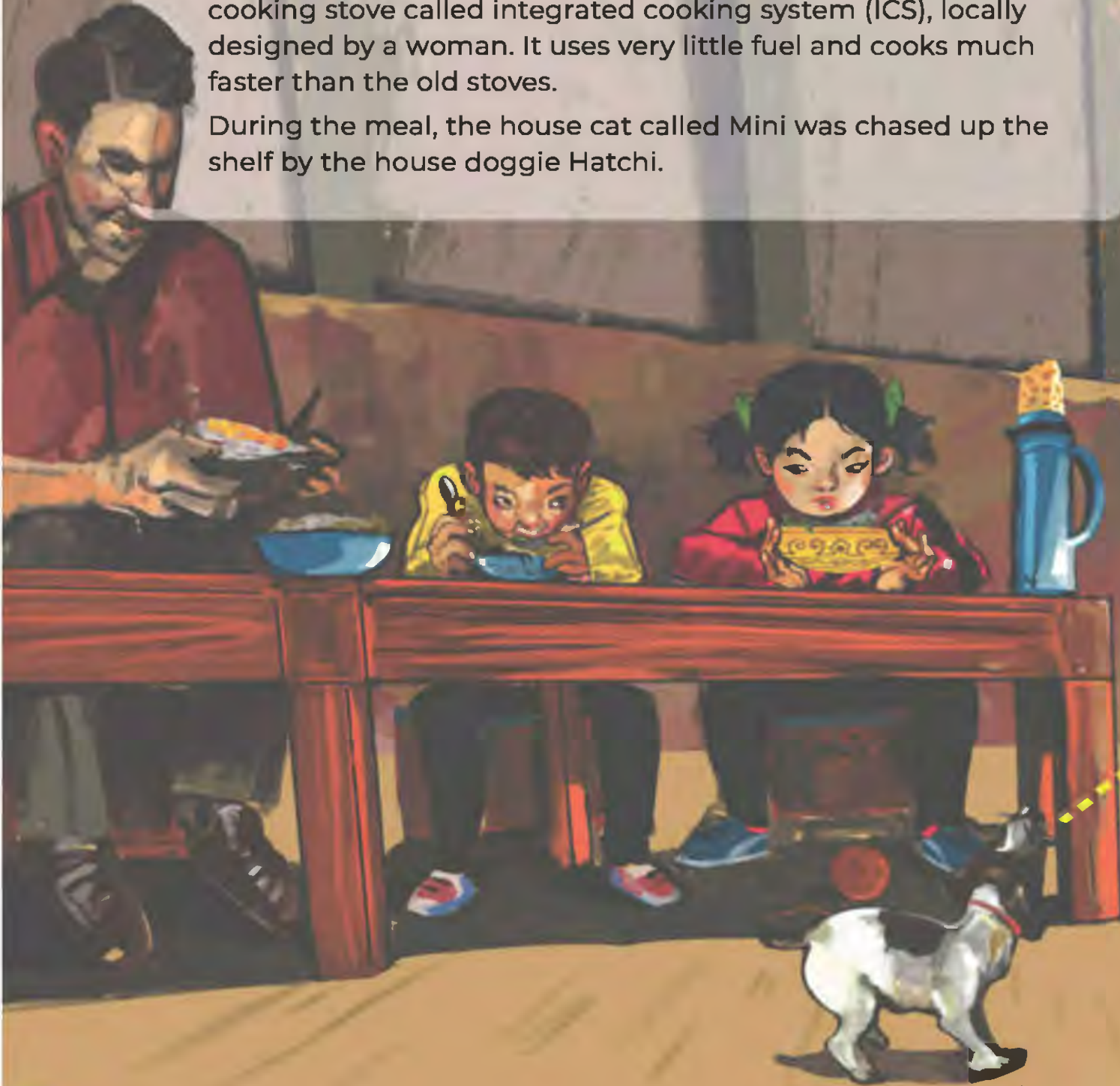


Lunch at Rato Mato

Next day, Mrs. Rai cooked the yummiest local food-*niguro*, *churpi*, *saag* and *gundruk* for them. They were served the food in the kitchen. Rohit's happiness knew no bounds.

The best part about their kitchen was this amazing new cooking stove called integrated cooking system (ICS), locally designed by a woman. It uses very little fuel and cooks much faster than the old stoves.

During the meal, the house cat called Mini was chased up the shelf by the house doggie Hatchi.





❏ Can you think why Mini could see the cheese on the jug but Hatchi could not?

❏ What is the view of the ICS for:

- Hatchi the dog
- Mini the cat

Treasure Hunt

Rohit and Srijana hid a treasure for their father somewhere in the farm near the homestay, Sparrow. Given below is the map they made and also the instructions they left behind. Help Suraj find the hidden treasure.

Instruction 1 : What is the gate closest to Paris homestay: _____

What is the gate closest to Primula homestay: _____

Instruction 2 : Draw a straight line connecting the gate closest to Paris to the gate closest to Primula homestay on the map.

Instruction 3 : Write the name of the flower growing on the right when you enter the farm through the gate nearest Paris.

Instruction 4 : Walk towards point D. What do you see on your left while you walk?

Instruction 5 : Take a right at the point D and walk on the pathway till the point where the drawn line meets the road. What object is on your:

a. Left _____

b. Right _____

Fill in the blanks to find out what the treasure is:





12. Tick-Tock!



It is a sunny Saturday and Tiara has woken up early because her grandparents are visiting after a long time. She calls them up at 8 o'clock and finds out that they have just left Turuk for Gangtok.



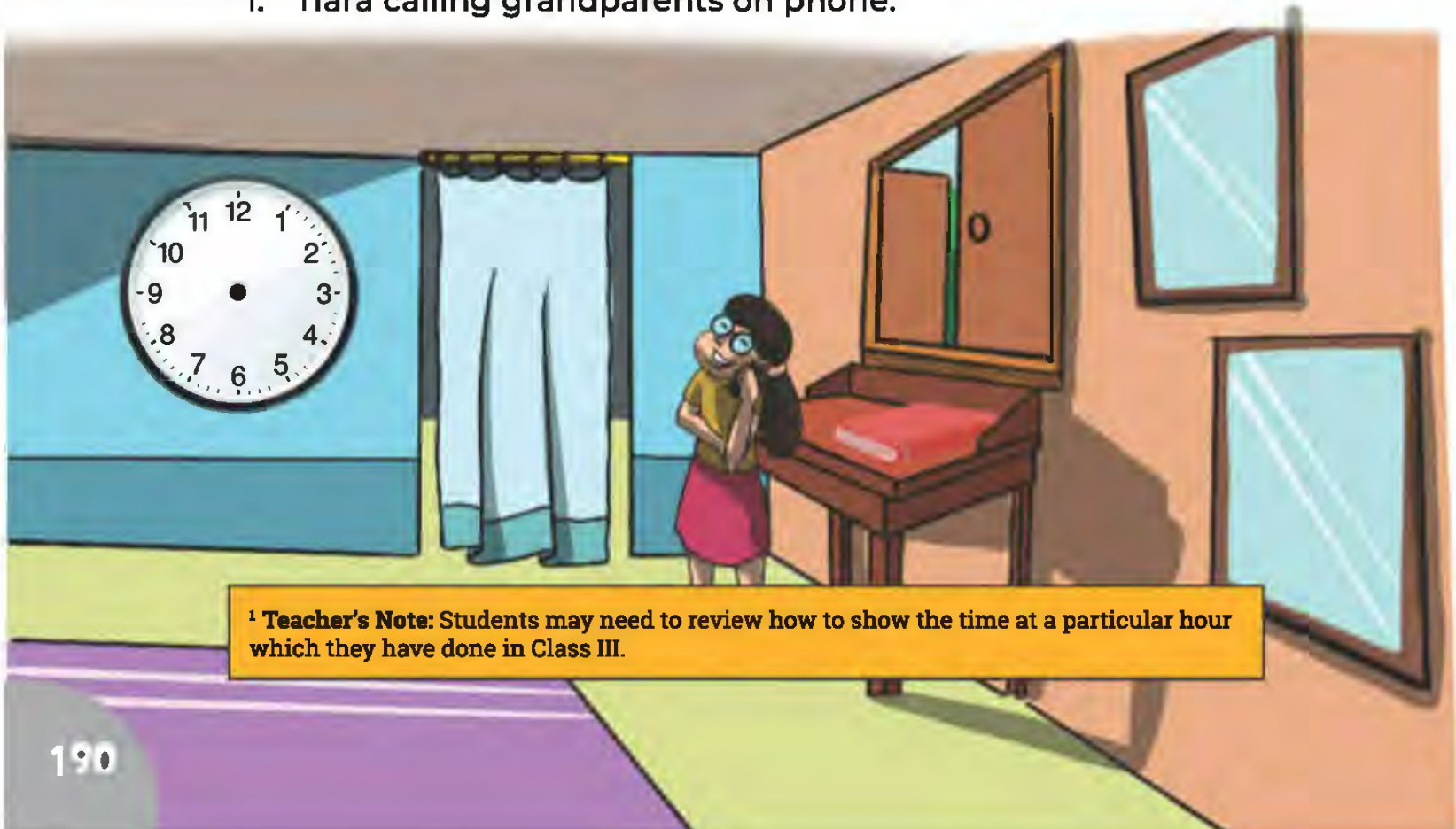
Oh! My grandparents will be here in three hours. I'd better hurry up and clean the room for them.

They arrive on time and there is so much excitement and happiness in the house.

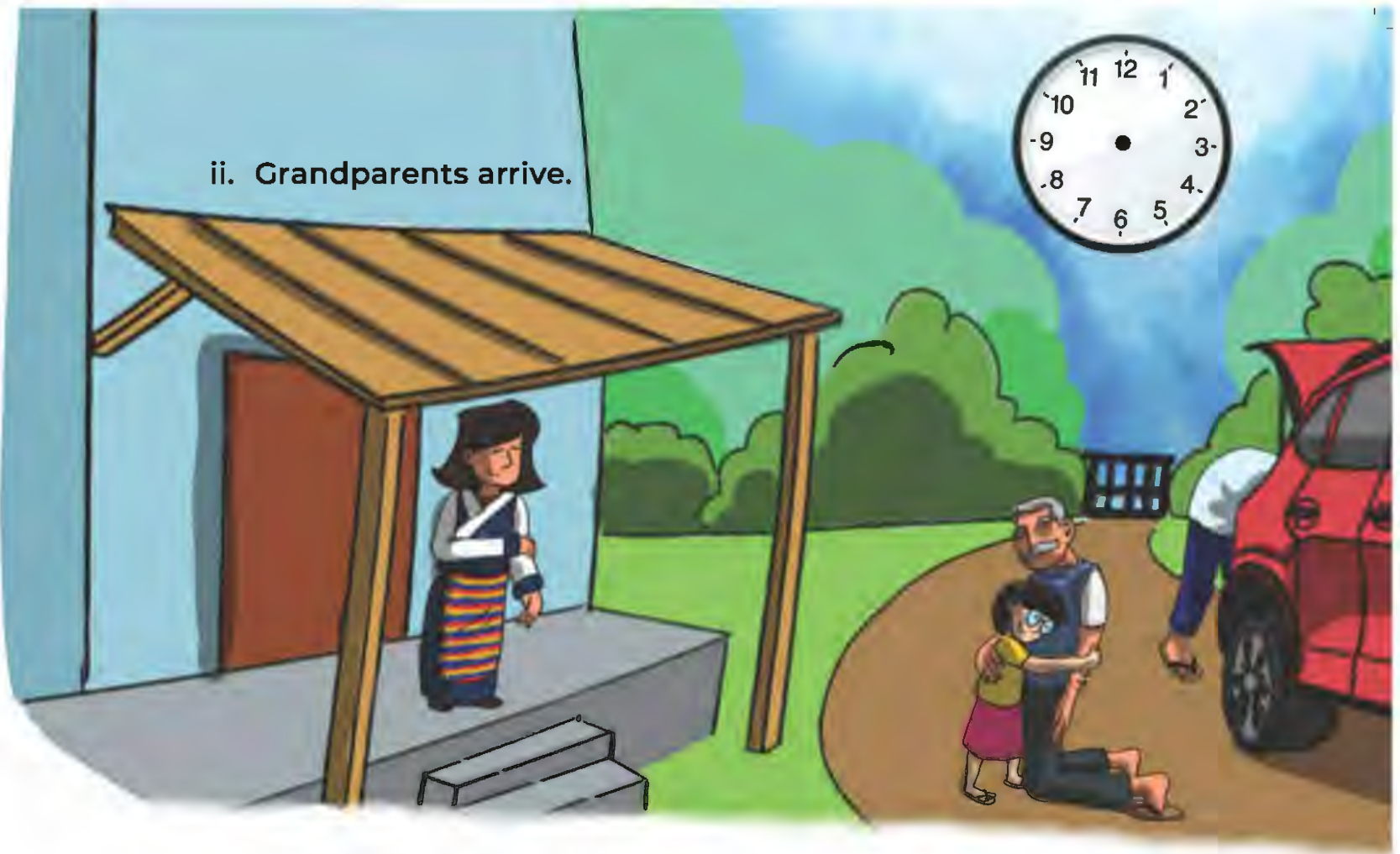
It takes an hour for them to settle down to lunch.

Look at the events below and draw the missing hour hand and minute hand in each clock to show the time of each event correctly.¹

- i. Tiara calling grandparents on phone.



¹ **Teacher's Note:** Students may need to review how to show the time at a particular hour which they have done in Class III.



iii. They all sit down for lunch.



School Timings

1. Draw the hour hand and the minute hand of the clock to show the time your school starts in the morning.



4. At what time did your school bell ring for the Morning Assembly today? _____
5. At what time will it ring for the Morning Assembly tomorrow? _____
6. How many hours are there between the Morning Assemblies of today and tomorrow? _____
7. Can you show the hours between the Morning Assemblies today and tomorrow on the number line below?

(Today)

(Tomorrow)




Mother

Azad Khan

1. Azad Khan leaves home for school at 8 o'clock every morning. But today, _____
2. By how much time was Azad Khan late today? ² _____

²Teacher's Note: Let the children draw their own conclusions about this question as they may or may not be familiar with 8:10. The discussion will open their understanding to the idea of minutes.

 In this clock, observe how the minute hand points to 12.

After a while observe that the minute hand has moved to 2.



a. 8:00



b. 8:10

Count how many markings the minute hand has moved as it changed from 12 to 2.

Each marking shows that one minute has passed. It is ten minutes past 8. It is written as 8:10. In the clock below draw the two hands and show the following:

a. 8:15 or quarter past 8.⁴



b. 8:30 or half past 8.



³**Teacher's Note:** It may be pointed out that the hour hand moves slower than the minute hand.

⁴**Teacher's Note:** Discuss the term 'quarter' and make the visual connection between the term and the quarter circle which has been covered by the minute hand when it is fifteen minutes past the hour.

c. 3 o'clock.



3:07 or seven minutes past 3.



d. 7 o'clock.



7:59



Observe a clock and write:

a. How many minutes have passed if the minute hand moves a full circle starting from 12 and back to 12 again?

















b. How does the hour hand move in this time?⁵

c. How many minutes are there in an hour?






Teacher's Note: Here students may say that it moves from any one number to the next depending on the time of observation. At this stage, they may be asked to revisit their answers in questions a to c above. They may now re-position the hour hand depending on how many minutes of the hour have passed. For example, at 8:30, the hour hand will be midway between 8 and 9.

Practice Time

1. Tick the clock which shows the time correctly:

5:02				
9:20				
1:17				
2:35				

2. Show the times for the following events on the clocks given alongside.

Sunrise	My mother or father goes to work at	Shop nearby opens at	I go to school at	I go to bed at
				

Describe in your own words where the hands of the first clock will point one hour after you see the sunrise.

Travelling by Train to Kolkata.

There is a lot of excitement in Yangchen's house. Her family has planned to go to Burdwan district to her neighbour Rukhsana's grandparents' home to celebrate Eid-ul-Fitr together. The two families sit together to choose a suitable train for their travel as there are quite a number of trains running between NJP and Kolkata. From Kolkata they have to catch a bus to Rukhsana's grandparents' home.



I found this timetable online.



Trains from New Jalpaiguri to Kolkata.

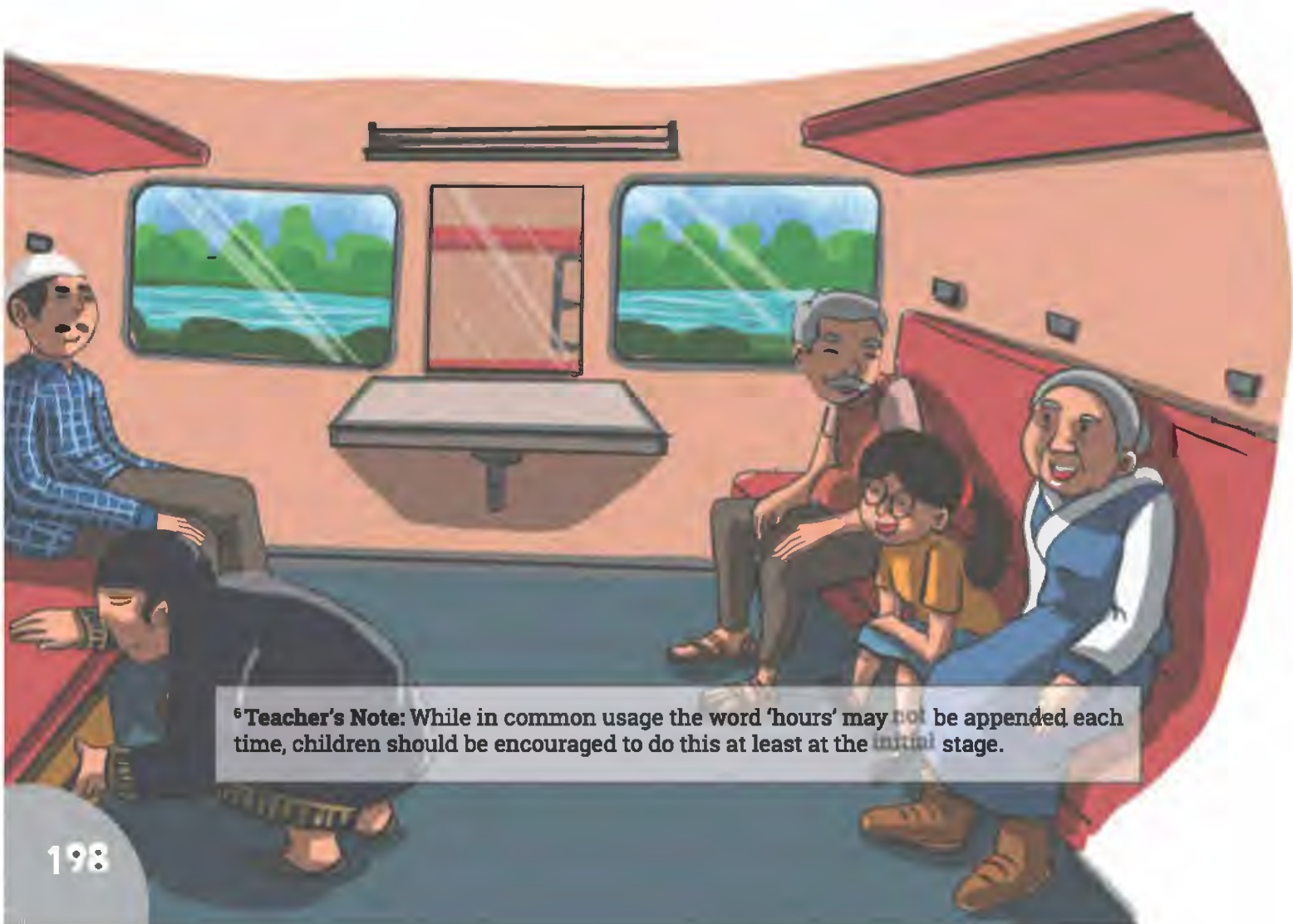
No.	Train No., Name, Run Days,	Departure Time Arrival Time	Travel Time
1	12344 DARJEELING MAIL Daily	NJP 20:00 SEALDAH 06:00	10 h
2	12042 SHATABDI EXPRESS Mon, Tue, Wed, Thu, Fri, Sat	NJP 05:30 HOWRAH 13: 35	08 h 05 min
3	13148 UTTAR BANGA EXPRESS Daily	NJP 18: 00 SEALDAH 05:15	11 h 15 min
4	12346 SARAIGHAT EXPRESS Daily	NJP 19: 35 HOWRAH 05:20	9 h 45 min
5	12378 PADATIK EXPRESS Daily	NJP 21: 00 SEALDAH 06:45	9 h 45 min

Yangchen and Rukhsana take a good look at the time table and cannot understand what some timings mean.



The Darjeeling Mail departs from NJP at 20:00 and arrives at Sealdah at 6:00. Appa, have they written the wrong timing for the departure of the train? How can the time be 20 o'clock?

Oh! No Yangchen, it means that the train departs from NJP at 8 in the night which is read as 20 hours in a 24 hour time system.⁶



⁶Teacher's Note: While in common usage the word 'hours' may not be appended each time, children should be encouraged to do this at least at the initial stage.

We know that there are 24 hours in a day.

Clock faces are marked 1 to 12 to depict the 12 hours and this is called the **12 hour system of time**.



Some institutions (like the Railways or Armed Forces, for example) follow the 24 hour system of time. Here, the day is not divided into two parts of 12 hours each.

Observe the clock below:

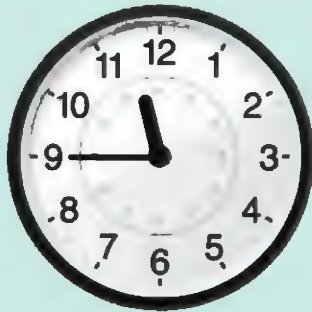


Start Time: 12 midnight or Zero Hour.

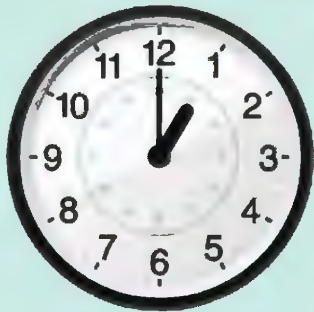
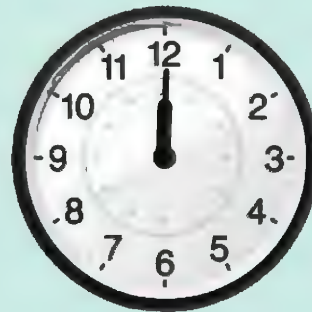
Time is written as the number of hours that have passed since midnight. Hence this is the way time is read in a 24 hour system of time.

1 in the night is 01: 00

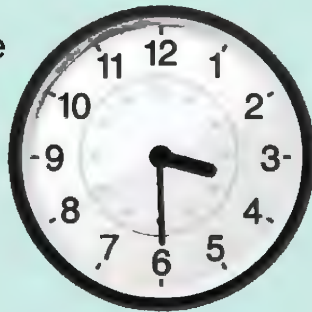
My flight is at 11 hours 45 minutes, I hope I get lunch on the plane.



11:45 (morning) is written as 11:45 hours. We continue the same as 12 in the afternoon. 12 noon is 12:00 hours



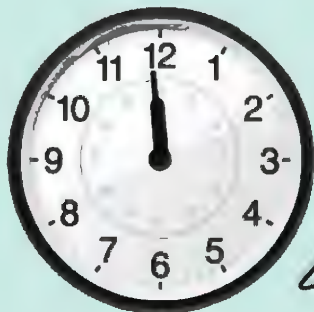
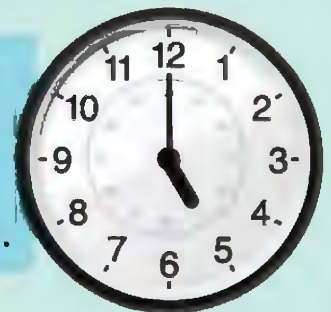
Lunch on the plane was served at 1 (afternoon) or 13:00 hours



The flight landed at 3:30 (afternoon) or 15:30 [fifteen thirty] hours



I have to report for duty at 17:00 hours. I can pick up my daughter from school and then go.



1 minute to my birthday tomorrow

11:59 at night is 23:59 hours

Now, observe the time in the first column and complete the table below:

Time by 12-hour clock	Time by 24-hour clock
3 o'clock in the afternoon	15:00 hours
5:30 in the evening	
8:30 in the night	
12 noon	

Finally, the group chose the Darjeeling Mail to go to Kolkata. Yangchen and Rukhsana reached Kolkata at 6 a.m. on Friday morning. Which day and at what time did they leave NJP station?

Morning or Evening?

This is Azad and Farida's wedding invitation card sent to Arun Kumar.

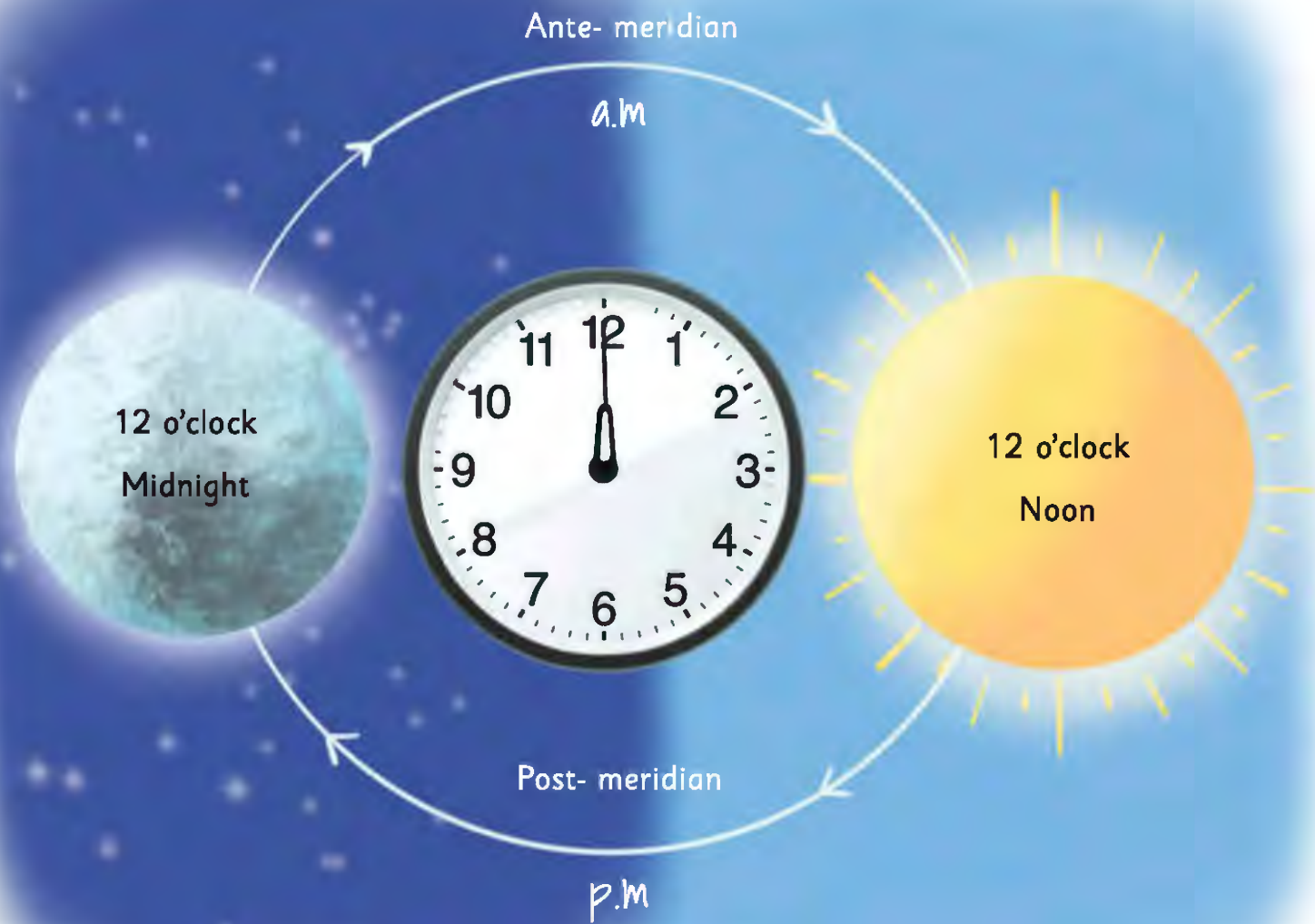
1. At what time is Arun invited for the wedding?
2. Is it morning or night time?





How do people refer to time in the morning and in the evening? ⁷

Look at the picture below.



11 o'clock in the morning is written as 11 a.m.

11 o'clock at night is written as 11 p.m.

When we see **a.m.** we know that it **is before mid-day** and when we see **p.m.** we know that it **is after mid-day.**

⁷ **Teacher's Note:** Elicit facts from students from the above drawing on understanding of midnight, mid-day or noon, a.m. and p.m.

 Make sentences with the following words or phrases:

a. 9 a.m. and 9 p.m.

b. Hour hand

c. Minute hand

d. After exactly 24 hours

Practice Time

1. Match the following

12 hours time system.	24 hours time system
9:00 p.m.	11:00 hrs
3:10 p.m.	17:00 hrs
5:00 p.m.	18:30 hrs
11:00 a.m.	21:00 hrs
6:30 p.m.	15:10 hrs

2. Complete the daily chart given below:

Activity	Time in am or pm	Time in 24- hour clock
Wakes up at 6 in the _____	6:00 a.m.	
Exercise at 6:30 in the morning		
Breakfast at 8 in the morning		
School assembly at _____ in the _____		9:00 hours
Lunch at 12:30 noon		
Play time 4:15 in the _____	4:15 p.m.	
Study time at 7 in the evening		
Dinner at 8:30 in the night		
Sleeps at _____ in the night		21: 00 hours

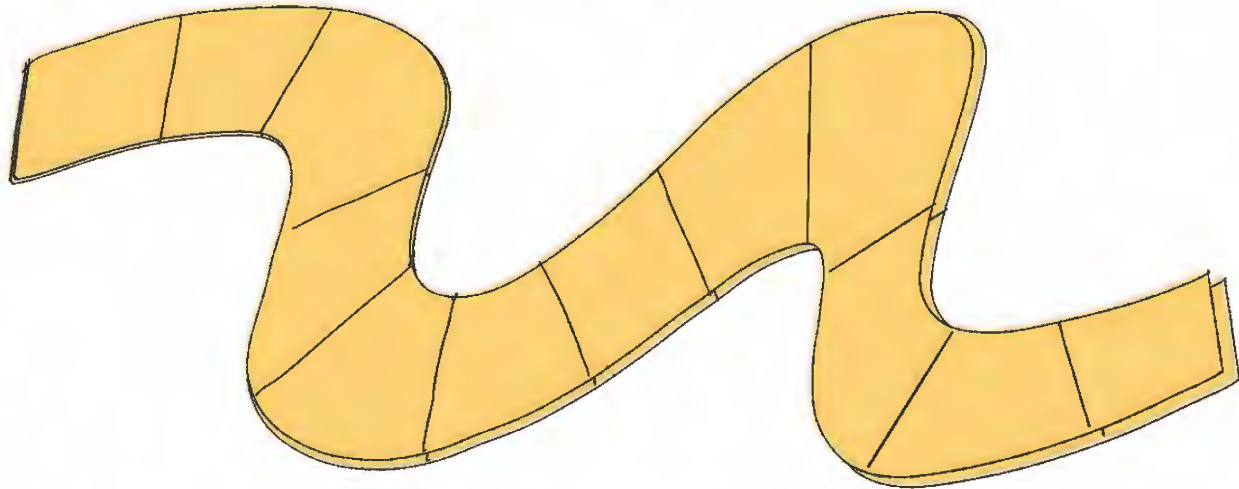
The _____ hour time system is used in places where specific times are used. Example: Railway station to avoid confusion in reading time.

The School Daily Routine

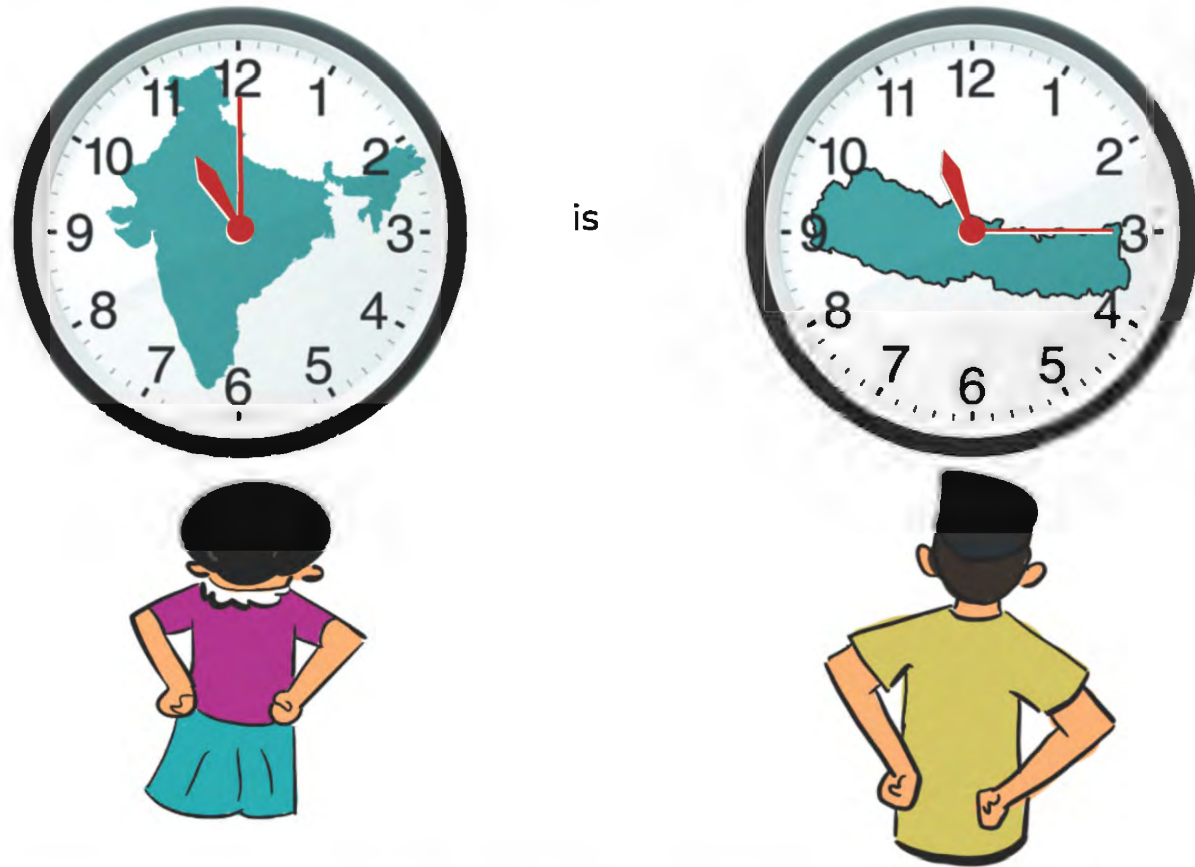
Fill in the timings for your school:

	Assembly	1st Period	2nd Period	Short Break	3rd Period	4th Period	Lunch Break	5th Period	6th Period
Start									
End									
Duration									

- How many minutes do you get to eat your midday meal?
Is the lunch break long enough for you to finish your midday meal?
- Prepare another routine of all the things that you do in 24 hours every day and write their times in order.











Different Places, Different Times



The time in Nepal is 15 min ahead of the time in India.

 Fill in the table given below with correct time of each country.

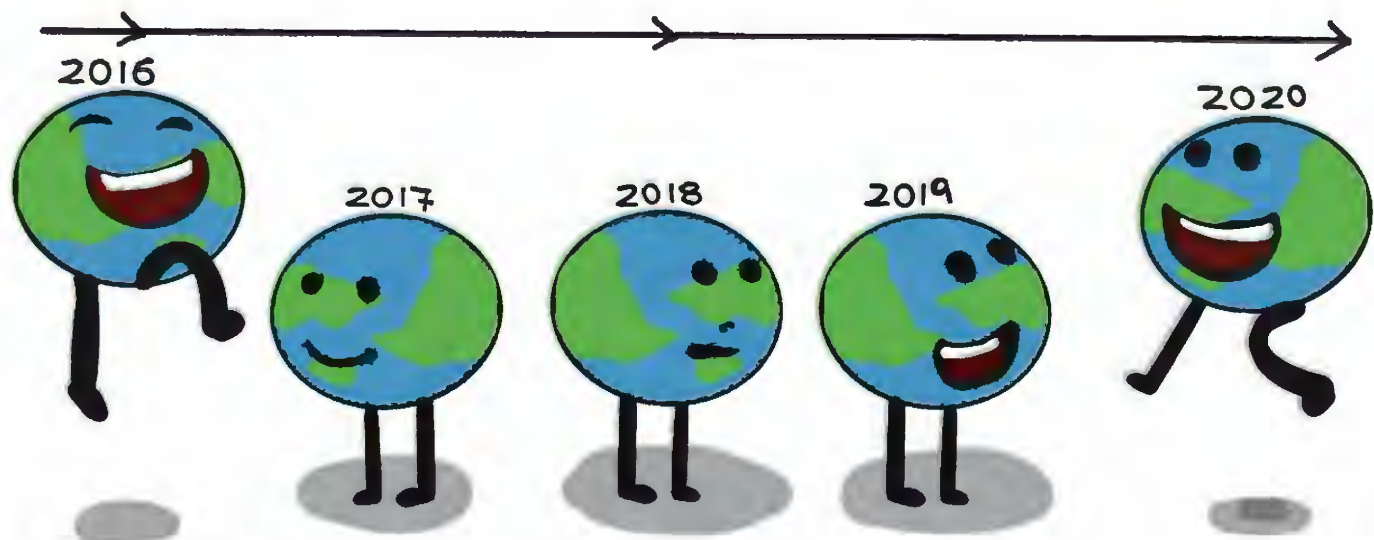
Time in India				
Time in Nepal				

 If it is 5:15 p.m in Nepal and the shops close in an hour, when is the closing time of shops in Nepal? What will be the time in India when the shops close in Nepal?

Years Do Leap!

Study the given calendars and spot the difference in the number of days:

FEBRUARY 2016					FEBRUARY 2019						
		7	14	21	28			3	10	17	24
1	8	15	22	29		4	11	18	25		
2	9	16	23			5	12	19	26		
3	10	17	24			6	13	20	27		
4	11	18	25			7	14	21	28		
5	12	19	26		1	8	15	22			
6	13	20	27		2	9	16	23			



There are 365 days and 6 hours in a year. We add up the 6 hours and every fourth year it makes 24 hours to make one more day.

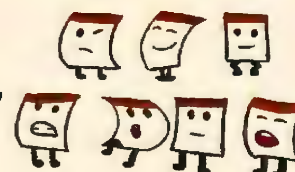
So for three years, every year has 365 days. Every fourth year has 366 days and is called a leap year.

- 2016 was a leap year. So the next leap year will be? _____
- Write the next 3 leap years: 2020 , _____, _____, _____
- Write the previous 3 leap years: _____, _____, _____, 2016

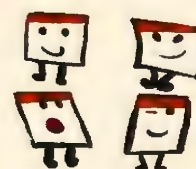
✂ The lines below can be sung in the popular rhyme
 'Old Mac Donald Had A Farm , E - I - E - I - O' tune. ⁸



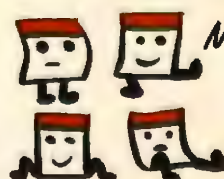
There are 7 days in a week,
 7 days in a week,
 Monday, Tuesday, Wednesday, Thursday,
 Friday, Saturday and Sunday.
 La..la...la..la



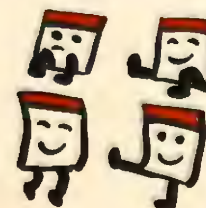
There are 4 weeks in a month, 4 weeks in a month,
 1st week, 2nd week, 3rd week, 4th week,
 4 weeks in a month.
 La..la..la..la



There are 12 months in a year,
 12 months in a year,
 January, February, March, April are the first four months
 There are 12 months in a year,
 12 months in a year,



May, June, July, August are the next four months
 There are 12 months in a year,
 12 months in a year,
 September, October, November,
 December are the last four months
 La..la..la..la



There're 365 days in a year, 365 days for 3 years,
 Leap once in every four years With 366 days!
 La..la..la..la



***Teacher's Note:** The tune above is a suggestion. You can recite or sing it in any tune that you like.

Days and Dates:

This is Ramon's birth certificate.

GOVERNMENT OF SIKKIM
CHIEF REGISTRAR OF BIRTHS & DEATHS HEALTH & FAMILY WELFARE DEPARTMENT
BIRTH CERTIFICATE

Certificate of Birth issued under section 12/17 of the Registration of Birth & Death Act, 1969.

This is to certify that the following information has been taken from the original record of Birth which is in the Register of Registration Centre Rhenock P.H.C. for Revenue Block/ Town Rhenock of North/ East/ South/ West District of Sikkim.

Name: <u>Ramon</u>	Sex: <u>Male</u>
Date of birth (in figures): <u>09/ 07/ 2009</u>	(in words): <u>9th July 2009</u>
Place of Birth: <u>Namchi</u>	Name of Mother: <u>Rebecca Joseph</u>
Name of Father: <u>Dominic Joseph</u>	Date of Registration: <u>10th July, 2009</u>
Registration Number: <u>187/09</u>	


Signature of issuing authority

And this is Azem's birth certificate.

GOVERNMENT OF SIKKIM
CHIEF REGISTRAR OF BIRTHS & DEATHS HEALTH & FAMILY WELFARE DEPARTMENT
BIRTH CERTIFICATE

Certificate of Birth issued under section 12/17 of the Registration of Birth & Death Act, 1969.

This is to certify that the following information has been taken from the original record of Birth which is in the Register of Registration Centre Rhenock P.H.C. for Revenue Block/ Town Rhenock of North/ East/ South/ West District of Sikkim.

Name: <u>Azem</u>	Sex: <u>Male</u>
Date of birth (in figures): <u>30/10/2009</u>	(in words): <u>30th October 2009</u>
Place of Birth: <u>Namchi</u>	Name of Mother: <u>Phurmit Lepcha</u>
Name of Father: <u>Pezang Tshering Lepcha</u>	Date of Registration: <u>30th October 2009</u>
Registration Number: <u>274/09</u>	


Signature of issuing authority

- a. Which year and month were they both born in?
When are their birthdays?
- b. Who is the elder of the two and by how much?

Good to Know

05/04/20 : This is called the DD/MM/YY way of writing the date.

DD: date MM: month YY: year

This is the 5th of April 2020

Have we passed this date? Can you write the date 10 years after this date?

Let us find:

1. August 5th is a Monday, write the dates of the next two Mondays.
2. Festivals are times of joy and unity .These are the festivals which take place during December in Sikkim according to the 2019 calendar.

<i>Barahimizong</i>	-	16 th December
<i>Sakewa</i>	-	16 th December
<i>Christmas</i>	-	25 th December
<i>Kagyed Dance</i>	-	25 th December
<i>Losoong/Namsoong</i>	-	27 th to 31 st December
<i>Tamu Lochar</i>	-	30 th December

- a. How many days after Barahimiziong does Tamu Lochar take place?
- b. How many days before Christmas and Kagyed Dance does Sakewa take place?
- c. By how many days is the Losoong/Namsoong festival longer than the other festivals?

Check the dates:

Fatimah went to a shop to buy a packet of dog biscuits on 25/09/2019. She read the details on the biscuit packet before buying it.

1. How old is the packet of biscuits?

Answer: _____months _____days

2. How many more days are left for it to be safe to eat?

Answer: _____months _____days.



***Teacher's Note:** Students may be asked to collect wrappers of different items and make a table of expiry periods for them.

Take Time to Love Your Pets.

Tiara had adopted a little, stray orphan puppy that had been abandoned by its mother. She had been informed about it by Ramu *kaka*, near whose *paan doka* the puppy had been born on February 29th 2016. When she took it home with her, it was April 5th 2016.

Tiara named the pup Sasha and took it to the nearby veterinary doctor to get its health check up done. The veterinary doctor gave her the details about its vaccination schedule.¹⁰



 The table below shows the time periods during which the puppy should receive vaccination for it to grow up hale and hearty.

<u>AGE</u>	<u>VACCINES</u>	
1. 6-8 weeks/ 1 1/2 - 2 months	DHPPiL *	DHPPiL - is a combination of vaccine to protect dogs against six different diseases namely: a. Canine Distemper b. Canine Hepatitis c. Canine Parvovirus d. Para- influenza virus e. Leptospirosis
2. 10-12 weeks/ 2 1/2 - 3 months	RABIES	
3. 10-12 weeks/ 3 1/2 - 4 months	DHPPiL	
4. Annual Vaccination	RABIES DHPPiL	

Vaccination Schedule of core vaccines required by all dogs and puppies.

¹⁰ **Teacher's Note:** Children should be introduced to the term Veterinary Doctor.

Can you answer the questions below?

- a. How old was the pup when she brought it home with her?

- b. Tiara took Sasha for the first DHPPil vaccination on 17th April 2016. How many days after she brought Sasha home did she take it for the vaccination? _____
- c. Write any date that was appropriate for Sasha to get her first rabies vaccination? _____
- d. On Sasha's first birthday Tiara gave her a big, juicy bone to chew on. On which date did Sasha turn 1 year old?

- e. What is unique about Sasha's birthday?

13. Rupees and Paise



Fuel for the car

Deepak from Kitam, South Sikkim is returning home after attending a wedding at Uttarey, West Sikkim. During the journey he stopped his car for petrol.



How much money are you paying, Baba?

I have to pay him ₹1500.

Bimla, please give him a ₹ 2000 note.



Anupam

Look! Tashi uncle, who also came from Kitam for the wedding is also at the pump. He too is giving a ₹ 2000 note. He is alone in the car, if we had travelled together, he would have saved money.



Yes son, you are right. We should try to travel together and reduce air pollution and save fuel. The journey becomes more enjoyable also!¹



Deepak



The meter on the pump shows 1500, then a dot and then 25. What does that mean?



Actually it is 1500 rupees and 25 paise. Nowadays, we don't carry these coins of 25 paise.



How much is 25 paise exactly? I had also seen a label of ₹ 425.50 on a medicine bottle.



I shall help you understand this once we reach home in the evening.



Yes, Baba.

¹ **Teacher's Note:** Teacher may extend this discussion on the advantage of minimising use of vehicles and how this has multiple benefits including the benefits of walking.

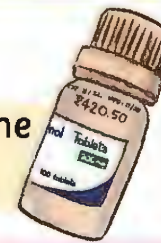
Good to Know

How do visually impaired people read currency notes?

The Reserve Bank of India says that the new currency notes in India of the denomination of ₹ 100 and above, already had "tactile markers and embossments" to help the visually challenged recognise the value of such notes. It will also help if the difference in the lengths and widths of each note in the denominations from ₹ 10 to ₹ 2,000 is atleast 1 cm.



Baba, this is the label on the medicine bottle that I was talking about.



We read this as 425 rupees and 50 paise.



What is 25 paise or 50 paise?

1 rupee is actually 100 paise. So, tell me how many 25s will make a 100?



There are _____ 25s in 100

Now, 1 Rupee = 100 paise

$$= \underline{\quad} + \underline{\quad} + \underline{\quad} + \underline{\quad}$$

$$= \underline{\quad} \times 25 \text{ p}$$

25 paise is $\frac{1}{4}$ of a rupee.

How much would 50 paise be?

$$1 \text{ Rupee} = 100 \text{ paise} = \underline{\quad} + \underline{\quad}$$



Oh then, 50 paise is half (or $\frac{1}{2}$) a rupee. So 25 paise is very little money.

Yes Anupam, you are right. But you know these amounts were much in use during our childhood time. Your grandparents used to do shopping with these little amounts.²



Good to Know

Paise (p)

Price list of items years back:

1 cup of tea = 5 p, 1 egg = 2 p, Pair of shoes = ₹ 3



Practice Time

Express these amounts in terms of Rupees and Paise. The first one has been done for you.³






i.	₹ 50.20	50 rupees and 20 paise
ii.	₹ 10.25	
iii.	₹ 105.15	
iv.	₹ 225.05	
v.	₹ 590.50	

²**Teacher's Note:** Teacher may extend this discussion as to why transactions with paise are not very common nowadays. Teacher may also lay emphasis on the importance of knowing paise even though children don't use them. Paise is a smaller unit of rupee. For reading a bank balance, interest on money deposited, mobile bills, price list, the knowledge and concept of paise is necessarily required.

³**Teacher's Note:** Teacher may involve children in knowing how to read the figures given above without getting them into the concept of decimals.

Let us find

How many such coins are needed to make one rupee? The first one has been done for you.

	$20\text{ p} + 20\text{ p} + 20\text{ p} + 20\text{ p} + 20\text{ p} = 100\text{ p} = ₹ 1$ So, 5 coins of 20 paise make 1 rupee
	
	
	
	

Anupam, I remember when we were very young, your three Kakas and I visited Rankey Mela in Namchi. We asked our grandfather for pocket money. Grandfather gave us ₹ 2 and asked us to share it equally between us. How much did we each receive?



Deepak

$₹ 2 = ₹ 1 + ₹ 1$
 $₹ 2 = 100\text{ p} + 100\text{ p} = 2 \times 100\text{ p}$
 $₹ 2 = 50\text{ p} + 50\text{ p} + 50\text{ p} + 50\text{ p}$
Each of you received 50 paise.



Anupam

You could also find it by division.
 $200\text{ p} \div 4 = 50\text{ p}.$ ⁴

Did you notice that to convert rupees to paise, you have to multiply by 100.



⁴ **Teacher's Note:** Teacher may also ask children to find this using repeated subtraction

You know, once my grandfather opened his kantoor (piggy bank). This money saved was used to help the needy. It had the following coins.



	Number of coins	Amount in Paise	Amount in Rupees
5 paise	100		
10 paise	20		
20 paise	10		
25 paise	40		
50 paise	20		
Total			



All together there are _____ coins. This must have been very heavy to carry in his pockets.

Yes, my grandfather decided to exchange these paise with rupees so that he didn't have to carry such a heavy bag.



There are 100 coins of 5 paise
This amounts to $100 \times 5 \text{ p} = 500 \text{ p}$

Now, let us find how many rupees are equal to 500 p = 5 x _____ p

$$500 \text{ p} = 100 \text{ p} + 100 \text{ p} + 100 \text{ p} + 100 \text{ p} + 100 \text{ p}$$

This gives $500 \text{ p} = ₹ 1 + ₹ 1 + ₹ 1 + ₹ 1 + ₹ 1$
 $= ₹ 5$ or
 $500 \div 100 = ₹ 5$



100 p is 1 rupee. The other way to say this is 1 p is $\frac{1}{100}$ of a rupee. So, 500 p will be $\frac{500}{100}$ rupees. You can save a lot of money by collecting these small coins in a Kantoor. Grandfather would have been able to help a lot of needy people.⁵

What if the total paise adds up to 250 p?



Let me try, $250 \text{ p} = 200 \text{ p} + 50 \text{ p}$
 $= 2 \times 100 \text{ p} + 50 \text{ p}$
 $= ₹ 2 \text{ and } 50 \text{ p}$



 Now, let us complete the table above to find the value of the coins in the *kantoor*.

Practice Time

Fill in the right value:

SL No.	Rupees	Paise
1	₹ 5	
2	₹	800 p
3		550 p

⁵ **Teacher's Note:** Students must understand the value of saving even small amounts.

Market Place

(Addition and Subtraction of Money)

Ruth and Mary went to the market with their father to shop for Christmas. They bought decorative lights and candles.



I know how it is read.

₹ 320.50 = ₹ 320 and 50 p

₹ 475.50 = ₹ 475 and 50 p

How is this added? I need to check the total. ⁶

Let us group Rupees together and Paise together and add them as shown below:

$$= ₹ 320 + ₹ 475 + 50 \text{ p} + 50 \text{ p}$$



I know, $50 \text{ p} + 50 \text{ p} = 100 \text{ p} = ₹ 1$

Yes, you are correct.

So, we shall write this below:

$$₹ 320 + ₹ 475 + ₹ 1 = ₹ 795 + ₹ 1 = ₹ 796$$



Teacher's Note: Students should be encouraged to check bills and spend money carefully.

Rupees	Paise
320	50
+ 475	+ 50
₹ 795	100
	100 p = ₹ 1
795 + 1 = ₹ 796	

In another shop they met Iqbal, their friend. He loved to draw and paint and he showed them the bill of what he had bought.



I would like to add this up and check the bill total.

₹ 49.99 = 49 rupees and 99 paise

₹ 29.99 = 29 rupees and 99 paise

= ₹ 49 + ₹ 29 + 99 p + 99 p

= ₹ 78 + 198 p

= ₹ 78 + 100 p + 98 p

= ₹ 78 + ₹ 1 + 98 p

= ₹ 79 + 98 p

Let us try it another way!



Rupees	Paise
49	99
+ 29	+ 99

Taking 1



Iqbal

This is how I would do it. I am going to add 1 paise to 49 rupees and 99 paise and make it 50 rupees as given under. Then I will have to add 29 rupees and 98 paise to 50 rupees. I get 79 rupees and 98 paise.

Rupees	Paise
49	100
+ 29	+ 98

By regrouping
100 p as 1 rupee

50	00
+ 29	+ 98

Total cost = ₹ 79.98

Which method did you like?

Iqbal paid ₹ 100 to the shopkeeper.

Here is the balance of ₹ 20.



Uncle, please make me understand the calculation for the balance.



Shopkeeper

Total cost = ₹ 79.98
 Cash given by you = ₹ 100
 So, I take ₹ 79.98 from ₹ 100



Rupees	Paise
100	00
- 79	- 98
99	100
100	- 98
- 79	
20	2

By regrouping
 ₹ 100 as ₹ 99
 and 100 p

Since 2 p is not in circulation, I gave you balance of ₹ 20.



Then he could have just made the prices ₹ 50 and ₹ 30. If 2 p was in circulation, I would have saved it up in my kantoor.

Activity:

Observe the price of the articles from the shop which Iqbal had gone to and find:

- Total price of pencil and scale
- Sum of costs of scale and sketch pen
- Mary had ₹ 20 and she wanted to buy a scale. Will she be able to buy it? Explain?
- If you had ₹ 100, what articles would you buy? How much money would the shopkeeper return?

RATE CARD	
Drawing Book	₹ 49.99
Paint Box	₹ 29.99
Pencil	₹ 2
Scale	₹ 25.55
Sketch pen pack	₹ 16.50



Let us get back to Grandfather's days and see how they calculated with money:

1. Sevika's Uncle gave her ₹ 15.50 and her Aunt gave her ₹ 10.50 as a blessing during *Dasami tika*.

What is the total amount of money that Sevika received?

Amount given by Sevika's Uncle = _____

Amount given by Sevika's Aunt = _____

Total Amount = _____

2. Amman had ₹ 125.25 in his *kantoor*. His mother gave him ₹ 12.75 to save.

What is the total amount Amman saved?

3. For *Id*, Salim purchased vegetables for ₹ 32.50 and fruits for ₹ 27.50.

How much money was spent by Salim in buying vegetables and fruits?

4. Lekhika went to the market to buy potatoes for lunch for the *khetalas*. Her mother had given her ₹ 50. She spent ₹ 30.50 to buy potatoes.

How much money was she left with?

Money with Lekhika = _____

Money spent = _____

Money remaining = _____

5. For a relief fund collection, Khandu village collected ₹ 372.75 and Shankhu village made a collection of ₹ 500. They spent ₹ 10.50 as taxi fare to reach the nearby bank for depositing the amount.

How much money did they deposit? _____

Activity:

- Look for the cost of vegetables or groceries in the newspaper. Make a list of 5 items you would want to buy and find its total.
- Given below is a list of items that you need to buy. Estimate the cost of each item. Now, based on your estimate, how much money would you take along with you?

Items	Price
Pen	
Sketch pen	
Eraser	
Pencil	
Chart paper	
Sharpener	

Cost of Many

NUSS (Nagarik Uthan Sewa Sansthan) is an NGO in Rhenock. It provides help to the needy people across the state and also outside it. Once, they distributed 30 umbrellas to school children who were from poor families.

If one umbrella costs ₹ 200, then what is the cost of 30 umbrellas? ⁷



If 1 umbrella costs ₹ 200,
then 3 umbrellas cost _____

And so 30 umbrellas cost _____



⁷Teacher's Note: Encourage students to solve this problem in different ways. One way has been suggested.

Practice Time

1.



Nayuma

Please buy 20 packets of mixed nuts to distribute in the orphanage near our house for our daughter Yuyuma's birthday.⁸

Each packet costs ₹ 50, so we will need _____

Cost of 1 packet = ₹ 50

Cost of 20 packets = $20 \times ₹ 50 =$ _____.



Anurag

2. The taxi fare for Yankila's trip is ₹ 60. Yankila had a ₹ 100 note and two ₹ 10 notes. But the driver did not have ₹ 10 or ₹ 20 notes. How can you help the driver and Yankila to settle the problem?



Yankila

Yankila has to give one ₹ 10 note to the driver uncle along with the ₹ 100 note.

But the fare is only ₹ 60. Yankila is paying
 $₹ 100 + ₹ 10 =$ _____



Yasana



Provash

Yankila has paid ₹ 110. Driver uncle has to give her a ₹ 50 note as change.
 $₹ 110 - ₹ 50 = ₹ 60$

***Teacher's Note:** Students should be encouraged to find different ways to do this multiplication. They should discuss which is the quickest way and why this works.

- A group of 8 friends from Daramdin decided to go to Gangtok to see the finals of the Governor's Gold Cup football match. If the fare of one person from Daramdin to Gangtok is ₹ 250, then how much money do they need to pay as fare for 8 people?
- A teacher decided to gift the children of her class a diary each on Children's Day. If the cost of one diary is ₹ 60, then how much does she need to spend for 25 students?⁹

Welfare Society

Tarpin Secondary School in East Sikkim has 20 Staff members in all. They formed a Welfare Society to improve public health, animal health and environmental health and contributed ₹ 50 per person per month.

- How much money was collected after six months?

Months	Amount per person	Amount from 20 members
February	₹ 50	
March		
April		
May		
June		
July		
Total money collected		

⁹**Teacher's Note:** Teacher may ask similar questions from his/her end for children to practice multiple costs from a unit cost and also ways to get change when notes of certain denominations are not available.

2. If the co-ordinator of the Welfare Society wanted to exchange the money collected with ₹ 2000 currency notes, then how many such currency notes does she receive for ₹ 6000?

$$₹ 6000 = \underline{\hspace{2cm}} + \underline{\hspace{2cm}} + \underline{\hspace{2cm}}$$

There are notes of ₹ 2000.

3. The society spent money as given in the details:

Children's health	₹ 2500
Eco club	₹ 1000
Feeding stray dogs	₹ 800
Awareness programme on disaster management	₹ 1200
Total expense	

- For which of the above categories is the society spending the most?
- For which of the above categories is the expenditure the least?
- How much money is left with the society at the end of six months when all these activities had been conducted?



Jyoti madam

Let us make ₹ 1000 and ₹ 2000

Earlier we had 1000 rupee notes but then it was banned in the year 2016.

Which currency notes and how many of each do you need to get ₹ 1000



Norbu

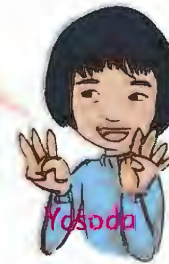
Ten notes of ₹ 100



Jahangir

I can take 5 notes of ₹ 200

we can take 3 notes of ₹ 200 and 4 notes of ₹ 100



Yasoda



Fill this table below as per your combinations.

Name of students	Combinations for ₹ 1000	Combinations for ₹ 2000
Marina	5 notes of ₹ 100 and 10 notes of ₹ 50	4 notes of ₹ 500



Children, you can see that bigger amounts like ₹ 1000 and ₹ 2000 can be made from smaller amounts.

Suppose we thought of ways to collect ₹ 1000. How would the class like to spend it?



Cake!



A picnic!



Posters for
the classroom!



Colours
and paints!



What good ideas you all have. Let's try to do a bit of each! For our classroom, let's buy some chart paper and colours so that we can make colourful posters.

Let's spend some money on fruits to eat.

And let's help our peon uncle get his motor cycle repaired with some of the money.

If we plan well, we could get a lot done with the money.¹⁰

¹⁰ **Teacher's Note:** Teachers may give project work both on planning how to raise money (collecting and selling old newspapers, growing and selling fruits and vegetables, etc.) and how to spend money. Children should understand the idea of making a plan and in giving priority to different areas such as healthy eating, learning through play and helping others. They can also collect data about their own family budget.

Teachers' Page

• Shapes and Spatial Understanding •

Spatial understanding is an important mathematical ability that children need to develop at an early age. Cognitive skills must be developed in order to understand objects in terms of its space occupancy, its views from different positions and its mathematical aspects. Most children have difficulties with this skill. Pedagogical strategies such as the exploration of objects and space through touch and sight helps them to recognise spatial features and construct mental and visual representations of shapes and arrangements in space.

Chapter 1: Looking at Shapes

In early primary, students should be able to recognise figures of 'the same shape' and differentiate between simple shapes. By class IV, they should recognise that the word 'shape' refers to both a 2D (rectangle, square, triangle, circle) and 3D (cube, cuboid, sphere, cylinder) attribute and so understand, for example, that a cube and a square are different shapes with different names. They should be able to match the 2D shapes with the faces of standard 3D shapes. At this stage, students should also be able to decompose more complex shapes into simpler ones and vice-versa. They should understand that rotating a shape does not change its attributes.

The chapter gives plenty of examples for all this, using free play and experimentation which allows children to realise their creative potential, at the same time helping them to communicate their growing understanding explicitly and confidently. For example, composing figures using tangrams and identifying the properties of the shape thus formed, tracing and cutting shapes and identifying shapes within shapes. Further ideas for teachers would be drawing shapes on dot sheets and connecting lines within the shapes to decompose them. While students understand at this level, that the same shape can be of different sizes, as they move to upper primary, an understanding of the properties of a shape and the ability to classify, distinguish and compare shapes develops.

Possible ESD connects can be developed using visits to local tourist spot and handicrafts centre, with carefully designed activities to identify and differentiate between shapes. Students could also be encouraged to observe, and record shapes encountered during cooking and while playing games. Do avoid stereotyping gender-based roles in these activities.

Chapter 3: How Long? How Far? How Wide?

The bigger idea of this chapter is to get children to identify the use of length, width and height measurement in context, appropriate units used to measure and how it contributes to fair decision making.

Measurement is not only about quantitative ideas, for children to understand and appreciate measurement, they should be able to see that it is an intrinsic attribute of different shapes.

Children need to be encouraged to use both local and standard ways of measurement. Since estimation is an important skill, get children to estimate measurements and to describe the reasoning that they used in order to estimate.

Suggested activities:

1. Distances they can walk/run.
2. Dimensions of objects around them.
3. Heights of plants, widths of leaves, other aspects of flora and fauna in their surroundings.
4. Personal statistics: height, length of torso/limbs, etc.

ESD connects can be developed by using the context of games that they play and by helping them to realise that mathematics is a tool to settle arguments and arrive at fair decisions and to record growth and other statistical data.

A number of 'draw and measure' activities are given in the chapter. The two levels of assessment for these are:

- Able to draw objects with the required measurement. Level 1.
- Able to demonstrate understanding of the difference between height, length, width and distance. Level 2.

At a higher level, students should be able to estimate fairly accurately and to choose units that are appropriate for the object being measured.

Assessment Examples

1. Measure the following using the appropriate unit:

- a. Length of your socks.
 - b. Height of your parent.
 - c. Length of your toothbrush.
 - d. Length of your walking pace/step.
2. How many steps is the closest market from your house?

Now, estimate the distance of the market from your home in standard units.

Chapter 4: Borders and Tiles

Though students have been familiarized with the process of tiling, the measurement of length and area poses particular problems for children firstly, because of their difficulties with understanding the iteration of standard units. For this reason, the measurement of the border length is first carried out using non- standard uniform units such as thumbprints. Secondly, students find it difficult to apply multiplicative reasoning to the measurement of area. Border length is intentionally introduced before area and in class IV, there is no attempt to use vocabulary such as perimeter and area. Conceptual understanding is the main thrust and so, there is also no attempt to prescribe the formulas associated with this chapter.

ESD connects can be developed by discussing the idea of fencing as in the man-animal conflict (Making a fence to save a farmer's crop) and ownership. The concept of how much land can lead to a discussion of the divide between rich and poor. They can measure spaces around them. Does the longer boundary indicate a larger number of tiles? Does the same boundary length indicate the same number of tiles? Classroom activities can involve recycling old cards, making the best from waste, etc.

Chapter 5: Parts of a Whole

Why is a quantitative topic such as fractions in the section on Shapes and Spatial Awareness? Probably the introduction to the need for something less than a whole is seen in real life as sharing things in concrete form. By viewing different shapes and objects as wholes and parts of wholes, students connect fractions to their daily transactions. In class IV, it is important that a student understands what a whole is, before understanding a Part of a Whole. The whole can be different in different contexts – it can be a whole biscuit or a whole packet of biscuits. Next, it is important that equal parts of wholes are emphasized.

There are different constructs to represent and think about for fractions –

- Part-whole relationships.
- Part-part relationships (ratio- relation between 2 sets).
- Quotient (fractions denote division and consequently decimals).
- Operator (multiplicative aspect).

This chapter emphasises the Part – Whole relationship.

The part of a whole as a single object. This involves cutting a naturally existing whole into equal parts according to measurable qualities such as length, area, volume, mass, etc. An example for length could be a rope cut into 3 parts of equal length. Each part is of the length of the whole rope.

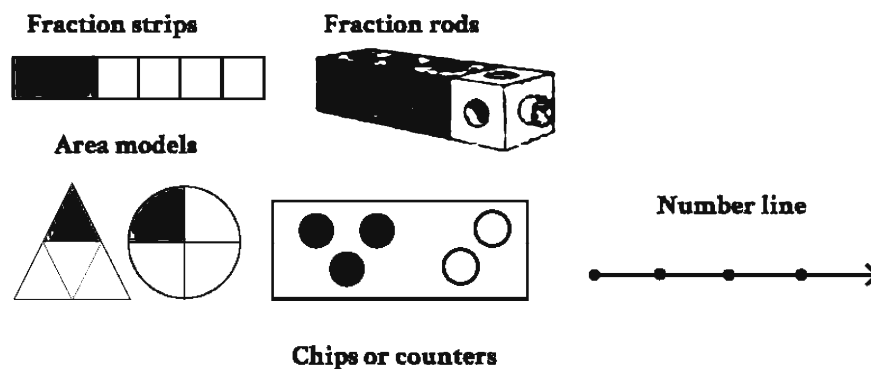


The part of a group or set. This involves selecting objects based on a defined criterion from a specific group. It does not require that the objects in the group are of the same size or type.

For example, suppose there are 12 different types of flowers and 4 of them are red flowers. We can represent this situation by the fraction $\frac{4}{12}$. Which means that 4 out of the 12 flowers are red. Here the part of a group/set meaning involves mentally placing discrete things into categories (e. g. red, prime) which is different from cutting up things according to length, area, or volume.



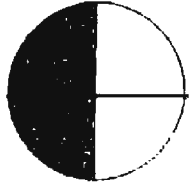
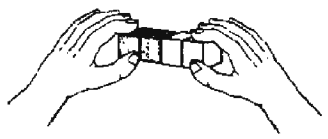
The following representations are used to demonstrate various ways students can be supported visually in their understanding and internalization of abstract concepts:



In class IV only half, quarter and three-quarter are introduced and students should understand the meaning of equal parts of a whole.

Making equal halves of a whole, completing the whole given half of it, making halves by paper folding are some of the different ways in which students can understand the concept of half. Using a grid can help students do these exercises easily. A quarter is introduced as a half of a half and the intuitive understanding of three quarters as $1 - \frac{1}{4}$ and $\frac{1}{4} + \frac{1}{2}$ is built using narratives. Stories are a good way for students to understand the need for taking fractions of fractions.

Developing fraction concepts:

Real life situation	Spoken or written word	Symbol	Picture	Manipulatives
Tashi cut roti into 4 equal pieces and gave one-half of the roti to her friend. How much roti is she left with?	One - half	$\frac{1}{2}$		

Assessment: Students can come up with their own problems on fractions and pose it to the class. For example, if they are asked to pose problems on fractional part of a collection of objects, this is a good opportunity for formative assessment.

- Does the student understand the concept of equal parts? Level 1.
- Does the student identify the part taken correctly? Level 2.
- Does the student understand how the half changes when the whole changes? Level 3.
- Can the student find the whole when the half is given? Level 4.

ESD connects can be developed by emphasis on sharing and sharing equally with both humans and animals. The value of nutritious food can be brought in by sharing foods which are natural, local and organic.

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- Can the student find the whole when the half is given? Level 4.

Chapter 6: Here We Go Round

The idea of a circle is both intuitive and technical and the focus of this chapter is to draw out the intuitive understanding of a circle and its parts. A suggested way of helping children understand

the idea of a circle, is, for example, to have a child stand at the centre, and have many other children run/walk/mark off (in other words, measure) the same distance from the child at the centre, and then join all these points to result in a circle. This helps children to see the relation between the centre and any point on the circle. Also, this will reinforce length measurement, and ideas of data collection (recording in tabular form) as well joining points to form a curve (circle) can also be introduced very naturally.

To illustrate the underlying pattern for circles -multiple groups of children can be made to form multiple circles with different values of radius – and the concepts of centre, diameter and circumference can be introduced. At this stage, conceptual understanding rather than formal defining is important. Activities to discover the properties of a circle such as its symmetry, the relationship between the radius and diameter, the possibility of drawing an endless number of radii or diameter, etc. have been included. The symmetry of a circle is the reason has a functional aspect and children could reflect on the circular shape of wheels, umbrellas, plates and so on.

To find the centre of a circle which cannot be folded, ask children open ended questions to elicit their own ideas of finding the centre of the circle.eg. *Pick a point which you think is the centre. Why did you choose this point? Or Can drawing lines help to find the centre? Which lines and why?* Games such as *Pick the Handkerchief* and songs such as *Ring A Ring of Roses* would familiarize children with circles informally. In this chapter we have used the song *Ghuma Ghuma Kay Mara*. The lyrics of one stanza are given here *Ghuma Ghuma Kay Mara, Ghuma Ghuma Kay Mara, David ne Goliath ko, Ghuma Ghuma Kay Mara*.

ESD connects can be built by dwelling on concepts of fair games and playing by the rules. Connections to math in nature and understanding the connect between symmetry and function of an object also has potential in this chapter.

Assessment: Can you find other ways to draw a circle? [Other ways to draw the circle such as keeping one foot fixed and tracing a curve with the other foot will be a fun way for children to understand the importance of the centre being a fixed point and the circles with different radii that can be drawn by children of different heights.]

Examples:

- Why are the circles different in sizes? (Does the child understand the role of radius in the size of the circle?) Level 1.
- Whose diameter will be shortest or longest? (Does the child understand the connection between radius and diameter?) Level 2.
- Who has drawn the best circle? Why? (Does the child understand the symmetry of a circle and the importance of keeping the centre fixed?) Level 3.

Chapter 11: Trip to Talkharkha

In class IV, students begin to pay attention to the shape and placement of component parts when they interpret and make drawings. They will also attempt to produce visual reality in drawings by only drawing the objects or parts of objects that can be seen. They should be able to describe one thing being between others and put key features in order on a map and attempt to show a bird's eye view of familiar settings with a 'rough' sense of proximity.

This gets them to see 2D in 3 D shapes. This integrates shapes and measurement concepts.

Suggested activities:

- Visualise and plan route map school to home.
- Children able to read friend's route map.

ESD connects can be built by exploring local scenic spots and drawing simple maps based on their observations. In this process, children can build an understanding of the value of clean air and water, the importance of eating local food, appreciating and learning local art and handicrafts and the value of scientific innovations such as the Integrated Cooking Systems.

Quantitative Reasoning

Quantitative Reasoning goes beyond number crunching and doing fast computations. The approach is to develop the skills of logic and reasoning in children so that they focus not just on product (the correct answer) but on process (the reasoning which they adopted). According to the Nuffield Foundation's paper: Key Understanding in Mathematics learning by Terezinha Nunes, Peter Bryant and Anne Watson of the University of Oxford, a course in quantitative reasoning should

- *Engage students in a meaningful intellectual experience*
- *Increase students' quantitative and logical reasoning abilities*
- *Improve students' ability to communicate quantitative ideas*
- *Encourage students to take other courses in the mathematical sciences*
- *Strengthen mathematical abilities that students will need in other disciplines*

In order to achieve these goals, the learning outcomes for a quantitative reasoning course reflect a mathematical learning that is predominantly conceptual rather than procedural and fosters a deeper understanding of the applicability and accuracy of standard mathematical skills and tools.

The topics in the syllabus such as operations on numbers, data handling, measurement, etc. give ample opportunity to develop such thinking in children. Formative assessment exercises have been suggested along with an assessment scheme. The levels in the assessment scheme will aid in a sharper diagnosis of the student's difficulties.

Chapter 2: Bigger Numbers

In class IV, we extend the numbers up to 9999. It is not just enough for students to understand how to read and write bigger numbers. They should be able to comprehend their magnitude by relating them to the size, quantity or measurement of objects and quantities that they encounter in real life. The chapter also includes the recognition of patterns in number sequences and the addition and subtraction of four-digit numbers.

Puzzles and games are suggested activities to develop mental strategies and automatisations. Students should be encouraged to try different ways of calculating answers and solving problems. They should also be given opportunities to explain their reasoning as illustrated in the chapter. Algorithms should be arrived at and not prescribed, and this also has been demonstrated in the chapter. Students should be encouraged to cross verify and check arithmetical facts by estimation, approximation and procedural understanding instead of accepting them at face value or blindly following prescribed algorithms.

ESD connects can be built using data such as: steps to be climbed at religious places, tourists visiting a zoological park, number of books in school libraries, jam produced in the government food preservation factory, population, etc.

Chapter 7: Scaling and Sharing

While children should use their informal knowledge about multiplication and division in the classroom, in class IV, they should formalise this knowledge and, in the process, gain a better understanding about the arithmetic operations themselves.

Encourage children to see patterns in multiplication tables and multiplication such as getting them to see what would be in the ones place digit on multiplying.

While repetitive addition is the most common model for multiplication, care has been taken to include examples in which multiplication is used for scaling, as a ratio, as an array and as a cartesian product. In fact, the very name of the chapter is based on the scaling model of multiplication, in order to set the ground for a more wholesome understanding of the multiplication of rational numbers.

ESD connects can be built by understanding the mental calculations done by small-business people, for example understanding multiplication by 10s and 100s using flower bouquets and baskets made by a poor flower seller. The concept of sharing equally is an intrinsic part of division. Examples of caring are blended with gender reversal - Husband caring for his wife by putting eye drops at equally spaced intervals- can build attitudes of consideration in students. They should also be encouraged to verify calculations using a variety of methods.

Assessment Examples

- Identifying and applying multiplication and division in a given context.
- A scale model of a car is 15 cm long. The real car is 20 times this length. How long is the real car?
- Multiplies the length of the model car (15) by the scaling factor (20): Level 1.
- Multiplies correctly to get the length of the real car as 300 cm: Level 2.
- Anusha would need 1 binding sheet to bind 3 notebooks. She was able to bind 12 books. How many sheets of paper did she use?
- Identifies the data and mathematical concept given in the problem or context. (Number and division): Level 1.
- Applies division correctly to solve the problem: Level 2.

Chapter 9: Heavy and Light

An intuitive understanding of weight as well as the introduction to the concept in Class III has determined the approach for the content of class IV. Balancing the two pans of a weighing scale transitions naturally into comparing and equalising the weights on both sides of the pan. Pedagogy should include practical activities to get children to have an experiential understanding of weight. For example, get them to estimate how many potatoes would weigh 1 kg, or what the weight they could comfortably carry is. In this chapter, children move on from making a balance to making weights for the balance using objects around them. They use standard weights such as gram and kilogram with the understanding of which units are better suited to weigh

which objects. Simple addition and subtraction of weights can be practised using their weekly grocery lists.

The chapter illustrates data collection and data representation in very natural contexts and many of the learning outcomes of data handling in class IV can be addressed here.

ESD connects can be built by describing children helping parents with chores: carrying heavy bags and finding out how much they carried. Understanding the functioning of public service institutions such as the Post Office, understanding that weight determines the postage cost. Connect with wildlife: weights of animals in the zoo. Connect with cleanliness: weight of dry waste collected during a garbage collection drive.

Chapter 10: Pouring and Filling

The approach is very similar to the previous chapter and the pedagogical practices lend themselves well to ESD connects as described below. The millilitre is introduced with exercises on conversion to litre, however the focus is on understanding how much a millilitre is and this is understood experientially by comparing the capacities of different containers.

Gender issues: Girls playing traditionally male sports such as football.

Sustainability: Carrying their own water bottles, drinking juice from glass (not plastic) bottles, carrying home the juice which was not drunk, watering plants with water collected from a leaking tap.

Medical precautions: Danger of overdosing on medicine.

Dietary recommendations: Drinking water regularly, regulating oil consumption.

Awareness about cooperatives: Volume of milk collected, ration shops and kerosene allotment.

Consumption: Water consumption due to large hotels catering to tourists.

Assessment:

- Activities that encourages estimation weights and capacities of objects.
- Use of appropriate unit measure
- Guess how many glasses of water can be filled in your water bottle. Estimate the capacity of your water bottle using an appropriate unit measure.
- Reasons and communicates the relationship between the capacity of the water glass and the capacity of the water bottle: Level 1
- Uses the capacity of the water glass to estimate the capacity of water bottle.

Chapter 12: Tick Tock

The study of the concept of time has a subtle level of complexity because time does not have a physical attribute. It simply quantifies the occurrence of events. Before actually learning how to measure time, students experience these units of time in their daily life and hence understand the concept of duration. Even a simple mark on the clock has a deep mathematical significance, it does not stand for a minute but signifies duration- the passing of a minute. The beauty of mathematical representation is thus built into this chapter. Children should be able to see the importance of time in the various activities they do and how the units differ according to the context.

There is plenty of scope to develop children's logical thinking and reasoning. Open-ended questions which relate to the child's experiential understanding of time personalise this chapter for the child. Communication skills are built as the child talks about his/her daily routine. Language exercises such as sentence making enable the child to use new vocabulary correctly and meaningfully.

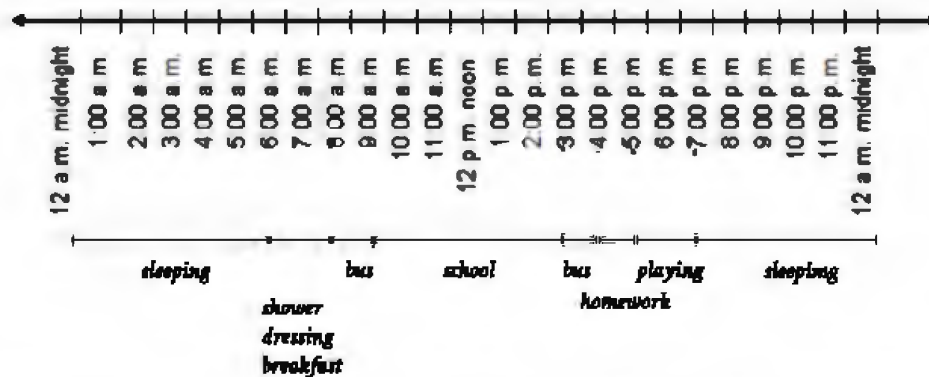
ESD connects can be built by focusing on the importance of daily routines and punctuality, understanding the importance of expiry dates on food items. Teachers are urged to design activities for children such as collecting of wrappers of food items, studying expiry dates or periods, doing simple calculations based on these, tabulating and discussing data and so on. Timetables, data about times of sunrise and sunset, time differences between geographical locations, etc. are other good sources of information for the child.

The examples used demonstrate communal harmony, for example neighbours going to celebrate a religious festival together, wedding invitations extended to friends from other communities. Or caring for animals: adopting a stray, giving it regular vaccinations and high quality, loving care.

Assessment

- Reads time and timeline and draws inferences
- Uses appropriate units to measure the duration of an event

1. Look at Sonu's routine on a weekday and answer the questions:



- a. When does school start and end for Sonu? write this using a 24 hour clock.
 - Able to read the timeline and locate the details: Level 1.
 - Writes the time correctly as per the 24 hour clock: Level 2.
- b. How long does Sonu spend on her homework each day? How long do you spend on your homework?
 - Able to calculate the duration of an event from the timeline: Level 1.
- c. Time you spend on playing is _____.
 - Gives a reasonable answer with the appropriate unit: Level 1.

Chapter 13: Rupees and Paise

Children get introduced to money even before they enter school and the topic must be addressed in the school curriculum for several reasons. Money has an important role in real life and children should understand its value in order to take wise financial decisions both now as well as in the future. Payments are handled by adults in different ways (via the bank, cards, the mobile, net banking, etc.). Money transactions lend themselves to role plays which are an excellent device for students to understand different perspectives.

It is a good idea to initiate discussions that surface students' understanding of money. Some sample questions that could be used are:

- Is everything that we consider precious worth a lot of money?
- Is there anything that money can't buy?
- Do you get pocket money? Do you spend it all or save some?
- Where does your pocket money come from?
- Does anyone have to work for their money?
- Suggested activities and manipulatives:
 - Flats- Long-Ones could be used to understand conversions. [One representing 1p, Long representing 10 p and Flat representing ₹1.]
 - Tables to show different ways to pay for an item. Work out the fewest coins (or notes) to pay for the different items.
 - Discussions on the purchasing power of notes and coins. [Let them discuss with their parents and grandparents about notes and coins being used and the changing value of items. This has also been described in the chapter.]
 - Role Play Scenarios: What can I buy for 50 p? ₹1? 5? Shopkeeper's method for giving change. Bank transactions: sample cheques, pass books, debit/ credit cards could be displayed.
 - Mid-day meal activity - Estimate amounts of food, find out the prices from shops, and work out the price per head.
 - Classroom displays: Old coins and notes, different kinds of *kantoor*s (piggy banks).

ESD connects can be made to Sustainability (example: concept of carpooling to save fuel), Inflation: Cost of living during grandparents' and parents' days as compared to the present. Also, the idea of giving money to charity can be discussed in the class. It is also important for children to understand the wise use of money: importance of planning, sharing and giving to the community.

Assessment:

Computes bills

Estimates total cost in a given context.

1. For the coming school semester, you want to buy the following stationery items. Estimate the total cost. What is the smallest currency note that you would take with you to the stationery shop to buy these things?

Colour Pencil Box	
6 notebooks	
1 Pencil box	

- b
- Makes reasonable estimates with the appropriate unit of money: Level 1.
 - Adds correctly or makes a rough estimate of the total cost: Level 2.
 - Gives a valid answer for the currency note: Level 3.

Data Handling Across Chapters

Data handling at this stage is to collect, record and present data in meaningful way. In class IV, data handling is seen across chapters. Encourage the students to find out their own information and show them how to record this accurately, be it in a list, table or tally chart. and how to convert this information into pictographs and bar graphs. They should also be encouraged to read and interpret these graphs. This could include comparison as well as sum and difference problems using information provided in the visual representation of the data.

- Representing given information in graphs.
- Analysing information given.

Example: Each student of class IV was asked to choose 1 sport to compete in on the Sports Day. The table shows their choices.

Sport	Number
100 m dash	25
200 m race	18
400 m race	16
100 m race	10

Draw a pictograph to show this.

What scale did you choose for this graph? Why?

- Chooses appropriate picture and scale to represent data: Level 1.
- Represents data correctly in pictograph: Level 2.
- Writes the scale for the pictograph: Level 3.

IV Pattern Recognition and Generalization

Regarding patterns, as Keith Devlin, a top mathematician says: *As the science of abstract patterns, there is scarcely any aspect of our lives that is not affected to a greater or lesser extent by mathematics, for abstract patterns are the very essence of thought, of communication, of computation, of society and of life itself.*

Note that while patterns are intuitively experienced by us in the cycle of seasons, in our daily routines, in art and craft and in almost every realm, the study of mathematics should help us to harness the power of patterns for powerful mathematical techniques such as conjecture, proof and generalization.

Chapter 6: Patterns, Patterns Everywhere

In class IV, we focus first on patterns which are obtained by reflection. The student is required to observe what changes and what remains the same. Students must be encouraged to see patterns in nature, in their clothes and on banners, signs, traffic signals and in general all around them. They should be encouraged to observe the symmetry in reflected patterns and to point out which objects show reflective symmetry and which don't. The use of a mirror to show reflection has been shown in the teacher pages of the class III mathematics book. An interesting exercise would be for them to observe in the symbols in the almanac have reflective symmetry or not.

Number patterns are an absorbing field of study for all ages. In class IV, we look at the patterns in particular types of numbers: odd and even, triangular numbers, square numbers which have their own visual styles which can develop visualization and creativity in students as they learn to represent these numbers. The questions in the exercise on odd and even numbers are intended to help the students develop an intuitive understanding of generalizations that they will use more formally at a later stage – such as 'the sum of two odd numbers is always even' and 'the sum of an even and an odd number is odd'. Teachers can also develop extension questions such as finding the number of square (or triangular) numbers less than 50 or finding the numbers which are both triangular and square numbers. Solving riddles using visual representations of the clues helps students develop strategies for problem solving and must be encouraged in class.

Children should be encouraged see patterns in all the other topics (both the obvious such as multiplication, perimeter and area and the subtle such as time, fractions, etc.) as this in turn helps children to generalize rules, understand algorithms and derive formulas.

ESD connects can be built by studying patterns in the traditional Sikkimese outfits: dawra surwal, Dhaka topi, faria, chaubandi choli. Or by observing reflections in the famous lakes of Sikkim. Visual patterns which translate to number patterns can be observed in the arrangements of fruits, of decorations, etc.

Assessment: Fun and well-designed activities may be developed to:

- a. Identify that children are able to extend patterns.
- b. Get children to describe patterns.
- c. Get children to create patterns.
- d. Identify that children apply their understanding of pattern recognition to generalize in other topics.