Kasturba Gandhi Balika Vidyalaya

Bridge Course

for Girls Entering Upper Primary Stage

MATHEMATICS



Department of Women's Studies

National Council of Educational Research and Training
Sri Aurobindo Marg, New Delhi - 110016

Bridge Course for Kasturba Gandhi Balika Vidyalaya

(For Girls' Entering Upper Primary Stage)

MATHEMATICS



राष्ट्रीय शैक्षिक अनुसंधान और प्रशिक्षण परिषद्
NATIONAL COUNCIL OF EDUCATIONAL RESEARCH AND TRAINING

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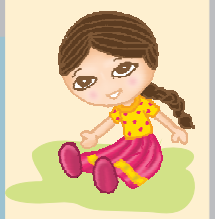
Foreword



The *National Curriculum Framework-2005* states that a critical function of education for equality is to enable all learners to claim their rights as well as to contribute to society and the polity. We need to recognise that rights and choices in themselves cannot be exercised until essential human capabilities are recognised. Thus, in order to make it possible for all learners from different socio-economic backgrounds, especially girls, to claim their rights as well as play an active role in shaping collective life. Education must empower them to overcome the disadvantages of unequal socialisation and enable them to develop their capabilities of becoming equal citizens.

Reaching out to the girl child has been central to the efforts of Universalising Elementary Education (UEE). The *Sarva Shiksha Abhiyan* (SSA), a national flagship programme for UEE recognises the need for special efforts to bring girls, especially from disadvantaged groups, to schools, and to bridge gender disparities in education at the elementary level. In this regard the Ministry of Human Resource Development attempts to address social, cultural and economic deprivation faced by girls from marginalised and disadvantaged sections of remote and rural society, by instituting the Kasturba Gandhi Balika Vidyalaya (KGBV) scheme, an innovative and promising initiative of the Government of India. Introduced as a scheme in 2004 it became a part of SSA in 2007. Currently it is operational in twenty-four states and one union territory.

The Bridge course is also an important step in translating some of the concerns stated in the Right of Children to Free and Compulsory Education Act, 2009, particularly in the context of ensuring that the children belonging to weaker sections and disadvantaged groups are not discriminated and prevented from pursuing and completing elementary education; and providing course of study for elementary education.

A National Consultation on KGBV was organised by NCERT from 11 to 12 August 2008 to share experience generated by the KGBV scheme operational over the last few years. This consultation brought together scholars from different fields. The consultation strongly recommended the development of Bridge Courses for girls enrolling in KGBV. It also recommended customised Teacher Training packages for upgrading the skills of KGBV teachers. Under this backdrop, the Department of Women's Studies took the initiative for developing the Bridge Courses and Teacher Training packages based on NCF-2005, in collaboration with other Curricular Departments of NIE, RIEs, University Departments, DIETs of Delhi, NGOs and practicing school teachers, including teachers of KGBV.

The Bridge Course is a pioneering initiative made by NCERT in addressing the academic needs of drop out girls who have revisited formal schools after a gap of two or more years. This course has been prepared keeping the learners'

contexts in mind. The pedagogical approaches woven in these courses in Science, Maths, History, Geography and the Languages—English and Hindi, use simple language with multiple participatory activities which can be contextualised as per the requirements of different KGBVs. The Bridge Course should not be treated as yet another book but is to be used for contextualising activities, preparation of worksheets, project work etc. which would enrich their pedagogical approaches. This material can be adopted and adapted according to the needs of KGBV girls. Additions to this material will be a growing approach and an evolving process.

DWS could not have gone ahead with this endeavour without the direction and guidance of Professor Krishna Kumar, former Director NCERT. He had rightly envisioned the importance of the present Bridge Course in addressing the academic challenges of girls under the KGBV scheme.

We also gratefully acknowledge contributions of the Review Committee chaired by Dr Sharada Jain, Director, Sandhan, Jaipur; and other members—Sister Sabina, Former, State Project Director, Mahila Samakhya Society, Patna, Bihar; Ms Seema Bhaskaran, State Project Director, Mahila Samakhya Society, Kerala; Ms Amukta Mahapatra, Director School Scape, Chennai for their expert review and suggestions.

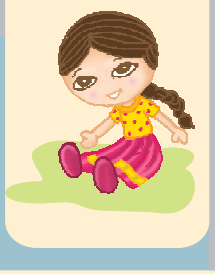
We are thankful to the members of Evaluation Team constituted by MHRD—Ms Sarita Mittal, Director EE8; Ms Kiran Dogra, Consultant Gender, EdCIL; and Ms. Dipta Bhog, Director, Nirantar for their inputs and suggestions.

As an organisation committed to systemic reform and continuous improvement in the quality of its products, NCERT welcomes comments and suggestions which will enable us to undertake further revision and refinement.

Director
National Council of Educational
Research and Training

New Delhi
11 June 2010

Preface



The Bridge Course for girls of Kasturba Gandhi Balika Vidyalaya (KGBV) has been developed keeping in view the guiding principles of the *National Curriculum Framework (NCF)-2005* that marks a departure from the legacy of bookish learning which continues to shape our system and causes a gap between the school, home and community. These materials developed in different subject areas, viz. English, Hindi, History, Geography, Science, and Mathematics are based on the NCERT primary and upper primary textbooks. All these subject areas in the Bridge Course will contribute to the learning skills of KGBV girls and will prepare them for entering into the upper primary stage. Use of bilingual approach in English and History course books of Bridge Course will take girls ahead in their learning and thinking skills. The flexibility in the approach and suggested activities taking the help of worksheets, teacher demonstration, anecdotes, reciting poems, crossword puzzles, experimenting, hands on skills, oral traditions and reading material across various subjects are the highlights of the Bridge Course.

Each subject area has used key concepts across the primary and upper primary textbooks of NCERT based on NCF-2005. Each concept has been dealt with through a different kind of activity without bringing any definition and the content for rote learning. The concept or the idea has been dealt through activities for the learners to understand, analyse and then apply in the given context. It is hoped that this material to be used as the bridge between primary and upper primary stage, will fulfill the learning needs of dropout girls. The activities are suggestive. Any alternate activity can also be carried out based on the local specific contexts. Each activity has the scope of creating similar other local-specific activities for encouraging learners to go beyond the course book. Its scope will get enhanced if this creates a space for more such activities.

The Bridge Course developed in different subjects is gender inclusive. It highlights the participation and contribution of women in diverse fields. This suggestive material is an effort in keeping the plurality and different contexts of KGBV girls in mind. The pedagogical approaches woven in Bridge Course attempts to address the multilevel and diverse needs of KGBVs located in different socio-cultural contexts. The Bridge Course has been tried and tested at NIE, NCERT from 22 February to 3 March 2010 on forty-four master trainers deputed by nine states, viz. Andhra Pradesh, Bihar, Chhattisgarh, Jharkhand, Madhya Pradesh, Orissa, Rajasthan, Uttar Pradesh and West Bengal.

The feedback received during the training of the master trainers have been duly incorporated. However, more suggestions, if any, will be welcome.

Do You Know ?

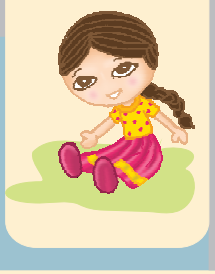
According to the 86th Constitutional Amendment Act, 2002, free and compulsory education for all children in 6-14 year age group is now a Fundamental Right under Article 21-A of the Constitution.

EDUCATION IS NEITHER A PRIVILEGE NOR FAVOUR BUT A BASIC HUMAN RIGHT TO WHICH ALL GIRLS AND WOMEN ARE ENTITLED



Give Girls Their Chance !

Development Team



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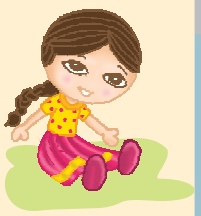


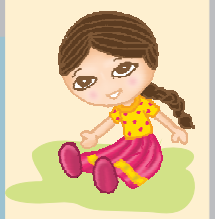
Acknowledgement

The National Council of Educational Research and Training gratefully acknowledges the valuable contributions of the following participants for the review of this Bridge Course: S K S Gautam, (Retd.) *Professor*, NCERT, Kameshwar Rao, *Assistant Professor*, NCERT, Priydarshani Kelkar, *Principal*, Kumar Mahendra Gupta, *Assistant Director* (SSA), Kishan Singh Bisht, *Assistant Teacher*, Chandra Prakash, *Assistant Teacher*, Swarnlata Sharma, *T.G.T.* (Mathematics), Ashmita Verma.

The Council also acknowledges the efforts of Surender Kumar, Kamlesh Rao and Monika Rajput, *DTP Operator*, Pradeep Kumar, *Mathematics laboratory assistant*.

The Council also gratefully acknowledges the academic and administrative support of Gouri Srivastav, *Professor and Head*, DWS, NCERT as the over-all coordinator of the KGBV Bridge Course and Teachers' training package.

Introduction



Kasturba Gandhi Balika Vidyalaya (KGBV) is an important programme for girls belonging to rural and marginalised groups of the society. The National Council of Educational Research and Training (NCERT) has been entrusted with the job of developing Bridge Course for the students of these Vidyalayas in different disciplines to upgrade their content knowledge and strengthen their academic rigour with confidence so that they can re-start their normal studies from Class VI onwards. Since mathematics is one of the important disciplines at the school stage, NCERT has developed this bridge course in mathematics for these children. The Bridge course in Mathematics consists of 12 chapters and it has been developed keeping in view the KGBV environment.

The *National Curriculum Framework (NCF) – 2005* states that "the twin concerns of the mathematics curriculum are: what can mathematics education do to engage the mind of every student and how can it strengthen the student's resources". It also recommends that children's experience during school hours must be linked to their day–to–day life. The syllabus and this bridge course in mathematics have been developed on the basis of NCF-2005 with an aim to discourage rote learning and to encourage interdisciplinary approach between different subject areas. We hope these measures will take us significantly further in the direction of a child-centred system of education outlined in the National Policy of Education – 1986.

Mathematics is a creative discipline. When a child solves a problem for the first time, it can stimulate moments of pleasure and wonder which in turn helps to discover more elegant solutions to that problem or establish hidden connections. Mathematics at Upper Primary Stage is connected with the experience and environment of the child. Therefore, while developing the concepts in the chapters, we began with concrete illustrations and developed concepts gradually to handle abstractions. Proper footnoting as hints has also been provided to the help of the teachers.

Activities encourage students to think about what they are doing and to share their thoughts with others. It also promotes creativity, investigations and allows for many answers and solution strategies. By taking the advantages of KGBV being residential schools, the bridge course in mathematics attempts to encourage the learning of mathematics by giving priority and space to opportunities for contemplation and wondering, discussion in small groups and activities requiring hands-on experience.

We hope that this bridge course will help children to generate interest and grasp the concepts in Class VI mathematics with much imaginative and creative mind.


Together
make it a
better world

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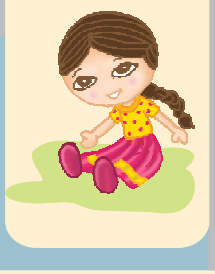

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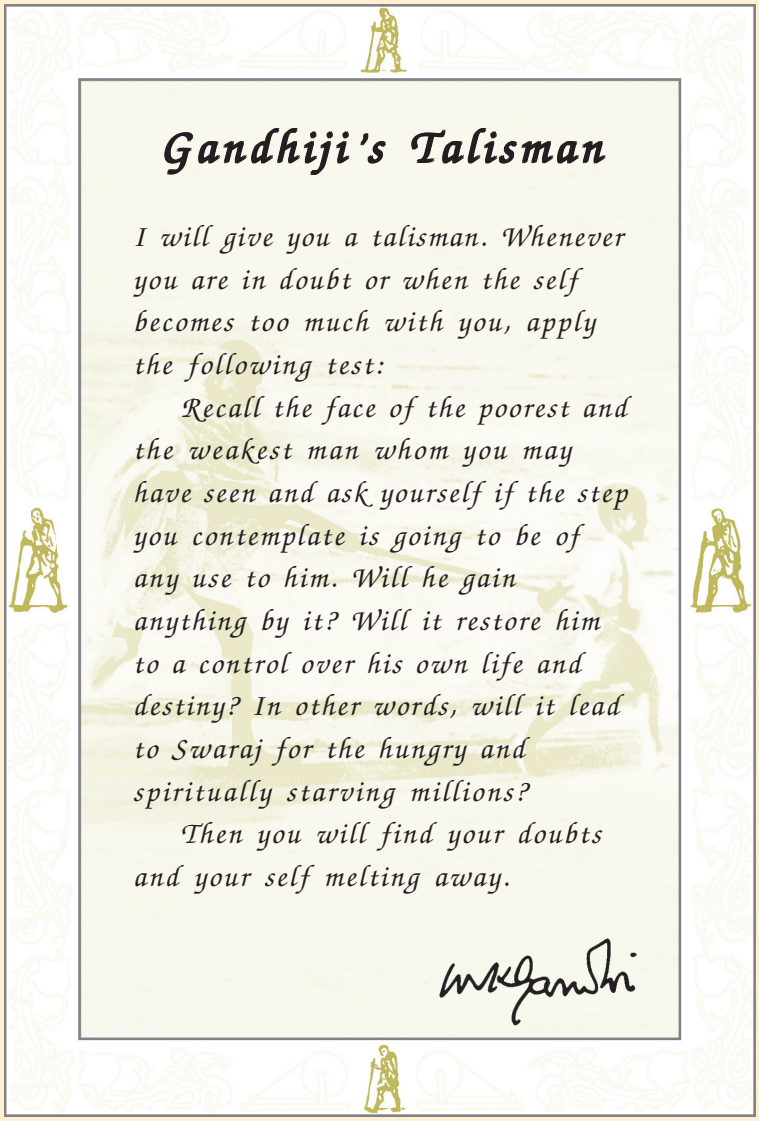


Gandhiji's Talisman

I will give you a talisman. Whenever you are in doubt or when the self becomes too much with you, apply the following test:

Recall the face of the poorest and the weakest man whom you may have seen and ask yourself if the step you contemplate is going to be of any use to him. Will he gain anything by it? Will it restore him to a control over his own life and destiny? In other words, will it lead to Swaraj for the hungry and spiritually starving millions?

Then you will find your doubts and your self melting away.

M K Gandhi



INTRODUCTION TO NUMBERS

1. Counting 1 to 9

One, One, One,
One little girl playing in the sun.

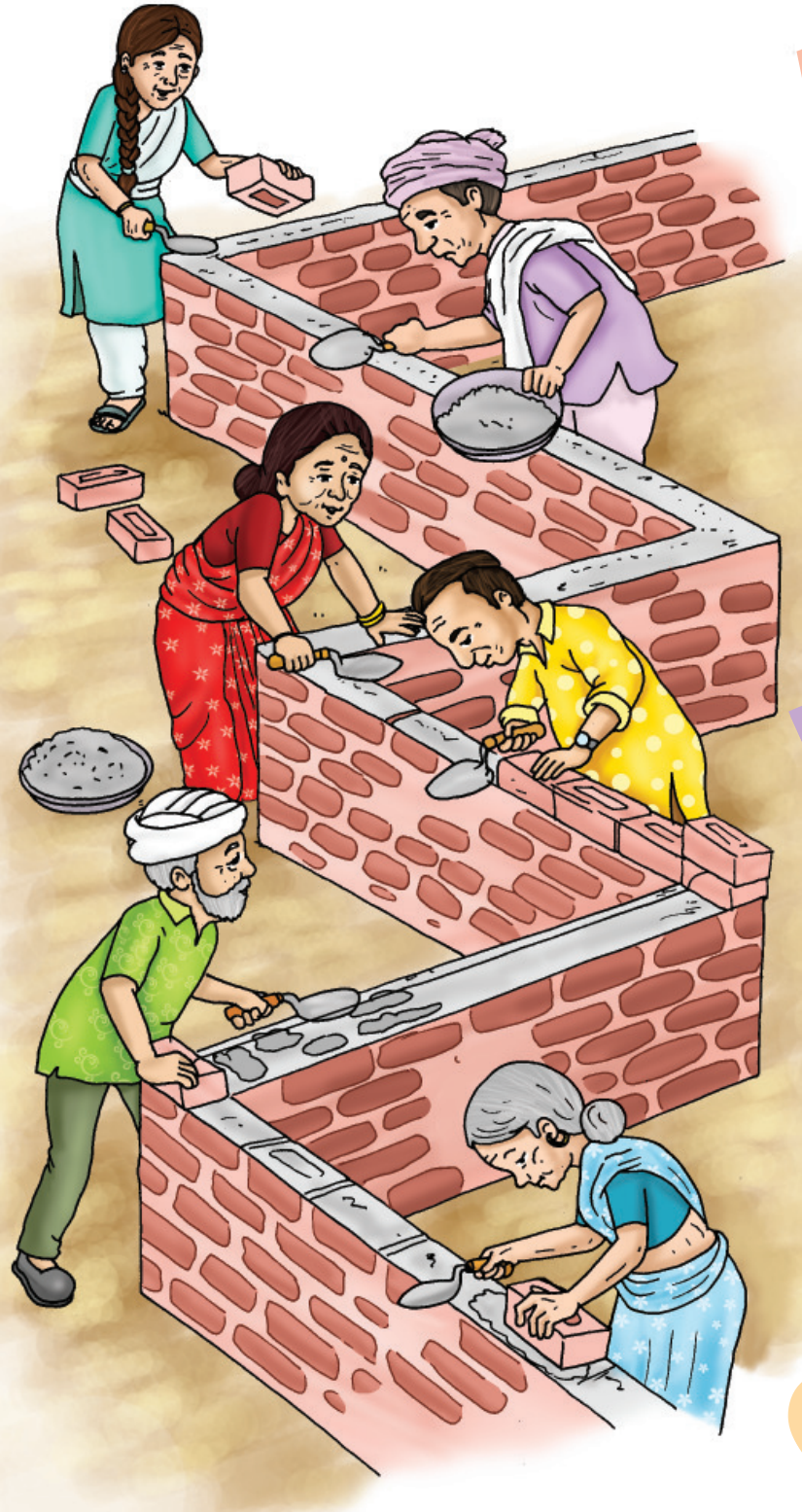
Two, Two, Two,
Two big kangaroos jumping in the zoo.

Three, Three, Three,
Three pretty girls planting a tree.

Four, Four, Four,
Four naughty boys knocking on the door.







Five, Five, Five,
Five strong swimmers
are ready to dive.

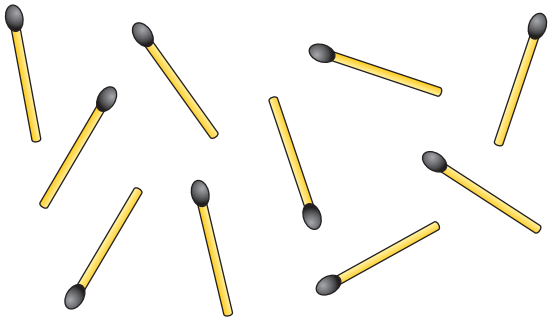
Six, Six, Six,
Six old masons
building a house with
bricks.

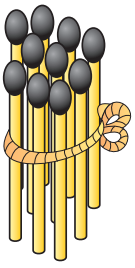
Seven, Seven, Seven,
Seven Little angels
come down from
heaven.

Eight, Eight, Eight,
Eight smart students
standing straight.

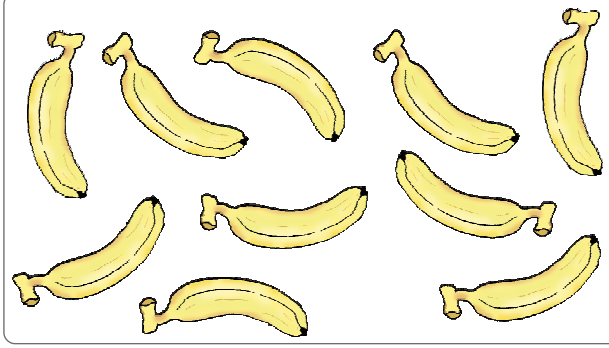
Nine, Nine, Nine,
Nine juicy grapes
hanging on a vine.

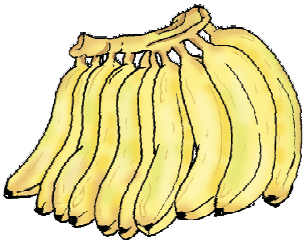
1.1 Numbers 10 and More





a bundle of TEN (10)

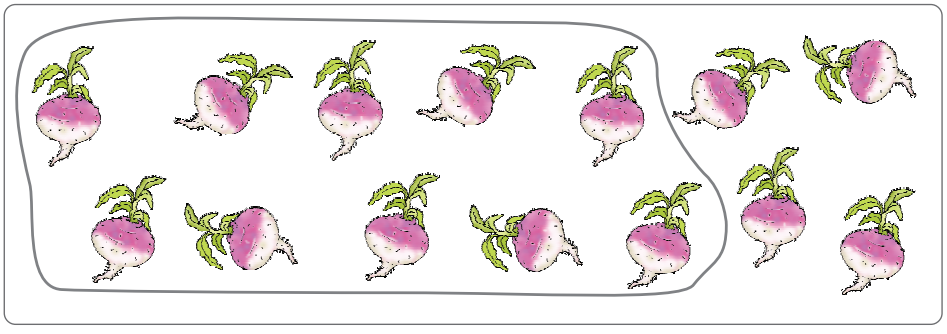




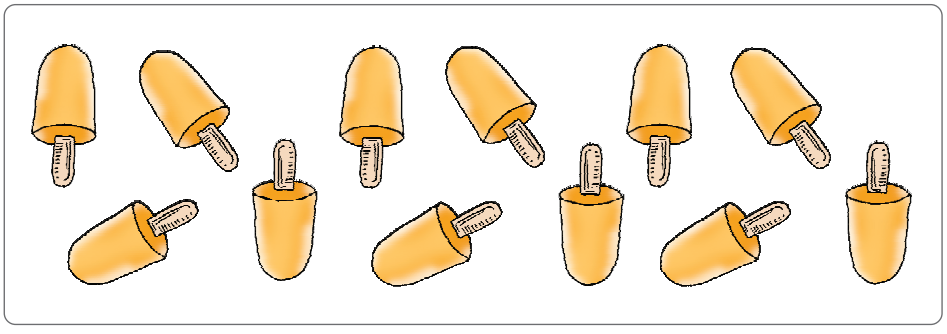
a bunch of TEN (10)

1.2 Grouping

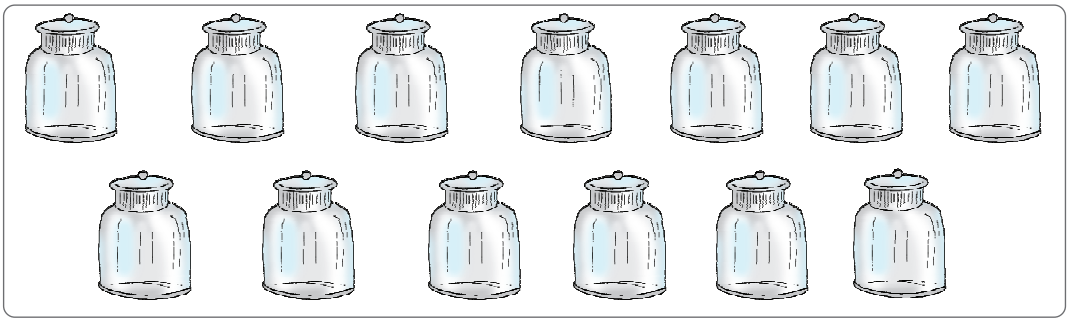
Make a group of 10.



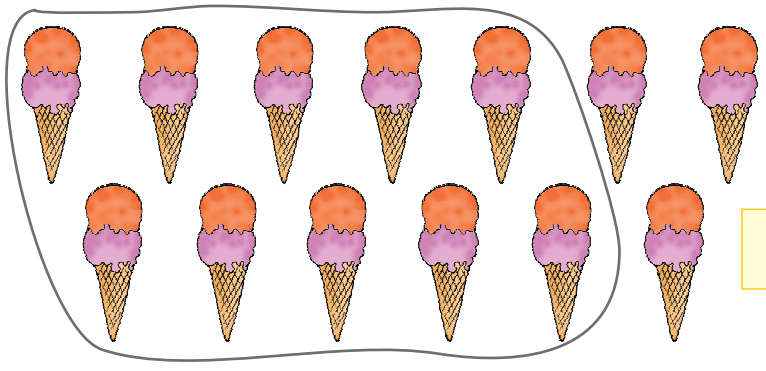
It has one tens and four more turnips







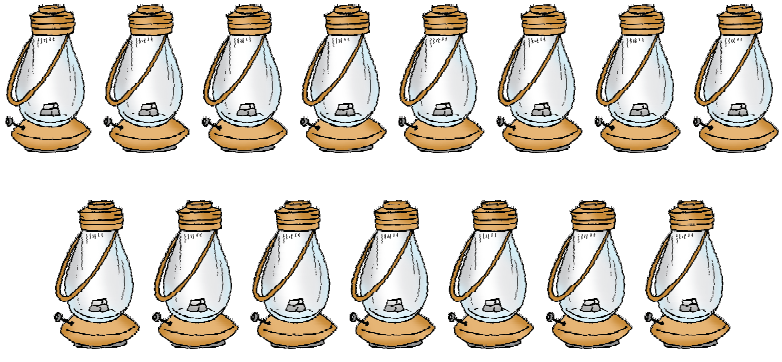
Make a group of 10 and write numbers.

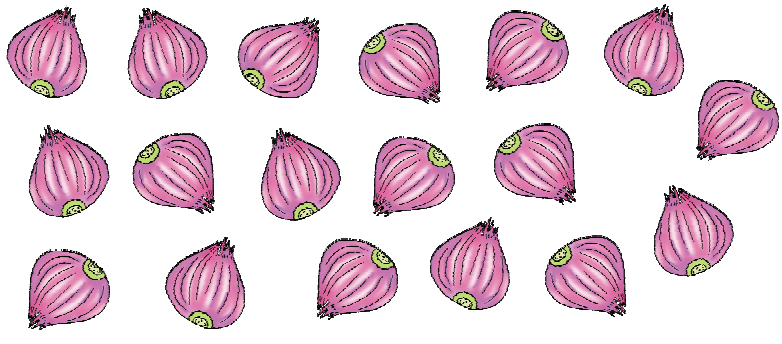


13

Tens	Ones
1	3

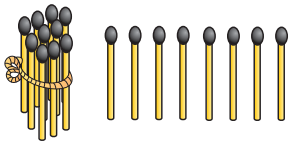
Tens	Ones





Tens	Ones

Fill in the blanks.



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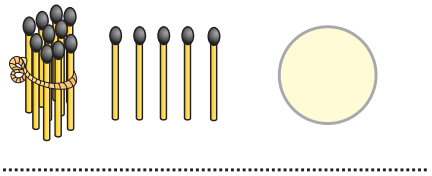
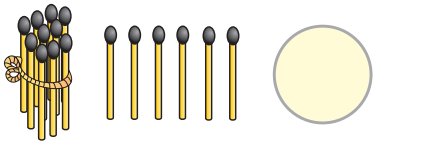
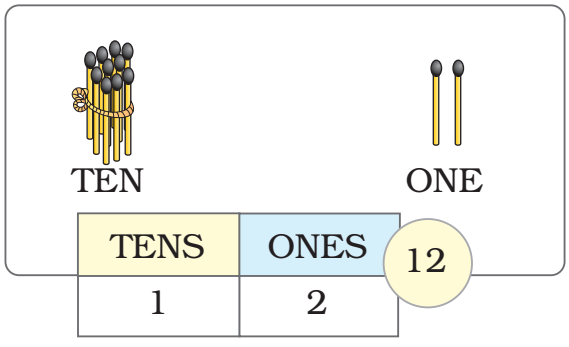
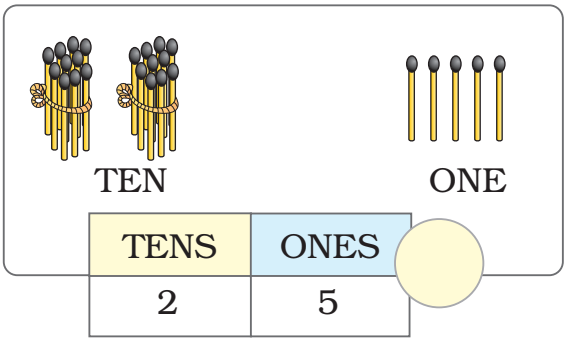
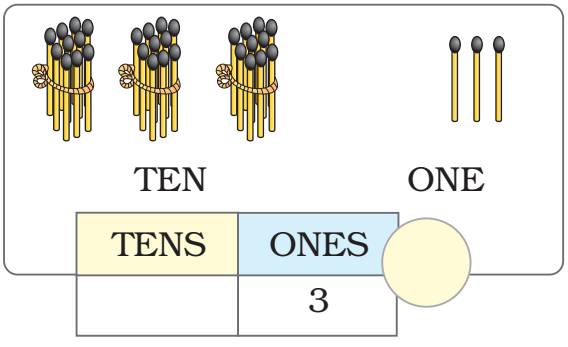


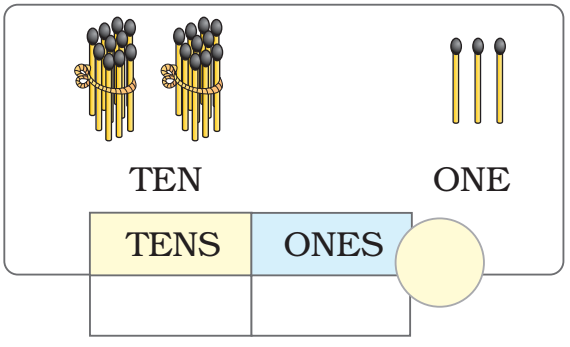


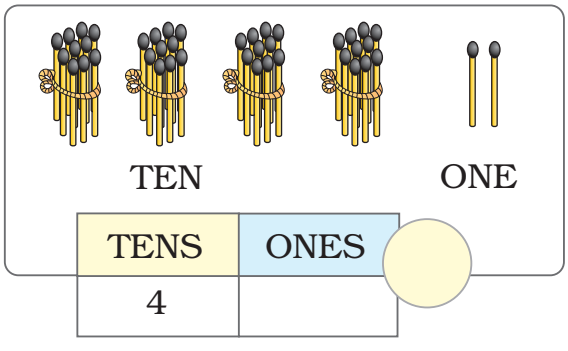
Write the numbers.

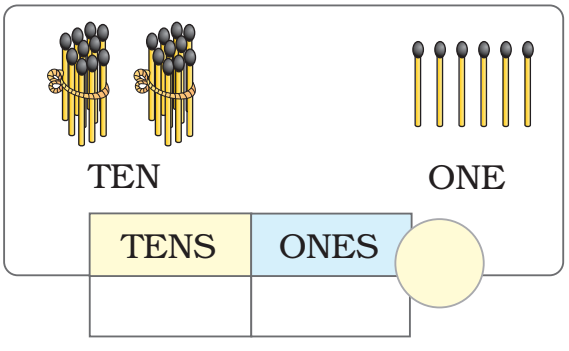




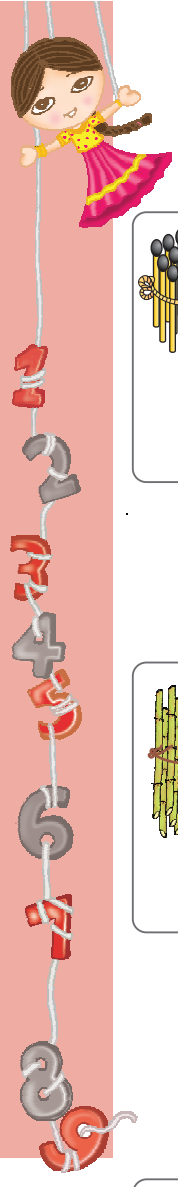


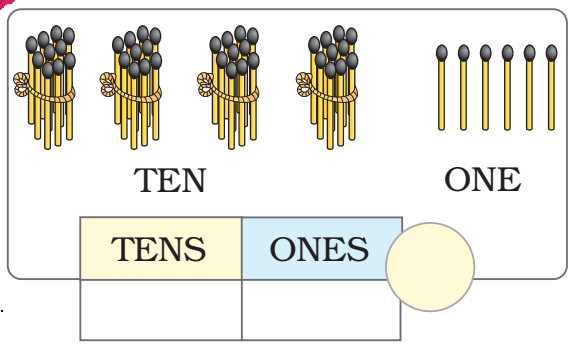


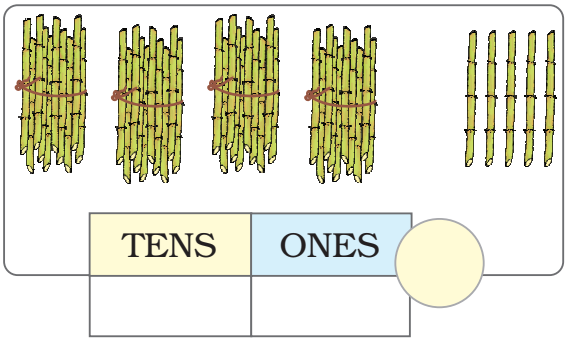


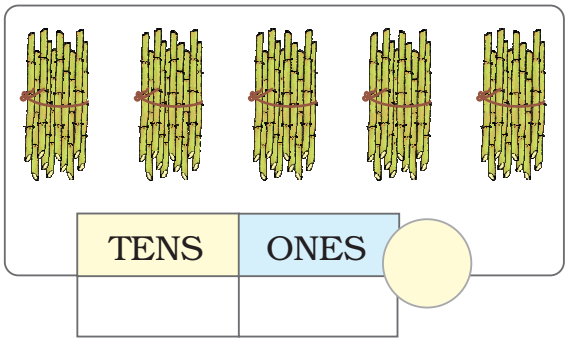


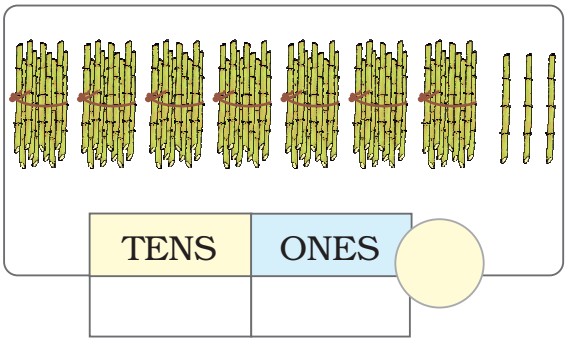


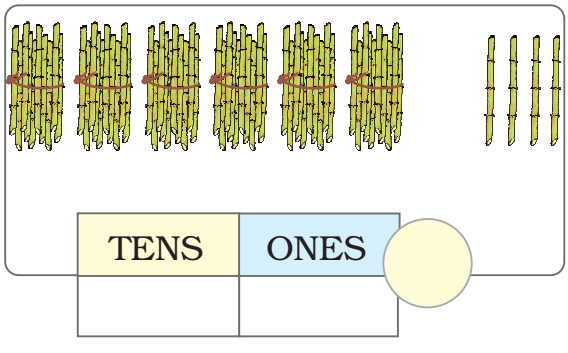


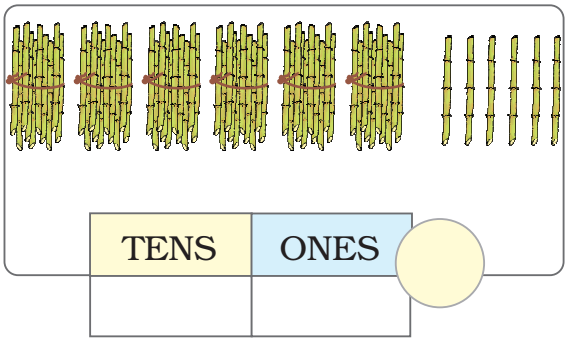

TEN
ONE
TENS
ONES


TENS
ONES


TENS
ONES


TENS
ONES


TENS
ONES


TENS
ONES

1.3 More on Tens and Ones



Teacher may help children to realise tens and ones in 2-digit numbers. Like in 18, 1 is represented by a 10-rupee note.

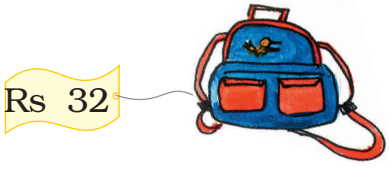
- Can you do this without uncle's help? How many10-rupee notes and 1-rupee coins you will give for these things?



Rs 20

2 Ten-rupee notes

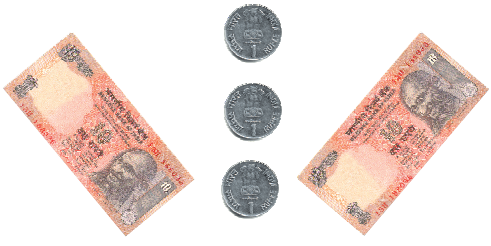
Rs 32





Rs 55

- How much money do the notes and coins make?



= Rs 23



= Rs



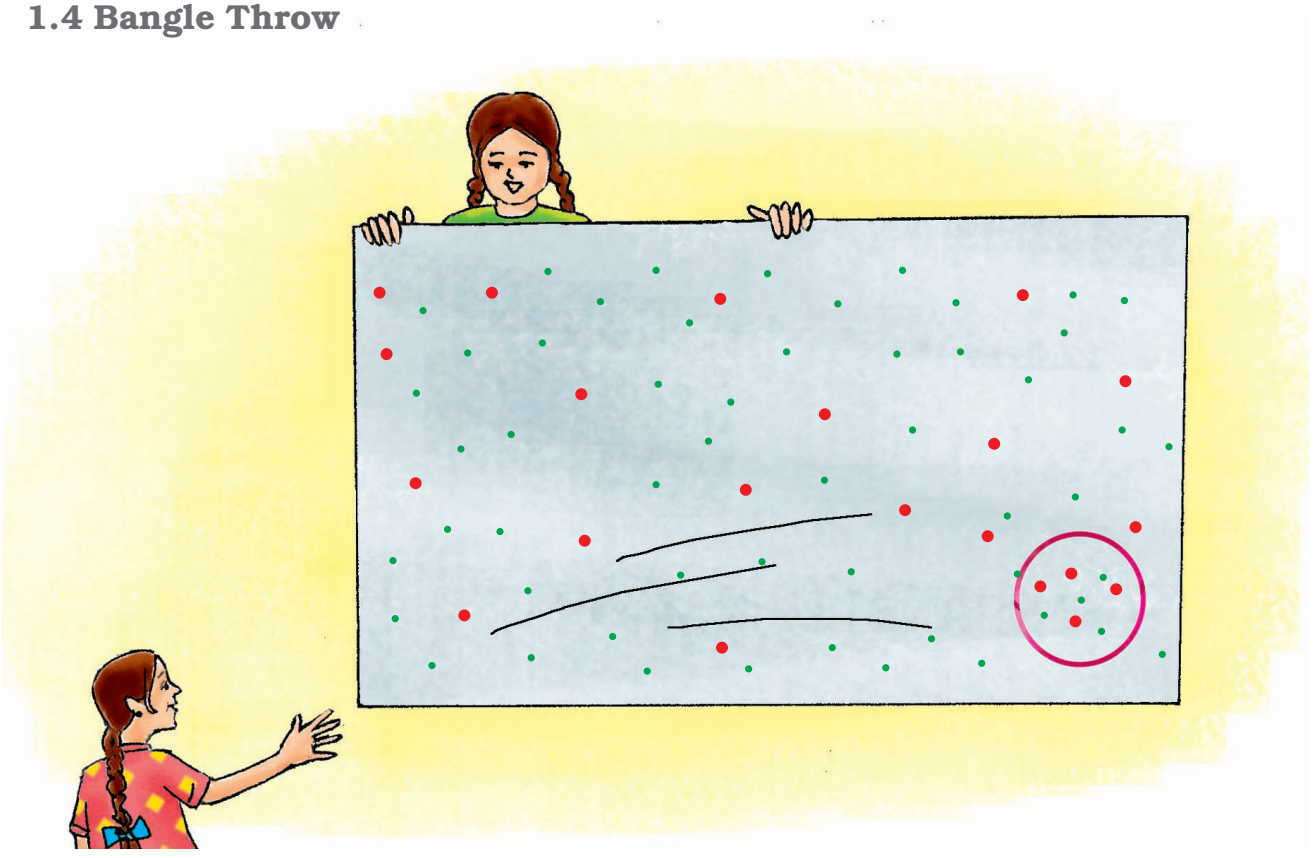
= Rs



= Rs

Do similar exercises with the help of play money (using fake notes).

1.4 Bangle Throw



Lali and Gesar are playing a bangle game. Lali has thrown the bangle on the dots.

Each big red dot is equal to 10 points. Each small green dot is equal to 1 point.

The dots inside the bangle are

Dots — 

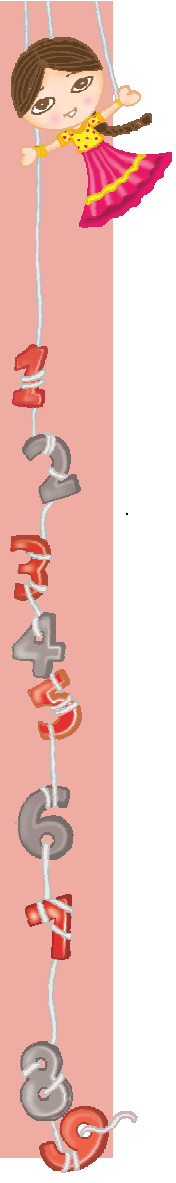
Points — 40 4

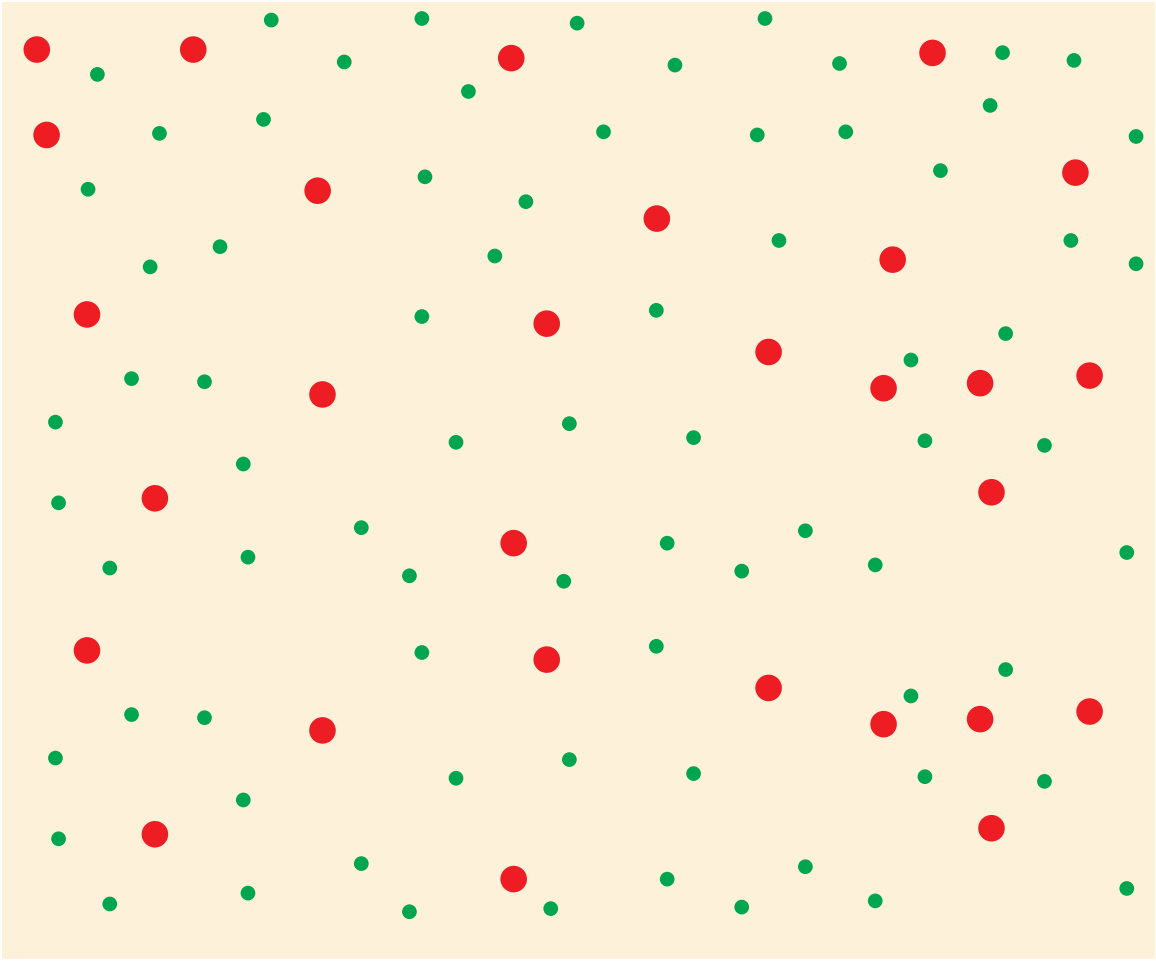
Lali has got 4 tens and 4 ones. So, Lali has got 44 points.

Each one throws the bangle twice. Here are the points.

Throw	Lali	Gesar	Winner
First	44	13	Lali
Second	16	32	Gesar







You can play this game with your friend using the board above. Write your points for each throw.

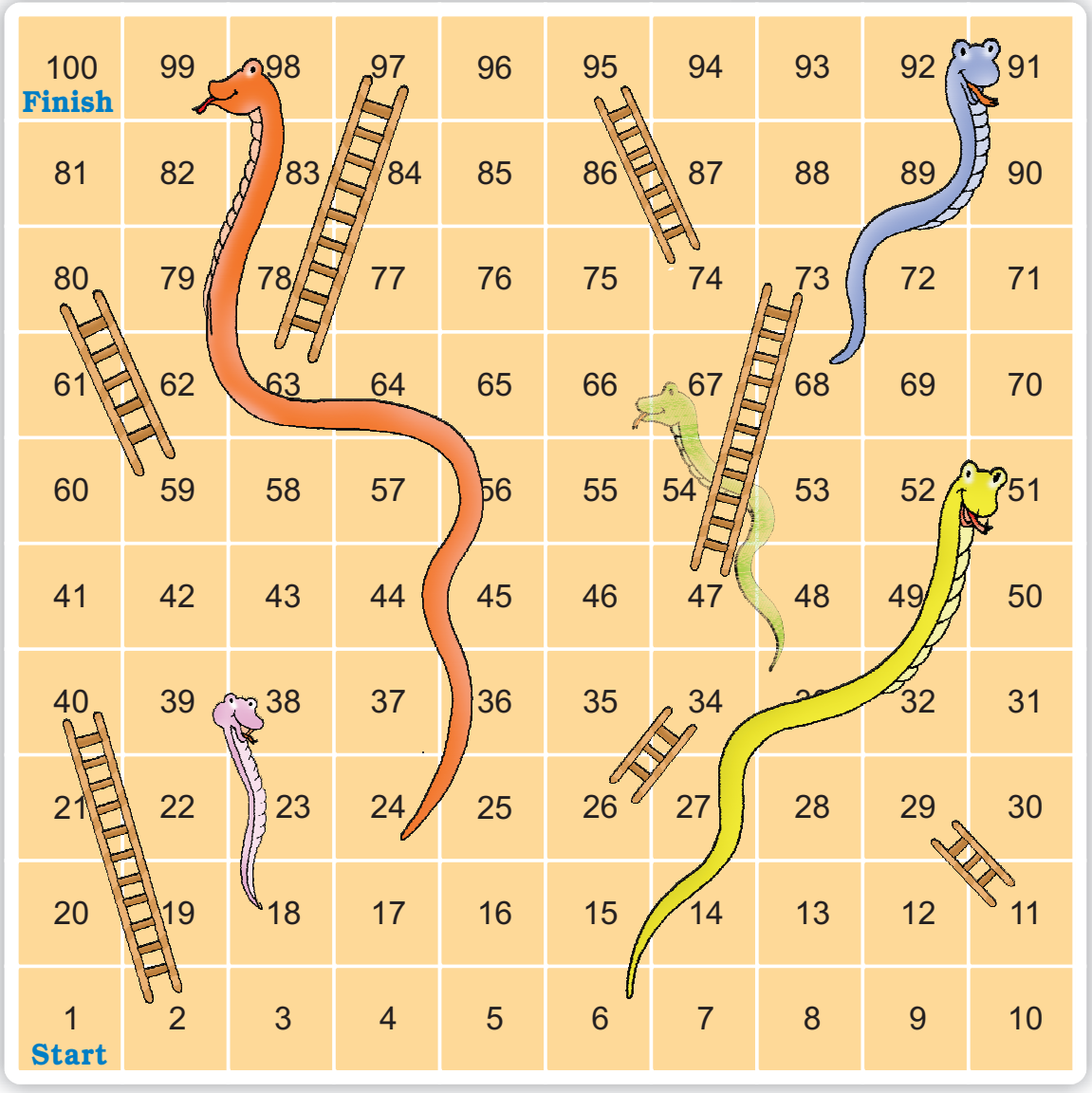
Throw	My points			My friend's points			Winner
	Tens	Ones	Total	Tens	Ones	Total	
First							
Second							
Third							
Fourth							
Fifth							
Sixth							

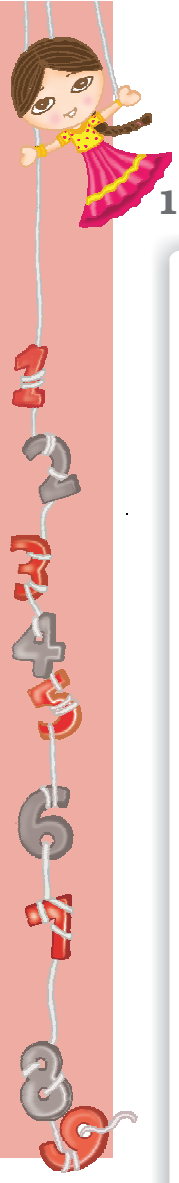
Encourage the children to compute the score mentally.

1.5 Write the missing numbers.

51	52	53	54	55	56	57	58	59	60
	62			65				69	
		73							80
			84				88		
		93		95				99	

1.6 Let us play the game of snakes and ladders.



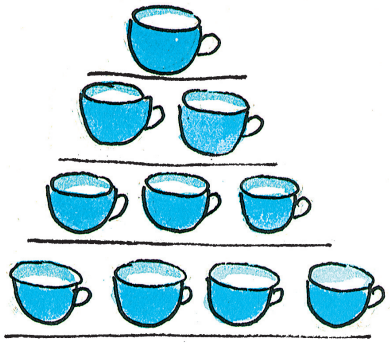


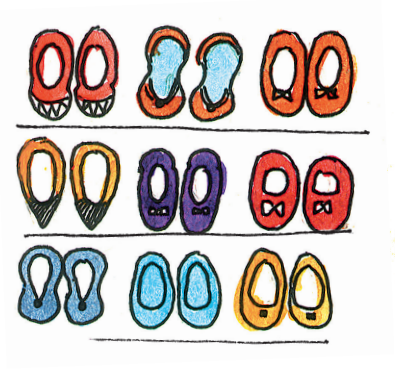
1.7 Numbers from 1 to 100 in words

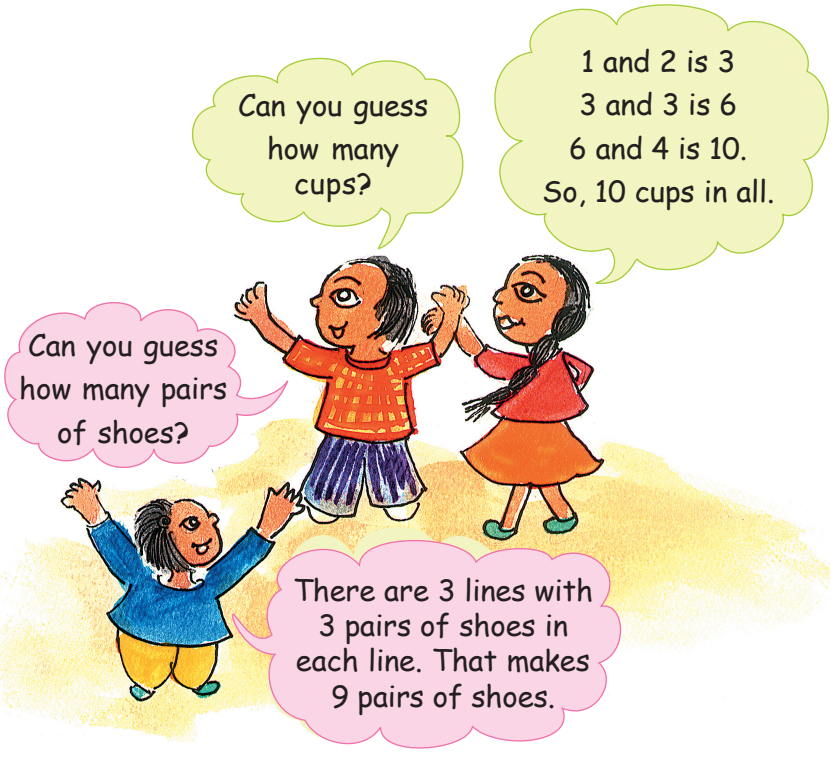
1	one	26	twenty–six	51	fifty–one	76	seventy–six
2	two	27	twenty–seven	52	fifty–two	77	seventy–seven
3	three	28	twenty–eight	53	fifty–three	78	seventy–eight
4	four	29	twenty–nine	54	fifty–four	79	seventy–nine
5	five	30	thirty	55	fifty–five	80	eighty
6	six	31	thirty–one	56	fifty–six	81	eighty–one
7	seven	32	thirty–two	57	fifty–seven	82	eighty–two
8	eight	33	thirty–three	58	fifty–eight	83	eighty–three
9	nine	34	thirty–four	59	fifty–nine	84	eighty–four
10	ten	35	thirty–five	60	sixty	85	eighty–five
11	eleven	36	thirty–six	61	sixty–one	86	eighty–six
12	twelve	37	thirty–seven	62	sixty–two	87	eighty–seven
13	thirteen	38	thirty–eight	63	sixty–three	88	eighty–eight
14	fourteen	39	thirty–nine	64	sixty–four	89	eighty–nine
15	fifteen	40	forty	65	sixty–five	90	ninety
16	sixteen	41	forty–one	66	sixty–six	91	ninety–one
17	seventeen	42	forty–two	67	sixty–seven	92	ninety–two
18	eighteen	43	forty–three	68	sixty–eight	93	ninety–three
19	nineteen	44	forty–four	69	sixty–nine	94	ninety–four
20	twenty	45	forty–five	70	seventy	95	ninety–five
21	twenty–one	46	forty–six	71	seventy–one	96	ninety–six
22	twenty–two	47	forty–seven	72	seventy–two	97	ninety–seven
23	twenty–three	48	forty–eight	73	seventy–three	98	ninety–eight
24	twenty–four	49	forty–nine	74	seventy–four	99	ninety–nine
25	twenty–five	50	fifty	75	seventy–five	100	one hundred

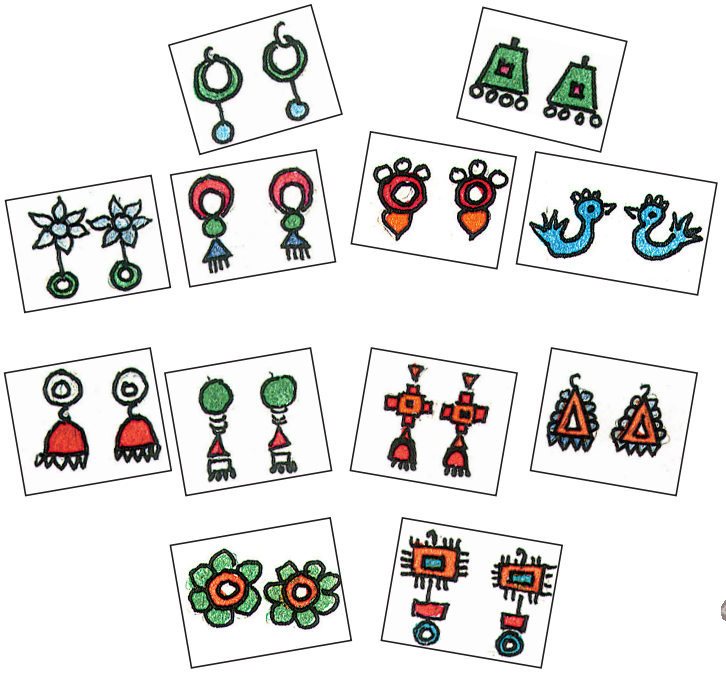
2. Counting in Groups

2.1 Look and Guess the Number









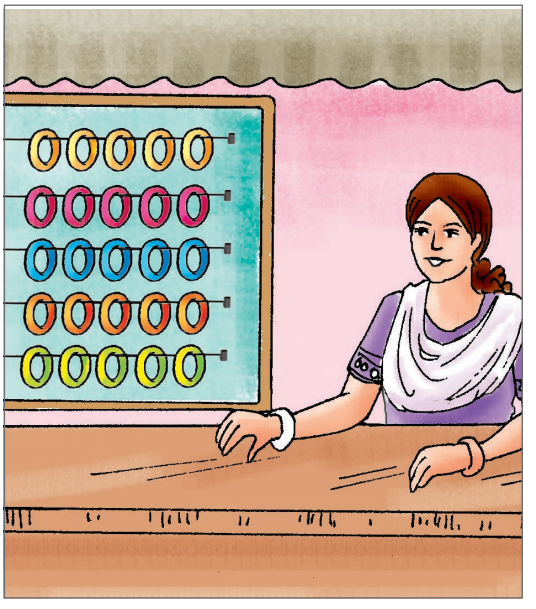
_____ pairs of earrings



Look at how different things are kept in groups. Try to guess the total number with counting in groups.



_____ glasses



_____ bangles

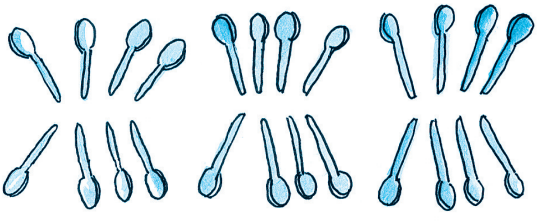
There are three groups of spoons.

- How many in each group?

  _____

- Guess the total number of spoons

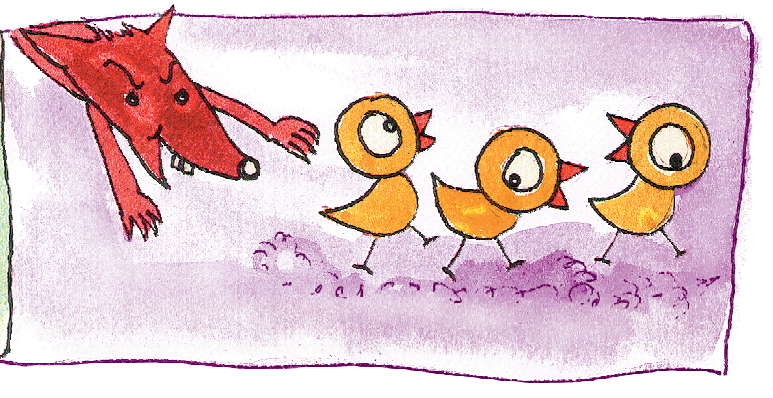
  _____



3. Counting in Tens

3.1 Chickens and the Clever Fox

Tiklee, the farmer has many chickens in her farm. One day a clever fox saw these naughty chickens playing around.

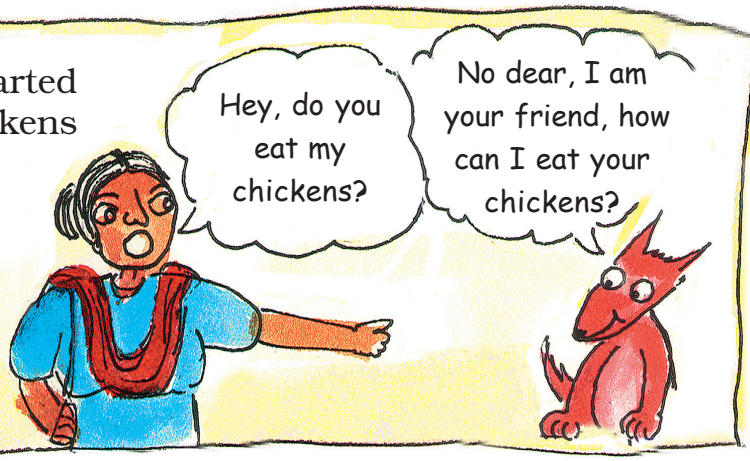


Ask children to guess the number of things around them. The idea here is to encourage them to look at the arrangement of objects and use the strategy of counting in groups.

From that day, she started stealing and eating chickens everyday.

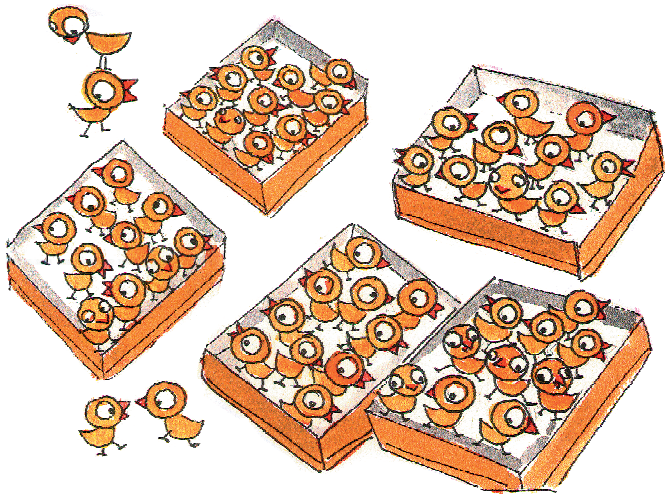
Tiklee came to know about it.

She asked the fox.



Tiklee thought of counting her chickens every morning and evening. But the chickens kept moving around here and there. She said, "I will put 10 chickens in one basket and count them. And if I find any of them missing, I will give the fox a tight slap."

In the morning, she counted her chickens.



- How many baskets of 10 chickens are there?_____
- How many chickens are there in all? 50 and 4 = _____



In the evening, she counted the chickens again by putting them in baskets each having 10 chickens.

- There are _____ baskets of 10 chickens.
- There are _____ and 3 = _____ chickens in all.
- Number of chickens eaten by the fox = chickens of one basket and one = 11

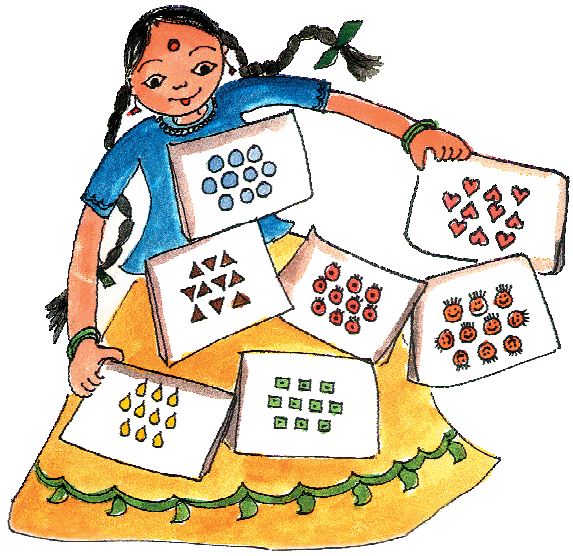


Kanak likes collecting different kinds of *bindis*.

Each packet has 10 *bindis*.

- How many packets does she have? _____
- So how many *bindis* in all?

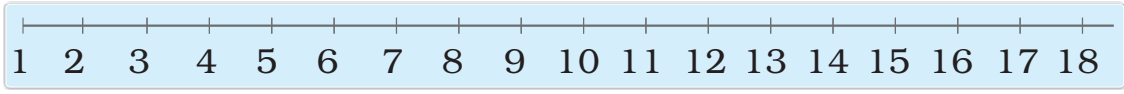
_____



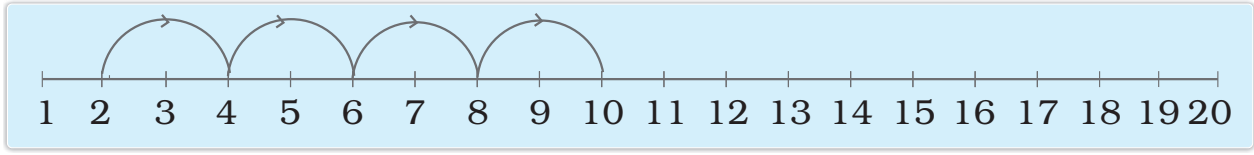
4. Skip Counting

4.1 Number line

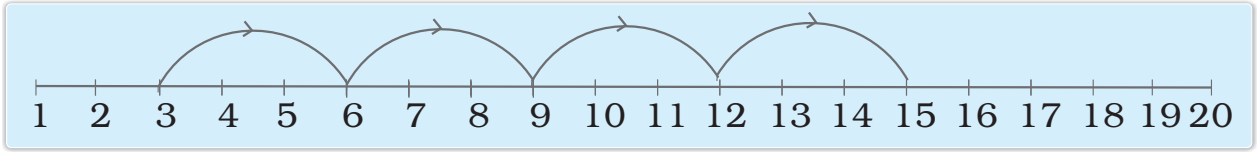
We denote the numbers on a line as follows:



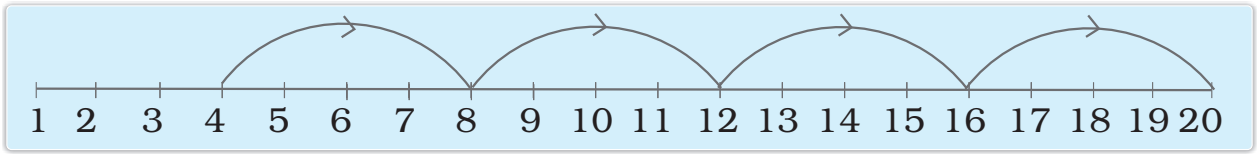
4.2 Skip counting in 2s starting from 2



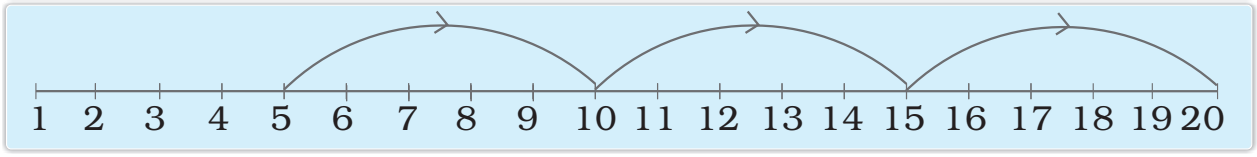
4.3 Skip counting in 3s starting from 3



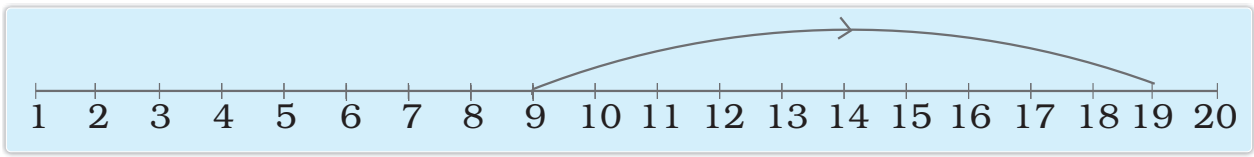
4.4 Skip counting in 4s starting from 4



4.5 Skip counting in 5s starting from 5



4.6 Skip counting in 10s starting from 9



Practice Time

(1) Encircle the numbers.

(a) Skip counting in 2s, starting from 1

(1)	2	3	4	(5)	6	7	8	9	10
11	12	13	14	15	16	17	18	19	20
21	22	23	24	25	26	27	28	29	30
31	32	33	34	35	36	37	38	39	40
41	42	43	44	45	46	47	48	49	50

(b) Skip counting in 3s, starting from 2

1	(2)	3	4	(5)	6	7	(8)	9	10
11	12	13	14	15	16	17	18	19	20
21	22	23	24	25	26	27	28	29	30
31	32	33	34	35	36	37	38	39	40
41	42	43	44	45	46	47	48	49	50

(c) Skip counting in 3s, starting from 23

21	22	23	24	25	26	27	28	29	30
31	32	33	34	35	36	37	38	39	40
41	42	43	44	45	46	47	48	49	50
51	52	53	54	55	56	57	58	59	60

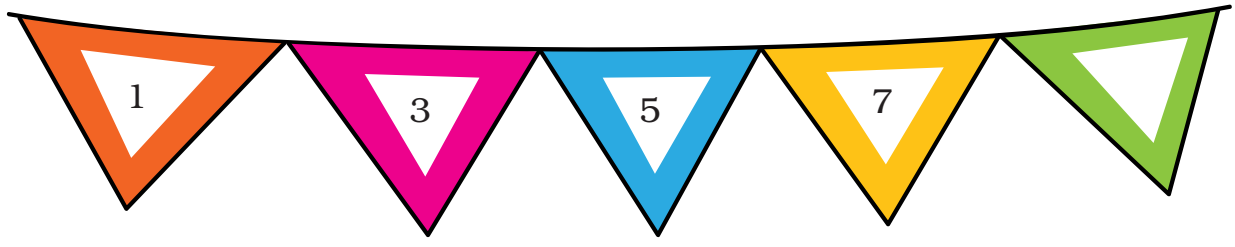
(d) Skip counting in 10s, starting from 1

1	2	3	4	5	6	7	8	9	10
11	12	13	14	15	16	17	18	19	20
21	22	23	24	25	26	27	28	29	30
31	32	33	34	35	36	37	38	39	40
41	42	43	44	45	46	47	48	49	50
51	52	53	54	55	56	77	58	59	60

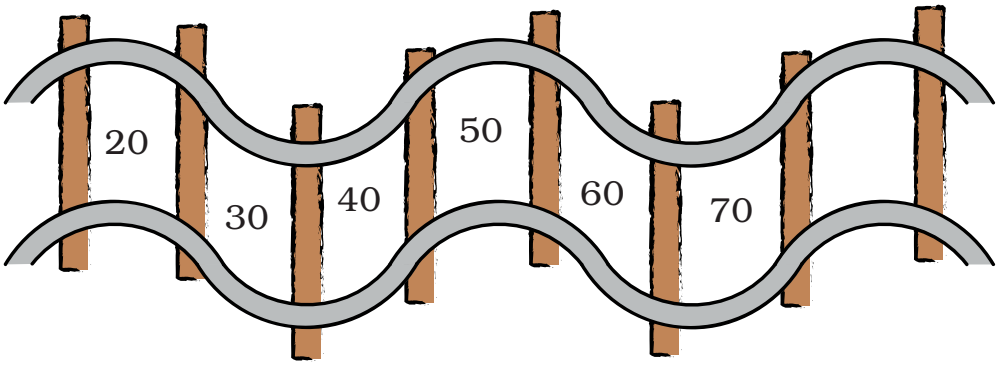
(2) Number patterns.

Let us look at some patterns with numbers. Fill the number in the blank space of each pattern.

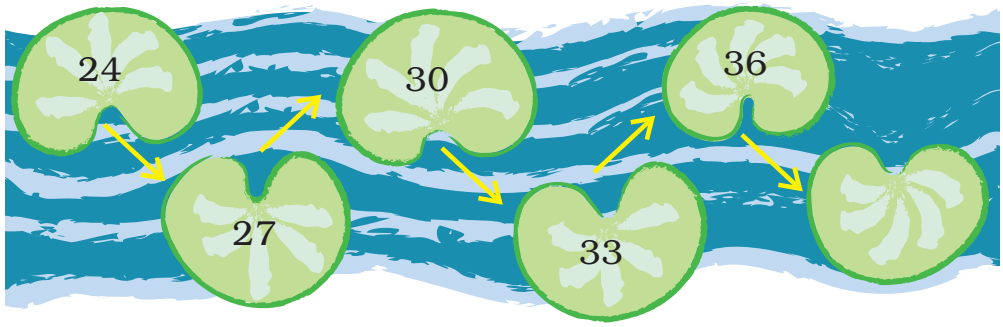
(a)



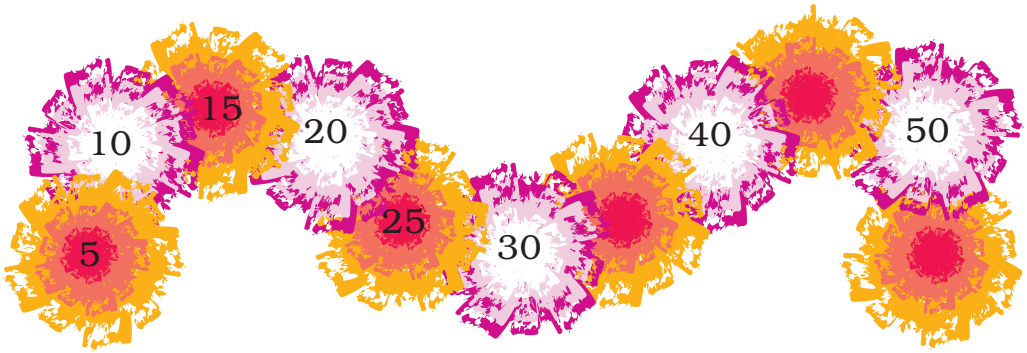
(b)



(c)

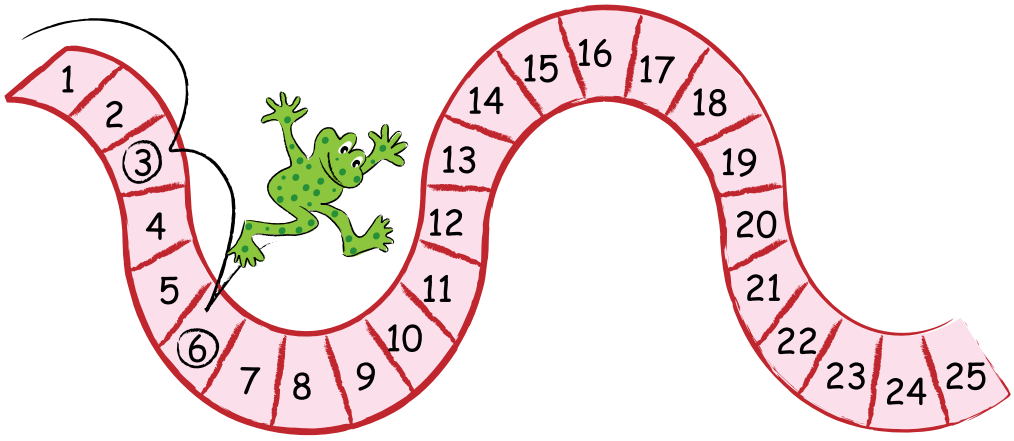


(d)



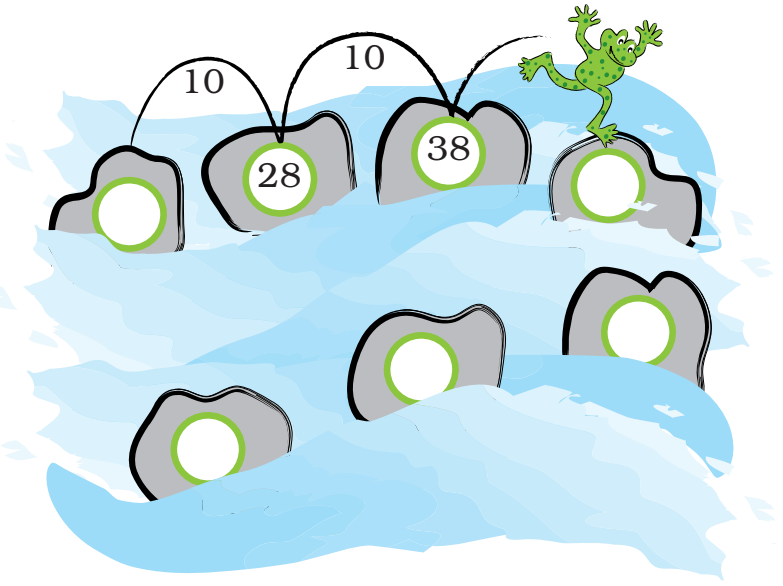
(3) Titu jumps.

(a) Titu frog jumps over two numbers and reaches the third number. Where will Titu go next? Make a ring on the other numbers.



Encourage children to identify the patterns. Discuss with them various other possible number patterns.

(b) Titu jumps and gets on every 10th stone. Write the numbers on the stones.

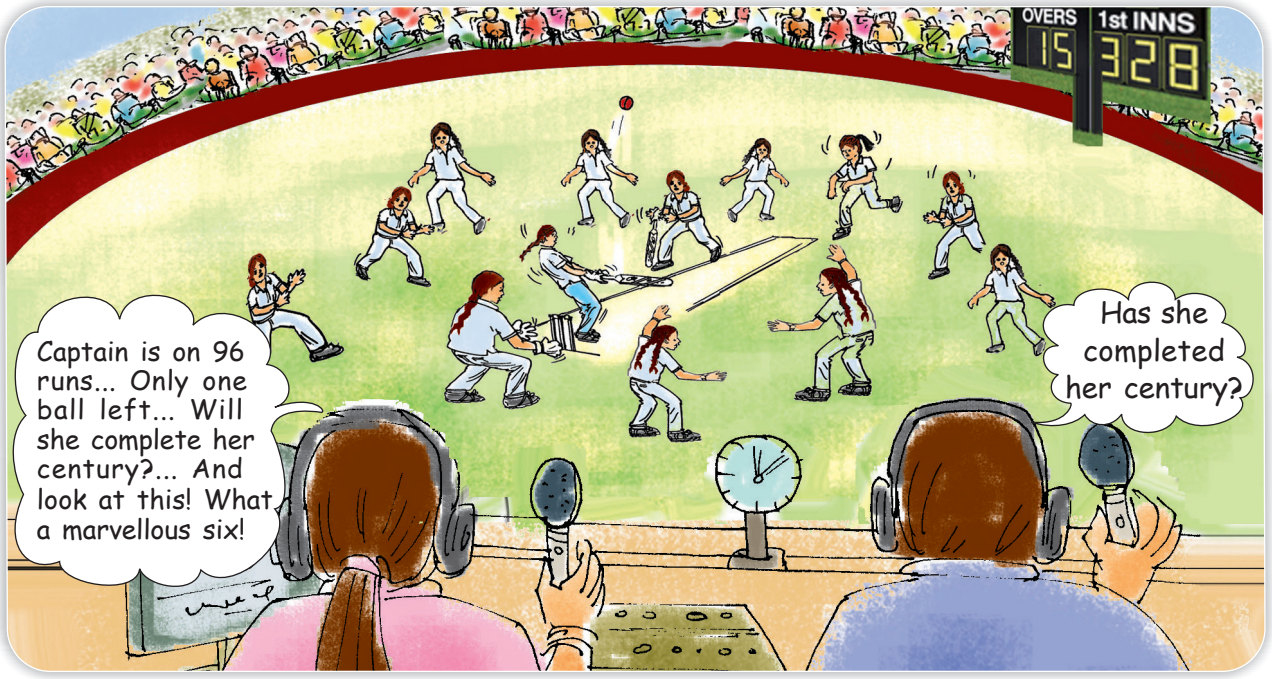


(4) Continue the pattern with counting in 5s.

5	10	15					
11	16	21					

5. Women's Cricket Match

A one-day match between India and South Africa in Guwahati...., India batting first.....



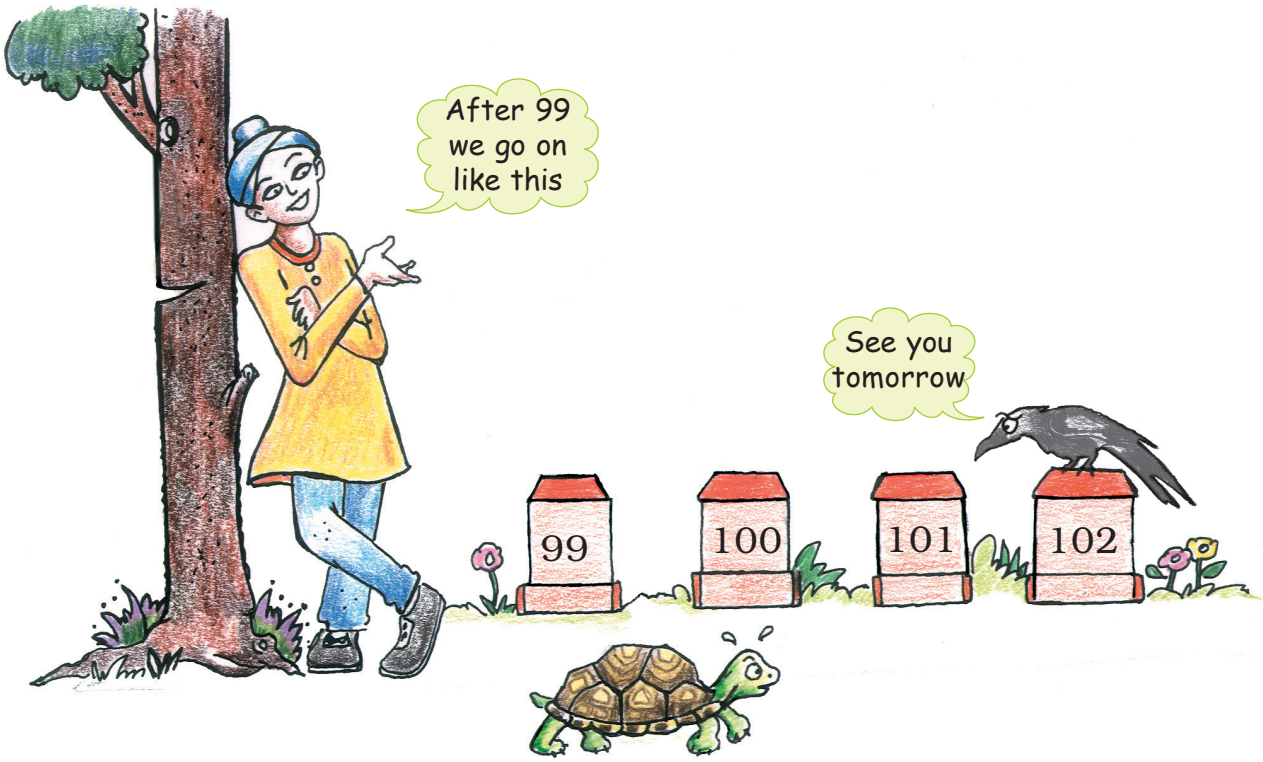
Fill in the blanks

How many more runs does the Captain need to complete her century? It can be also seen as, Captain scored 96 + ___?___ = ___100___ runs.

How many runs do these players need to complete a century?

	Runs scored	Runs needed to complete a century
Player 1	93	
Player 2	97	
Player 3	89	
Player 4	99	

6. Numbers beyond 99



Numbers are understood not by reciting them in order but by making associations in familiar contexts. Here the idea of a 'century' of runs is used which means 'one hundred runs' and half century means 50 runs. Teachers could add other examples from children's environment to think about 3-digit numbers. Encourage them to speak about large numbers even if they cannot read or write them. However, before discussion on 3-digit numbers, students may be introduced the basic addition which is given in the second chapter.

Fill in the Blanks

99-112		195-206	
Number (in figures)	Number (in words)	Number (in figures)	Number (in words)
99	Ninety-nine	195	One hundred ninety-five
100	One hundred	196	One hundred ninety-six
101	One hundred one	197	One hundred ninety-seven
102	_____	198	One hundred ninety-eight
103	One hundred three	____	One hundred ninety-nine
104	One hundred four	200	Two hundred
____	One hundred five	201	Two hundred one
106	One hundred six	____	_____
107	_____	203	Two hundred three
____	One hundred eight	____	Two hundred four
109	One hundred nine	205	Two hundred five
110	One hundred ten	206	_____
111	One hundred eleven		
____	One hundred twelve		

Practice Time

(1) Top ten scores in a cricket tournament

Player	Score	Player	Score
A.P.J.	128	M.D.	178
A.S.	100	P.K.	105
C.K.	99	S.T.	141
D.M.	162	T.P.K.	112
K.S.P.	152	V.V.S.	120





- C.K. just missed her century. How many runs did she need to make a century? _____
- _____ and _____ scored almost equal runs.
- _____ scored a complete century no less no more.
- Maximum runs scored by any batswomen are _____.
- _____ and _____ have a difference of just 1 run between them.
- _____ scored 2 more than one and a half century.

(2) Mark the Numbers in the following chart. As indicated in the table below some numbers have already been marked for your help.

744	810	45	401	54
555	374	171	261	159
656	140	179	891	16
195	155	410	159	685
454	136	60	74	699
800	445	642	202	943

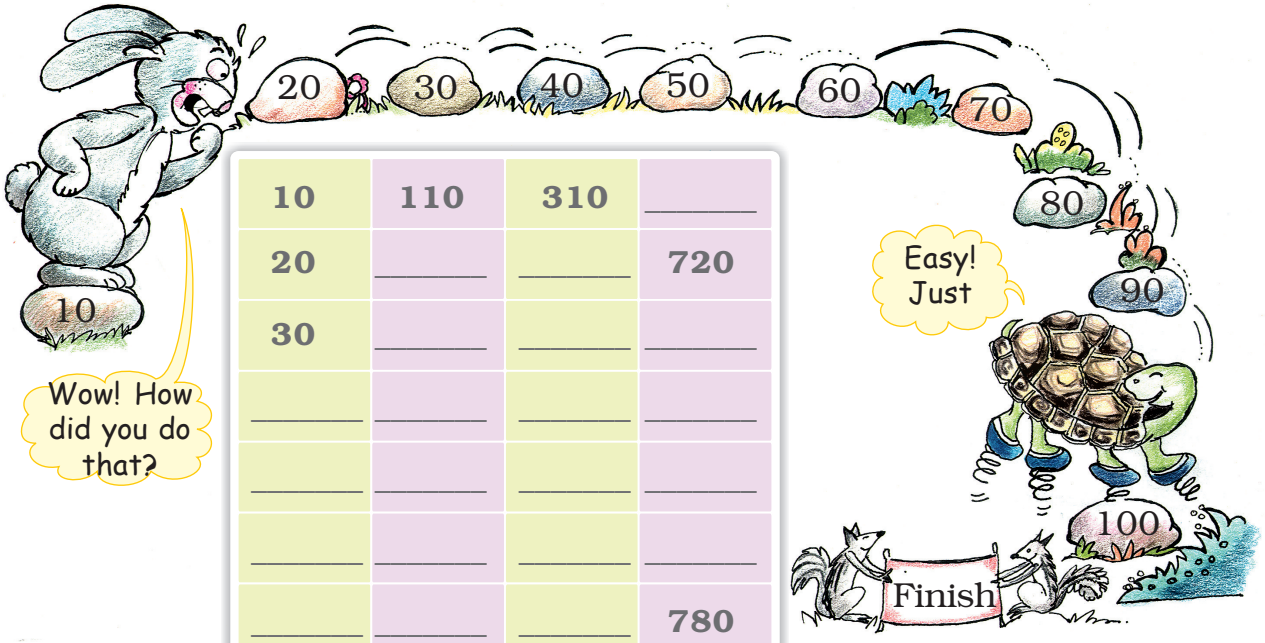
Observe the following table

Mark with circle ◯	Mark with rectangle ▭	Mark with triangle △
One hundred forty	Fifty-four	Four hundred forty-five
Two hundred two	Sixty	Sixteen
Two hundred sixty-one	One hundred ninety-five	One hundred fifty-nine
Eight hundred	Five hundred fifty-five	Six hundred eighty-five



(3) Counting in 10's

Complete the table.



10	110	310	_____
20	_____	_____	720
30	_____	_____	_____
_____	_____	_____	_____
_____	_____	_____	_____
_____	_____	_____	_____
_____	_____	_____	780
_____	_____	_____	_____
_____	190	_____	_____
100	200	400	_____

(4) Counting in 50's

Complete the table.

200	550	900
250	_____	_____
_____	650	_____
350	_____	_____
_____	750	_____
_____	_____	_____
500	850	_____

- How far can you go like this? _____
- What is the biggest number you can call out? _____

Children should be provided the numbers in different orientations, for example, numbers storing from right side of the page. And also encourage children to compute the score mentally.

(5) Class, Jump!



- Jump 2 steps forward.

  104, 106, 108, ◯ , ◯ , ◯ , ◯ .

- Jump 10 steps backward.

  200, 190, 180, ◯ , ◯ , ◯ , ◯ .

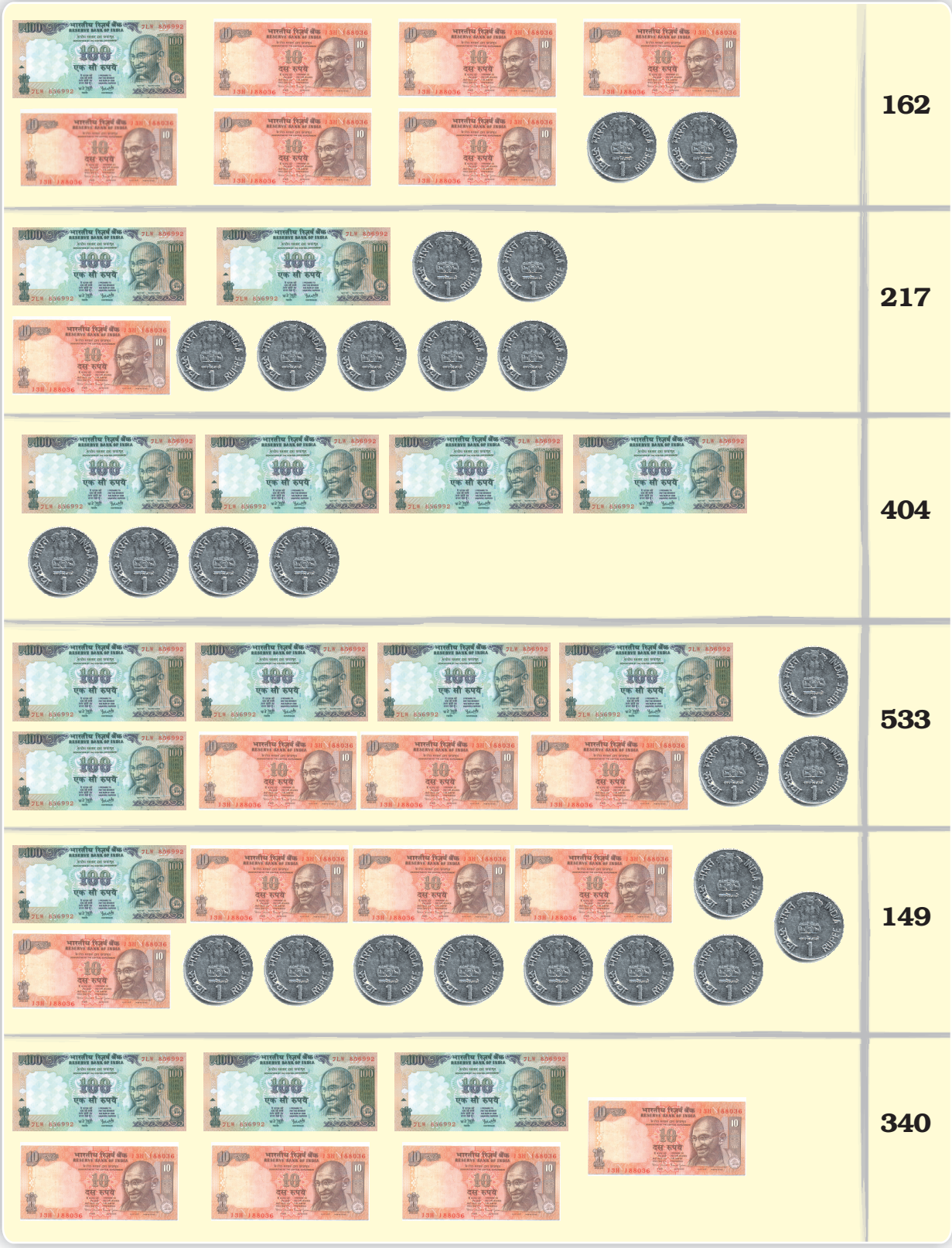
- Continue the pattern.

  550, 560, 570, ◯ ◯ ◯ ◯

  910, 920, 930, 940, ◯ , ◯ , ◯ , ◯ .



7. Currency – Hundreds, Tens and Ones



Practice Time

(1) Fill in the smaller boxes and write the number in the bigger box.

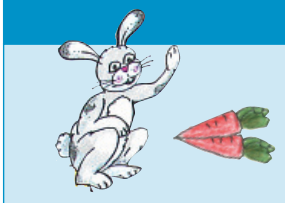
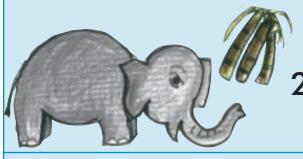
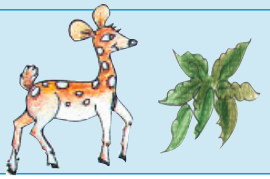


(2) Lazy Crazy Shop

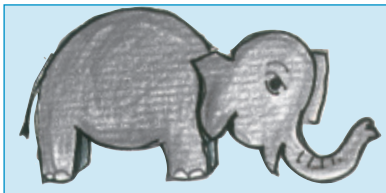
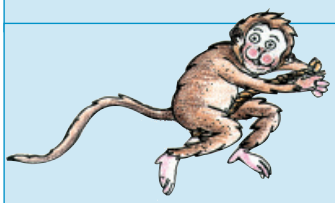
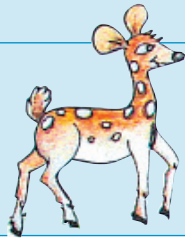
This is the jungle shop. Lazy Crazy gives things only in packets of hundreds, tens and loose items.



(a) Find out how many packets of hundreds, tens and loose items each animal will take. Fill in the blanks.

	Packets of 100	Packets of 10	Loose items
 143			
 210			
 242			
 552			

(b) Lazy Crazy also has a crazy way of taking money. She takes only in  notes,  notes and  coins. Now find out how they will pay her for what they have taken.

	Rs 420
	Rs 143
	Rs 242
	Rs 55

(3) Who am I? Match with the number on the right.

(a) I come between 40 and 50 and there is a 5 in my name. 96

(b) I have 9 in my name and I am very close to 90. 150

(c) If you hit a 4 after me, you score a century. 45

(d) I am equal to ten notes of 10. 89

(e) I am century and a half century 87

(f) I am exactly in between 77 and 97. 100

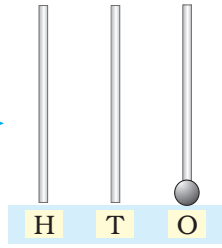
Here several stories and exercises are used to help children understand the decimal number system. The term 'place-value', which often confuses children, has not been used at all in the beginning.



8. Cubes and Abacus

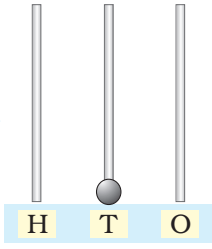


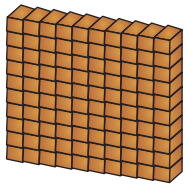
1 one → is written as → 1 One (O) → is shown as



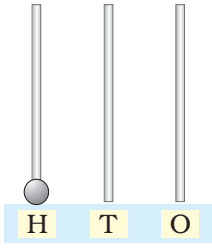


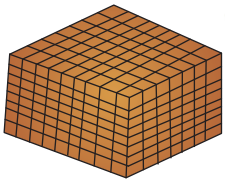
10 one or 1 ten → is written as → 10 Ten (T) → is shown as



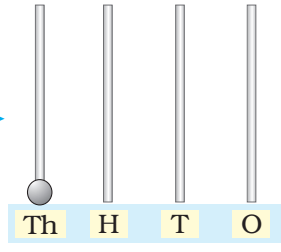


100 ones or 10 tens or 1 hundred → is written as → 100 Hundred (H) → is shown as

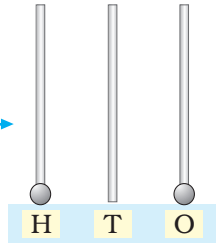




1000 ones or 100 tens or 10 hundreds or 1 thousand → is written as → 1000 Thousand (Th) → is shown as

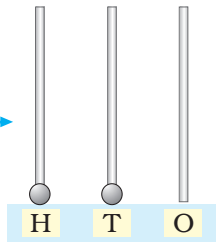


Read			Write	See
1 hundred	0 tens	1 one	→ 101 →	

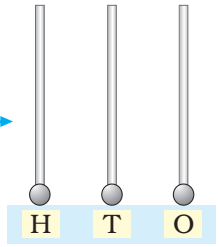


After an introduction of the decimal system with stories given in the proceeding pages, the connection between concrete examples and abstract thinking, should be worked out with the help of cubes and abacus.

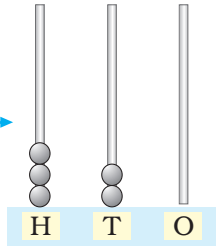
1 hundred 1 ten 0 one → 110 →



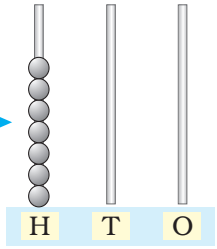
1 hundred 1 ten 1 one → 111 →



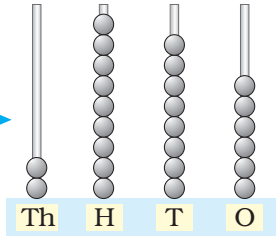
3 hundred 2 tens 0 one → 320 →



7 hundreds 0 ten 0 one → 700 →



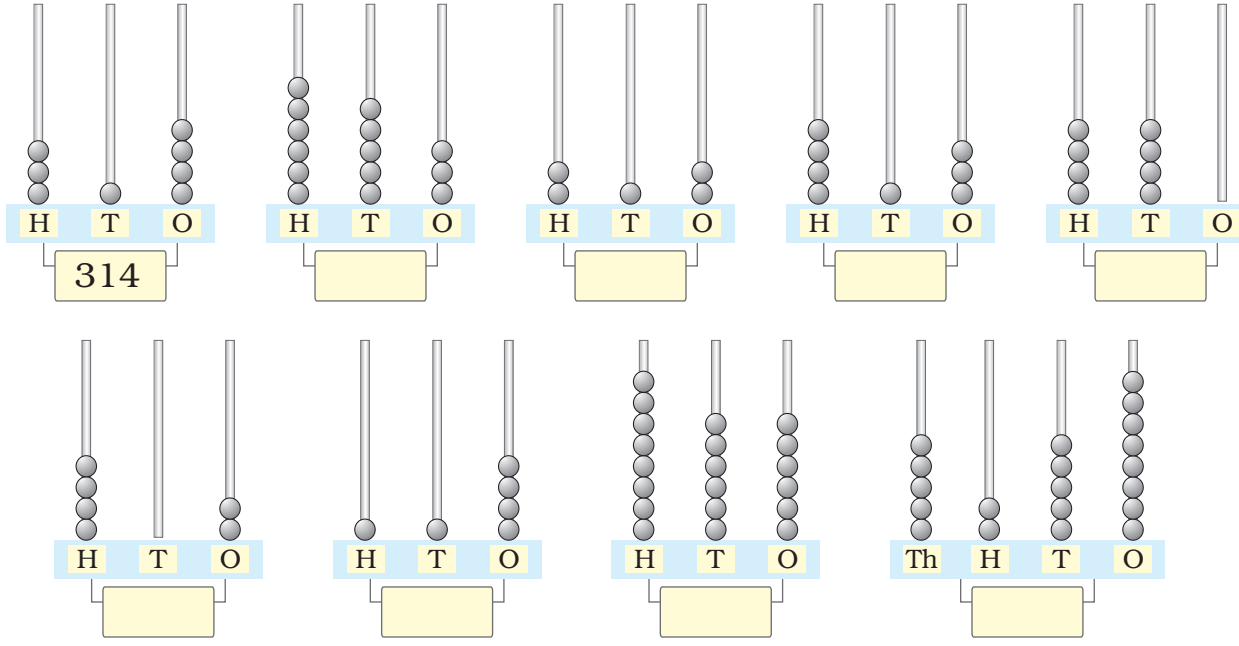
2 Thousands 9 hundreds 8 tens 6 ones → 2986 →





Practice Time

(1) Read the abacus and write the number.



(2) Fill in the blanks.

	2 hundreds	4 tens	5 ones, is written as	245
3 thousands	4 hundreds	2 tens	3 ones, is written as	
	7 hundreds	5 tens	8 ones, is written as	

(3) Fill in the blanks.

	918 means	9	hundreds	1	tens	8	ones
	413 means		hundreds		tens		ones
5555 means		thousands		hundreds		tens	ones

9. Place-value and Expanded Form

7 ← This is a one-digit number.

26 ← This is a two-digit number.

147 ← This is a three-digit number.

2519 ← This is a four-digit number.

48
- 8 ones → 8 is in ones place
- 4 tens → 4 is in tens place

Think and Discuss

There are 9 one-digit numbers, namely 1, 2, 3, 4, 5, 6, 7, 8, 9

There are 90 two-digit numbers, namely 10, 11, 12, 13, ..., 98, 99

There are 900 three-digit numbers, namely 100, 101, 102,...., 998, 999

There are 9000 four-digit numbers namely 1000, 1001,.....998, 9999

Similarly,

316
- 6 ones → 6 is in ones place
- 1 ten → 1 is in tens place
- 3 hundreds → 3 is in hundreds place

Similarly,

9683
- 3 ones → 3 is in ones place
- 8 tens → 8 is in tens place
- 6 hundreds → 6 is in hundreds place
- 9 thousands → 9 is in thousands place



This topic should be taught to the children after introducing basic addition of numbers.

Practice Time

(1) Encircle the digit in ones place.

27	109	315	3810

(2) Encircle the digit in hundreds place.

251	101	610	4785

(3) Encircle the digit in tens place.

87	108	4218	650

(4) Using the digits 2, 5 and 8, write all possible three-digit numbers (use a digit only once).

9.1 Place–value

Let us consider the numbers

624	246	426

Here, each one is a three-digit number, consisting of the digits 2, 4 and 6. But these three numbers are different.

In 624	4 is at the ones place.	So, its place value is 4.
In 246	4 is at the tens place.	So, its place value is 40.
In 426	4 is at the hundreds place.	So, its place value is 400.

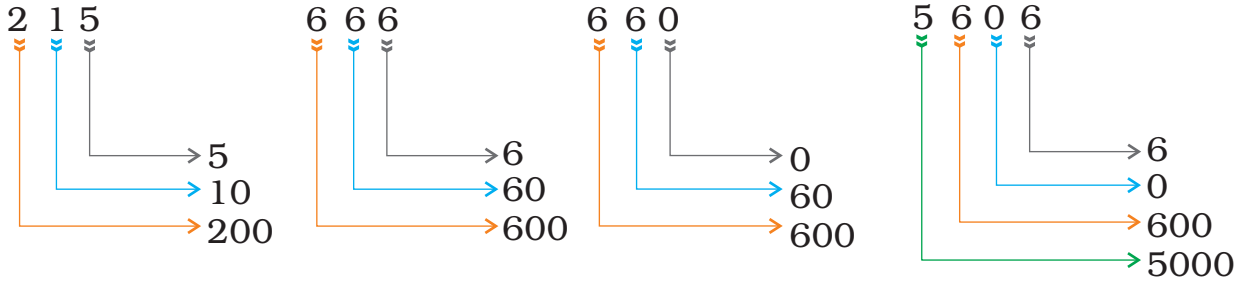
In the number 689,

9	9 is at ones place. So, its place value is 9.
8	8 is at the tens place. So, its place value is 80.
6	6 is at the hundreds place. So, its place value is 600.

Similarly, in the number 6705,

5	5 is at ones digit. So, its place value is 5.
0	0 is at the tens digit. So, its place value is 0.
7	7 is at the hundreds digit. So, its place value is 700.
6	6 is at the thousands digit. So, its place value is 6000.

Read the place-value of each digit of the numbers given below.



From the above, let us add the place-values of the digits of the number. In each case, the sum so obtained is the number itself.

So, we can write

859 = 800 + 50 + 9 215 = 200 + 10+ 5

794 = 700 + 90 + 4 666 = 600 + 60 + 6

660 = 600 + 60 5606 = 5000 + 600 + 6

Note that 800 + 50 + 9 is called the expanded form of 859.

Similarly,

5000 + 600 + 6 is the expanded form of 5606 and so on.



Practice Time

(1) Write the place-value of the encircled digit in the box.

9 (7) 0 ☐ (3) 243 ☐ (2) 96 ☐

(3) 6 ☐ 31 (0) ☐

(2) Write the place-value of the digit 5 in the box.

156 ☐ 8521 ☐ 315 ☐

657 ☐ 750 ☐

(3) Write the expanded form of the following numbers.

234 = ☐ + ☐ + ☐

613 = ☐ + ☐ + ☐

313 = ☐ + ☐ + ☐

7438 = ☐ + ☐ + ☐ + ☐

(4) Write the numbers in the box.

521 + 90 + 8 = ☐ 600 +10 = ☐

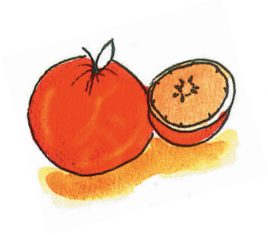
2000 + 40 + 6 = ☐ 700 + 8 = ☐

10. More or Less, Let Us Guess

Ring the correct answer.

- Number of teeth in your mouth
  - More than 40
  - Less than 40





- Number of seeds in an orange
  - More than 50
  - Less than 50

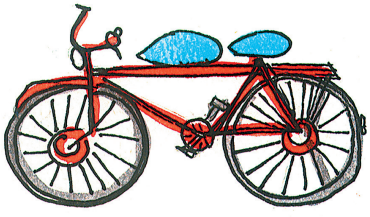
- Number of matchsticks in a matchbox
  - More than 30
  - Less than 30





- Number of pencils with you
  - More than 45
  - Less than 45

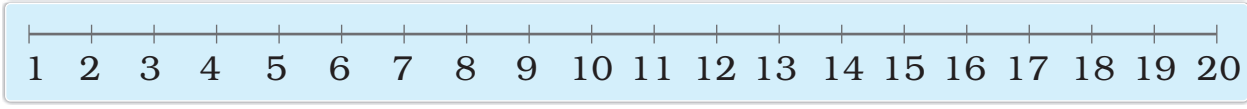
- Number of spokes in one cycle wheel
  - More than 20
  - Less than 20





10.1 Comparison of numbers (using the number line)

Look at the number line.



Here,

8 is on the right of 5. We know that 8 is greater than 5.

10 is on the right of 9. We know that 10 is greater than 9.

On a number line, a number on the right of another number is greater.

Also,

8 is on the left of 10. We know that, 8 is less than 10.

9 is on the left of 11. We know that, 9 is less than 11.

A one digit number is less than a two digit number

So, making use of symbols > (greater than) and < (smaller than) we can write

3 < 5	5 > 4	6 > 5	8 > 2
23 > 12	25 > 18	27 < 48	51 > 15
100 > 98	140 < 150	241 > 142	707 > 770

Note that 3 < 5 is the same as 5 > 3.
Similarly, 23 > 12 is the same as 12 < 23.

If a number has more digits than another, it is greater of the two.
For example, 213 > 87; 301 > 98; 37 > 9.

If two numbers have the same number of digits, then

(a) compare the digits on the extreme left. The number with greater digit is greater.

(b) if the extreme left digits are the same, compare the next digits of the right, and so on. Example, 625 > 486; 765 > 748; 654 > 653.

Which one is greater (>) or smaller (<)?

67 or 102

Here, 67 has 2 digits and 102 has 3 digits.

So, 102 is greater than 67,

That is, 102 > 67 or 67 < 102.

947 or 698

Here, both have 3 digits. But of the two extreme left digits, 9 is greater than 6

So, 947 is greater than 698

That is, 947 > 698 or 698 < 947.

567 or 576

Here, both have 3 digits. Also, the extreme left digits are the same, namely 5.

So, we compare the next digits to the right of 5. These digits are 6 and 7.

Since, 6 < 7, we have 567 < 576 or 576 > 567.

870 or 876

Here, both have 3 digits. The digits of hundred's places are same, namely 8.

Also, the digits of ten's places are the same, namely 7.

So, we compare the digits of one's places.

Since 6 > 0, we have 876 > 870 or 870 < 876.



Children can be informed about the position of numbers on the number line, so that they can get intuition for estimation of comparison of numbers.
Children should be helped to develop a sense/intuition for comparing numbers through the estimation of their position on the number line.

PRACTICE TIME

(1) Insert > or < in ◯.

333	>	233	23	<	234		
240	◯	24	607	◯	67	103 ◯ 31	76 ◯ 607
963	◯	396	405	◯	540	770 ◯ 707	672 ◯ 267
317	◯	371	605	◯	56	411 ◯ 421	328 ◯ 329

(2) Encircle the greatest number.

87	107	99	41	401	710
123	321	312	606	660	666
220	202	200	55	505	550

(3) Encircle the smallest number.

721	712	271	39	936	130
506	605	65	842	248	428

(4) Arrange the following numbers in order, from the smallest to the greatest (ascending order).

37	167	96	37	96	167
410	140	89			
505	550	555			

(5) Arrange the following numbers in order, form the greatest to the smallest (descending order).

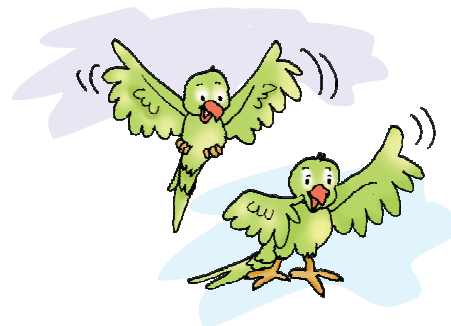
67	76	27	76 67 27
241	412	98	
654	456	99	



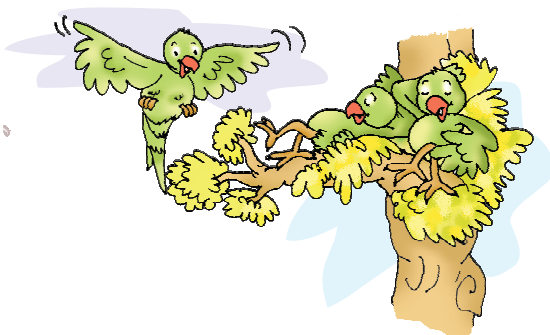


ADDITION OF NUMBERS

1. One more

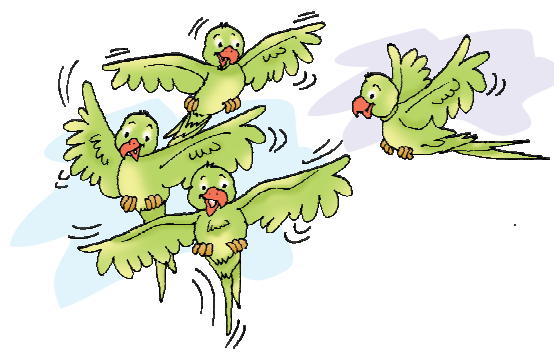


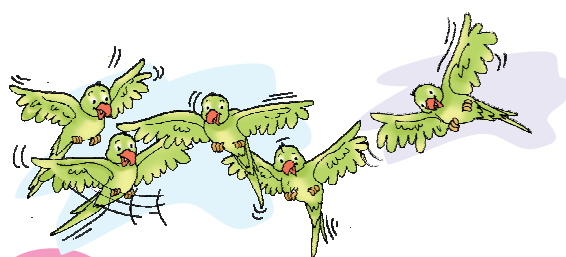
One little parrot,
singing I love you,
One more joins in,
making them two.



Two little parrots,
resting on a tree,
One more joins in,
making them three.

Three little parrots,
looking for more,
One more joins in,
making them four.

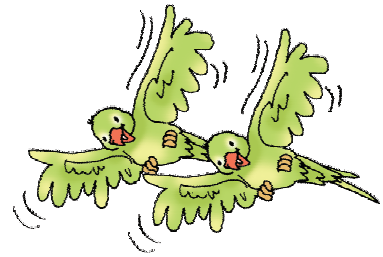




Four little parrots,
wanting to dive,
One more joins in,
making them five.



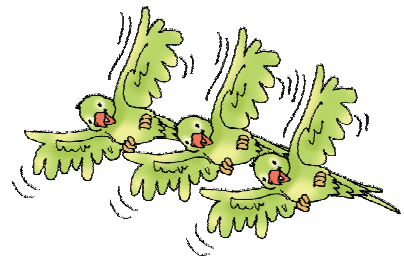

1 parrot and 1 parrot



are equal to 2 parrots



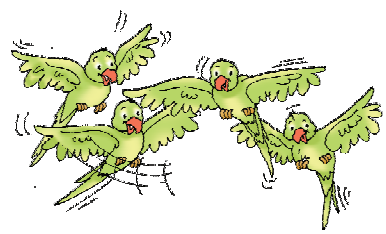

2 parrots and 1 parrot



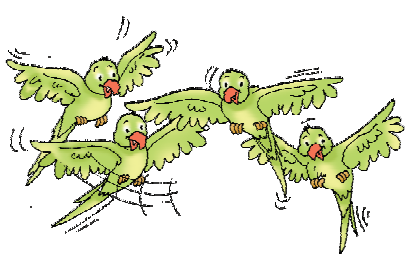
are equal to 3 parrots



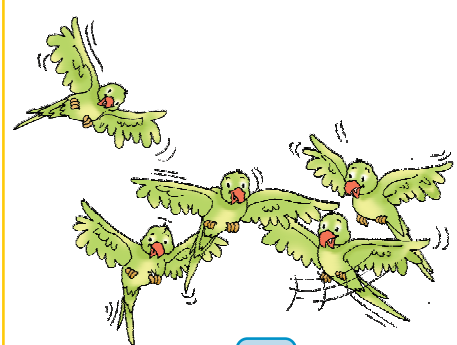

3 parrots and 1 parrot



are equal to 4 parrots



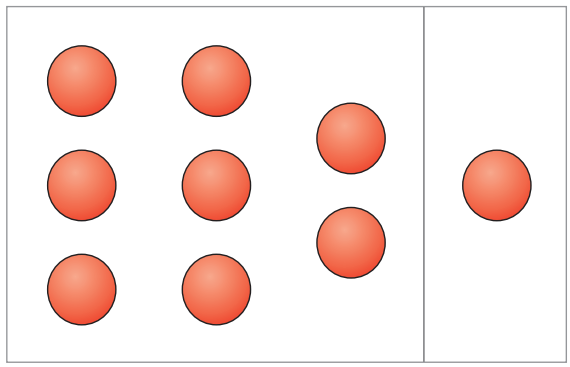

4 parrots and 1 parrot



are equal to 5 parrots

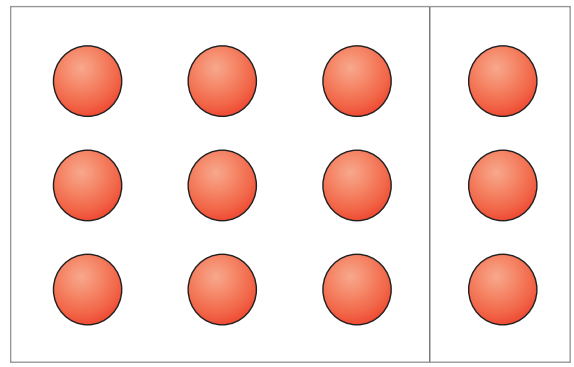


2. Addition (Joining)



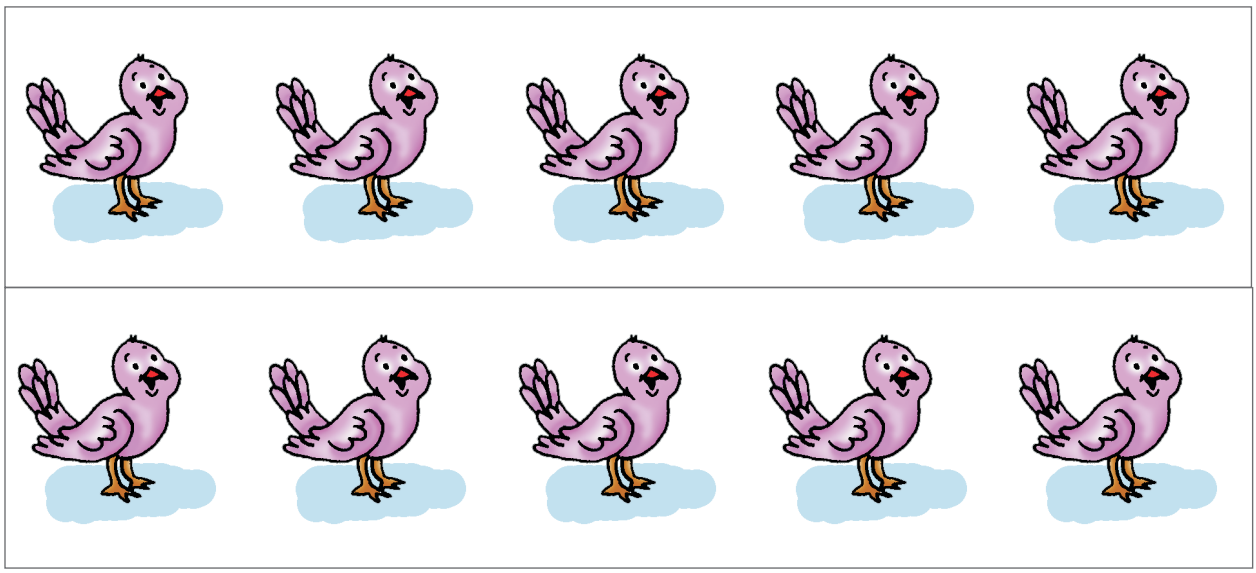
8 and 1 make 9

8 + 1 = 9



9 and 3 make 12

9 + 3 = 12



5 and 5 make 10

5 + 5 = 10

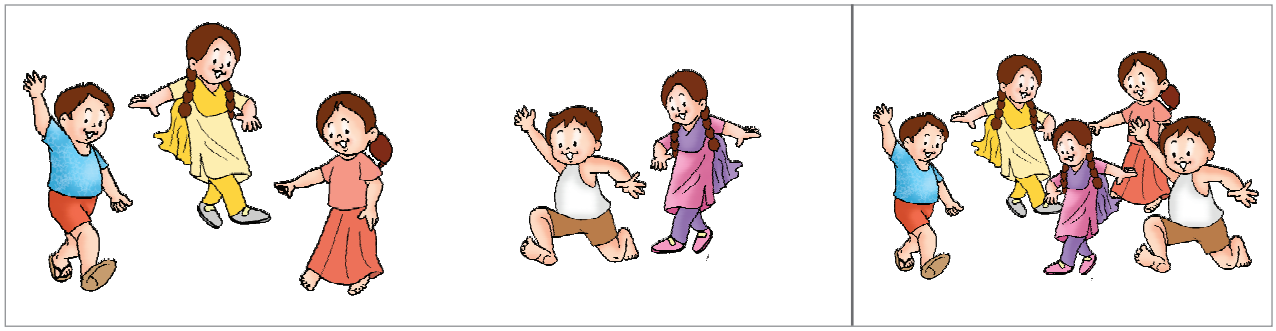
The sign '+' indicates addition

It is read as plus

We read 4 + 2 = 6 as "four plus two is equal to six".

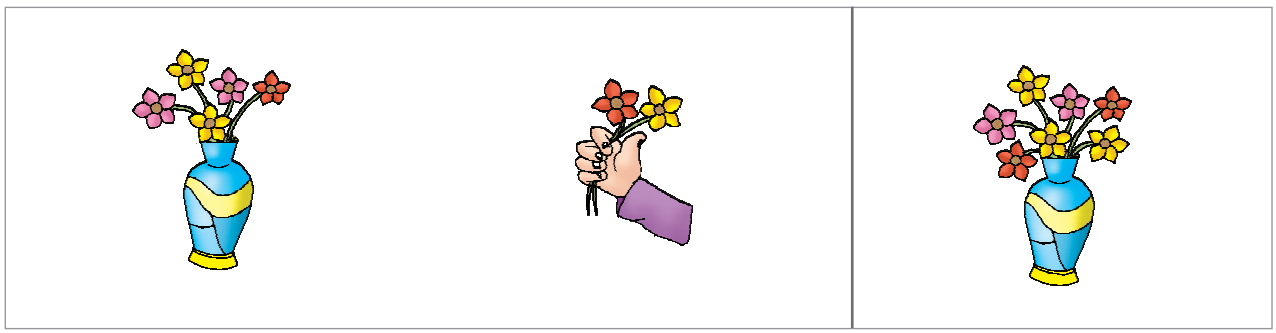
6 is called the sum of 4 and 2.

3. How Many Altogether?



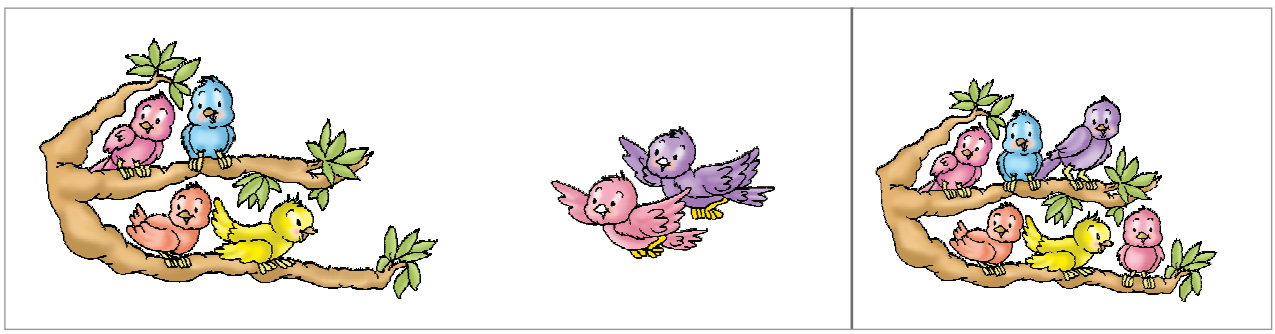
3 Children and 2 Children are equal to 5 Children

3 + 2 = 5



5 Flowers and 2 Flowers = ____ Flowers

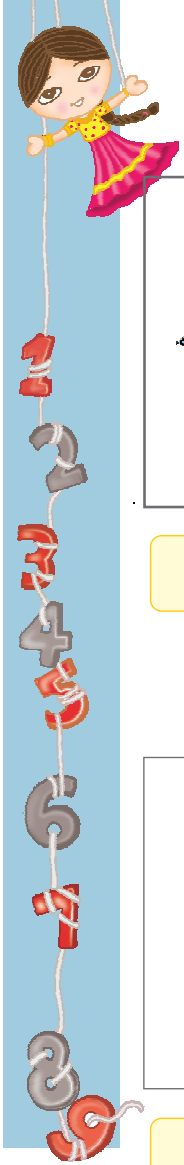
5 + 2 = _____



____ Birds and ____ Birds = ____ Birds

_____ + _____ = _____

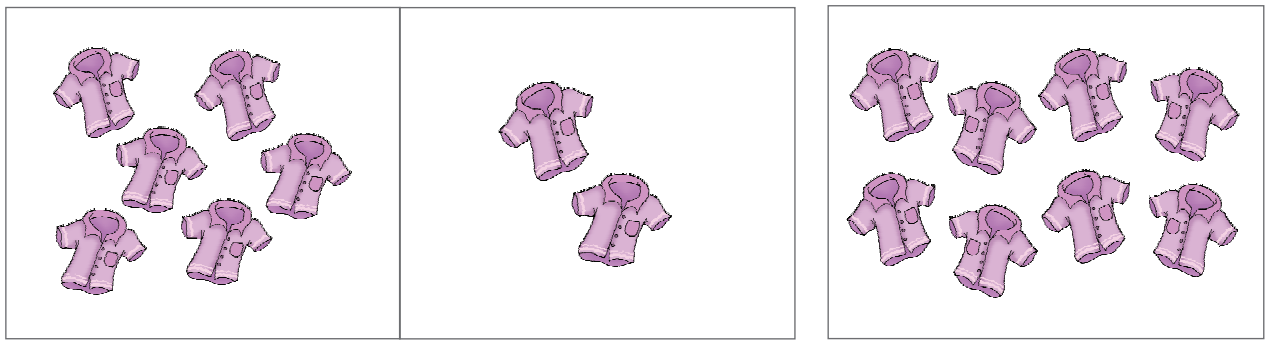






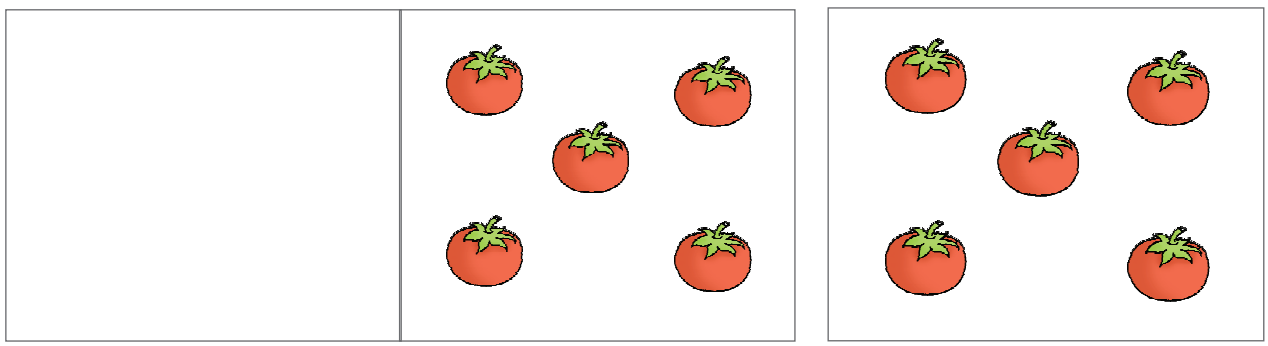
☐ Books and ☐ Books = ☐ _____

_____ + _____ = _____



☐ _____and ☐ _____ = ☐ Shirts

_____ + _____ = _____



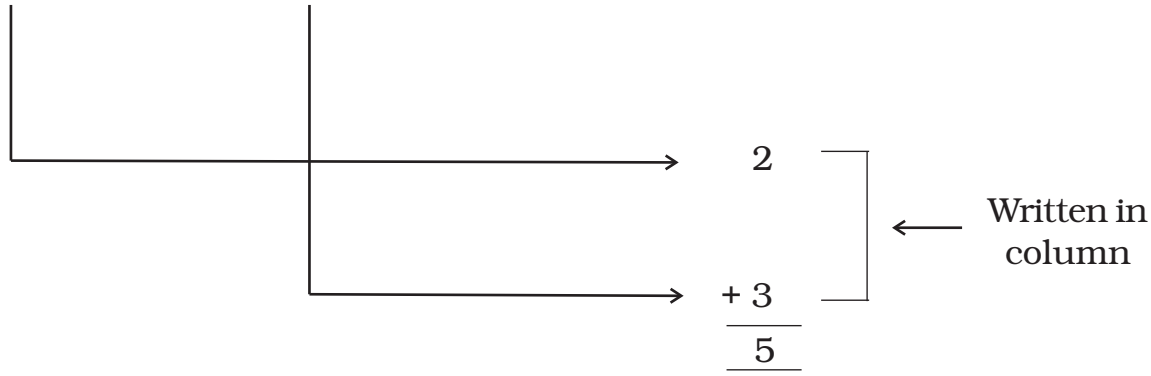
☐ _____and ☐ _____ = ☐ Tomatoes

_____ + _____ = _____

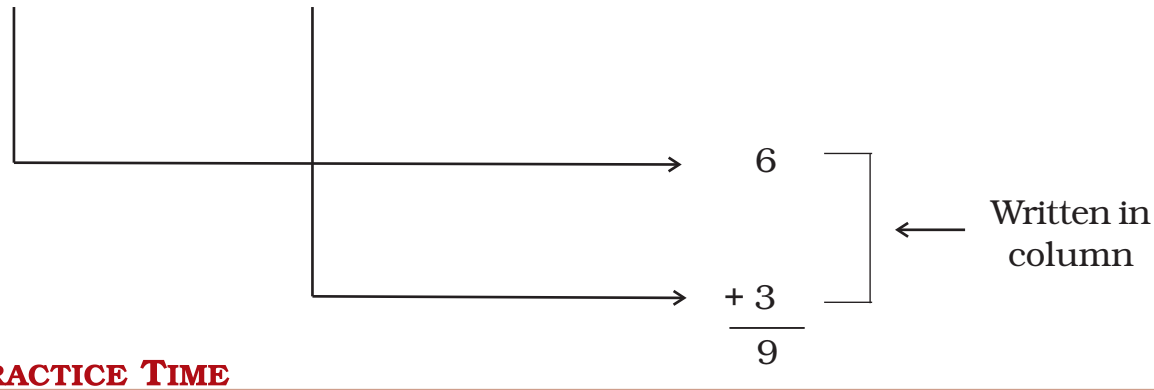
4. Column Addition



2 + 3 = 5



6 + 3 = 9



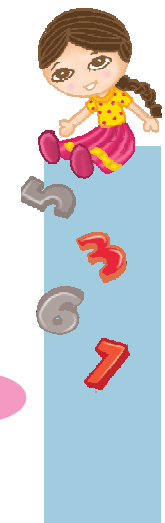


Practice Time

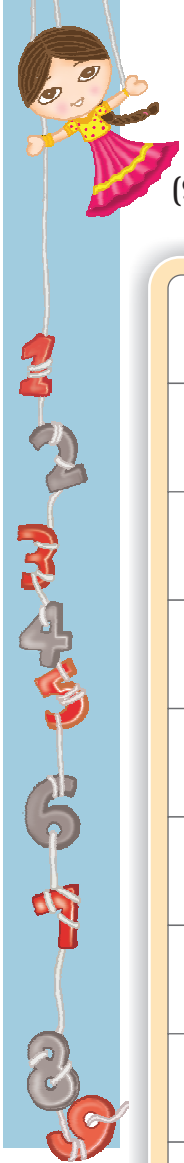
(1) 4 + 3 = ☐ (2) 9 + 6 = ☐ (3) 5 + 0 = ☐

(4) 0 + 9 = ☐ (5) 3 + 6 = ____ (6) 3 + 9 = ____

(7) 8 + 7 = ____ (8) 0 + 4 = ____



The teacher may demonstrate the addition of numbers with the help of folds in the fingers or by other means.



(9) Complete the table, look the pattern and colour them.

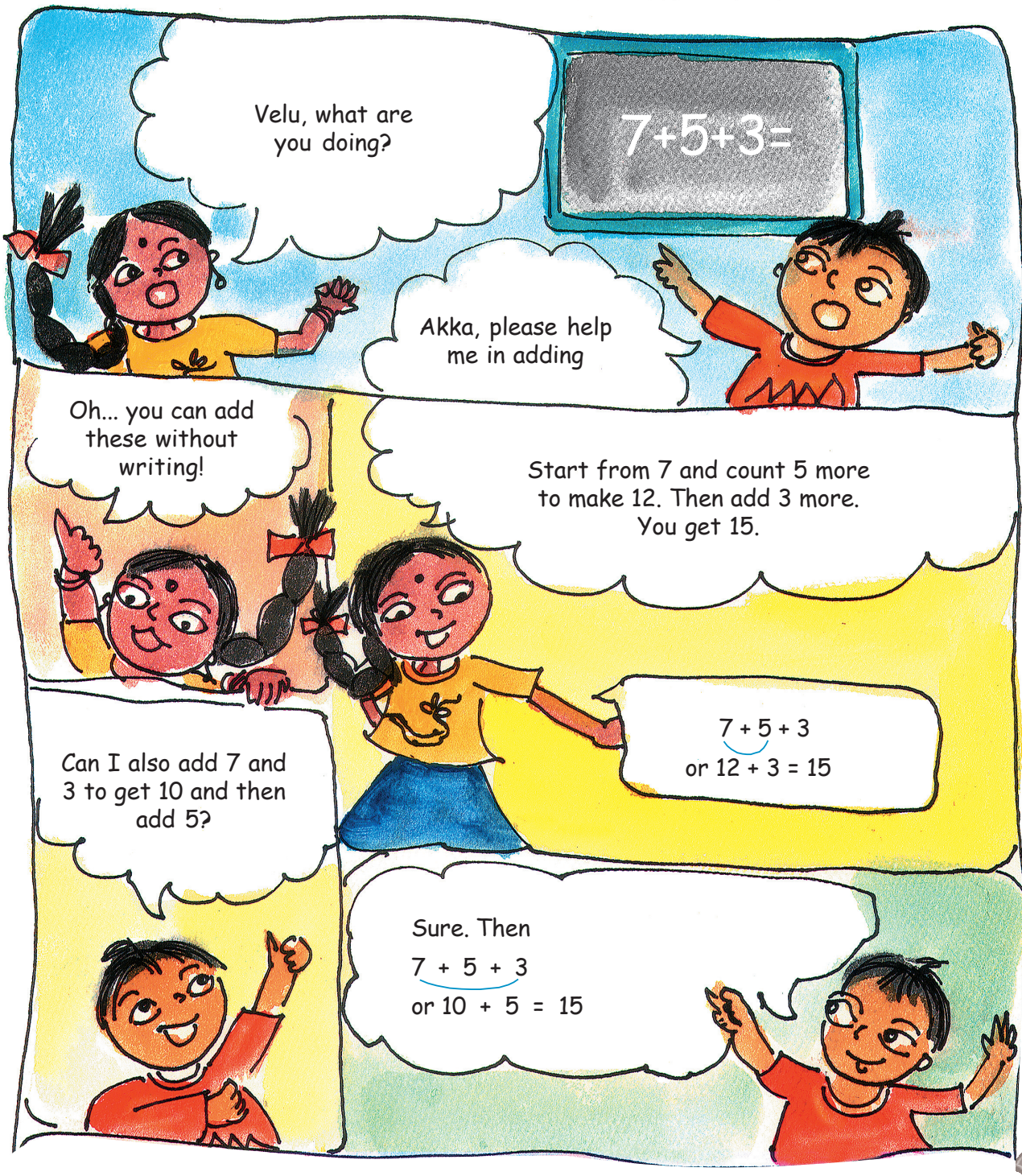
+	0	1	2	3	4	5	6	7	8	9
0	0					5				9
1					5				9	
2								9		
3	3						9			
4						9				
5					9					
6				9						
7			9							
8		9								
9	9			12						

Think

- What do you find on adding 0 to any number?
- What do you find on adding 1 to any number?
- What do you find on adding two numbers in reverse order like 3+4 and 4+3?

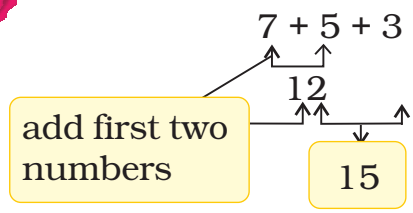
5. Addition of Three Numbers

How fast can you add?



Children have now learnt how to find the sum of two given numbers. They can now be given practice in adding more than two numbers. For any sum they will add only two numbers at a time. For example to find the sum of three numbers, add any two and then add the third number to the sum of the two.





It may also be written as

$$\begin{array}{r} 7 \\ +\ 5 \\ +\ 3 \\ \hline 15 \end{array}$$

add first two numbers

Add any two numbers first and then add the third number to the sum obtained.



Practice Time

Find the sum

(1) $3 + 2 + 5 =$ $3 + 2$ $+ 5 = 5 + 5 =$ 10

(2) $9 + 4 + 1 =$ $9 + 1$ $+ 4 =$ ____ + ____ = ____

(3) $7 + 3 + 8 =$ ____ + ____ = ____ + ____ = ____

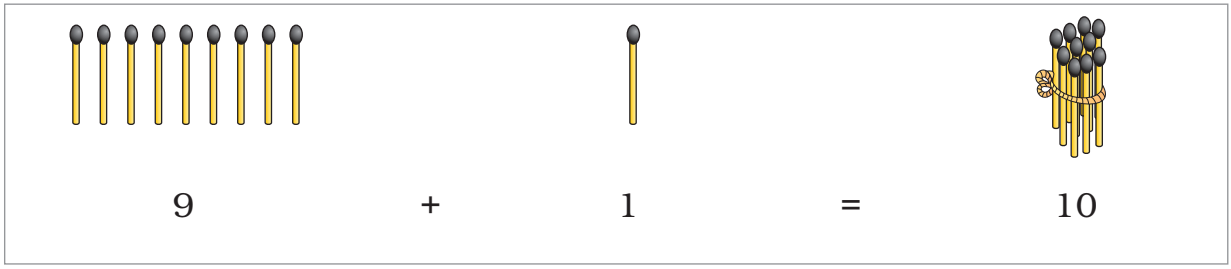
(4) $8 + 3 + 2 =$ ____ + ____ = ____ + ____ = ____

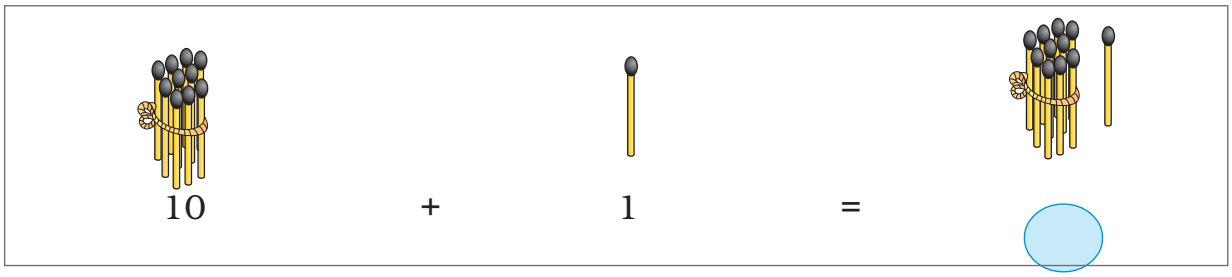
(5) $2 + 0 + 9 =$ ____ + ____ = ____ + ____ = ____

(6) _____ + _____ + _____ = 12

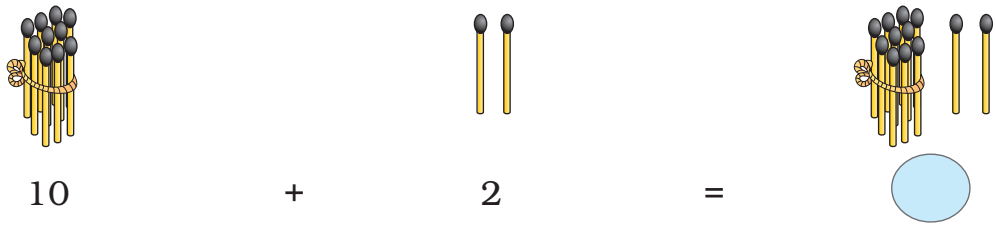
6. Addition Without Carrying

Fill in the blanks

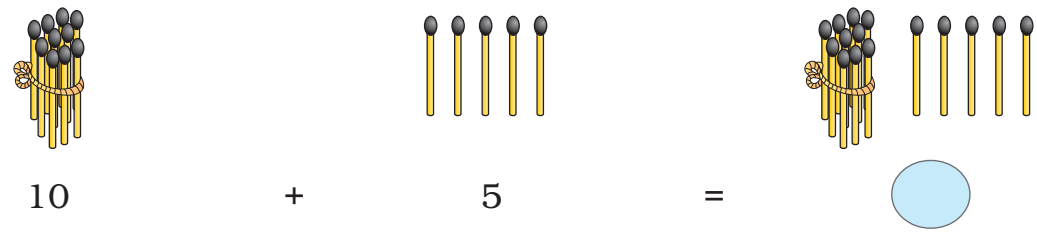




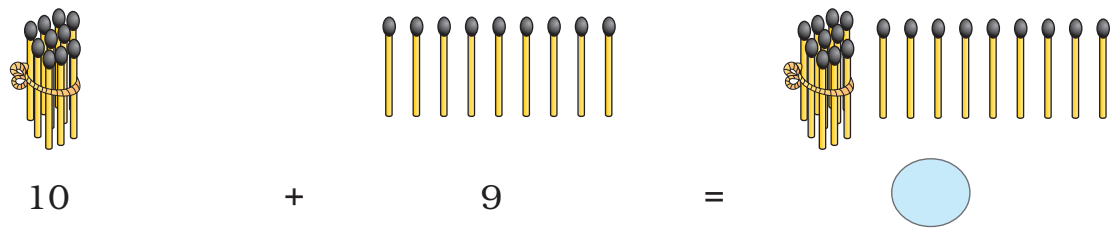
In Question 6, there may be several answers. Student may be encourged to give as many correct answers as she can.



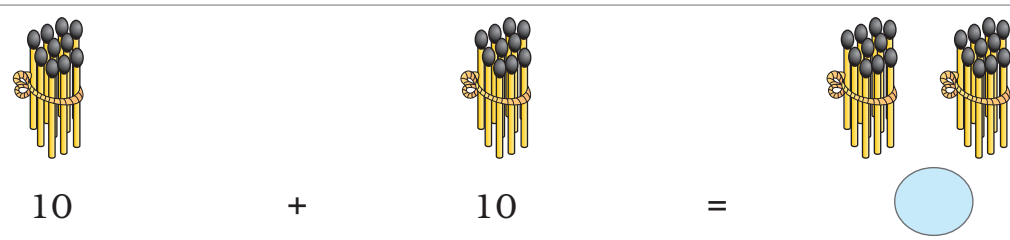
10 + 2 = ◯



10 + 5 = ◯



10 + 9 = ◯



10 + 10 = ◯

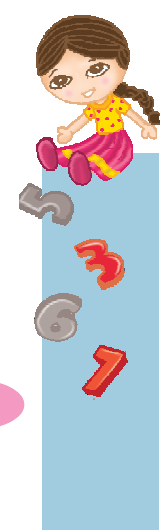
Beads and necklace shop

Kinnaree sells (beads) in the bazar. She sells loose and (necklaces) of 10 beads each.

Razia wants 12 beads. So Kinnaree gives her one and two loose .

Now you find out how many necklaces and loose beads the other children take.





	Beads	Necklace of 10 beads	Loose beads
Razia	12		
Reema	17		
Aarif	24		
Sonu	35		
Simaran	31		



How many beads are taken by Razia and Reema together?

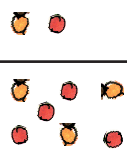


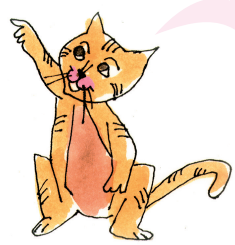
Razia



Reema







Uhm---h! Razia has one necklace, and two beads. Reema has one necklace and seven beads.

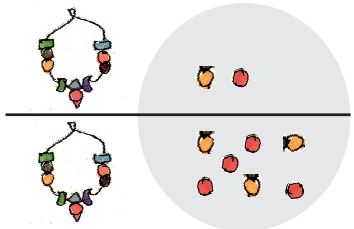
Right! You can write it like this.

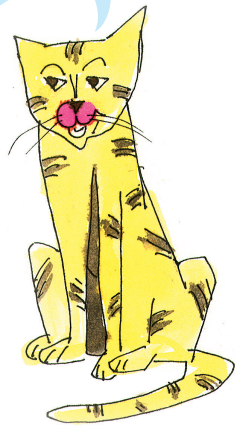


		•
	1	2
+	1	7

Encourage children to make groups of 10 using materials like beads, matchsticks, buttons etc. These concrete experiences will help to develop their understanding.

First let us take all the loose beads together and count.



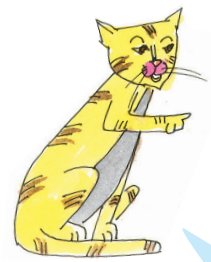


1	2
+ 1	7
	9

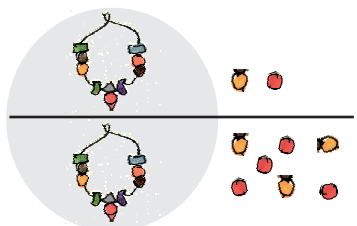
There are 9 loose beads.

So, I write 9 in this box.





Now, take all the necklaces together and count.

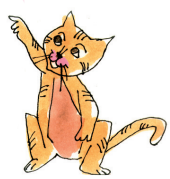


1	2
+ 1	7
2	9

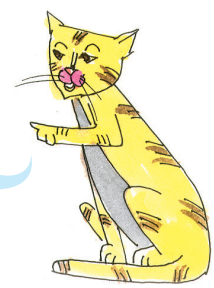


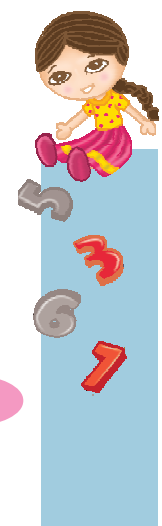
There are 2 necklaces. So, I write 2 in this box.

I got it! Razia and Reema have 2 necklaces and 9 beads in all.



That is right! Razia and Reema have 29 beads in all.





Addition of 2-digit numbers can be understood as shown below.

	Tens	Ones
3 2 →	3	2
+ 2 5 →	2	5

	Tens	Ones
3 2 →	3	2
+ 2 5 →	2	5
		7 ← Add ones

	Tens	Ones
3 2 →	3	2
+ 2 5 →	2	5
5 7	5	7 ← Add Tens

32+25 = 57

The above addition can be displayed as follows:

$$\begin{array}{r} 32 \\ +\ 25 \\ \hline 57 \end{array}$$

How many? 23 beads, 34 beads and 12 beads

	Tens	Ones
23 →	2	3
34 →	3	4
12 →	1	2

Step 1.

$$\begin{array}{r} 23 \\ 34 \\ +12 \\ \hline \end{array}$$

← Arrange in coloumns

Step 2.

$$\begin{array}{r} 23 \\ 34 \\ +12 \\ \hline 9 \end{array}$$

← Add ones

The understanding of addition of 2-digit numbers depends upon the understanding of place-value. The children should be aware of this fact.

Step 3.

$$\begin{array}{r} 2\,3 \\ 3\,4 \\ +1\,2 \\ \hline 69 \\ \hline \end{array}$$

Add tens

So, there are 69 beads in all.



Practice Time

Find the sum

(1) $\begin{array}{r} 3\,3 \\ +\,2\,5 \\ \hline \\ \hline \end{array}$

(2) $\begin{array}{r} 5\,5 \\ +\,3\,3 \\ \hline \\ \hline \end{array}$

(3) $\begin{array}{r} 1\,1 \\ +\,8\,0 \\ \hline \\ \hline \end{array}$

(4) $\begin{array}{r} 2\,6 \\ 6\,2 \\ +\,1\,1 \\ \hline \\ \hline \end{array}$

(5) $\begin{array}{r} 3\,6 \\ 4\,3 \\ +\,1\,0 \\ \hline \\ \hline \end{array}$

(6) 23 + 32 = ☐

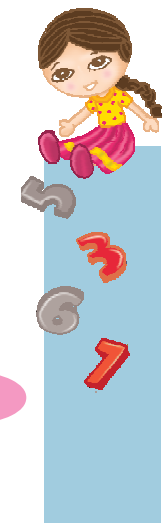
(7) 14 + 31 + 27 = ☐

(8) In Muneeza's home there are 13 English story books and 22 Hindi story books. How many story books are there in all?

$$\begin{array}{r} 1\,3 \\ +\,2\,2 \\ \hline \\ \hline \end{array}$$

$$\begin{array}{r} 3\,5 \\ +\,2\,3 \\ \hline \\ \hline \end{array}$$

(9) Daljeet has 35 marbles. Arvinder has 23 marbles. How many marbles do they have in all?

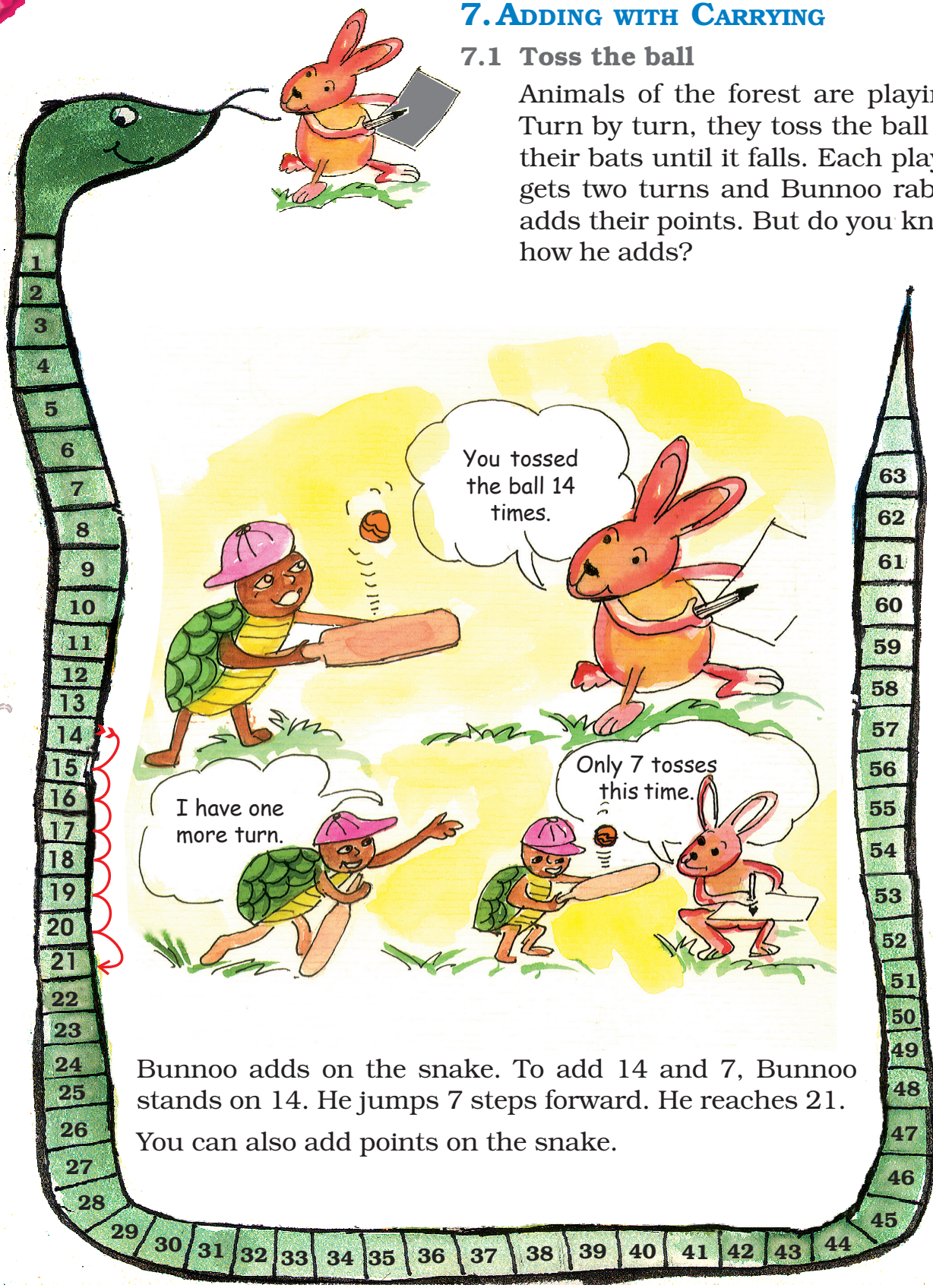


While working on word problems of addition, children should be encouraged to understand the question first.

7. Adding with Carrying

7.1 Toss the ball

Animals of the forest are playing. Turn by turn, they toss the ball on their bats until it falls. Each player gets two turns and Bunnoo rabbit adds their points. But do you know how he adds?



Bunnoo adds on the snake. To add 14 and 7, Bunnoo stands on 14. He jumps 7 steps forward. He reaches 21.

You can also add points on the snake.

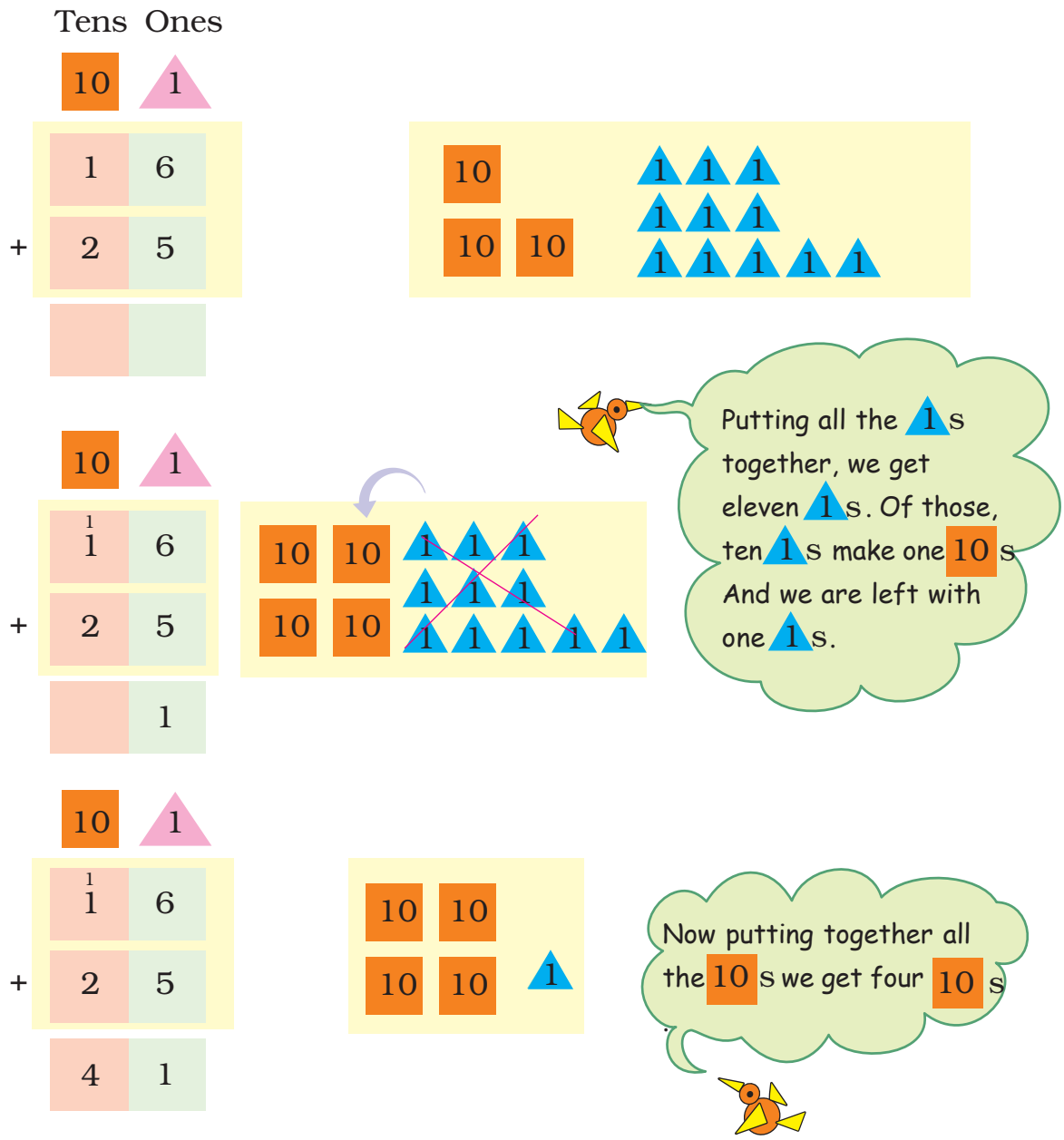
7.2 How many birds in all?

There are 16 birds on a tree and 25 more birds flew in. How many birds in all are there now?

Total number of birds will be the sum of 16 and 25.

We have to find 16 + 25

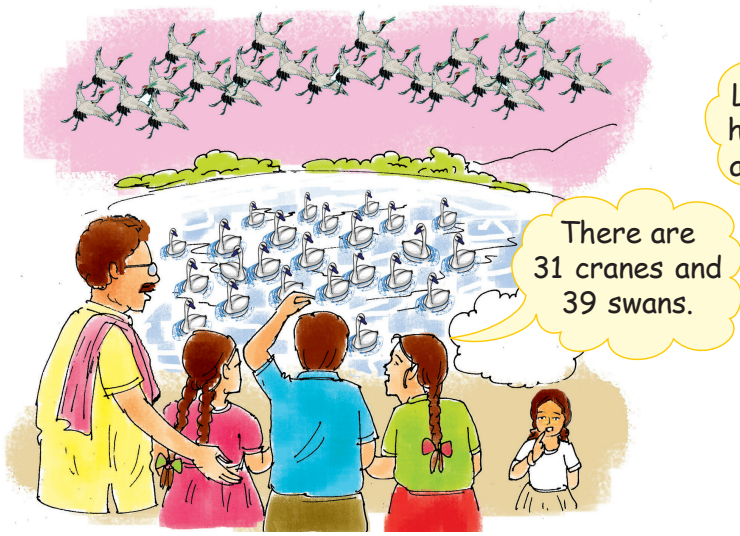
For 16 + 25 we write as follows:



So, the total number of birds is 41.

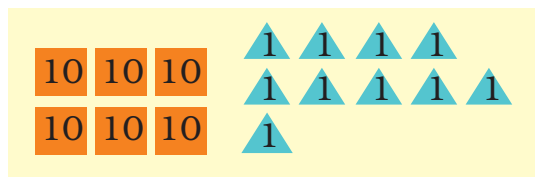
Children should be encouraged to write 'The Carry' on the top of next column as given above.

7.3 How many cranes and swans?





		10	1
Number of swans		3	9
Number of cranses	+	3	1
Total number of birds			



The total number of birds is _____.

- Addition of 2–digit number (with carrying) can be understood as below.

Step 1.

$$\begin{array}{r} 49 \\ +35 \\ \hline \\ \hline \end{array}$$

← Write in columns

Step 2.

$$\begin{array}{r} {}^{1}4\,9 \\ +3\,5 \\ \hline 4 \\ \hline \end{array}$$

← add ones (9 + 5 = 14)

Step 3.

$$\begin{array}{r} {}^{1}4\,9 \\ +3\,5 \\ \hline 84 \\ \hline \end{array}$$

← add tens (1 + 4 + 3 = 8)

Thus, **49 + 35 = 84**

Steps of addition may be demonstrated initially in the following way

	Tens	Ones
49 →	4	9
35 →	3	5
	7	14

7 ten 1 ten and 4 ones

8 tens 4 ones

84

8. Adding Three 2-Digit Numbers

Find the sum of 36, 39 and 17.

Step 1.

$$\begin{array}{r} 36 \\ 39 \\ +\ 17 \\ \hline \\ \hline \end{array}$$

← Arrange in columns

Step 2.

$$\begin{array}{r} {\scriptstyle 2} \\ 36 \\ 39 \\ +\ 17 \\ \hline 2 \\ \hline \end{array}$$

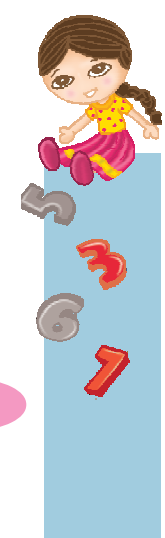
← Add ones (6 + 9 + 7 = 22)

Step 3.

$$\begin{array}{r} {\scriptstyle 2} \\ 36 \\ 39 \\ +\ 17 \\ \hline 92 \\ \hline \end{array}$$

← Add tens (2 + 3 + 3 + 1 = 9)

36 + 39 + 17 = 92



PRACTICE TIME

(1) Padmini's Canteen



Help Venkatesha to make the bills.

	Rupees
Dosa	2 3
Uthappam	2 8

	Rupees
Idli	15
Coffee	8

	Rupees
Dahi Vada	25
Chilli Rice	18
Total	.....

	Rupees
Soup	27
Noodles	15
Total	.....

Here, the standard algorithm for addition has been explained through some examples. However, it should be emphasised that learning algorithm only does not help to develop children`s conceptual understanding of additions. For this, it is important to give them many word problems and encourage them to find out alternative ways to solve them.

(2) Renu scored 23 runs in a cricket match and Apoorva scored 69. How many runs did they make in all?

	10	1
	2	3
+	6	9

They made _____ runs in all.

10	1

(3) Dema sold 48 shawls first day in a fair. Next day she sold 17 more shawls. How many shawls did she sell in all?

Dema sold _____ shawls in all.

(4) Find the sum

(a)
$$\begin{array}{r} 47 \\ +\ 07 \\ \hline \\ \hline \end{array}$$

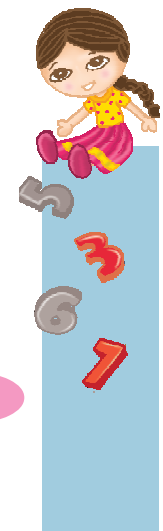
(b)
$$\begin{array}{r} 14 \\ +\ 29 \\ \hline \\ \hline \end{array}$$

(c)
$$\begin{array}{r} 50 \\ 17 \\ +\ 29 \\ \hline \\ \hline \end{array}$$

(d)
$$\begin{array}{r} 25 \\ 25 \\ +\ 20 \\ \hline \\ \hline \end{array}$$

(e) $39 + 33 =$ ☐ , $33 + 39 =$ ☐

Is $39 + 33 = 33 + 39$?

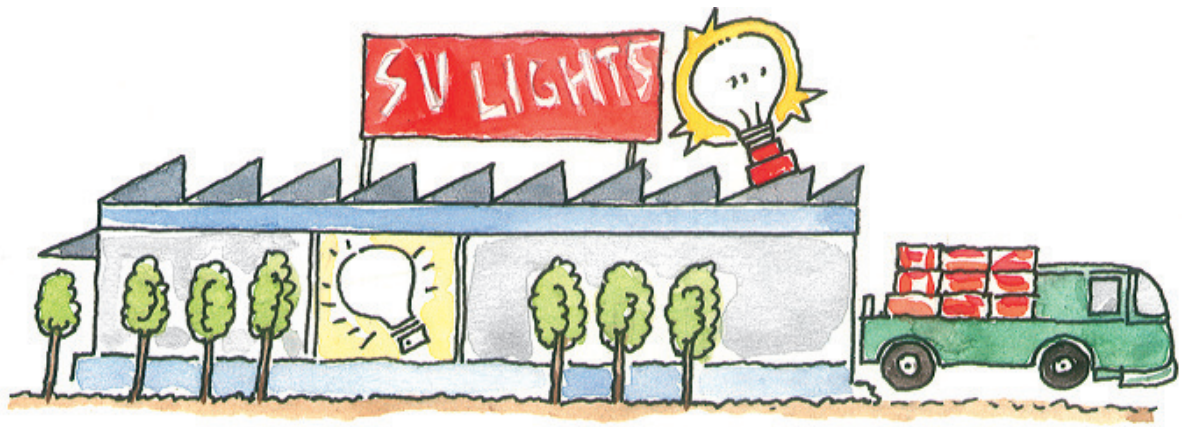


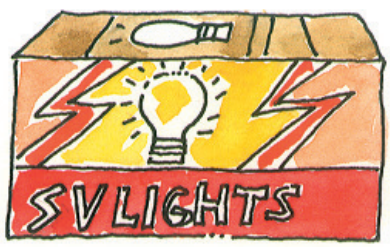
9. Addition of Large Numbers

9.1 How many bulbs?

A factory made 270 bulbs on the first day. On the second day it made123 bulbs.

How many bulbs did the factory make in these two days?

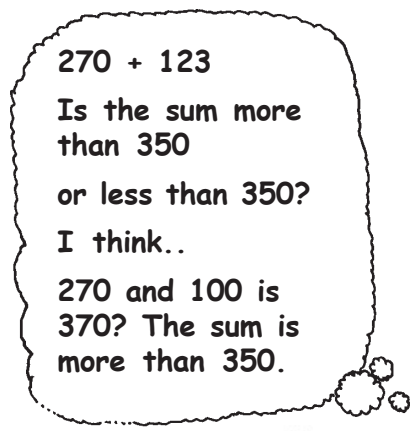


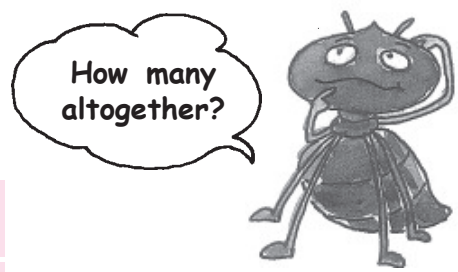


First day - 270 bulbs



Second day - 123 bulbs



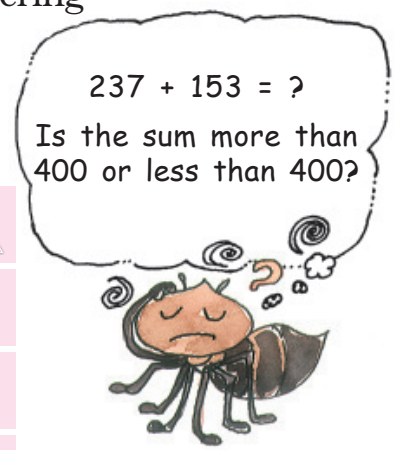


		100	10	1
Bulbs made on first day		2	7	0
Bulbs made on second day	+	1	2	3
Sum		3	9	3

PRACTICE TIME

(1) A shopkeeper Tshering had 153 candles. Vitho gave him 237 more candles. How many candles does Tshering have now?

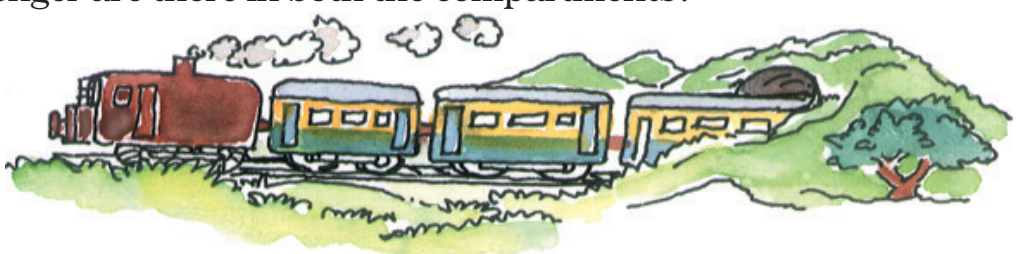




	100	10	1
	2	3	7
+	1	5	3

Work out the following story problems in the same way. Read each problem and say it in your own words. Guess the answer before writing it.

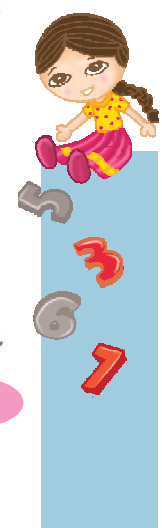
(2) A train compartment is carrying 132 passenger. Another compartment is carrying 129 passenger. In all, how many passenger are there in both the compartments?



(3) Shanu found 138 pebbles. Karim found 44 pebbles. How many pebbles did they find in all?

	100	10	1
	1	3	8
+		4	4





(4) A teacher kept a note of which fruits students like most in her school. This is what she found —



Students	Oranges	Mangoes	Total
Girls	136	240	
Boys	128	243	
Total			

Find out



(i) How many students in the school like oranges?



(ii) How many students in the school like mangoes?



(iii) Altogether, how many students are there in the school?

(iv) Is the number of girls more than 350 or less than 350?

9.2 Can you add 353, 135 and 232?

Write the numbers in columns and add column–wise:

	H	T	O
	1	1	
	3	5	3
	1	3	5
+	2	3	2
	7	2	0

Remember
First add ones, then tens and lastly hundreds

So, 353 + 135 + 232 = 720

Can you add 7665 and 1155?

	Th	H	T	O
			1	
	7	6	6	5
+	1	1	5	5
				0

→

	Th	H	T	O
			1	1
	7	6	6	5
+	1	1	5	5
			2	0

	Th	H	T	O
			1	
	7	6	6	5
+	1	1	5	5
		8	2	0

→

	Th	H	T	O
			1	1
	7	6	6	5
+	1	1	5	5
	8	8	2	0

So, 7665 + 1155 = 8820

How much money Maya has!

Maya has Rs 1658 with her. Her brother gave Rs 256 to her. How much money does Maya have now?

Maya will have Rs 1658 + Rs 256.

We have to find 1658 + 256

	Th	H	T	O
		1	1	
	1	6	5	8
+		2	5	6
	1	9	1	4

Write the numbers in columns. First add ones, then tens, then hundreds and finally thousands.

Maya has Rs 1914 with her.

Practice Time

(1) 234
+ 152
_____

(2) 115
111
+ 151
_____

(3) 234
980
+ 508
_____



(4) $\begin{array}{r} 4532 \\ +\,2104 \\ \hline \\ \hline \end{array}$

(5) $\begin{array}{r} 8405 \\ +\,1327 \\ \hline \\ \hline \end{array}$

(6) $\begin{array}{r} 7856 \\ +\,2349 \\ \hline \\ \hline \end{array}$

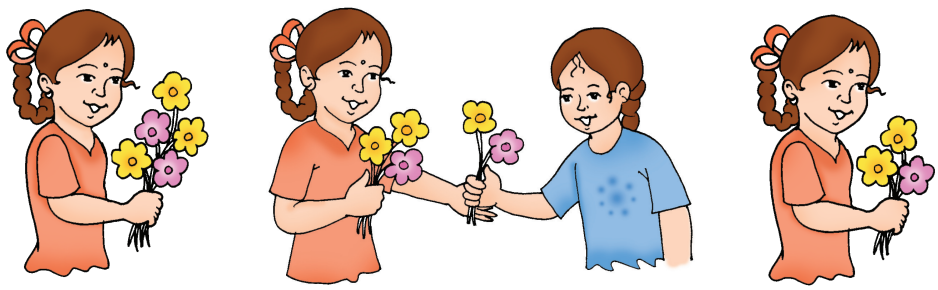
(7) $\begin{array}{r} 1835 \\ +\,519 \\ \hline \\ \hline \end{array}$

8. Lall, Bole and Paul have 134, 162 and 103 stickers respectively. How many stickers do they have altogether?
9. Kumud sells 697 chocolates on Sunday, 526 on Monday and 738 on Tuesday. How many chocolates does she sell in three days?
10. In a library there are 2586 English story books, 5051 Hindi story books and 1235 comics. How many books are there in all?
11. In an election, Neha got 5328 votes and Reshma got 3923 votes. Find the total number of their votes polled?



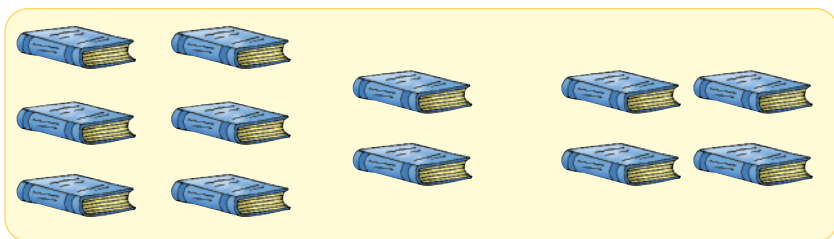
SUBTRACTION OF NUMBERS

1. Taking Away



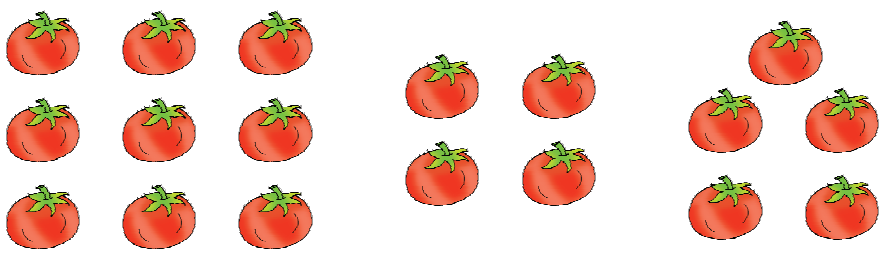
5 Take away 2 Left 3

5 - 2 = 3



6 Take away 2 Left 4

6 - 2 = 4



9 Take away 4 Left 5

9 - 4 = 5

The concept of subtraction should be developed with highlighting its connection with the concept of addition.

The sign '–' stands for subtraction. It is read as 'minus'. We read '6 – 4 = 2' as ' Six minus four is equal to two'

In 6 – 4 = 2, 2 is called the difference of 6 and 4.



5 - 4 = 1

5
- 4
1



6 - 2 = ☐

6
- 2



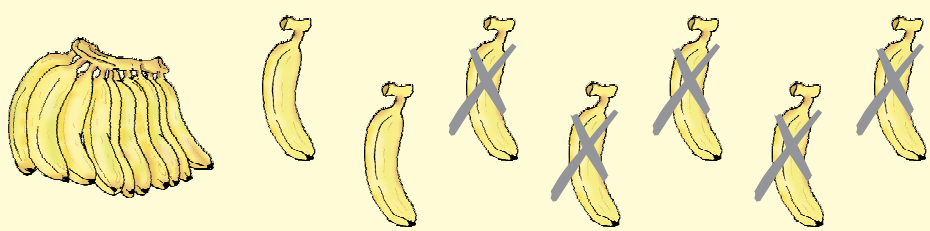
9 - 5 = ☐

9
- 5



4 - 4 = ☐

4
- 4



17
- 5
12

The teacher may explain the students that in finding the difference of two numbers one has to subtract smaller number from the bigger one.

Practice Time

(1) 4 – 2 = 2

(2) 8 – 4 = ☐

(3) 5 – 2 = ☐

(4) 3 – 1 = ☐

(5) 7 – 7 = ☐

(6) 4 – 0 = ☐

(7)
$$\begin{array}{r} 2 \\ -\ 0 \\ \hline 2 \end{array}$$

(8)
$$\begin{array}{r} 9 \\ -\ 7 \\ \hline \square \end{array}$$

(9)
$$\begin{array}{r} 8 \\ -\ 8 \\ \hline \square \end{array}$$

(10)
$$\begin{array}{r} 6 \\ -\ 4 \\ \hline \square \end{array}$$

(11) 8 = ☐ 7

(12) 3 = ☐ 3

(13) 15 – 4 = ☐

(14)
$$\begin{array}{r} 17 \\ -\ 4 \\ \hline \square \end{array}$$

(15)
$$\begin{array}{r} 19 \\ -\ 8 \\ \hline \square \end{array}$$

(16) Gehna's mother bought 9 bananas from the market. She gave 4 bananas to Gehna. How many bananas were left with her?

(17) Lali had 8 flowers. She put 3 flowers in a vase. How many flowers were left with her?

2. Subtraction (without Borrowing)

There are 58 toffees with Avni. She gave 26 to her sister Savita. How many toffees are left with Avni?

Avni is left with 58–26 toffees.

Let us now find 58 –26.

Arrange the given numbers in columns.

			Tens	Ones
	5	8	5	8
–	2	6	– 2	6

			Tens	Ones
	5	8	5	8
–	2	6	– 2	6
				2

Subtract ones from ones: 8 - 6 = 2

			Tens	Ones
	5	8	5	8
–	2	6	– 2	6
			3	2

Subtract tens from tens: 5 - 2 = 3

Thus

	5	8
–	2	6
	3	2

58 - 26 = 32

Subtract 37 from 48

Step 1.

	4	8
–	3	7

Arrange in columns

Step 2.

	4	8
–	3	7
		1

Subtract ones: 8 - 7 = 1

48 - 37 = 11

Step 3.

	Tens	Ones
	4	8
–	3	7
	1	1

Subtract tens : 4 - 3 = 1

Subtraction of 2-digit numbers may be carried out on a squared paper. It facilitates neatness and makes work systematic. It is better that subtraction of 2-digit numbers is done by the student by writing the numbers in a column as discussed above.

Practice Time

(1)
$$\begin{array}{r} 96 \\ -\ 60 \\ \hline \\ \hline \end{array}$$

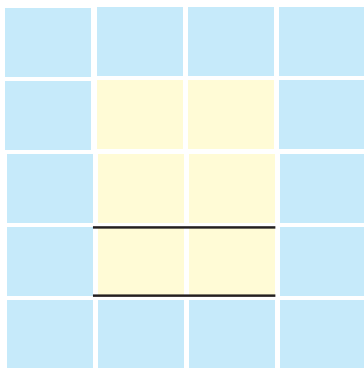
(2)
$$\begin{array}{r} 99 \\ -\ 66 \\ \hline \\ \hline \end{array}$$

(3)
$$\begin{array}{r} 55 \\ -\ 23 \\ \hline \\ \hline \end{array}$$

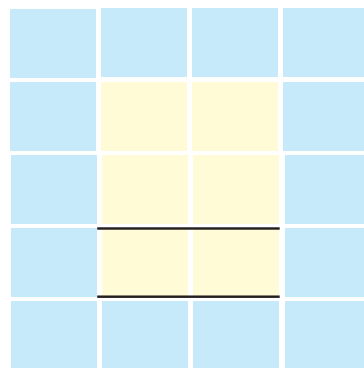
(4)
$$\begin{array}{r} 79 \\ -\ 27 \\ \hline \\ \hline \end{array}$$

Arrange the given two numbers in columns. Then find their difference by subtracting smaller number from the bigger.

(5) 47 and 32



(6) 40 and 50



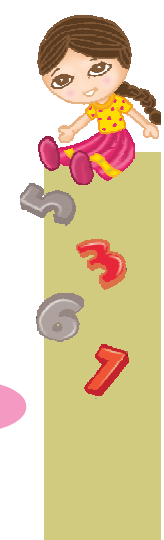
3. Subtraction (with Borrowing)

A garden has 43 fruit trees. Out of these, 19 are of guava. How many trees are of other fruits?.

To find the number of trees other than that of guava, we have to subtract 19 from 43 which means to find 43-19.

Step 1.
$$\begin{array}{r} 43 \\ -\ 19 \\ \hline \\ \hline \end{array} \longrightarrow \begin{array}{rr} \textbf{Tens} & \textbf{Ones} \\ 4 & 3 \\ -\ 1 & 9 \\ \hline \\ \hline \end{array}$$

Arrange in columns.



Step 2.

	4	3
–	1	9

→

	3 Tens	13 Ones
	4	3
–	1	9
		4

Subtract ones from ones. Here, 9 cannot be subtracted from 3. Borrow 1 ten from tens. 1 ten = 10 ones.

1 ten + 3 ones = 13 ones.
and 13– 9 = 4.

Step 3.

	4	3
–	1	9

→

	3 Tens	13 Ones
	4	3
–	1	9
	2	4

Subtract tens from tens.

Step 4.

	4	3
–	1	9
	2	4

Thus, 43 - 19 = 24

The process can be displayed as:

	3	13
	4	3
–	1	9
	2	4

PRACTICE TIME

(1)

	4	4
–	2	8

(2)

	9	0
–	1	6

(3)

	9	1
–	0	6

(4)

	5	8
–	1	9

(5) I had 33 marbles. I gave 18 marbles to Shashi. How many marbles do I have now?

(6) There are 42 students in a class, out of which 28 are girls. Find the number of boys in the class.

4. Subtraction of Large Numbers (3-digit numbers)

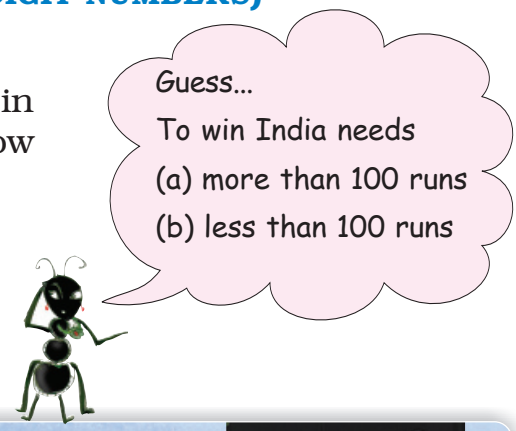
Cricket Match

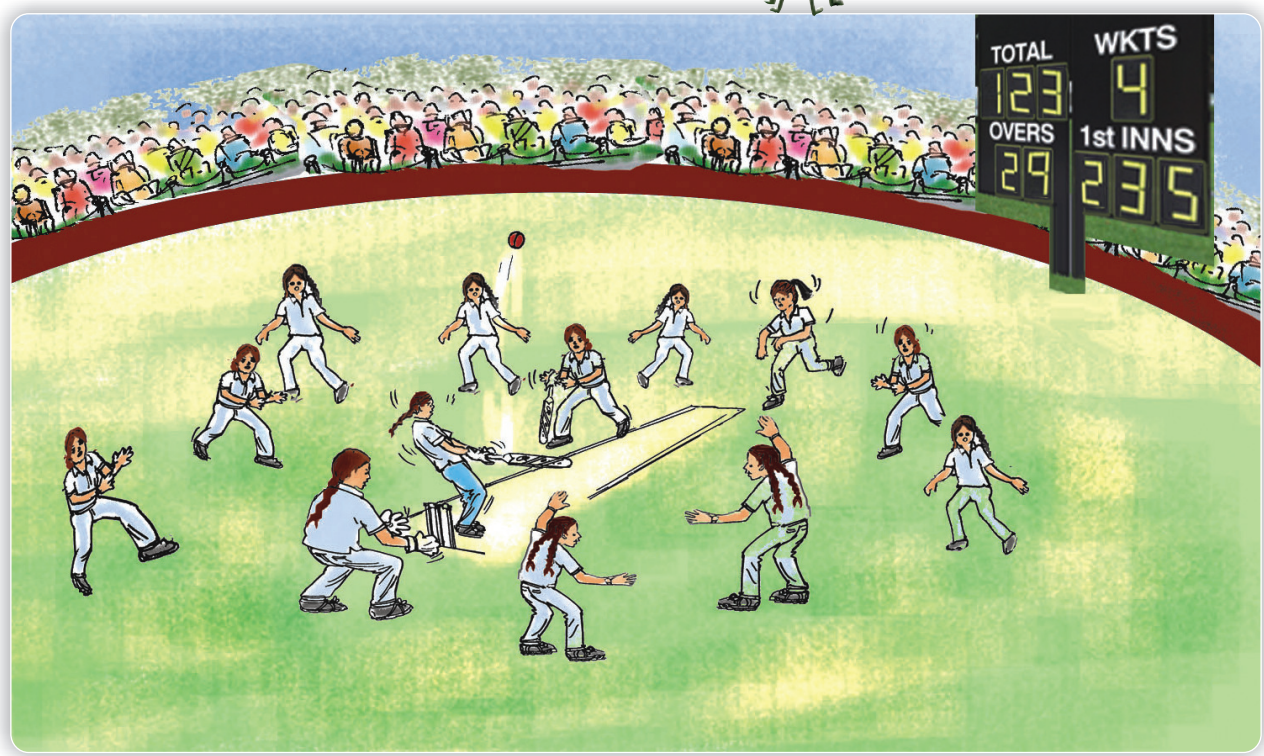
In a cricket match, Sri Lanka made 235 runs in a one day match. India has made 123 runs. How many more runs does India need to win?

To win, India must make at least 236 runs.

Runs India needs, to win —

236 – 123 = ?





	100	10	1
Runs to win	2	3	6
Runs by India –	1	2	3
Runs needed	1	1	3

100 10 ~~10~~ 1 1 1 ~~1~~ ~~1~~ ~~1~~
~~100~~ ~~10~~ 1

~~100~~ ~~10~~ ~~10~~ ~~1~~ ~~1~~ ~~1~~

So we are left with
100 10 1 1 1

To win, India must make at least 113 more runs.

The above process can also be displayed in the following way —

Step 1. Arrange in columns.

	H	T	O
	2	3	6
–	1	2	3

Step 2. Subtract ones from ones.

	H	T	O
	2	3	6
–	1	2	3
			3

6 - 3 = 3

Step 3. Subtract tens from tens

	H	T	O
	2	3	6
–	1	2	3
		1	3

3 - 2 = 1

Step 4. Subtract hundreds from hundreds

	H	T	O
	2	3	6
–	1	2	3
	1	1	3

2 - 1 = 1

236 -123 = 113

Try it Yourself

Geeta had Rs 368 in her purse. She bought a book for Rs 123. How much money is left in her purse?

Money left in her purse is Rs 368 – Rs 123 = ?

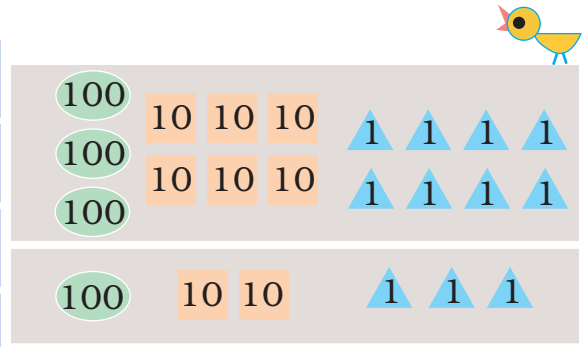


Guess...
Money left in Geeta's purse is
(a) more than Rs 200
(b) less than Rs 200



The emphasis should be laid on the connection of both approaches. The teacher should discuss with students which number is to be placed above and why.

		100	10	1
Money in Geeta's purse		3	6	8
Cost of book	–	1	2	3



Can you help Nabeela?

Nabeela's mother sent her to market to buy ghee. She gave her Rs 245. Nabeela bought 1 kg ghee for Rs 127. Now Nabeela was left with Rs. 98.

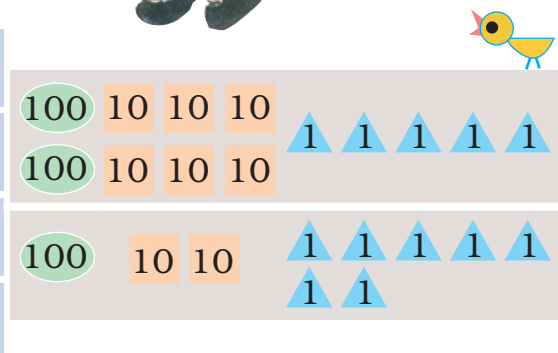
(Kilogram is written as kg.)

Did the shopkeeper give her the right amount?

Let us find out.



		100	10	1
Money Nobeela had		2	4	5
Cost of Ghee	–	1	2	7

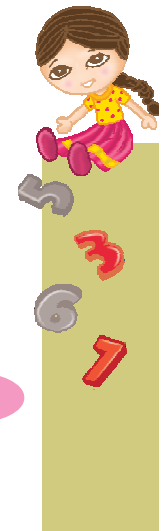


We cannot take seven 1 from five 1

So borrow one 10

10 is 1 1 1 1 1

1 1 1 1 1





100	10	1
2	$^{3}\cancel{4}$	$^{1}5$
− 1	2	7

100	10	10
100	10	10
100	10	10

1 1 1 1 1
1 1 1 1 1
1 1 1 1 1
1 1

Now we have fifteen 1

From fifteen 1 take away seven 1 Only eight 1 are left.

100	10	1
2	$^{3}\cancel{4}$	$^{1}5$
− 1	2	7
		8

100	10	
100	10	10
100	10	10

1 1 1 1 1
1 1 1 ~~1~~ ~~1~~
~~1~~ ~~1~~ ~~1~~ ~~1~~ ~~1~~
~~1~~ ~~1~~ ~~1~~ ~~1~~ ~~1~~
~~1~~ ~~1~~

100	10	1
2	$^{3}\cancel{4}$	$^{1}5$
− 1	2	7
	1	8

100	10	
100	~~10~~	~~10~~
100	~~10~~	~~10~~

1 1 1 1 1
1 1

Now take away two 10 s from three 10 . Only one 10 is left.

Now take away one 100 from two 100 s. One 100 is left.

100	10	1
2	$^{3}\cancel{4}$	$^{1}5$
− 1	2	7
1	1	8

100		
~~100~~	10	
~~100~~	10	

1 1 1 1 1
1 1 1
1 1

Nabeela should have Rs 118 with her Rs 98.

How much more money should the shopkeeper give Nabeela?

You can also find 245 – 127 in the following way —

Step 1.

	H	T	O
	2	4	5
–	1	2	7

Arrange in columns.

Step 2.

	H	T	O
		3	15
	2	4	5
–	1	2	7
			8

Subtract ones from ones. Can you subtract 7 from 5 ? No. Take (borrow) one ten from tens, so that 5 ones becomes 1 ten + 5 ones = (10+5) ones = 15 ones. Subtract 7 ones from 15 ones and get 8 ones.

Step 3.

	H	T	O
		3	15
	2	4	5
–	1	2	7
		1	8

Subtract tens from tens

3 - 2 = 1

Step 4.

	H	T	O
		3	15
	2	4	5
	1	2	7
		1	8

Subtract hundreds from hundreds

2 - 1 = 1

Practice Time

(1) Baby tortoise is 33 years old. Mummy tortoise is 155 years old. How much younger is Baby tortoise than Mummy tortoise?

Age of Mummy tortoise: 155 years

Age of Baby tortoise: 33 years



	100	10	1
	1	5	5
–		3	3

Baby tortoise is ____ years younger than Mummy tortoise.

(2) Arvind has read 69 pages of a story book. Gouri has read 95 pages of that book. Who has read more pages and how many more?



	10	1
	9	
–	6	

(3) Reena noted the electricity meter readings of her house. Last month's reading was 118 units. This month's reading is 193 units. How much electricity did she use in one month?

This month's reading _____

Last month's reading _____

100	10	1
1	9	3
1	1	8



She used _____ units of electricity.

(4) Khushboo bought a shirt for Rs 125 and a trouser for Rs 165. How much money did she spend altogether?

Bought a shirt for Rs _____

Bought trousers for Rs _____

100	10	1
1	6	5
1	2	5

She spent Rs _____ altogether.



Teachers should motivate students to decide which operation they have to use to solve a problem. More of such exercises can be given where students decide the appropriate operation.

5. Subtraction of Large Numbers (More than 3 digits)

Subtract 3657 from 8249.

Step 1.

	Th	H	T	O
	8	2	4	9
–	3	6	5	7

Arrange the numbers in columns.

Step 2.

	Th	H	T	O
	8	2	4	9
–	3	6	5	7
				2

Subtract ones from ones

9 - 7 = 2

Step 3.

	Th	H	T	O
		1	14	
	8	2	4	9
–	3	6	5	7
			9	2

Subtract tens from tens. Is 4–5 possible? Borrow 1 hundred (10 tens) from 2 hundreds.

Step 4.

	Th	H	T	O
	7	11	14	
	8	2	4	9
–	3	6	5	7
		5	9	2

Subtract hundreds from hundreds. You are left with 1 hundred. Can 6 be subtracted from 1? No. Borrow 1 thousand from 8 thousands.

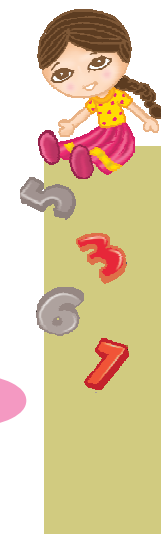
Step 5.

	Th	H	T	O
	7	11	14	
	8	2	4	9
–	3	6	5	7
	4	5	9	2

Subtract thousands from thousands

7 - 3 = 4

So, 8249 - 3657 = 4592



Practice Time

(1)
$$\begin{array}{r} 467 \\ -\ 19 \\ \hline \\ \hline \end{array}$$

(2)
$$\begin{array}{r} 139 \\ -\ 110 \\ \hline \\ \hline \end{array}$$

(3)
$$\begin{array}{r} 325 \\ -\ 204 \\ \hline \\ \hline \end{array}$$

(4)
$$\begin{array}{r} 6742 \\ -\ 4975 \\ \hline \\ \hline \end{array}$$

(5)
$$\begin{array}{r} 9641 \\ -\ 769 \\ \hline \\ \hline \end{array}$$

(6)
$$\begin{array}{r} 8000 \\ -\ 3643 \\ \hline \\ \hline \end{array}$$

(7) Match each of the following with the correct difference.
The first one is done for you.

		Difference
(i)	8152 – 999	8112
(ii)	6302 – 451	3022
(iii)	3100 – 78	5851
(iv)	3434 – 675	3766
(v)	5000 – 1234	2759
(vi)	9000 – 888	7153

(8) Fill in the blanks

(i) 20 + _____ = 25

(ii) _____ + 118 = 232

(iii) 214 + _____ = 432

(iv) 750 + _____ = 1975

(v) 6587 + _____ = 7892

(vi) 5893 + _____ = 7925

(vii) 5602 + _____ = 6205

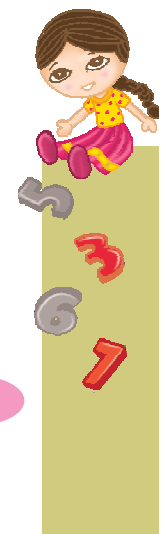
(9) There were 1003 hens in a poultry farm. Due to some disease 165 hens died. Find the number of hens left in the farm.

(10) In a Board Examination, 9406 candidates appeared. 8729 candidates passed. How many failed?

(11) A group of teachers had a bundle of 1325 answer books for checking. Next week, they received 875 answer books for checking. How many answer books were there in all with them?

(12) There were some pins in a packet. One day 637 pins were used. On another day 800 pins were used. How many pins were used?

(13) The population of a village is 4325. The number of males is 2512. What is the number of females?





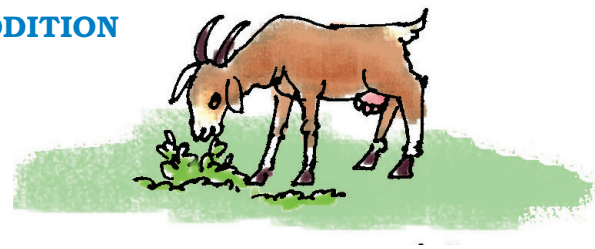
MULTIPLICATION OF NUMBERS

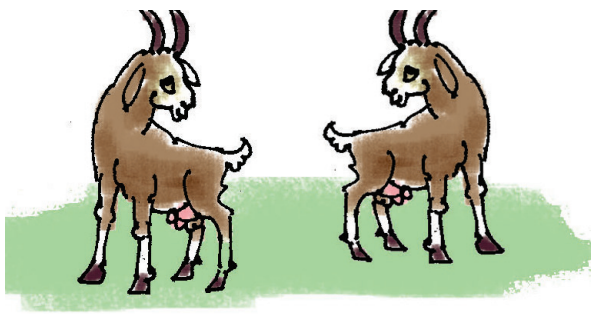
1. Multiplication As Repeated Addition

1.1 Leggy animals

How many goats? 1

How many legs ? 4





How many goats? 2

How many legs altogether?

4 + 4 = 8

2 **times** 4 is 8, it is also written as **2 ×4** = 8

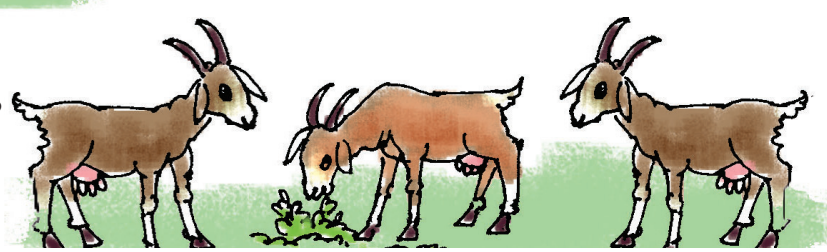
How many goats? 3

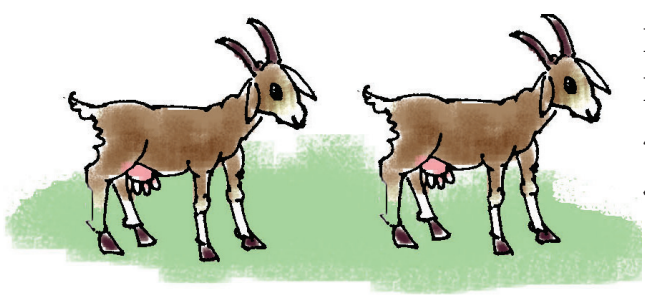
How many legs altogether?

4 + 4 + 4 = _____

3 **times** _____ is 12 .

Therefore, **3 ×4 =** _____



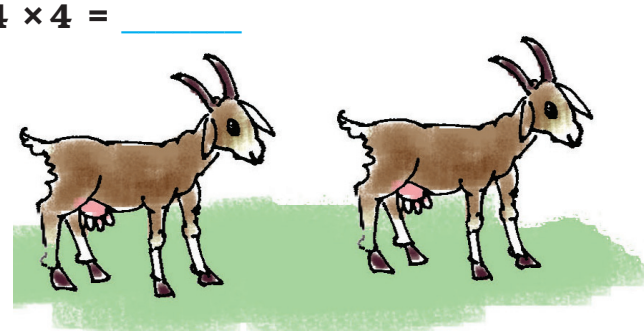


How many goats? 4

How many legs altogether?

4 + 4 + 4 + 4 = _____,

4 ×4 = _____

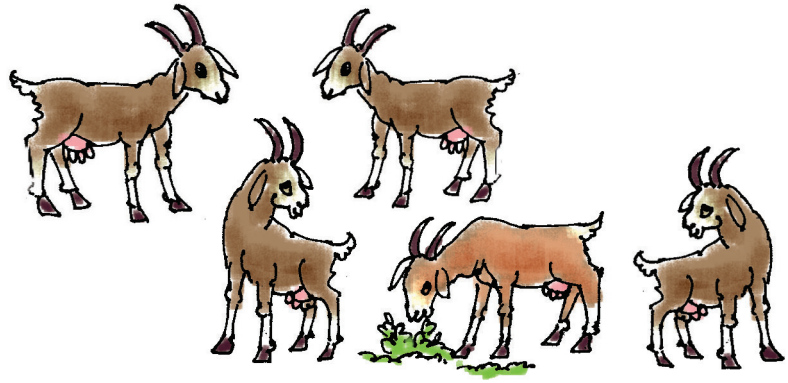


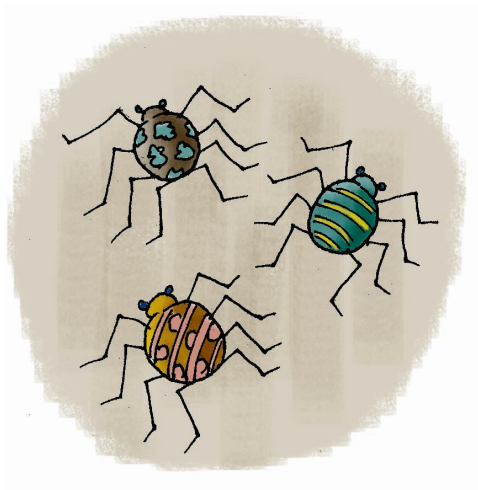
There are 5 goats.

How many legs altogether?

4 + 4 + 4 + 4 + 4 = _____

5 × 4 = _____





How many spiders? _____

One spider has 8 legs.

How many legs altogether?

8 + 8 + 8 = _____

In all, spider legs are 3 times 8

3 × _____ = _____

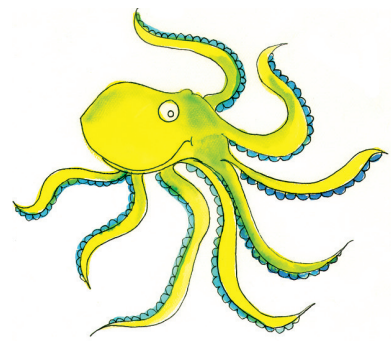
Do you know this leggy fellow?

This is an octopus.

It lives in the sea.

It also has 8 legs.

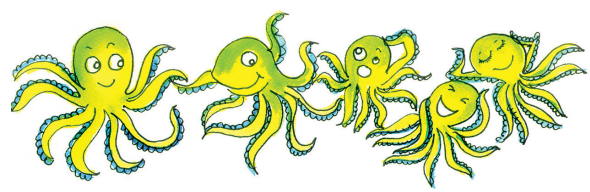
So how many legs altogether do 5 octopuses have?

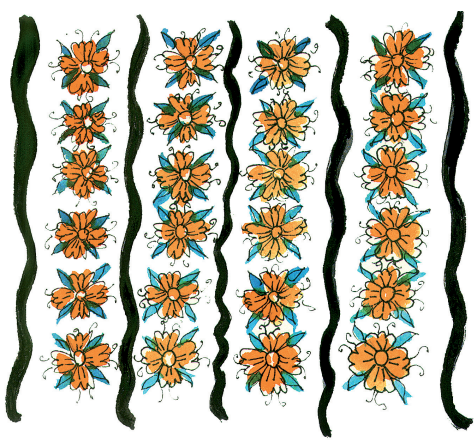


_____+_____+_____+_____+_____ = _____

5 times _____ = _____

5 × _____ = _____





1.2 Find the number

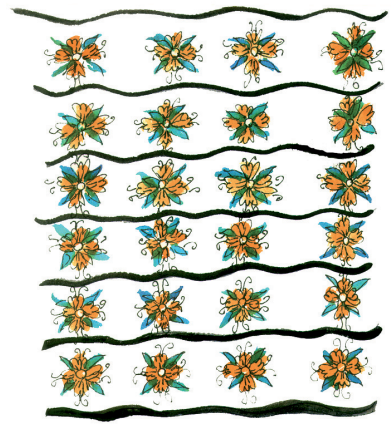
How many flowers in this design?

It has 4 columns. Each column has 6 flowers.

So, there are 6 + 6 + 6 + 6 = 24 flowers.

Altogether the design has 4 times 6, flowers **4 × 6 = 24**.

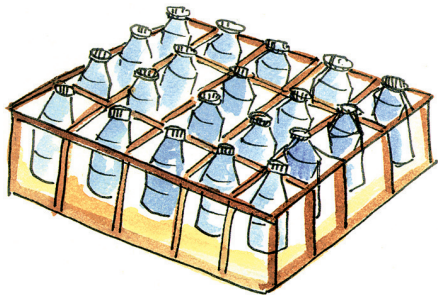
Emphasis should be laid on connection build up between addition and multiplication.



Let's try another way. The design has 6 rows. Each row has 4 flowers.

So, there are 4 + 4 + 4 + 4 + 4 + 4 = 24 flowers

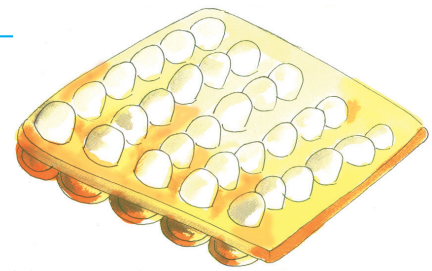
Altogether the design has 6 times 4 flowers.
6 × 4 = 24.



In the same way, how many bottles are these?

_____ times _____ = _____ bottles

_____ × _____ = _____



How many eggs?

_____ times _____ = _____ eggs

_____ × _____ = _____



Practice Time

(1) Fill in the blanks

9 + 9 + 9 + 9 + 9 + 9	=	6	×	9	=	54
4 + 4 + 4 + 4 + 4	=	5	×	4	=	
8 + 8 + 8	=		×	8	=	
3 + 3 + 3 + 3 + 3	=	5	×		=	
30 + 30 + 30	=		×		=	
12 + 12 + 12 + 12	=		×	12	=	
10 + 10 + 10 + 10	=		×		=	



(2) Rewrite using the **+** sign.

2 × 5 is 2 times 5 or 5 + 5

4 × 18 is 4 times _____ or _____ + _____ + _____ + _____

3 × 20 is _____ times _____ or _____ + _____ + _____



8×9 is ☐ times ☐ or ☐ + ☐ + ☐ + ☐ +
☐ + ☐ + ☐ + ☐

(3) Bindeshwari bought 5 packets of biscuits. Each packet has 4 biscuits. Bindeshwari bought

$4 + 4 + 4 + 4 + 4 =$ _____ biscuits.

5 times 4 = _____ × _____ = ☐



(4) There are 12 desks in a classroom. Each desk has 4 legs. The total number of legs of the desks is

$4 + 4 + 4 +$ ____ + ____ + ____ + ____ +
____ + ____ + ____ + ____ + ____ =

12 times 4 = ____ × ____ = ☐



(5) Sabiha brought home 3 bunches of flowers. Each bunch has 4 flowers. How many flowers were there?

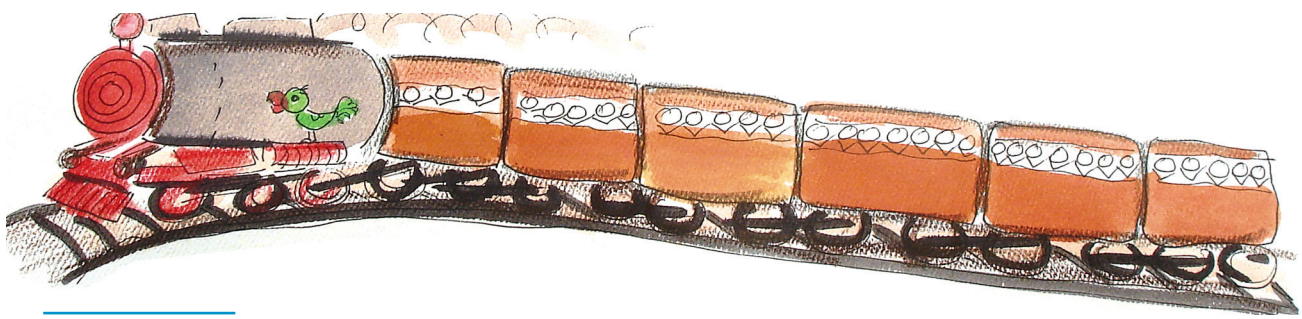
$4 + 4 + 4 = 3$ times _____

= _____ × _____ = ☐

(6) One rail coach has 8 wheels. How many wheels are in 6 coaches?

$8 + 8 +$ ____ + ____ + ____ + ____ = ____ times _____

= ____ × ____ = ☐



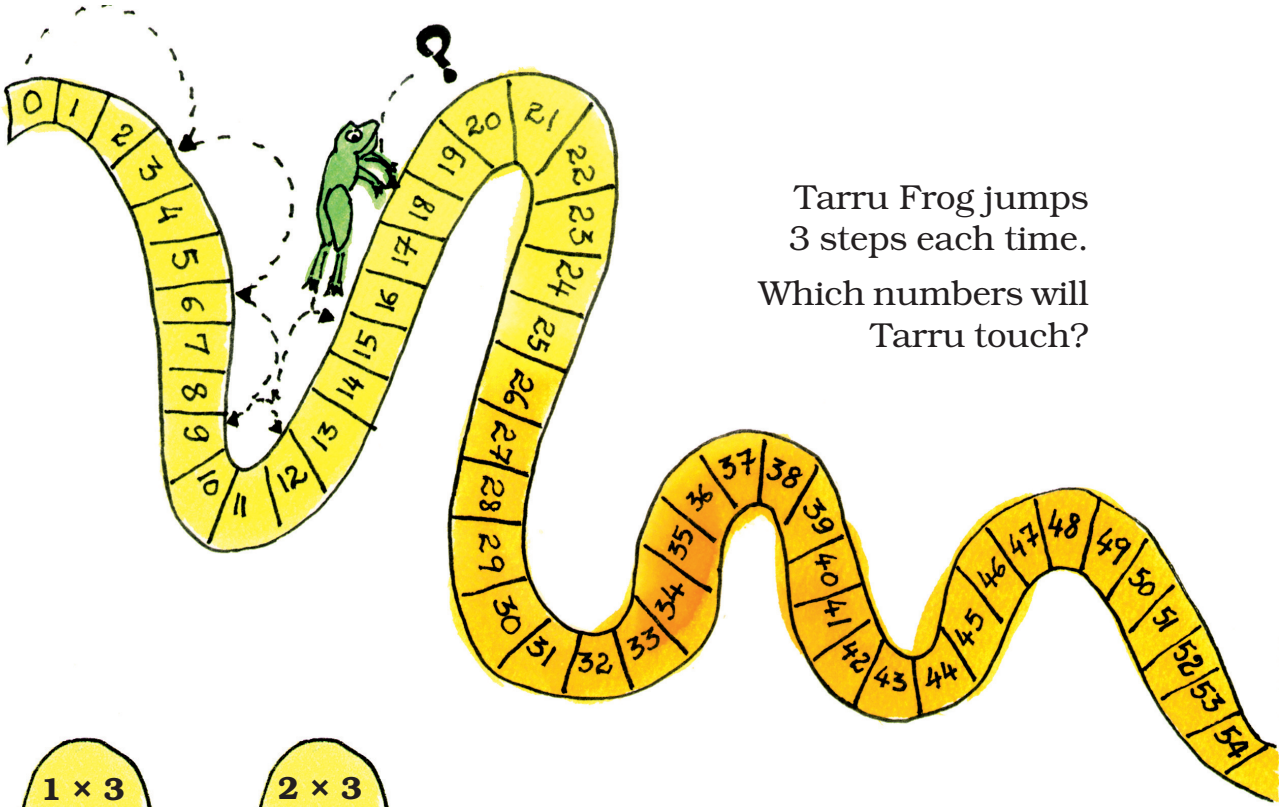
After children attempt word problems, there should be a discussion on how they arrived at their answers. This will help children develop a conceptual understanding of multiplication.

1.3 How many times 2?



1 time 2	is 2	or 1×2	$= 2$
2 times 2	is 4	or 2×2	$= 4$
3 times 2	is 6	or 3×2	$= 6$
4 times 2	is _____	or 4×2	$=$ _____
5 times 2	is _____	or 5×2	$=$ _____
6 times 2	is _____	or 6×2	$=$ _____
_____ times 2	is _____	or _____ $\times 2$	$=$ _____
_____ times _____	is _____	or 8×2	$=$ _____
_____ times _____	is _____	or 9×2	$=$ _____
_____ times _____	is _____	or 10×2	$=$ _____

1.4 Jump with me



Tarru Frog jumps
3 steps each time.

Which numbers will
Tarru touch?

1 × 3	2 × 3		
3	6		
3 × 3	4 × 3	5 × 3	6 × 3
3 × 3	4 × 3	5 × 3	6 × 3

1 × 3 = 3

2 × 3 = 6

3 × 3 = _____

4 × 3 = _____

5 × 3 = _____

6 × 3 = _____

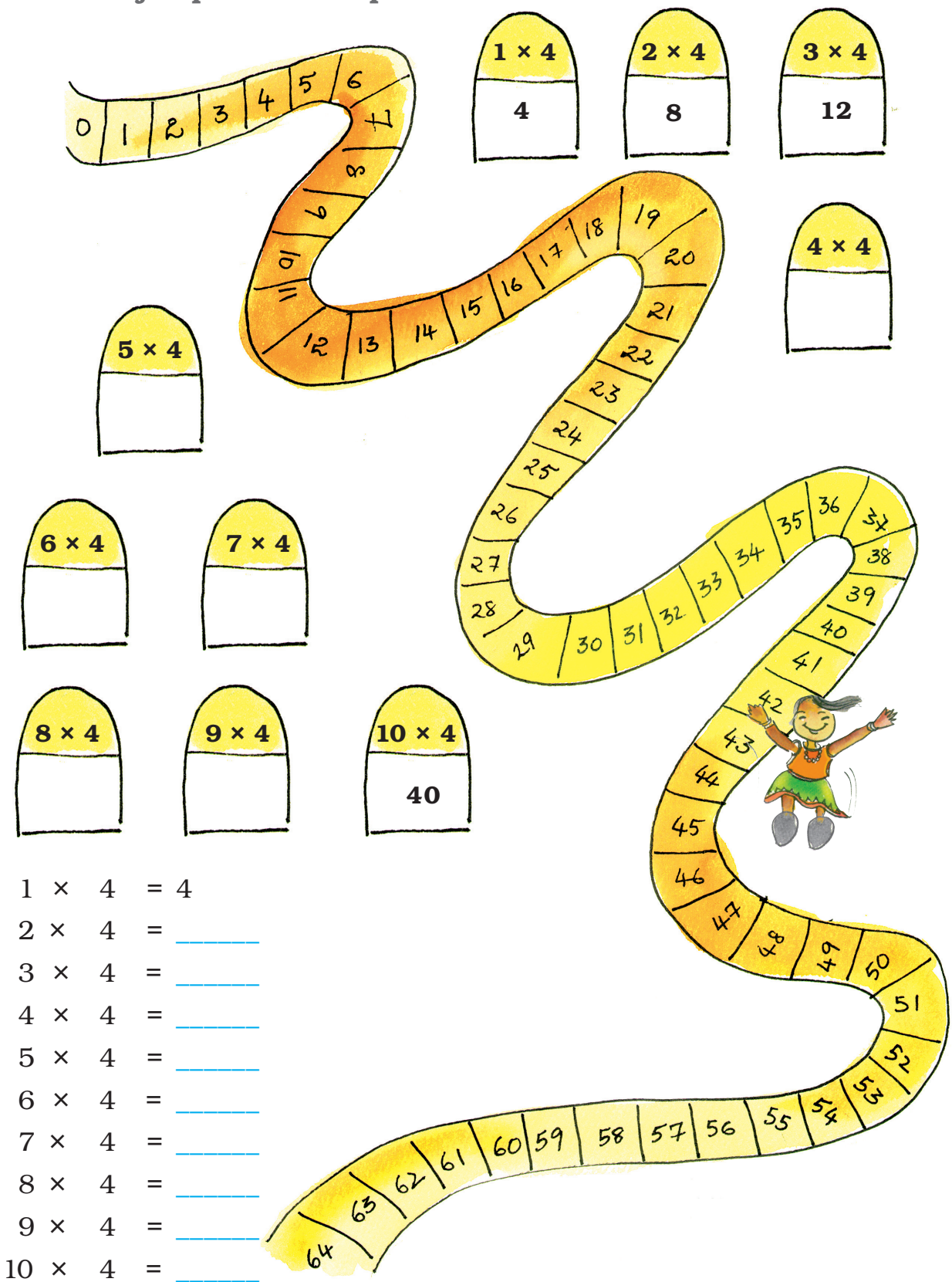
7 × 3 = _____

8 × 3 = _____

9 × 3 = _____

10 × 3 = _____

1.5 Show jumps with 4 steps



1 × 4 = 4

2 × 4 = _____

3 × 4 = _____

4 × 4 = _____

5 × 4 = _____

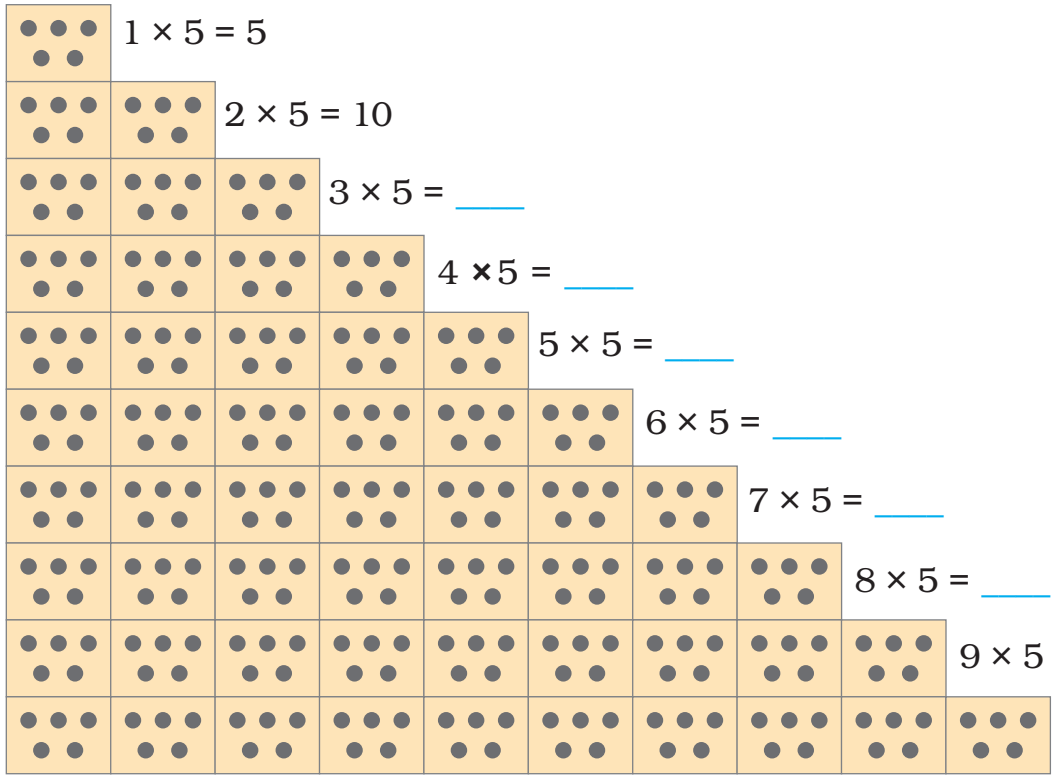
6 × 4 = _____

7 × 4 = _____

8 × 4 = _____

9 × 4 = _____

10 × 4 = _____



$1 \times 5 = 5$

$2 \times 5 = 10$

$3 \times 5 =$ ____

$4 \times 5 =$ ____

$5 \times 5 =$ ____

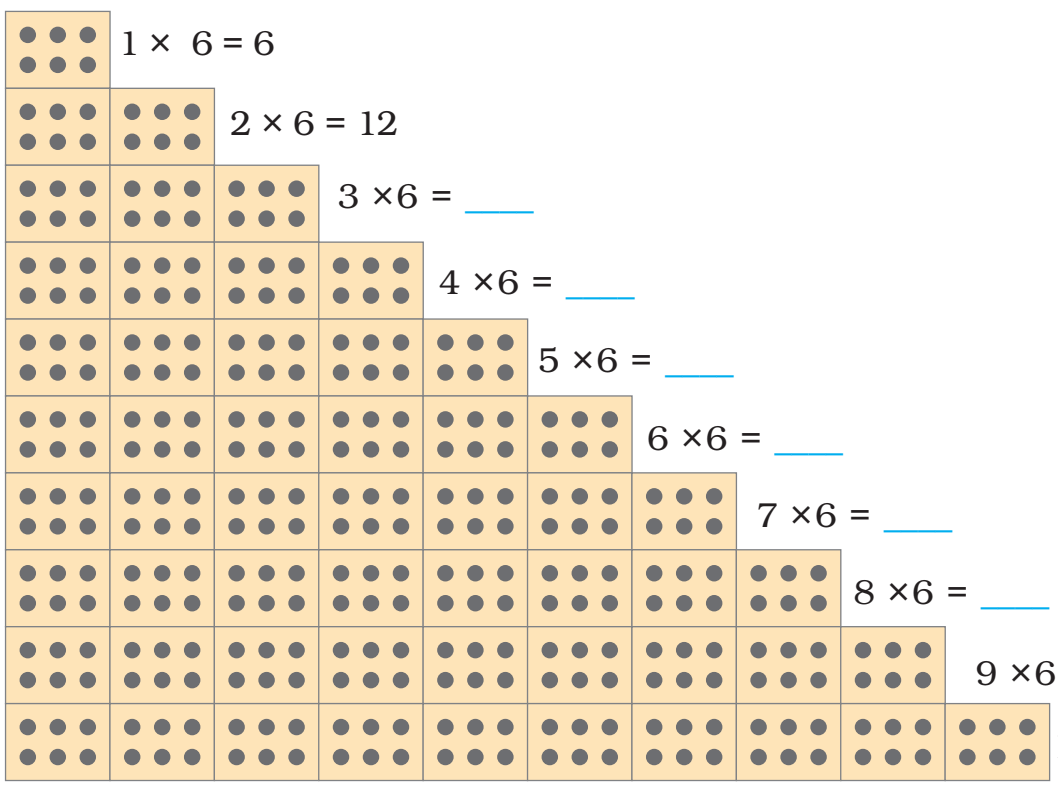
$6 \times 5 =$ ____

$7 \times 5 =$ ____

$8 \times 5 =$ ____

$9 \times 5 =$ ____

$10 \times 5 =$ ____



$1 \times 6 = 6$

$2 \times 6 = 12$

$3 \times 6 =$ ____

$4 \times 6 =$ ____

$5 \times 6 =$ ____

$6 \times 6 =$ ____

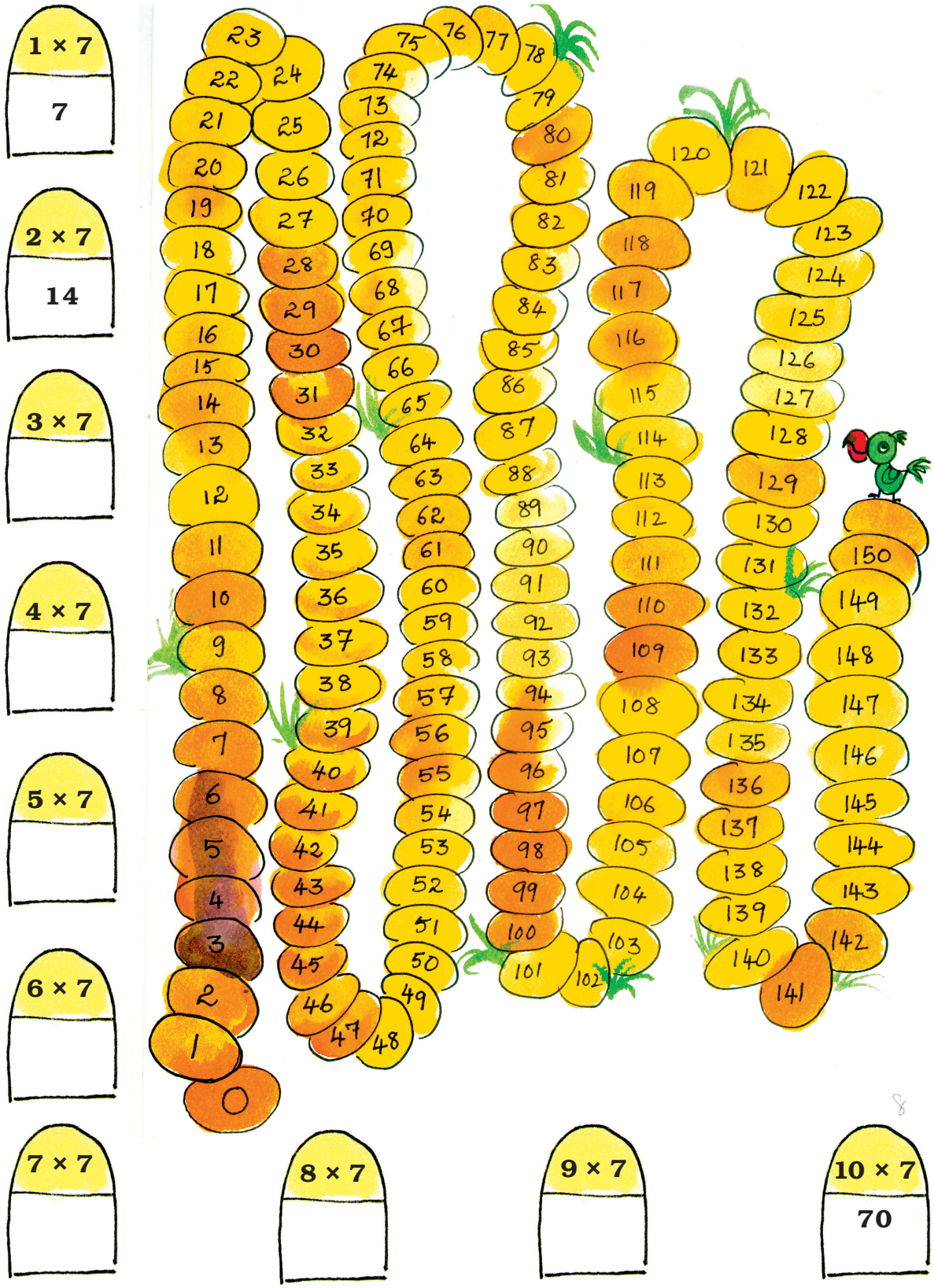
$7 \times 6 =$ ____

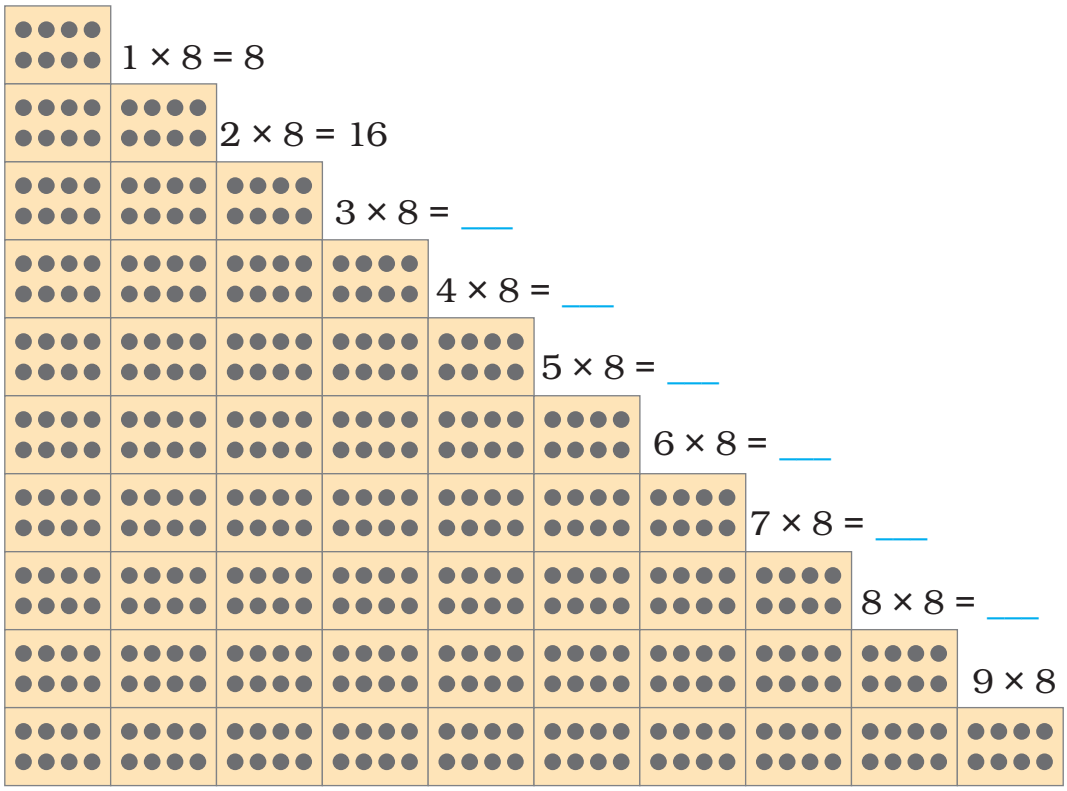
$8 \times 6 =$ ____

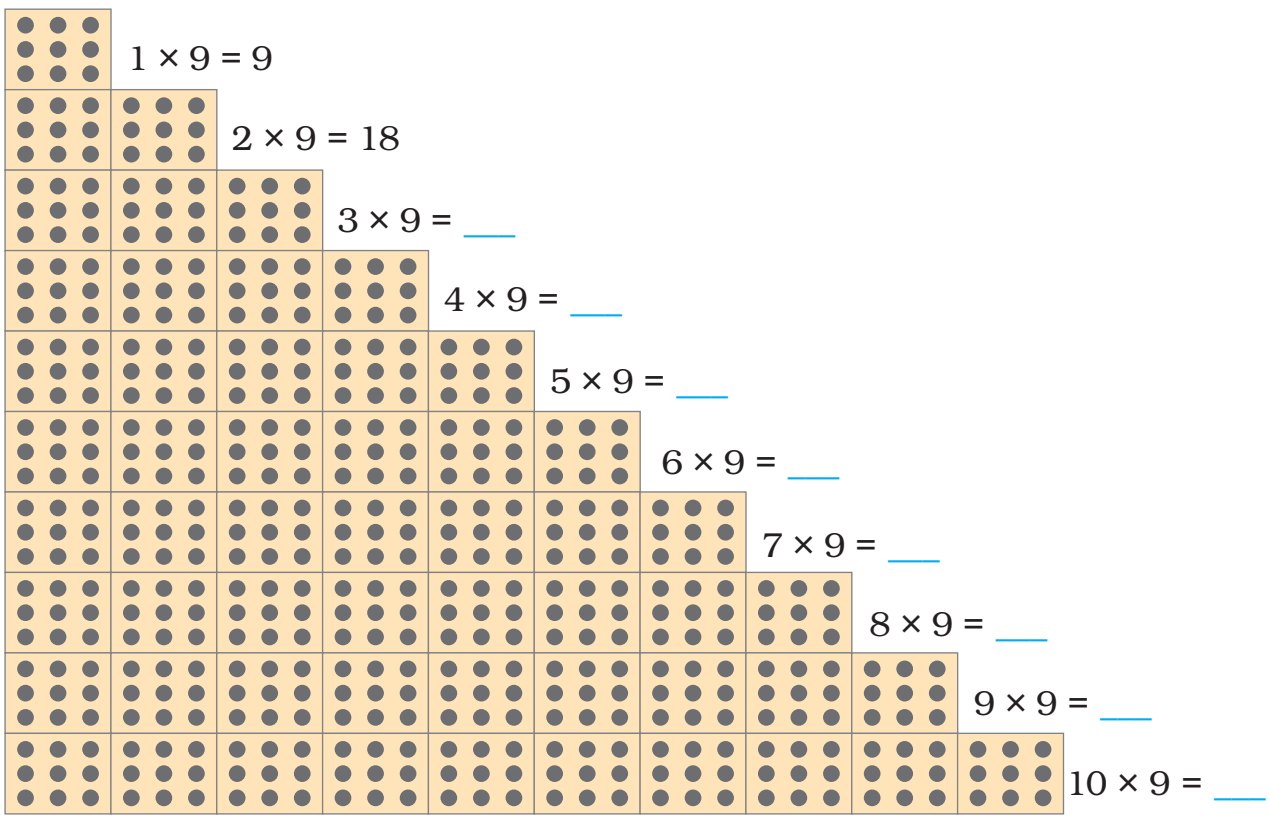
$9 \times 6 =$ ____

$10 \times 6 =$ ____

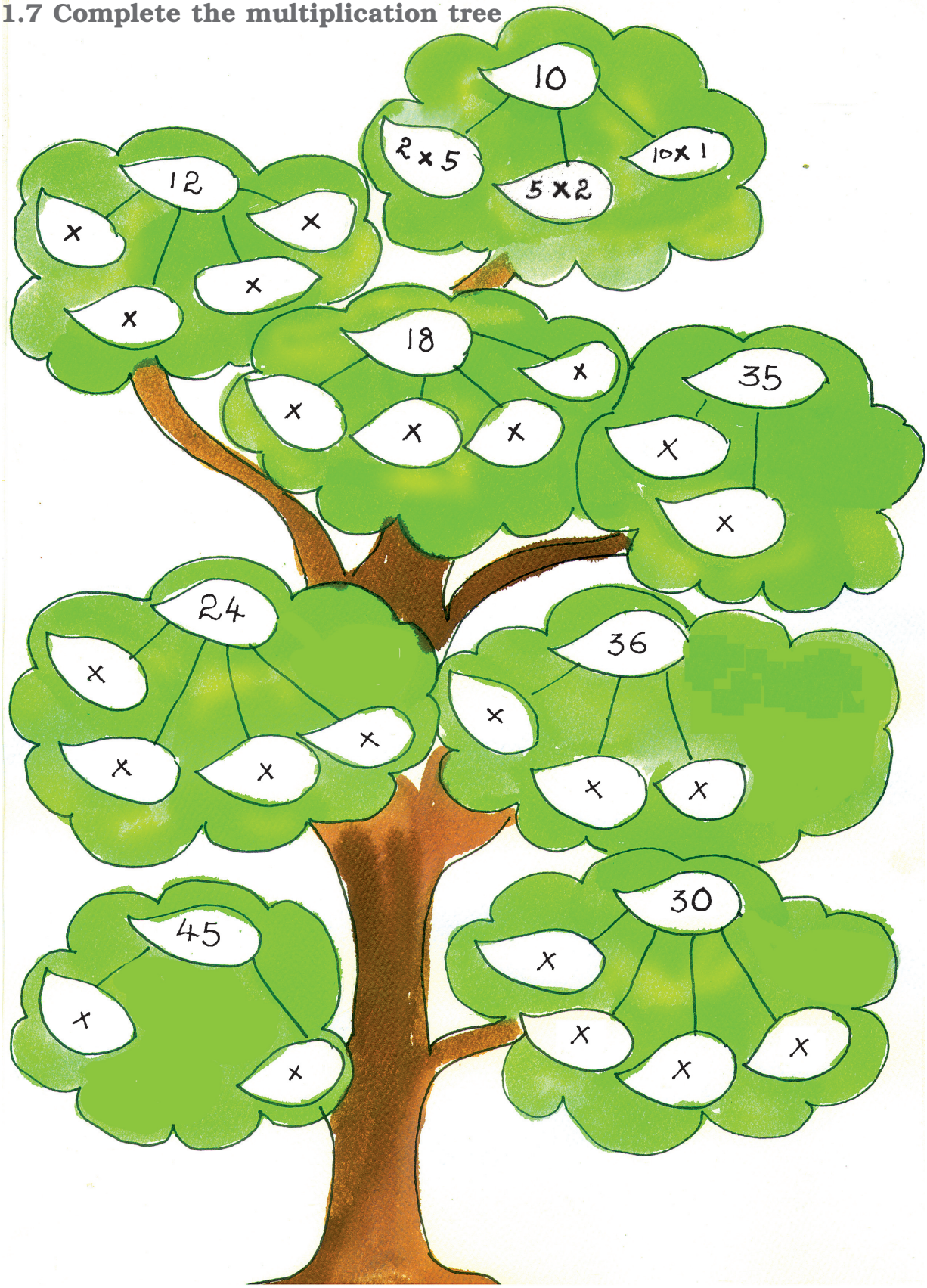
1.6 Try jumps with seven steps




1 × 8 = 8
2 × 8 = 16
3 × 8 = ___
4 × 8 = ___
5 × 8 = ___
6 × 8 = ___
7 × 8 = ___
8 × 8 = ___
9 × 8 = ___
10 × 8 = ___


1 × 9 = 9
2 × 9 = 18
3 × 9 = ___
4 × 9 = ___
5 × 9 = ___
6 × 9 = ___
7 × 9 = ___
8 × 9 = ___
9 × 9 = ___
10 × 9 = ___

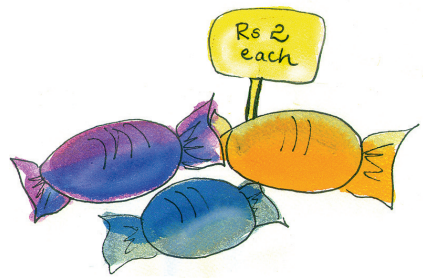
1.7 Complete the multiplication tree

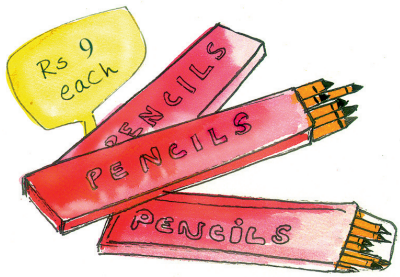


1.8 Let us do shopping

How much do these things cost?

4 toffees cost 4 × 2 = 8 rupees.

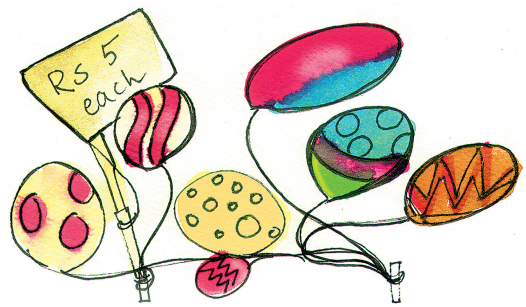




3 pencil boxes cost 3 × 9 = 27 rupees.

10 pencil boxes cost _____ × _____ = _____ rupees.

9 balloons cost _____ × _____ = _____ rupees.





5 toys cost _____ × _____ = _____ rupees.

7 face masks cost _____ × _____ = _____ rupees.



Practice Time

(1) Complete the following

2	×	7	=	3	×	9	=
4	×	9	=	5	×	2	=
5	×	8	=	10	×	3	=
10	×	6	=	2	×	8	=
5	×	9	=	10	×	8	=

(2) Look at the patterns and complete them.



3, 6, 9, 12 , 15 , 18 .

2, 4, 6, _____, _____, _____.

10, 20, 30, _____, _____, _____.

4, 8, 12, _____, _____, _____.

5, 10, 15, _____, _____, _____.

(3) Fill in the blanks

1 × 10 = 10

2 × 10 = 20

3 × 10 = ☁

4 × 10 = ☁

5 × 10 = ☁

6 × 10 = ☁

7 × 10 = ☁

8 × 10 = ☁

9 × 10 = ☁

10 × 10 = ☁

(4) The almirah has 4 shelves.
There are 5 books in each shelf.
How many books are in the almirah?

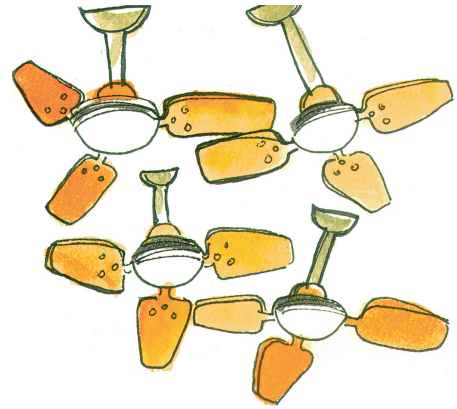
4 × 5 = _____ books

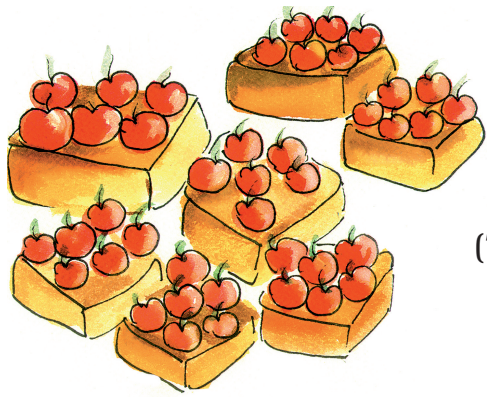




(5) A shirt has 5 buttons.
How many buttons would 3 shirts have?

(6) There are four fans. Each fan has 3 blades. What is the total number of blades in all?





(7) A box contains 6 apples. How many apples in all will seven boxes have?

(8) Complete the following

8	×	3	=		5	×		= 35
3	×		=	30		×	6	= 36
	×		=	42	10	×		= 60
5	×		=	40		×	9	= 36
	×		=	54		×	7	= 28

Multiplication Patterns

9	×	1	=	9				
9	×	2	=	18	1	+	8	= 9
9	×	3	=	27	2	+	7	= 9
9	×	4	=	36	3	+	6	= 9
9	×	5	=	45	4	+	5	= 9
9	×	____	=	____	____	+	____	= ____
9	×	____	=	____	____	+	____	= ____
9	×	8	=	____	____	+	____	= ____
9	×	9	=	____	____	+	____	= ____
9	×	10	=	____	____	+	0	= 9

Did you see the pattern in the 9 times table?

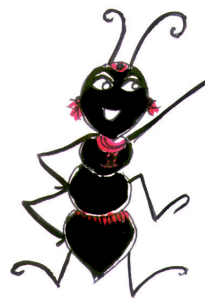
2. Multiplying Big Numbers

- Two toffees were given to each student in the class. If there were 34 students, how many toffees were given in all?

  Total students present = 34

  Each student gets 2 toffees.

  So, total number of toffees given is 34 × 2.



34x2 is 34 times 2
30 times 2 is 3 tens times 2 which is 6 tens = 60. So the answer is more than 60. Similarly 40 times 2 is 80. So the answer is less than 80. What is the answer?



How can we find 34 times 2?

I know!



Bharti wrote

30	4	
		× 2

See, 34 is 30 and 4. Right?

What's this?



Next Bharti wrote

30	4
30 × 2 **60**	4 × 2 **8**



But what's the answer?



30 times 2 is 60 and 4 times 2 is 8.





Wow! That's smart.



Just add the numbers in the boxes, and you get the answer 60 + 8 = 68, 68 toffees in all.

- In a picnic 4 fruits were given to every student. The number of students was 23. Find out the total number of fruits given.

  Number of students in the picnic = 23

  Fruits given to each student = 4

  Total number of fruits = 23 × 4



23 × 4 means 23 times 4
20 times 4 is 80.
So the answer is more than 80.
The answer is also less than 100.
Can you tell why?

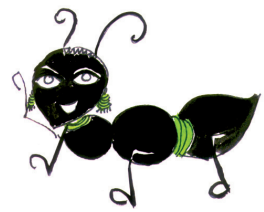
Let us try if we can do this by Bharti's method.

20	3
20 × 4 **80**	3 × 4 **12**

Adding 80 and 12 gives

$$\begin{array}{r} 80 \\ +\ 12 \\ \hline 92 \end{array}$$

So, 23 times 4 is 92.



(1) Fill in the blanks

- 22 × 3 = ☐
- 21 × 4 = ☐
- 30 × 5 = ☐
- 26 × 4 = ☐
- 35 × 3 = ☐



(2) First try to guess the answer and then calculate.

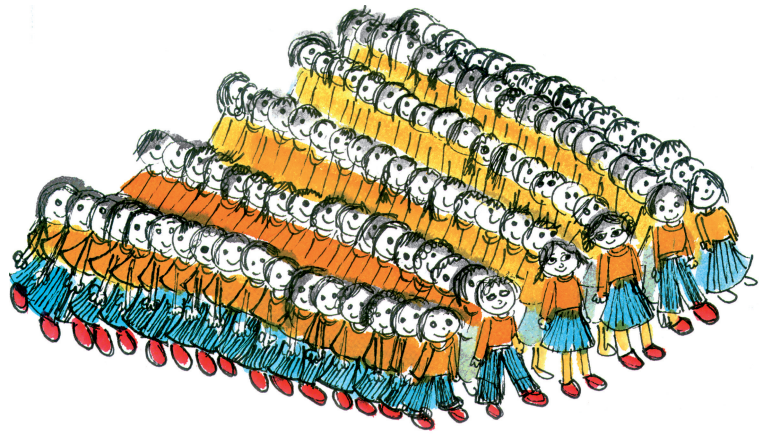
A flower has five petals. A bunch has 13 flowers. How many petals are there in the bunch?



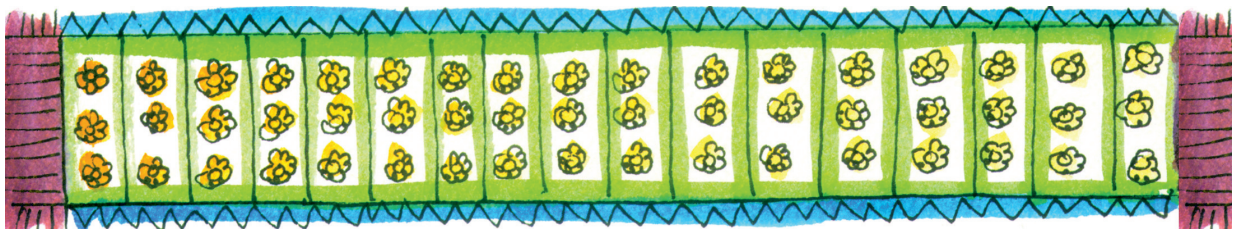
(3) A book has 64 pages. What will be the total number of pages in 8 such books?

The activities given here are designed to develop children's conceptual understanding of multiplication. The standard method for multiplying larger numbers may be efficient, but teaching it too early may actually hinder learning. The method given here builds on children's growing sense of multiplying by a two-digit or three-digit number. Children should also be encouraged to estimate the result of the operation.

(4) Students stand in rows in the assembly. There are six rows of students. Each row has17 students. How many students are there?



(5) A design has 3 flowers in it. A piece of cloth has 17 such designs. How many flowers will be on the cloth?



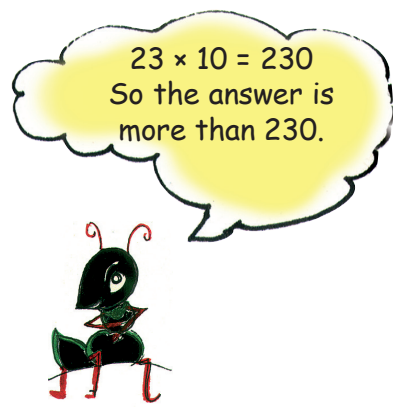
3. How many in 23 dozens?

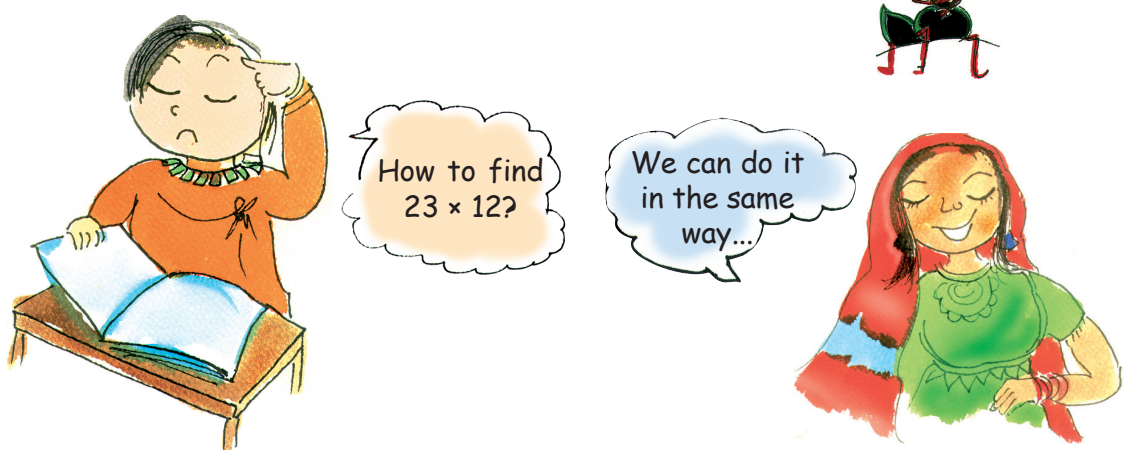
Many things are sold in dozens. For example, bangles and bananas are often sold in dozens.

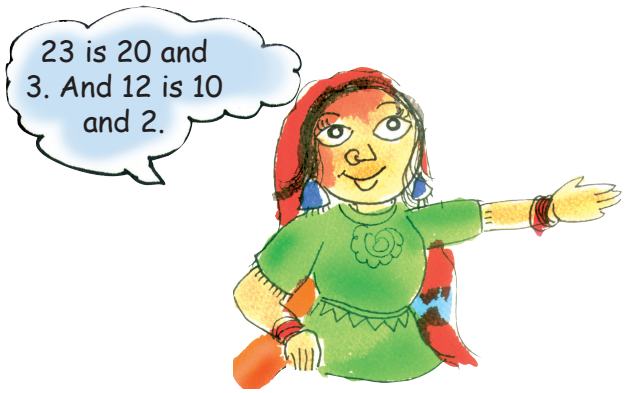
1 dozen bananas means 12 bananas.

So 23 dozen bananas =

23 × 12 bananas.







Bharti wrote

20	3	
		×10
		× 2

Next Bharti wrote

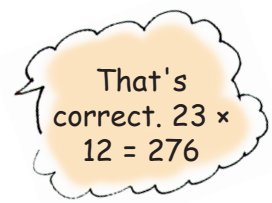
20	3
20 × 10 **200**	3 × 10 **30**
20 × 2 **40**	3 × 2 **6**

And Bharti wrote

200
40
30
+ 6
276







So, 23 dozen bananas = 276 bananas.

Now try doing 43 × 13

43 is 40 and 3

13 is 10 and 3

We write the numbers in the boxes as shown.



40	3
40 × 10 **400**	3 × 10 **30**
40 × 3 **120**	3 × 3 **9**

Add the numbers in the boxes.

```
  400
  120
   30
+   9
-----
  559
-----
```

So 43 × 13 = 559

Bela has done the above multiplication as follows:

```
   43
×  13
-----
  129   <-- 43 × 3
  430   <-- 43 × 10
-----
  559
-----
```

How will you multiply 195 × 31 by Bela's method?

```
   195
×   31
-------
   195      (195 × 1)
  ___0      (195 × 30)
-------
```



PRACTICE TIME



(1) First guess the answer and then check it by calculating using Bharti's method

42 × 23 = _____ 73 × 11 = _____

51 × 13 = _____ 54 × 12 = _____

25 × 36 = _____ 12 × 14 = _____

(2) Multiply these numbers.

(a) 32, 46

(b) 67, 18

```
   32
×  46
-------
  192      (32 × 6)
 ____      (32 × 40)
-------
```

```
   67
×  18
-------
 ____      (67 × 8)
  670      (67 × __)
-------
```



(3) Do these in your notebook.

(a) 47 × 19 (b) 188 × 91

(c) 63 × 57 (d) 225 × 22

(e) 360 × 12 (f) 163 × 42

(4) Shantaram is a special cook who comes only on party days. Last year he was called for only 28 days. For each day he has to be paid Rs 165. Find out how much money he will get in all.



(5) Find 165 × 365.

165	
× 365	
___	(165 × 5)
_____	(165 × 60)
49500	(165 × 300)

In the beginning, students may write 165 × 5, 165 × 60, 165 × 300 to understand the process of multiplication, but after sufficient practice they may discontinue this practice.

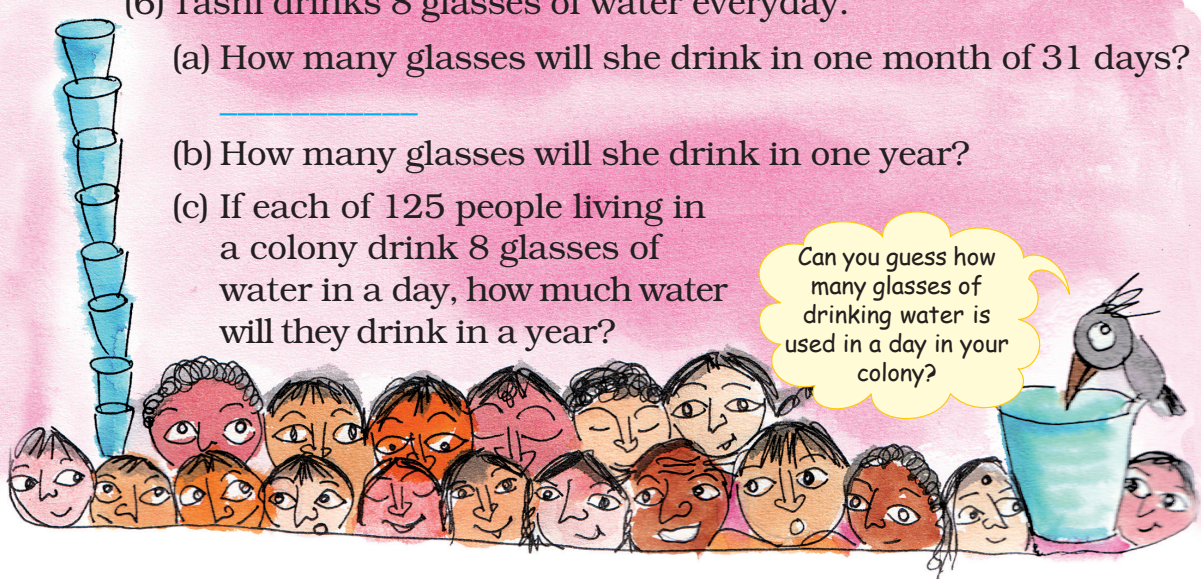
(6) Tashi drinks 8 glasses of water everyday.

(a) How many glasses will she drink in one month of 31 days?

_____

(b) How many glasses will she drink in one year?

(c) If each of 125 people living in a colony drink 8 glasses of water in a day, how much water will they drink in a year?



(7) If Soha's heart beats 72 times in one minute, how many times does it beat in one hour?

(a) Now find out how many times does it beat in one day.

(b) Count your own heart beats to find out how many times your heart beats in a week.





(8) A baby elephant drinks around 12 L of milk everyday. How much milk will it drink in two years?

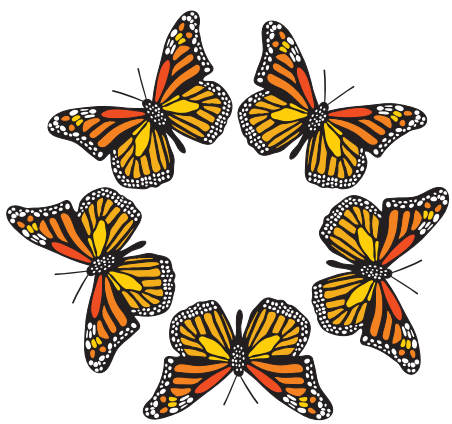
(9) A baby blue whale drinks around 200 L of milk in one day. Just imagine how much milk that is! How much milk would the baby blue whale drink in eighty days?

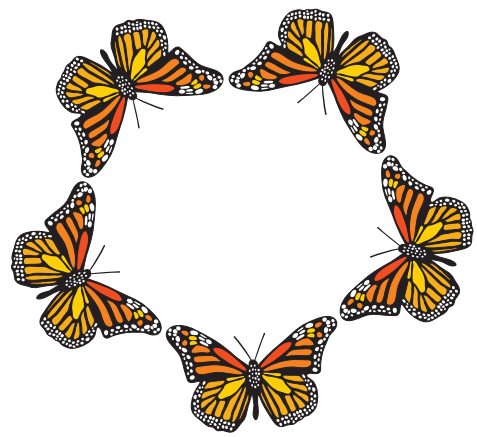




DIVISION OF NUMBERS

1. How Many in Each Group?



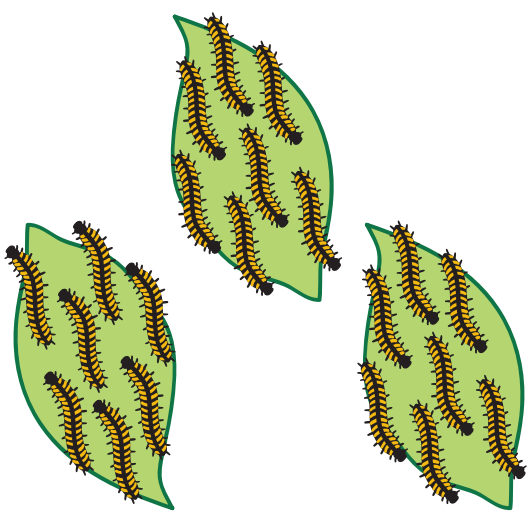


- There are in all 10 butterflies.

  They are divided equally into 2 groups.

There are 5 butterflies in each group. It is written as 10 divided by 2 is equal to 5,

10 ÷ 2 = 5

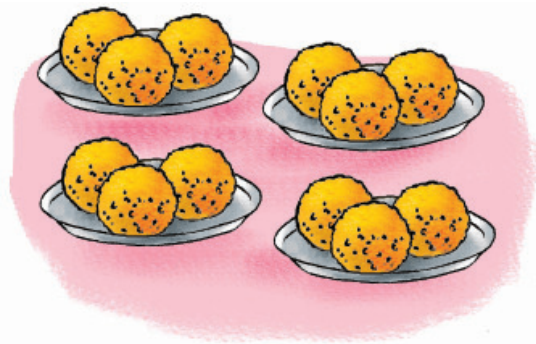


- There are in all 21 caterpillars.

  They are divided equally into 3 groups.

  There are _____ caterpillars in each group.

21 ÷ 3 = _____

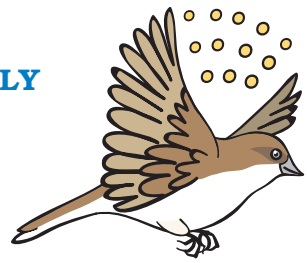


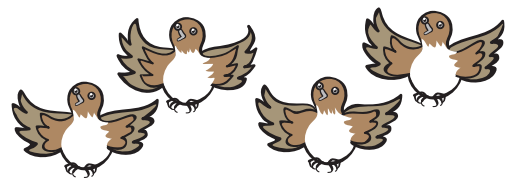
- There are in all 12 *laddoos*.
  They are divided equally into _____ groups.
  There are _____ *laddoos* in each group.

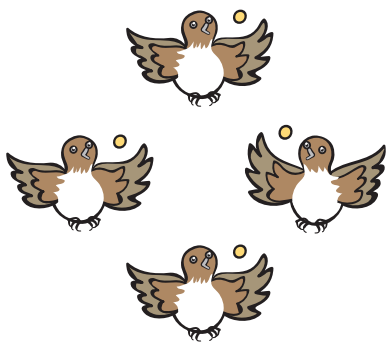
12 ÷ _____ = _____

2. Sharing Equally

- **Share the grains**







Mummy bird brings 12 grains.
How to distribute equally among baby birds?
Mummy bird starts by giving 1 grain to each baby.



Then she gives one more grain to each baby.



Each baby has got 2 grains now.
How many grains are left?_____
She gives one more grain to each baby.
All the grains are finished.

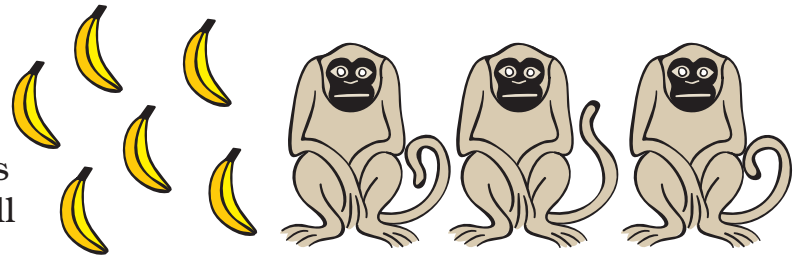
12 grains have been **divided** among 4 baby birds.
Each baby has got 3 grains.

12 ÷ 4 = 3

- **Here are 6 bananas.**

  Here are 3 monkeys.

  If they share the bananas equally, each monkey will get 2 bananas.

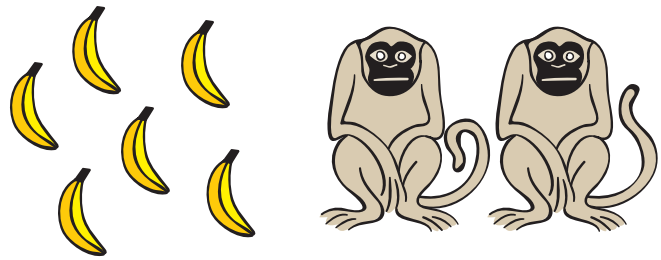




6 bananas divided into 3 equal parts = 2 bananas in each part.

$6 \div 3 = 2$

If there are 6 bananas and 2 monkeys,





each monkey will get 3 bananas.

6 bananas ÷ 2 = 3 bananas

$6 \div 2 = 3$

Practice Time

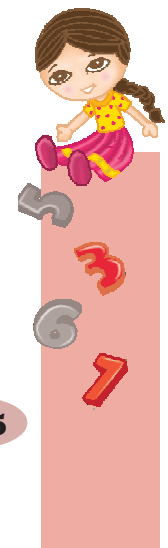
(1) If there are 60 bananas and 2 monkeys, how many will each monkey get? _____ bananas.



(2) Five friends shared equally 10 five-rupee coins which is, 50 rupees.

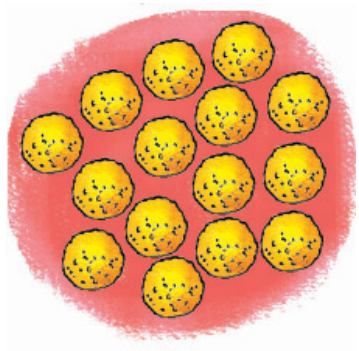
Each friend got _____ coins, which is _____ rupees

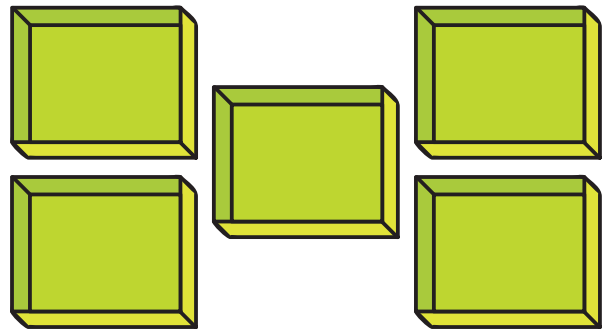
$50 \div 5 =$ _____



Give children the experience of sharing things equally and writing corresponding division statements.

(3) Minku puts 15 laddoos equally into 5 boxes.





(a) How many laddoos will there be in each box?

There will be ____ laddoos in each box.

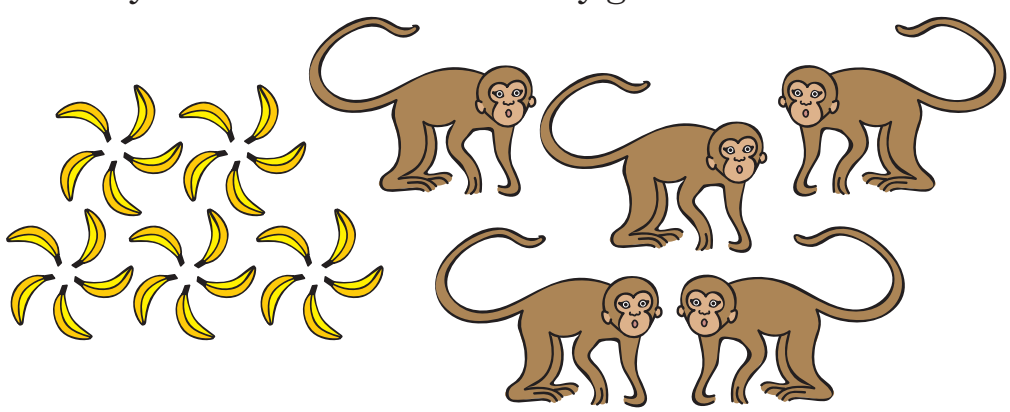
15 ÷ 5 = ____

(b) If she uses only 3 boxes, how many laddoos will there be in each box?

There will be ____ laddoos in each box.

____ ÷ 3 = ____

(4) 5 monkeys share 25 bananas equally among themselves. How many bananas will each monkey get?

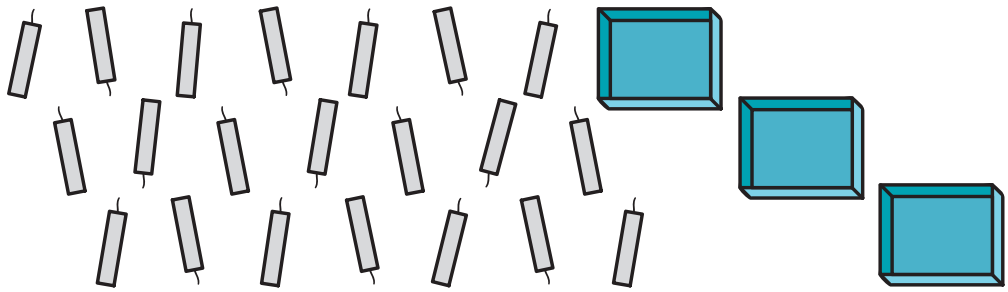


____ ÷ 5 = ____

Each monkey will get ____ bananas.

(5) There are 21 candles. Put them equally in 3 boxes. How many candles are there in each box?

_____ ÷ _____ = _____



3. Division as Repeated Subtraction

4 added repeated by 5 times

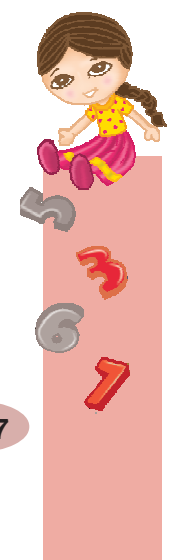
4 + 4 + 4 + 4 + 4 is written as $5 \times 4 = 20$

Subtracted 4 repeated by 5 times from 20, you get 0.

which means 20 – 4 – 4 – 4 – 4 – 4 = 0

20	← Subtracted 1 time
– 4	
16	← Subtracted 2 time
– 4	
12	← Subtracted 3 time
– 4	
8	← Subtracted 4 time
– 4	
4	← Subtracted 5 time
– 4	
0	

We write $20 \div 4 = 5$



Can you find 18 ÷ 3?

1 8	
– 3	1 time
1 5	
– 3	2 times
1 2	
– 3	3 times
9	
– 3	4 times
6	
– 3	5 times
3	
– 3	6 times
0	





18 ÷ 3 = ☐

Find 28 ÷ 7

28
– 7
.....
– 7
.....
– 7
7
– 7
0



28 ÷ ☐ = ☐

PRACTICE TIME

(1) 28 ÷ 2 = (2) 56 ÷ 7 = (3) 48 ÷ 4 =

(4) 66 ÷ 6 = (5) 96 ÷ 8 = (6) 110 ÷ 10 =

Emphasis should be laid on understanding connection between subtraction and division.

(7) Kanta Devi has 30 metres of rope.

She distributes it equally among her 3 children.

Each child gets ☐ metres of rope.

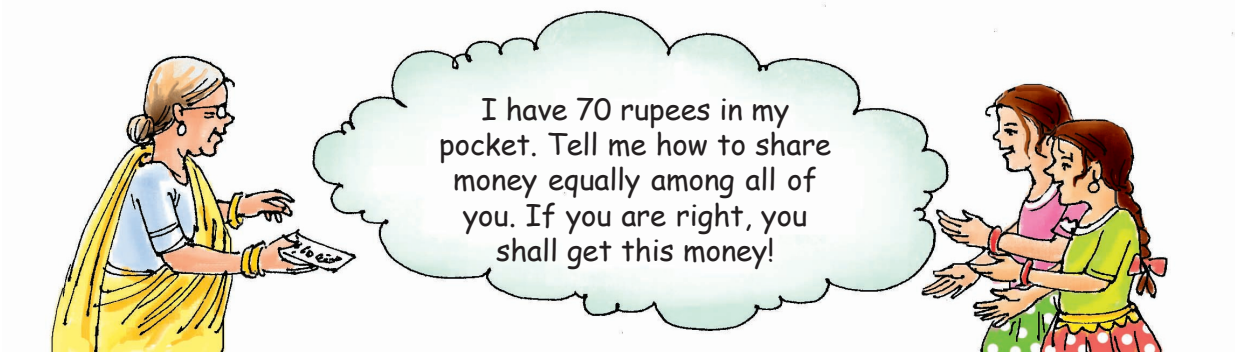
If there is 36 metres of rope, how much of rope will each child get? ☐

And if there is 60 metres of rope, how much will each child get? ☐

4. Methods of Division

Children and their grandfather

Rashi, Seema, Mridul, Rohit and Lokesh asked their grandmother to give them money for the Fair.



One method

Rashi and Seema thought for a while and said — We know how to divide 70 rupees among us which means, how to find 70 ÷ 5.

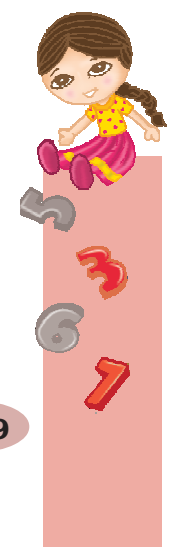
Seema starts writing and says —

$$\begin{array}{r} 10 \\ 5\overline{)\,70} \\ -\,50 \\ \hline 20 \end{array}$$

→ First, I give Rs 10 to each one of us.

→ So, I have distributed 5 × 10 = 50 rupees.

→ 20 rupees are still left.



Rashi completes it like this. She says —

I give 4 rupees more to each. So, I have distributed 20 rupees.

Now nothing is left. And all the money is divided equally.

So, each gets 10 + 4 = 14 rupees.

Check : 5 × 14 = 70.

$$\begin{array}{r|l} & 10 + 4 \\ \hline 5 & 70 \\ & -\ 50 \\ \hline & 20 \\ & -\ 20 \\ \hline & 0 \end{array}$$

Another Method

Mridul and Lokesh are trying 70 ÷ 5 in a different way.



Lokesh writes —

First, I give Rs 5 to each.

I have distributed 5 × 5 = 25 rupees.

Next, I give Rs 6 more to every one.

I have distributed 30 rupees more.

Now I am left with _____ rupees.

$$\begin{array}{r|l} & 5 + 6 \\ \hline 5 & 70 \\ & -\ 25 \\ \hline & 45 \\ & -\ 30 \\ \hline & ? \end{array}$$

How will Lokesh distribute the rest of the money? Complete it.

So, each child gets 5 + 6 + _____ = _____ rupees.

Check your answer! Multiply your answer by 5 and see if you get 70. Is your answer correct?



You may think also as follows

$$\begin{array}{r|l} & 11 + 3 \\ \hline 5 & 70 \\ & -\ 55 \\ \hline & 15 \\ & -\ 15 \\ \hline & 0 \end{array}$$

$$\begin{array}{r|l} & 12 + 2 \\ \hline 5 & 70 \\ & -\ 60 \\ \hline & 10 \\ & -\ 10 \\ \hline & 0 \end{array}$$

$$\begin{array}{r|l} & 13 + 1 \\ \hline 5 & 70 \\ & -\ 65 \\ \hline & 5 \\ & -\ 5 \\ \hline & 0 \end{array}$$

$$\begin{array}{r|l} & 14 \\ \hline 5 & 70 \\ & -\ 70 \\ \hline & 0 \end{array}$$

$$\begin{array}{r|l} & 15 \\ \hline 5 & 70 \\ & -\ 75 \\ \hline & ? \end{array}$$

Can you start with Rs 15 to each?

These methods are actually about how children divide when they distribute some objects repeatedly. In this case, they might first give Rs 10 each to five people and then next distribute the remaining money in the second round. They could as well distribute it by first giving Rs 5 to each. Children can, thus, use any method to complete the process of division. This is the beauty of this method.

Candles in packets

Meera made 204 candles to sell in the market. She makes packets of 12. How many packets will she make?

Number of packets will be 204 ÷ 12. Meera finds it as follows.

```
        10 + 5 + 2
12 ) 204
   - 120
      84
   -  60
      24
   -  24
       0
```

204 ÷ 12 = 10 + 5 + 2 = 17



Practice Time

(1) Divide the following.

(a) $5\overline{)65}$	(b) 84 ÷ 2	(c) $3\overline{)69}$	(d) 90 ÷ 6
(e) $4\overline{)72}$	(f) $9\overline{)108}$	(g) 232 ÷ 2	(h) $2\overline{)428}$

(2) Fiza made 225 candles to sell in the market. She makes packets of 5. How many packets will she make?

If she packs them in packets of 15, then how many packets will she make?

(3) On Sports Day, 322 children are in the school playground. They are standing in 7 equal rows. How many children are there in each row? If they are standing in 14 equal rows, how many children will be in each row?

(4) Neelu brought 15 storybooks to her class. Today 45 students are present. How many students will need to share one book?



(5) Razia wants change for a 500-rupee note.



How many notes will she get if she wants in return —

(a) All 50 rupee notes? _____

(b) All 20 rupee notes? _____

(c) All 5 rupee notes? _____



(6) You have to distribute 72 tomatoes equally in 3 baskets. How many tomatoes will there be in each basket? If you have to distribute them equally in 12 baskets, how many tomatoes will there be in each basket?

5. Division in Larger Numbers

Paying instalments

Dolma took a loan from a friend to buy a moped for Rs 9,588. She has to pay it back in equal amounts every month for six months. How much will she have to pay every month? She asked her children to calculate.



Her daughter did it this way.

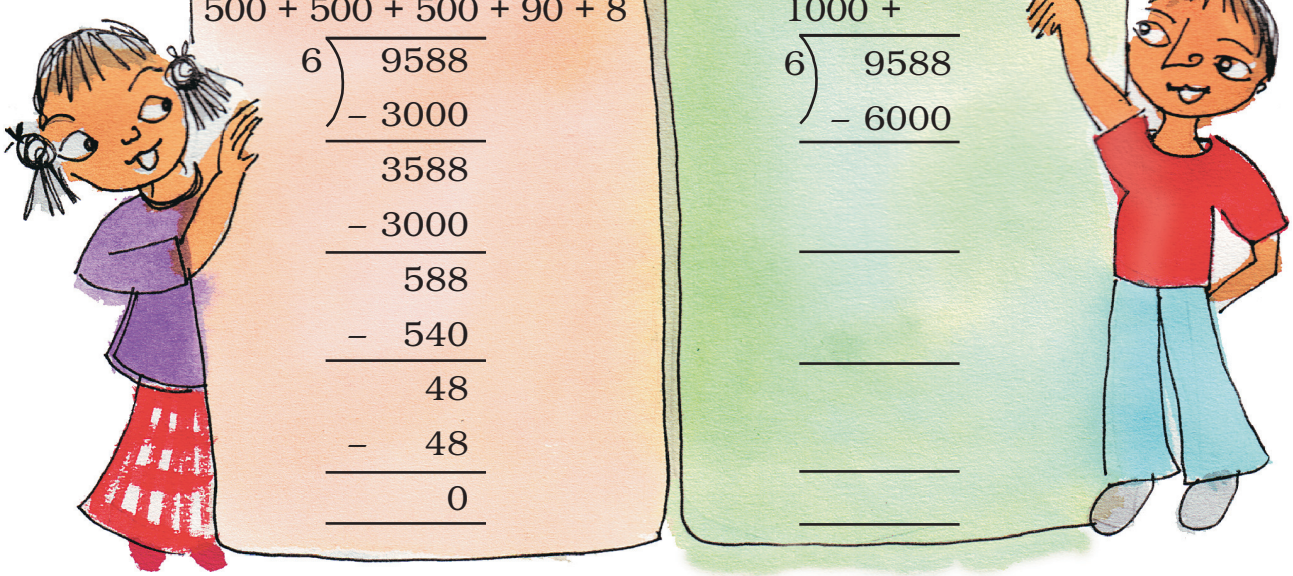
500 + 500 + 500 + 90 + 8

$$
\begin{array}{r|l}
6 & 9588 \\
 & -\ 3000 \\
\hline
 & 3588 \\
 & -\ 3000 \\
\hline
 & 588 \\
 & -\ 540 \\
\hline
 & 48 \\
 & -\ 48 \\
\hline
 & 0 \\
\hline
\end{array}
$$

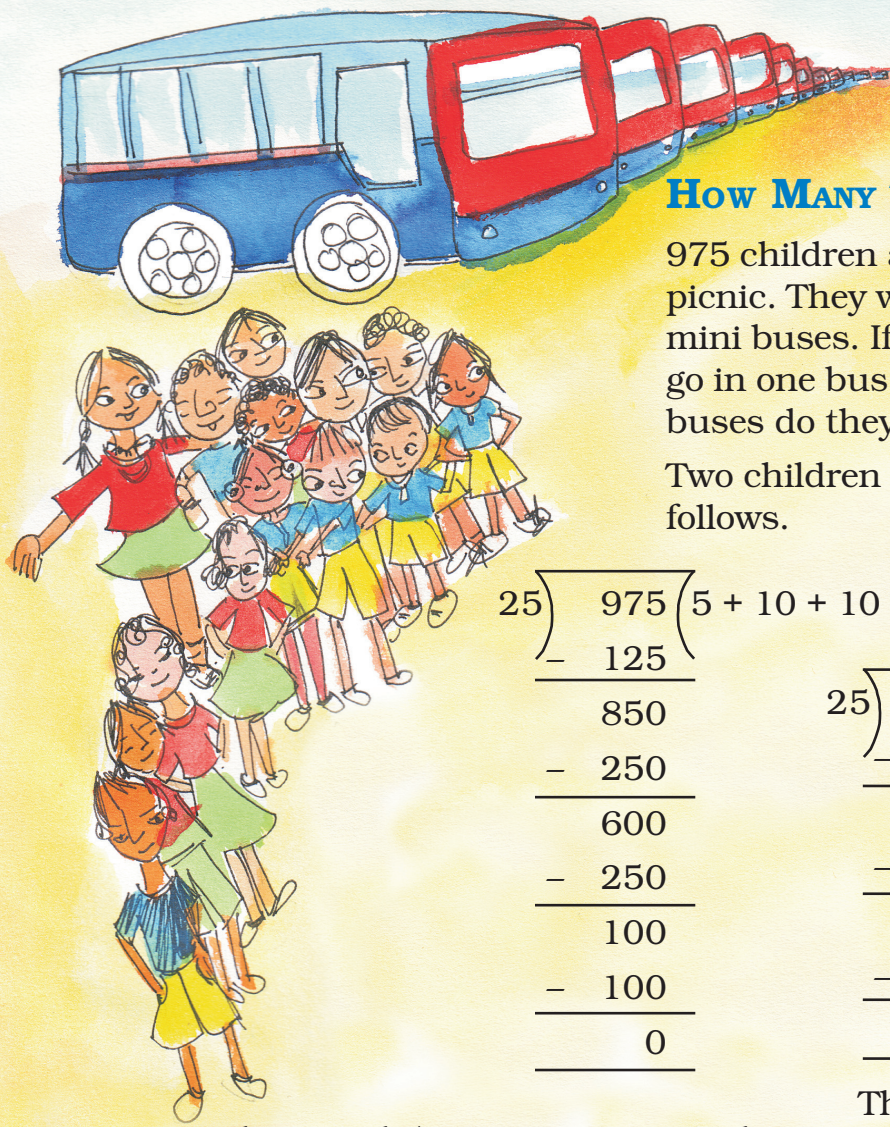
Her son started this way.
Now you complete it.

1000 +

$$
\begin{array}{r|l}
6 & 9588 \\
 & -\ 6000 \\
\hline
 & \_\_\_\_ \\
 & \_\_\_\_ \\
\hline
 & \_\_\_\_ \\
 & \_\_\_\_ \\
\hline
 & \_\_\_\_ \\
\hline
\end{array}
$$



Will both of them get the same answer? Discuss with your friends.



How Many Times?

975 children are going on a picnic. They will be taken in mini buses. If 25 children can go in one bus, how many buses do they need?

Two children have solved it as follows.

$$
\begin{array}{r|l}
25 & 975 \\
- & 125 \\
\hline
 & 850 \\
- & 250 \\
\hline
 & 600 \\
- & 250 \\
\hline
 & 100 \\
- & 100 \\
\hline
 & 0 \\
\hline
\end{array}
\qquad 5 + 10 + 10 + 10 + 4
$$

They need 5+10+10+10+4= 39 buses

$$
\begin{array}{r|l}
25 & 975 \\
- & 500 \\
\hline
 & 475 \\
- & 250 \\
\hline
 & 225 \\
- & 225 \\
\hline
 & 0 \\
\hline
\end{array}
\qquad 20 + 10 + 9
$$

They need 20+10+9 = 39 buses

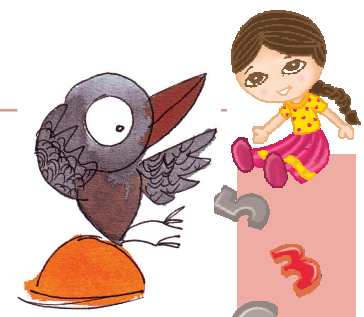
Check that 39 × 25 = 975. This is corresponding multiplication fact.

Practice Time

(1) Divide these

(a) 4228 ÷ 4 (b) 770 ÷ 22 (c) 9872 ÷ 8

(d) 672 ÷ 21 (e) 742 ÷ 7 (f) 637 ÷ 13



The teacher may explain the division fact with corresponding multiplication fact which is 4×6 = 24 which is the same as 24 ÷6 = 4 and also as 24÷4 = 6.

(2) Do these divisions and check your results by reverse multiplication fact

(a) 432 ÷ 9 (b) 900 ÷ 10 (c) 448 ÷ 7

(d) 678 ÷ 6

6. Division with Remainder

Children's Day

Children are happy today. They are celebrating Children's Day. Each child will be given 4 pencils from school. The school has got 969 pencils. To find out how many children can get pencils, the teacher asks them to divide 969 by 4.



Iru's Way

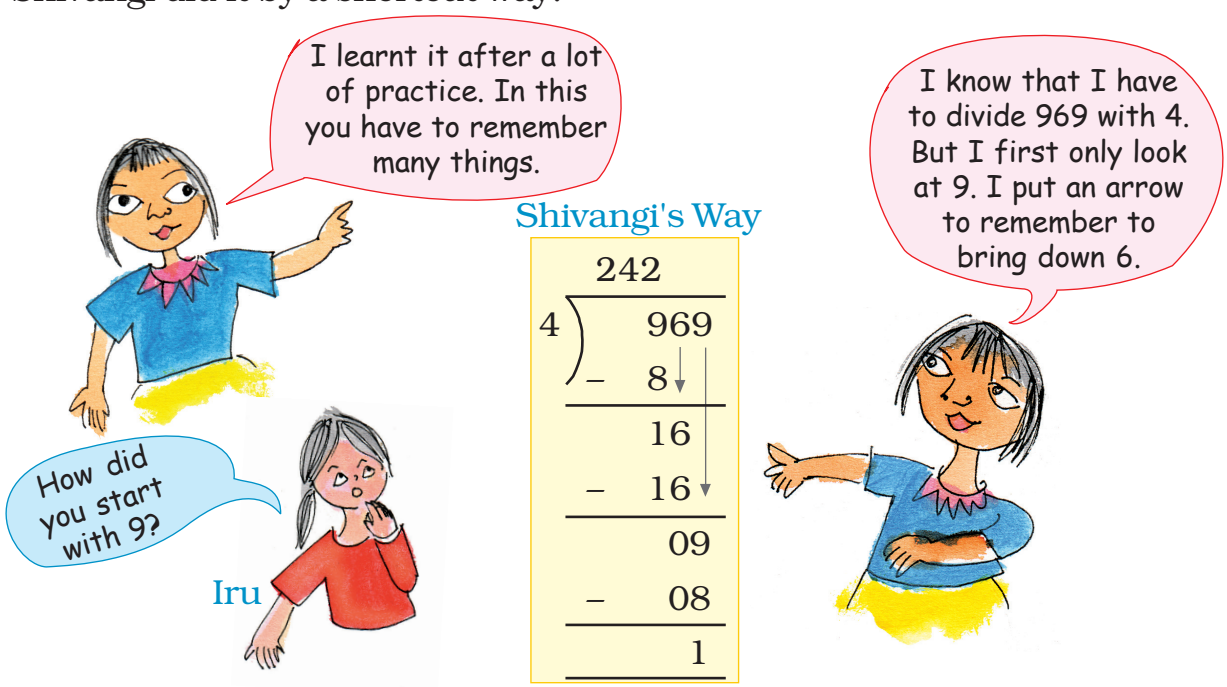
```
4 ) 969 ( 100 +
  – 400
  ------
```

Sreeni's Way

```
4 ) 969 ( 200 +
  –
  ------
```

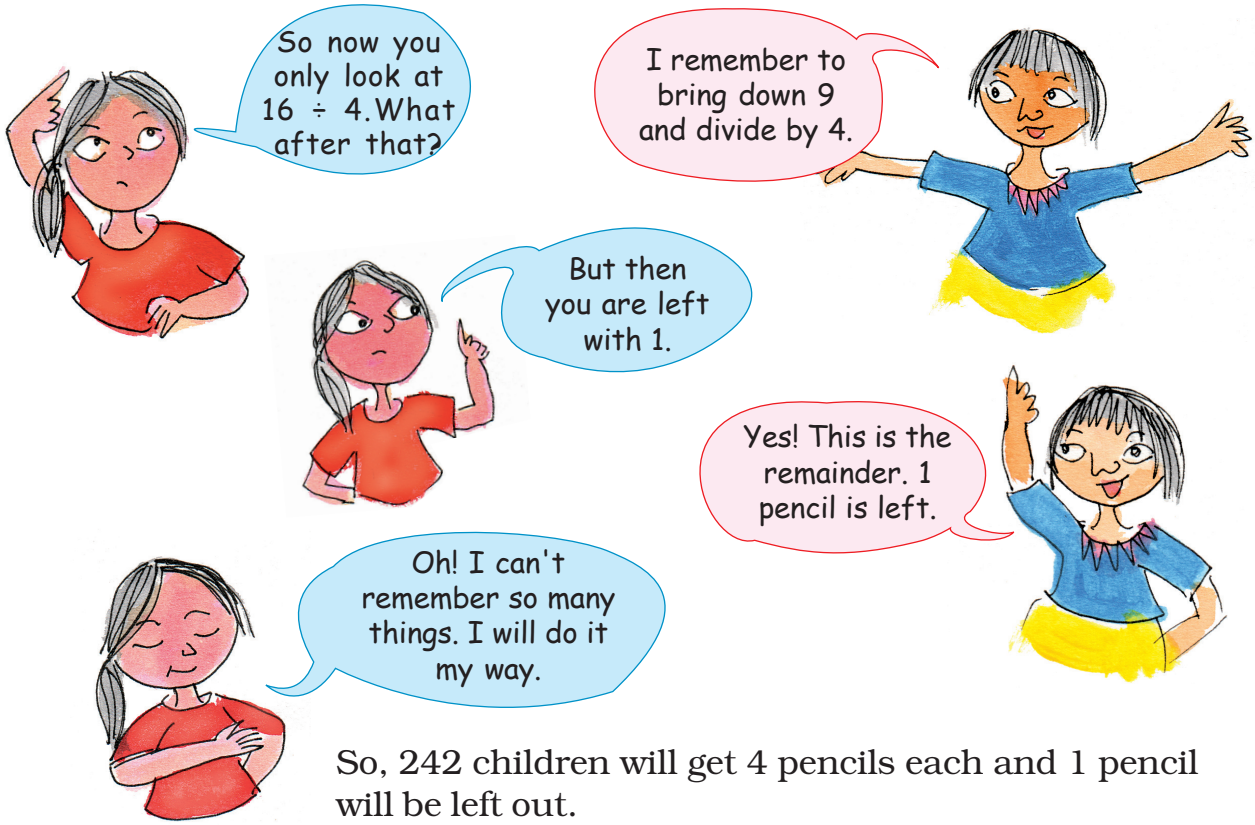
Complete Iru's and Sreeni's way of division.

Shivangi did it by a shortcut way.



Shivangi's Way

```
   242
4 ) 969
  – 8
  ------
    16
  – 16
  ------
     09
  – 08
  ------
      1
```



So, 242 children will get 4 pencils each and 1 pencil will be left out.

If each child is given 15 pencils, how many children can get the pencils?

Using Shivangi's way:

$$
\begin{array}{r|l}
 & 064 \\
\hline
15 & 969 \\
 & -\ 0 \\
\hline
 & 96 \\
 & -\ 90 \\
\hline
 & 69 \\
\hline
 & -\ 60 \\
\hline
 & 9 \\
\hline
\end{array}
$$

I cannot divide 9 by 15 so put a 0 first. Then I look at 96. I see that $15 \times 5 = 75 < 96$, $15 \times 6 = 90 < 96$, $15 \times 7 = 105 > 96$. Thus, put 6 and continue.

So, 064 or 64 children will get 15 pencils and 9 pencils will be left out.

In the above division,

we call 969 as dividend, 15 as divisor, 64 as quotient and 9 as remainder

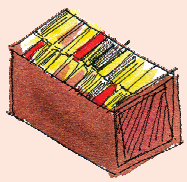
Verify that in a division sum

Dividend = Divisor × Quotient + Remainder

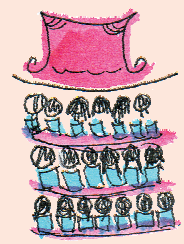
Practice Time

(1) Complete the table given below

	Dividend	Divisor	Quotient	Remainder
380÷8	380	8	47	4
728÷12	728	12		
1404÷7				
9765÷9				



(2) 576 books are to be packed in boxes. If one box has 24 books, how many boxes are needed?



(3) 836 people are watching a movie in a hall. If the hall has 44 rows, how many people are sitting in a row?



(4) A gardener bought 458 apple plants. He wants to grow 15 plants in each row. How many rows can he grow?

How many plants would be left over?

(5) Shyamli bought a battery. She read on it 'Life: 2000 hours'. She uses it throughout the day and the night. How many days will the battery run?





Problems involving multiplication and division

(6) A tank is full with 300 L of water. How much water will be filled in 25 tanks? If 15 buckets can be filled with one tank of water, how many buckets in all can be filled with the water in 25 tanks?

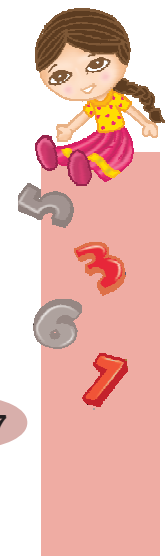
Initially, let the children write 0 in the quotient as shown above. After sufficient practice 0 may not be written.Further, the teacher may emphasise that the remainder should always be less than the divisor.

(7) There are 28 *laddoos* in 1 kg. How many *laddoos* will be there in 12 kg? If 16 *laddoos* can be packed in 1 box, how many boxes are needed to pack all these laddoos?





(8) There are 26 rooms in a school. Each room has 4 plants. The plants are removed from rooms and arranged equally in 13 rows in a flowerbed. How many plants will be there in each row?





INTRODUCTION TO FRACTIONS

1. HALF

Tit for Tat

One day Amina met a painter.



After a while the painter showed her the picture.

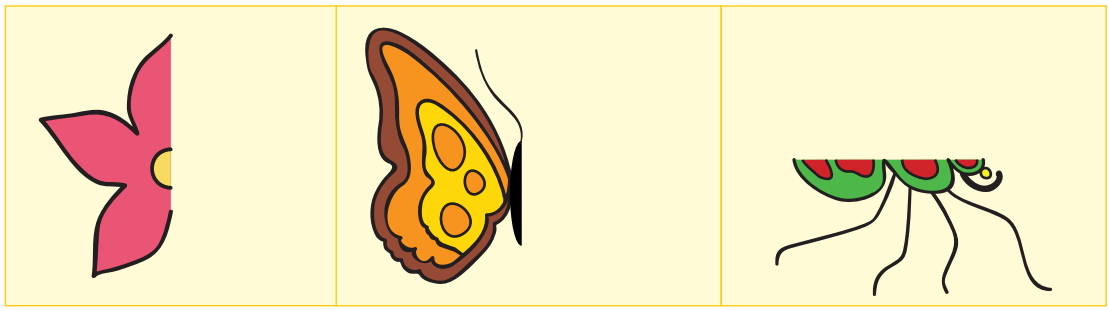


Amina gave him a hundred-rupee note.



Make the other half

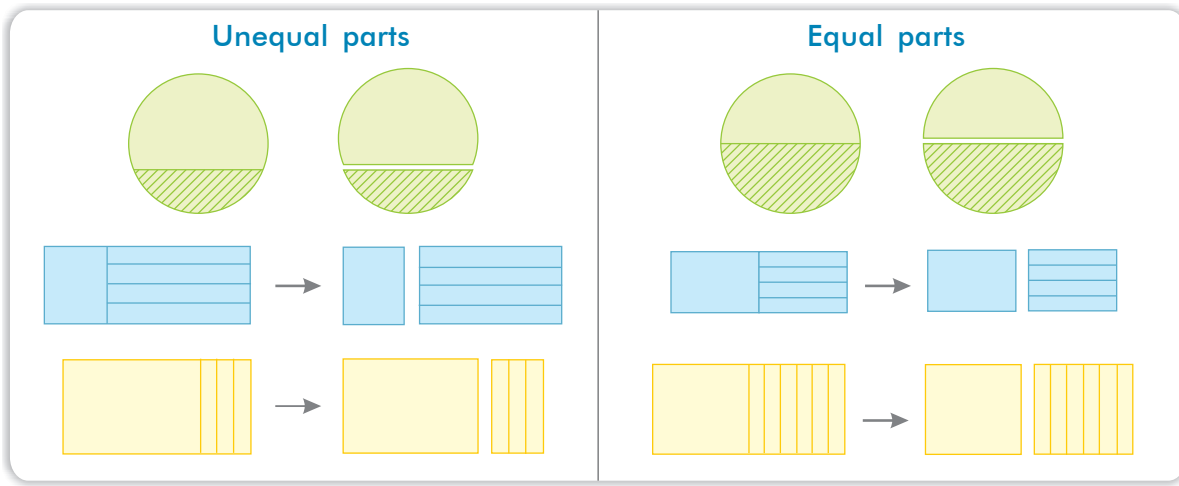
Half of the picture is drawn here. Can you complete the picture by drawing the other half?



2. Part of a Whole

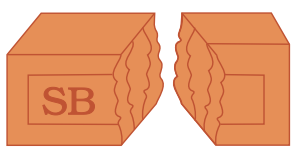
- Two unequal and two equal parts of a whole

  When we cut a 'whole' in two parts we either get two equal parts or two unequal parts. Let us look at some examples.

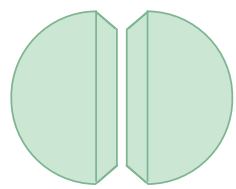


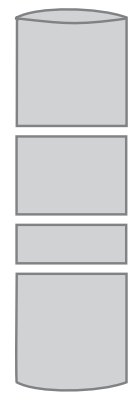
- Observe the following

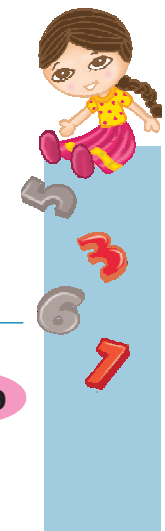
  Each object is cut into a number of parts. Some in equal parts and some in unequal parts. Write against in each division "Equal parts" or unequal parts.

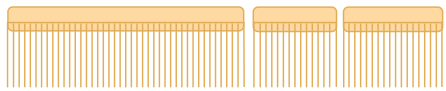


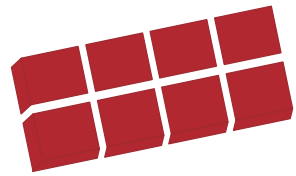
Unequal

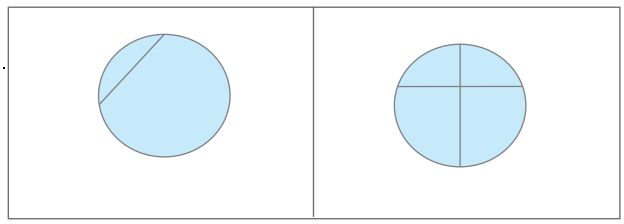


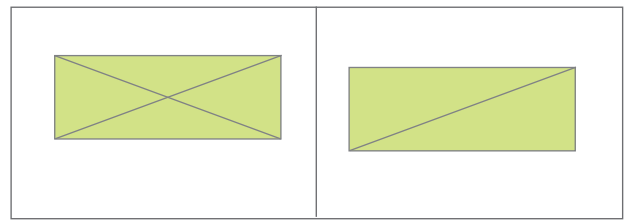


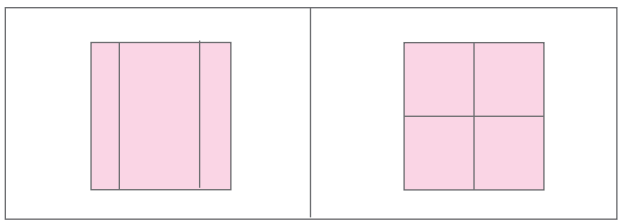




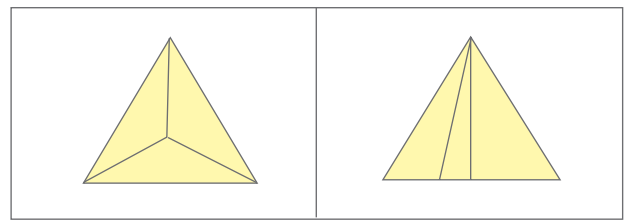




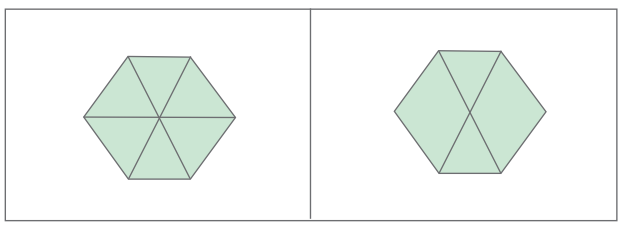


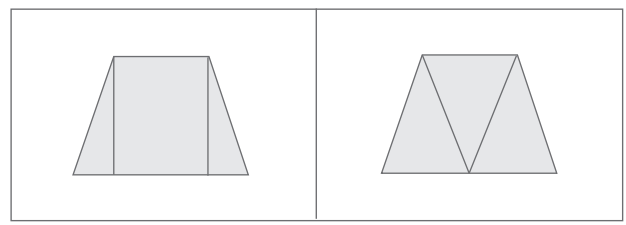


Unequal



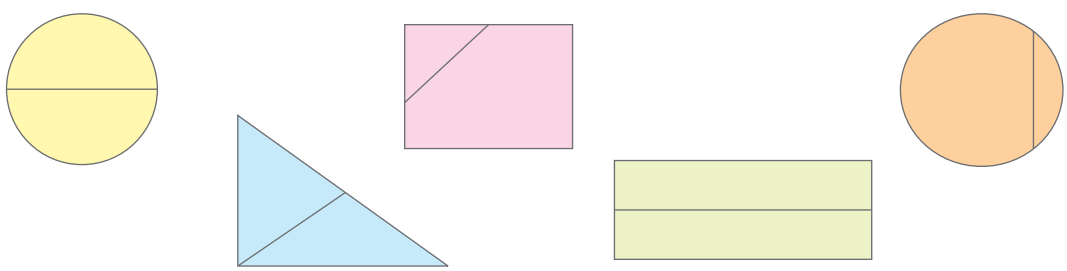
Equal



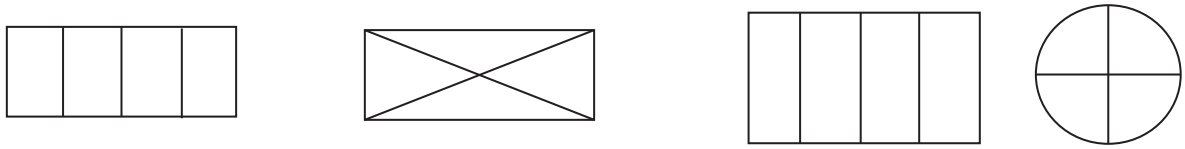


PRACTICE TIME

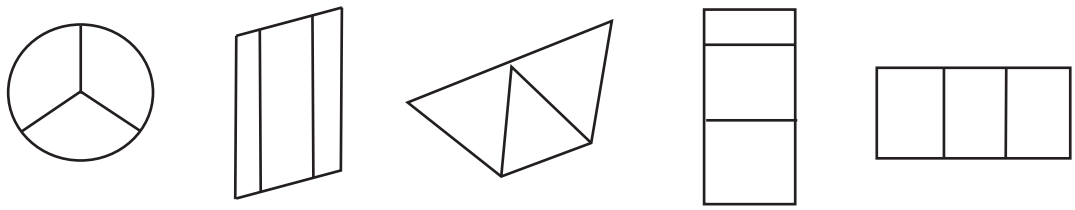
(1) Mark a tick (✔) on the figures which are divided into **two equal parts.**



(2) Colour the parts of figures in different colours which are divided into **four equal parts**.

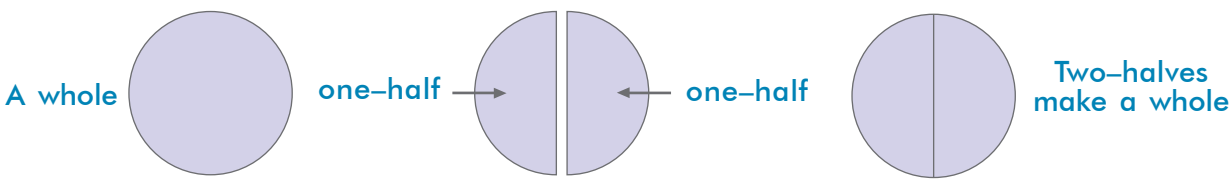


(3) Shade the figures which are divided into **three equal parts**.



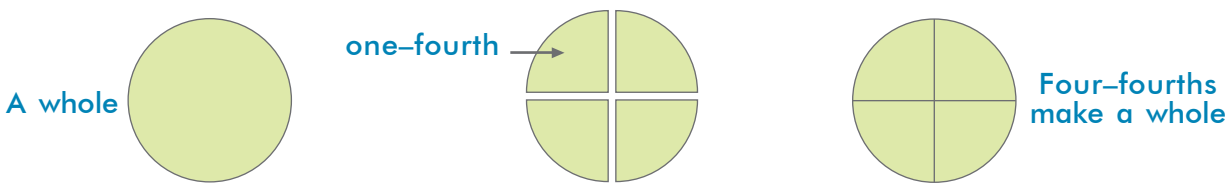
3. One–half, One–fourth, One–third of a Whole

When a whole (say a circle) is cut or divided into two equal parts, each part is called **one–half** of the whole.



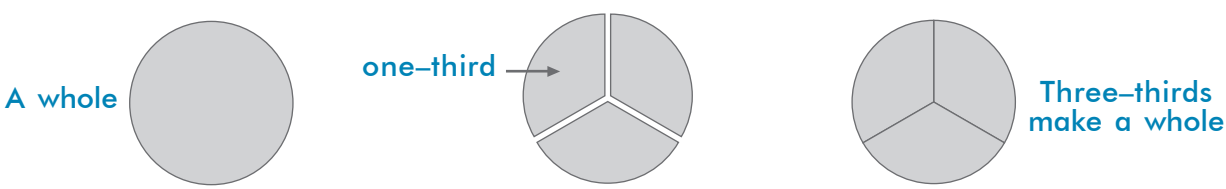
We write the whole as 1 and one–half as $\frac{1}{2}$.

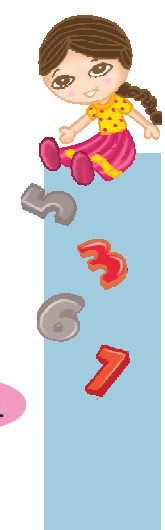
When a whole is cut or divided into four equal parts, each part is called **one–fourth** of the whole.



One-fourth is also called a **quarter**. One–fourth is written as $\frac{1}{4}$.

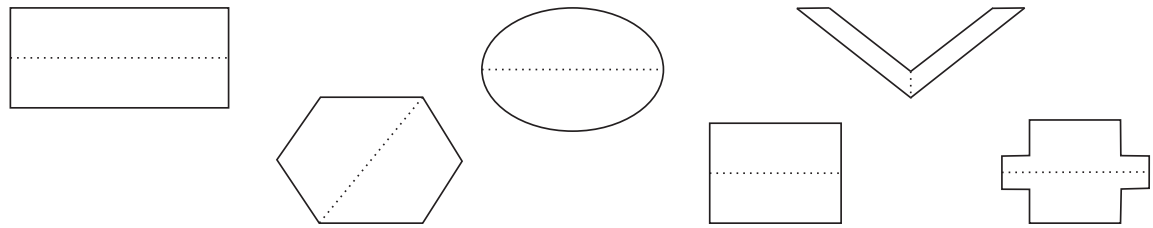
When a whole is cut or divided into three equal parts, each part is called **one–third** of the whole. One–third is written as $\frac{1}{3}$.



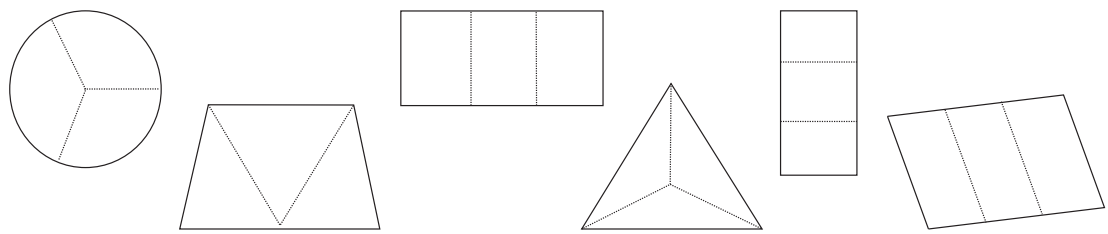


Practice Time

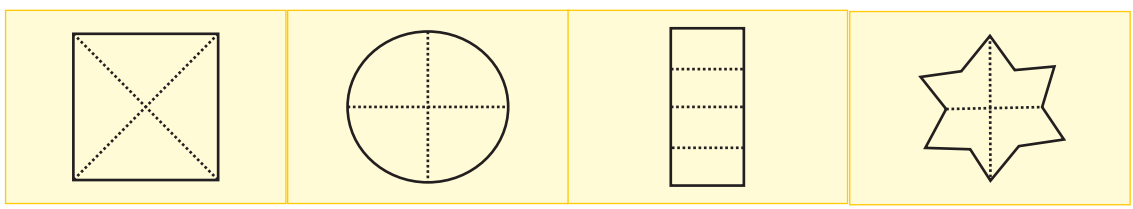
(1) Each shape shown below is a whole cut into two equal parts by a dotted line. Shade half of the shapes.



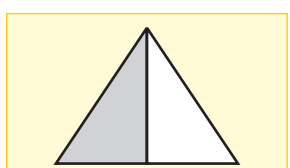
(2) Each shape shown below is a whole cut into three equal parts by dotted lines. Shade one–third of the shapes.



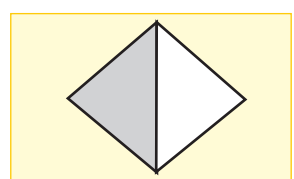
(3) Each shape shown below is a whole cut into four equal parts by dotted lines. Shade one–fourth of the shapes.

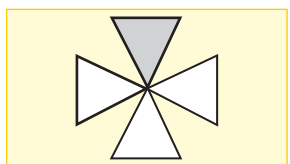


(4) Write below each figure, one–half, one–third or one–fourth for the shaded part of the figure.

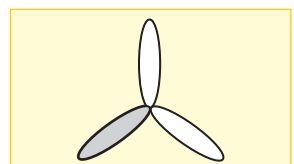


One–half

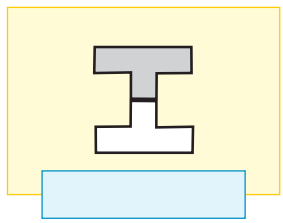
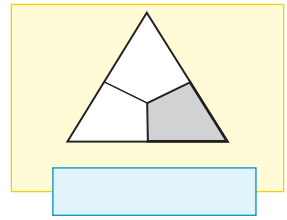
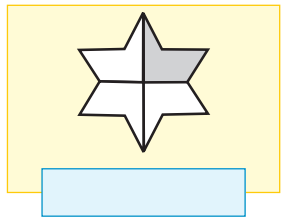
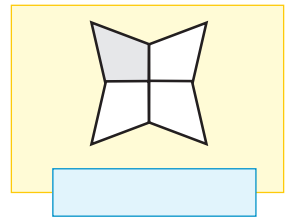
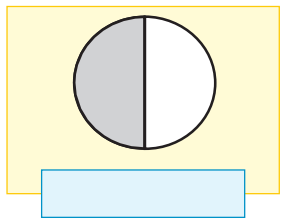
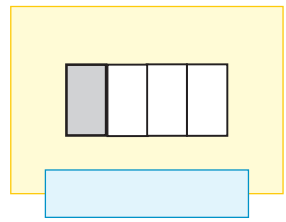




One–fourth

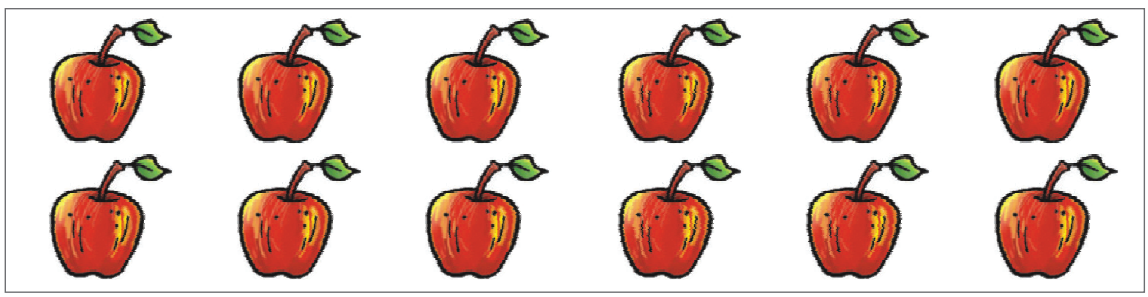


One–third

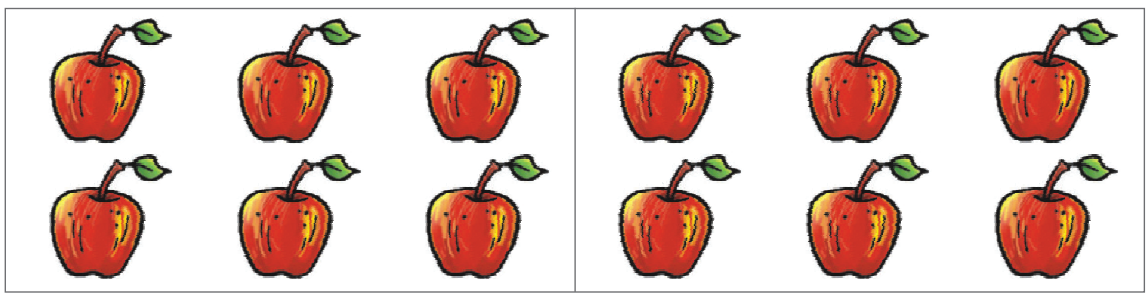







4. Parts of a Collection

Here is a collection of 12 apples

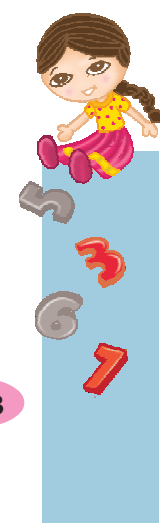


Mummy divided them into 2 equal parts for Rani and Shanti



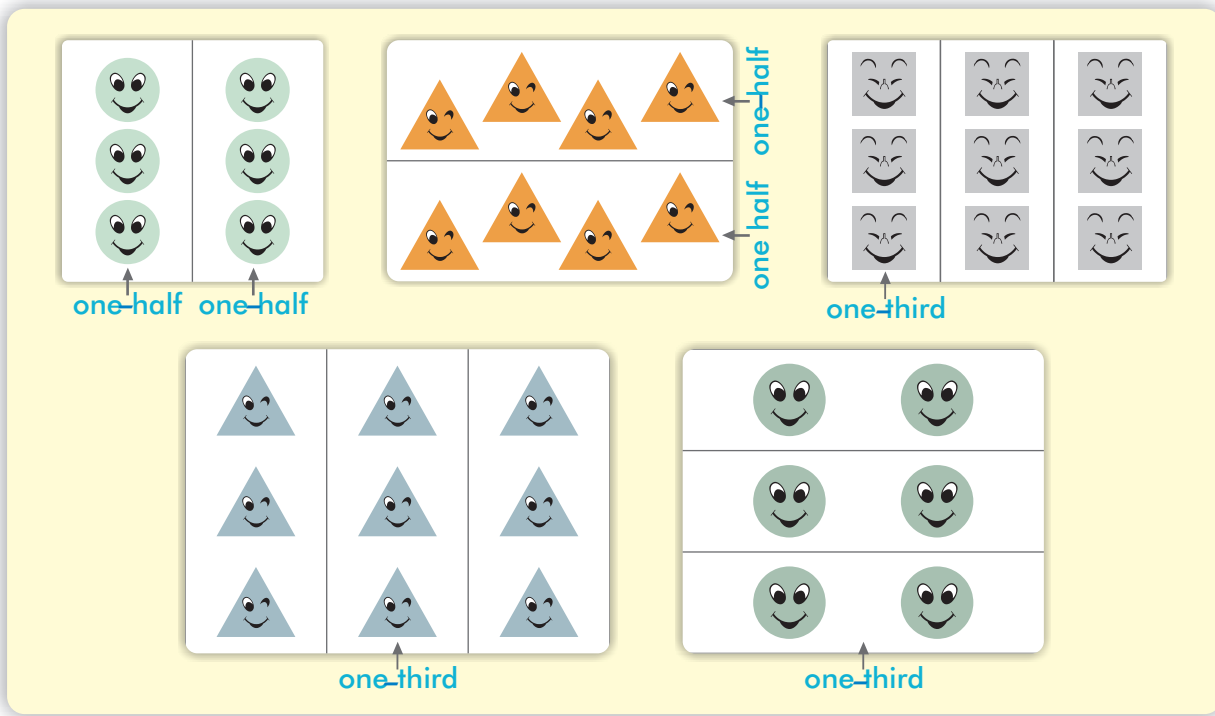
For Rani For Shanti

How many apples did Rani get? _____

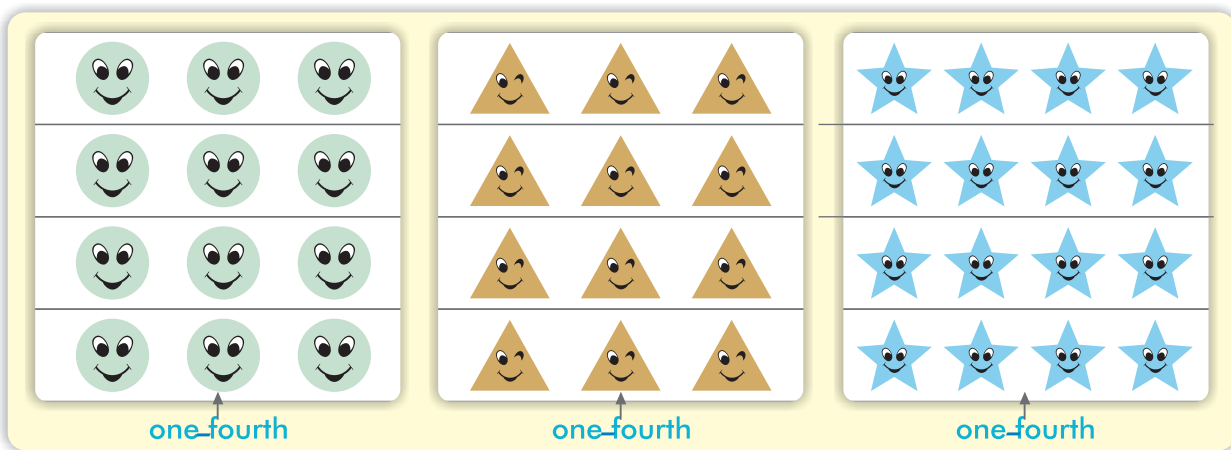


5. One–half, One–third and One–fourth of a Collection

When a collection is divided into 2 equal parts, each part is one–half of the collection.



When a collection is divided into 4 equal parts, each part is one–fourth or a quarter of the collection.



Thus, we see that to know the number of objects (or shapes) in one–half, one–third, one–fourth (or quarter) of a collection. we divide the number of objects (or shapes) in the collection by 2, 3 and 4 respectively.

A collection has 10 objects. How many objects are there in one–half of the collection?

One half of 10 = 10 ÷ 2

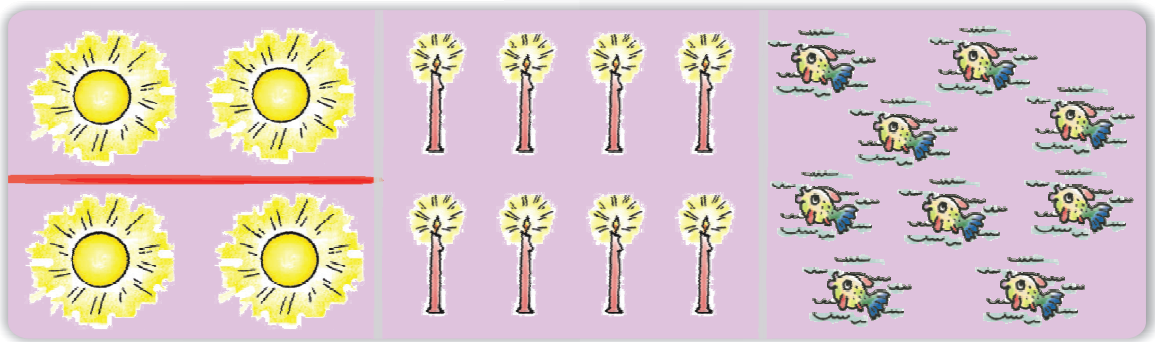
10 ÷ 2 = **5**

A collection has 8 objects. How many objects are there in one-fourth of the collection.

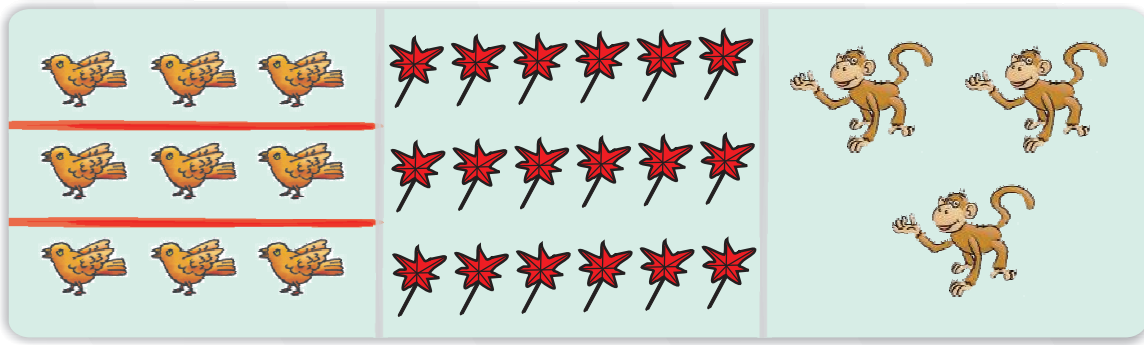
8 ÷ 4 = **2**

Practice Time

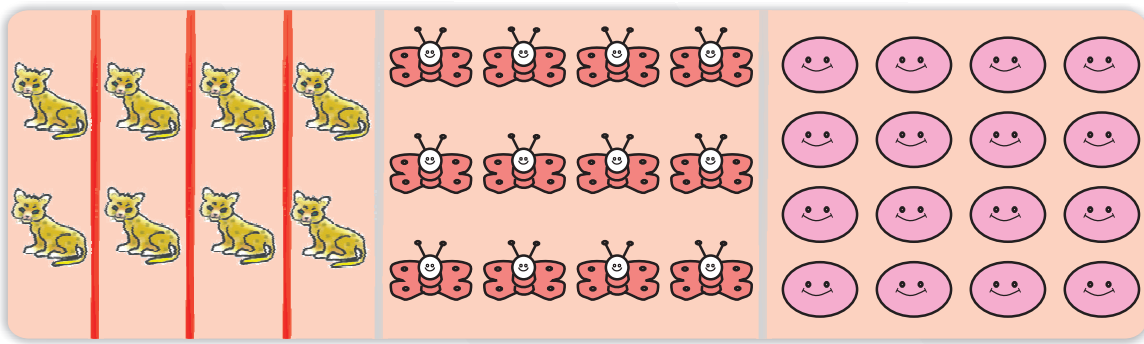
(1) Mark **one–half** of each collection. The first one is done for you.



(2) Mark **one–third** of each collection. The first one is done for you.



(3) Mark **one–fourth** (or a **quarter**) of each collection. The first–one is done for you.



(4) If a collection has 12 objects, how many objects are there in one–fourth of the collection?

(5) If a collection has 20 objects, how many objects are there in one–half of the collection?

(6) If a collection has 18 objects, how many objects are there in one–third of the collection?

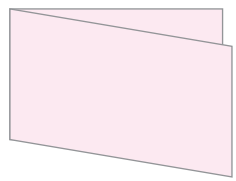
6. Folding and Cutting of a Whole

Activity

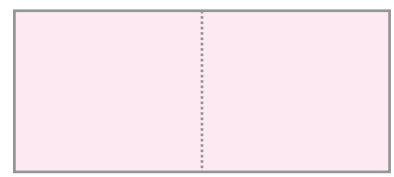
1(a) One–half



Take a sheet of paper

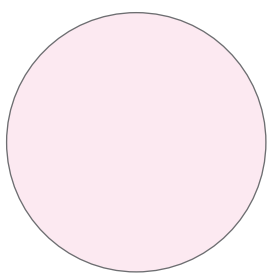


Fold it by bringing two opposite edges together

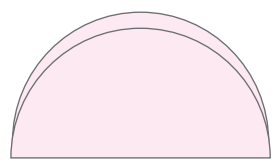


Unfold the sheet. There is a line in the middle which divides the sheet in two–halves.

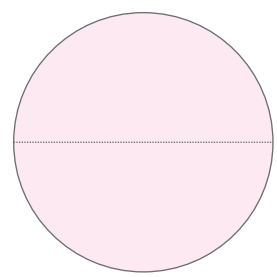
(b)



Take a circular sheet of paper

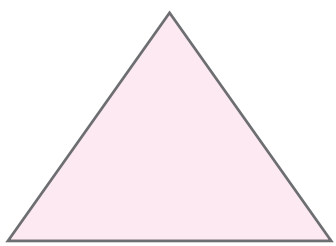


Fold it as shown above

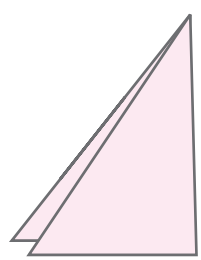


Unfold the sheet. There is a line in the middle which divides the sheet in two–halves.

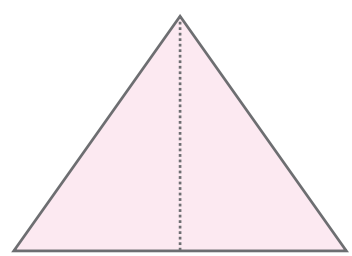
(c)



Take a triangular sheet of paper as shown above.



Fold it as shown above

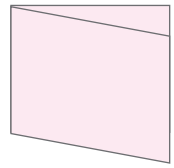


Unfold the sheet. There is a line in the middle which divides the sheet in two– halves.

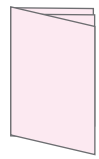
2 (a) One–fourth



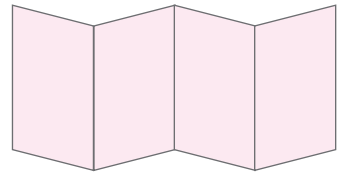
Take a sheet of paper



Fold it by bringing the opposite edges together.

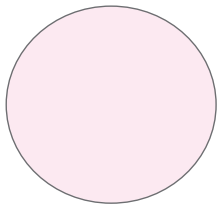


Fold it again.

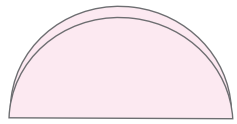


Unfold the sheet. There are three lines which divide the sheet in four quarters.

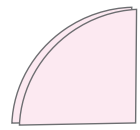
(b)



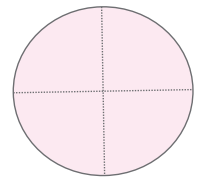
Take a circular sheet of paper



Fold it



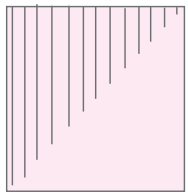
Again fold the folded sheet.



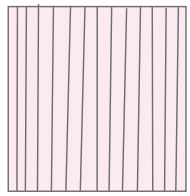
Unfold the sheet. The sheet is divided into four equal parts.

7. More Parts

(a) One–half and two–halves of a Whole

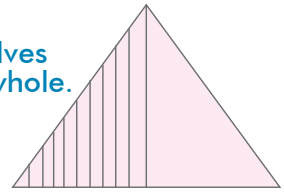


one–half

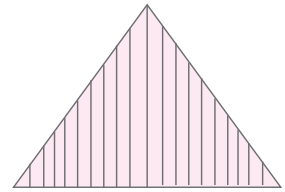


two–halves or a whole

Two–halves make a whole.

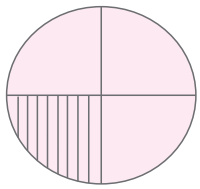


one–half

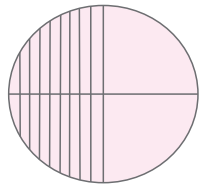


two–halves or a whole

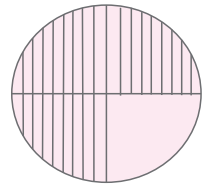
(b) One–fourth, two–fourths, three–fourths, four–Fourths of a Whole



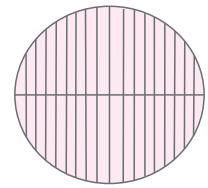
one–fourth



two–fourths



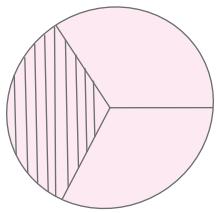
three–fourth



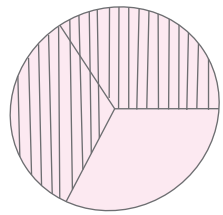
four–fourth or a whole

Four–fourths make a whole.

(c) One–third, two–thirds, three–thirds of a Whole

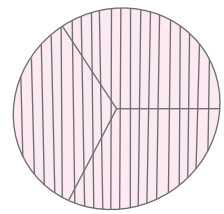


one–third

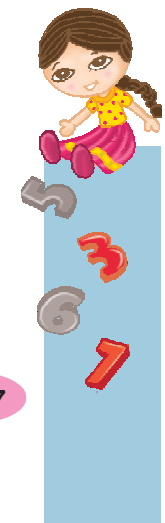


two–third

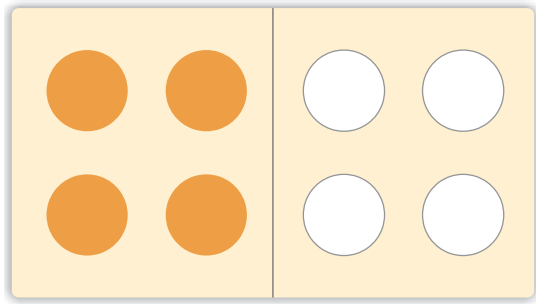
Three–thirds make a whole.



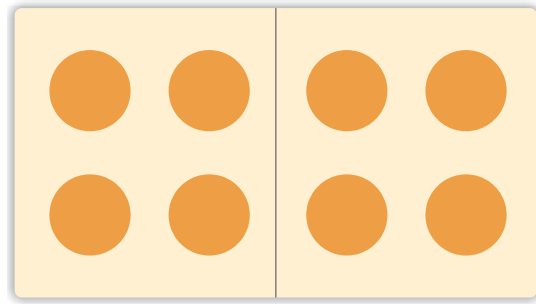
three–thirds or a whole



(d) One–half and two–halves of a Collection

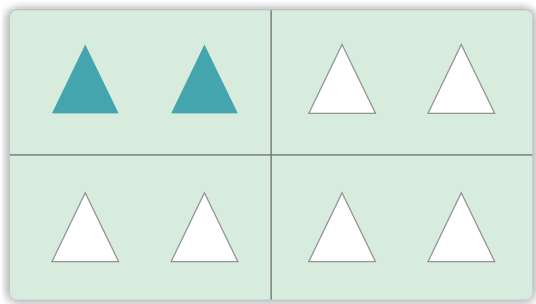


One–half is shaded.

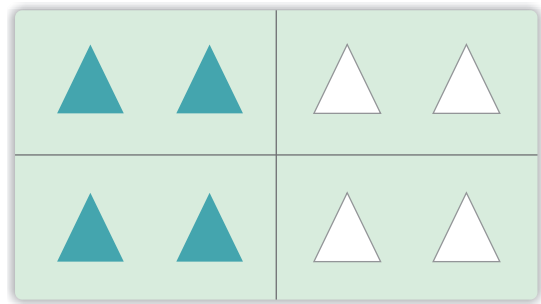


Two–halves are shaded or all are shaded.

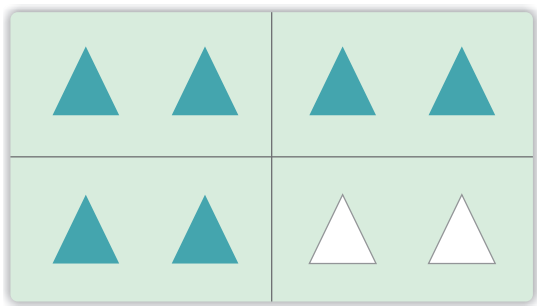
(e) One–fourth, two–fourths, three–fourths, four–fourths of a Collection



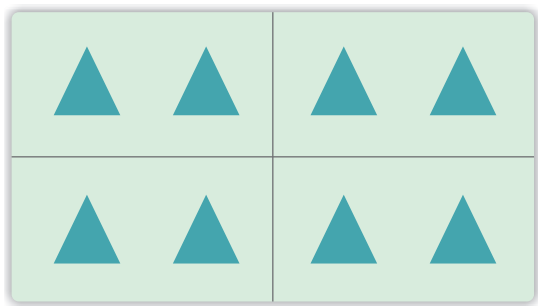
One–fourth is shaded.



Two–fourths are shaded.

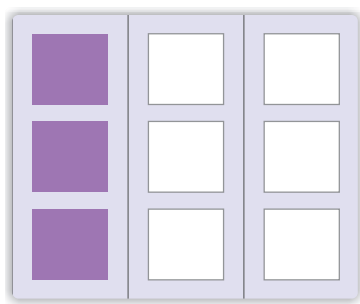


Three–fourths are shaded.

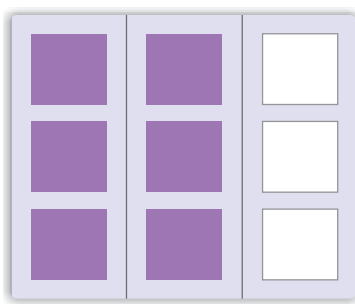


Four–fourths are shaded or all are shaded.

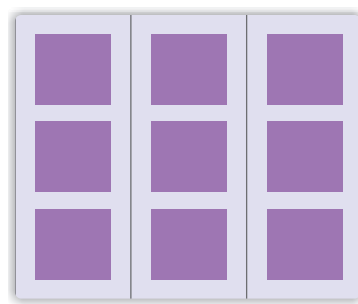
(f) One–third, two–thirds, three–thirds of a Collection.



One–third is shaded.



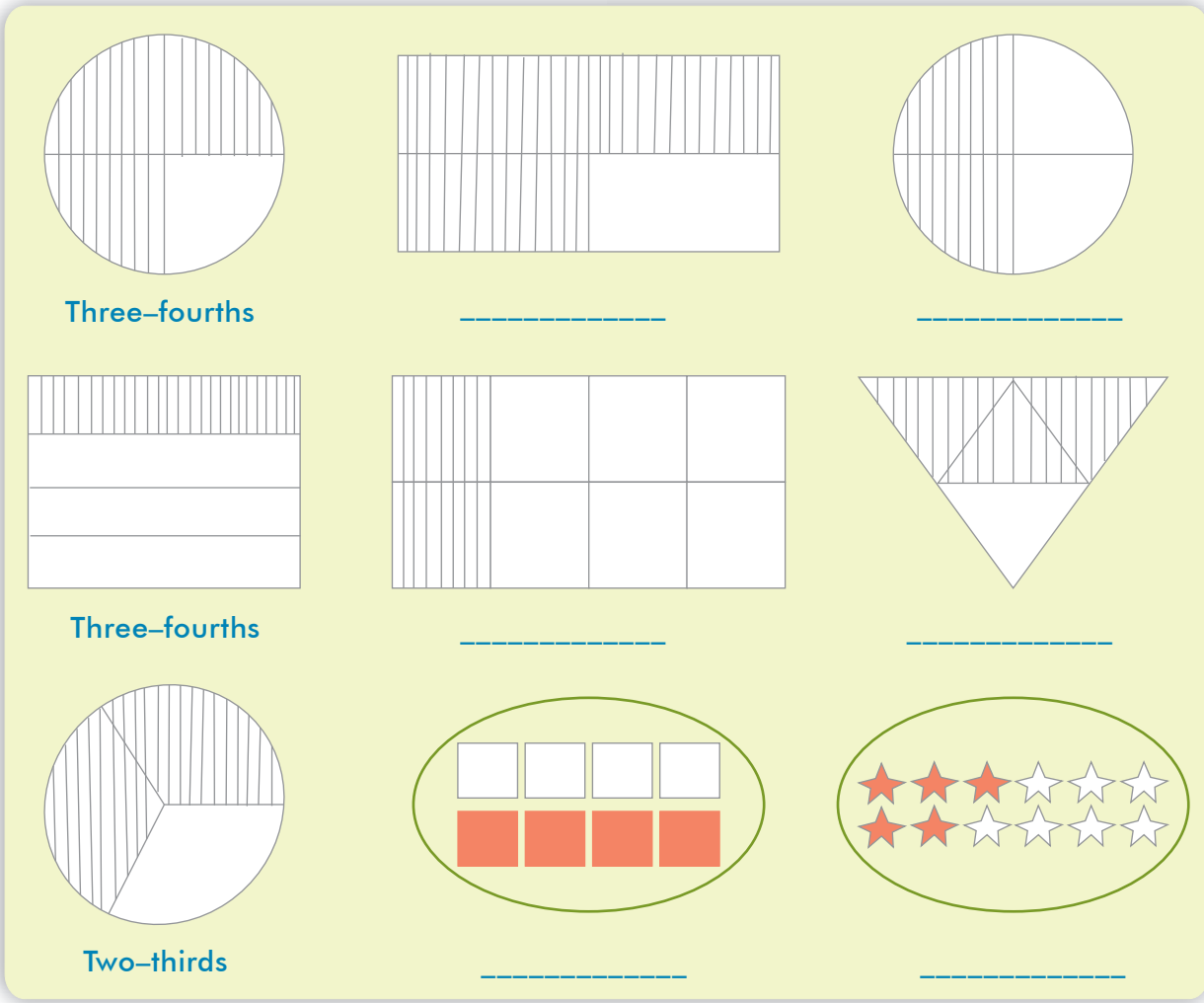
Two–thirds are shaded.



Three–thirds are shaded or all are shaded.

Practice Time

(1) What part does the shaded or coloured portion show?



8. Fractions

Look at the following:

We write

Whole	as	1	one–half	as	$\frac{1}{2}$
one–third	as	$\frac{1}{3}$	one–fourth	as	$\frac{1}{4}$
two–thirds	as	$\frac{2}{3}$	three–fourths	as	$\frac{3}{4}$

$\frac{1}{2}$, $\frac{1}{3}$, $\frac{1}{4}$, $\frac{2}{3}$ and $\frac{3}{4}$ are few examples of fractions.

$\frac{1}{2}$ 2 (called denominator) indicates that whole is divided into two equal parts.

1 (called numerator) indicates that only 1 part is considered

$\frac{3}{4}$ 4 indicates that a whole is divided into four equal parts.

3 indicates that only 3 parts are considered

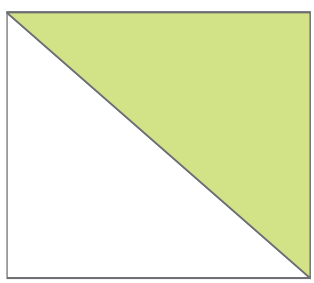
$\frac{2}{3}$ 3 indicates that a whole is divided into three equal parts.

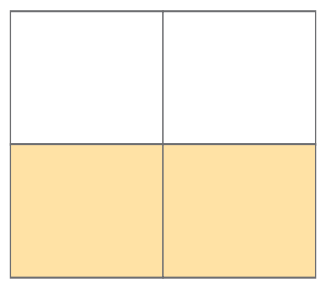
2 indicates that only 2 parts are considered

$\frac{\mathbf{2}}{\mathbf{3}}$ → Numerator
→ Denominator

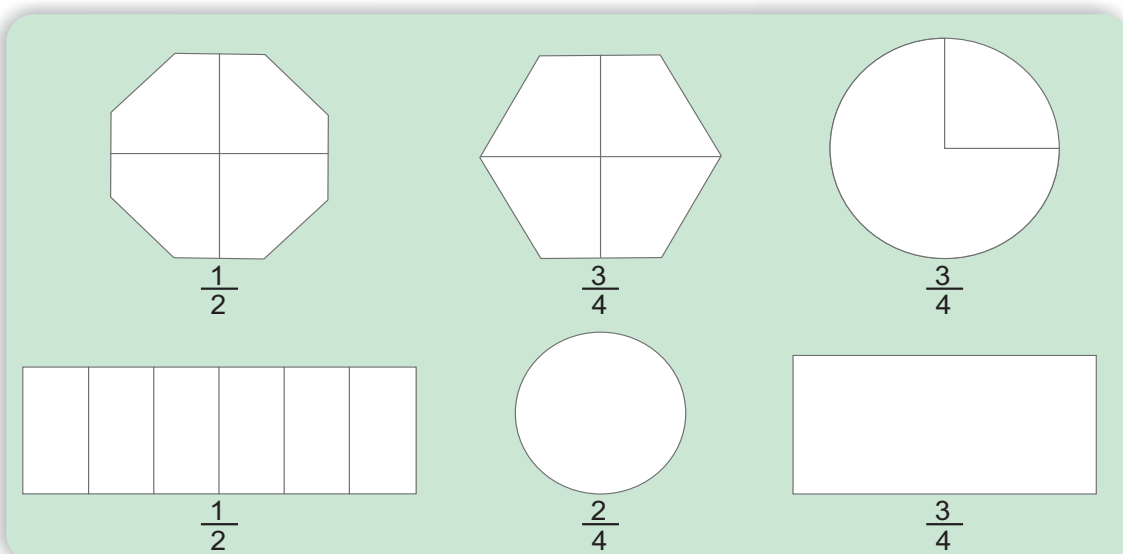
PRACTICE TIME

(1) What fraction is coloured? Write below each shape.

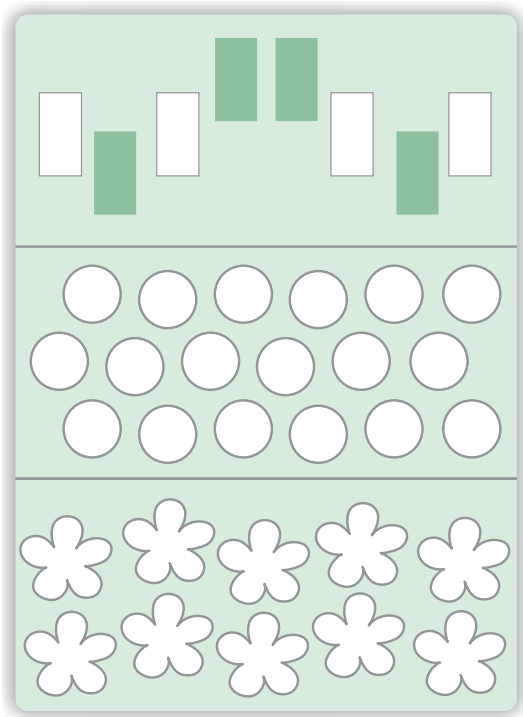




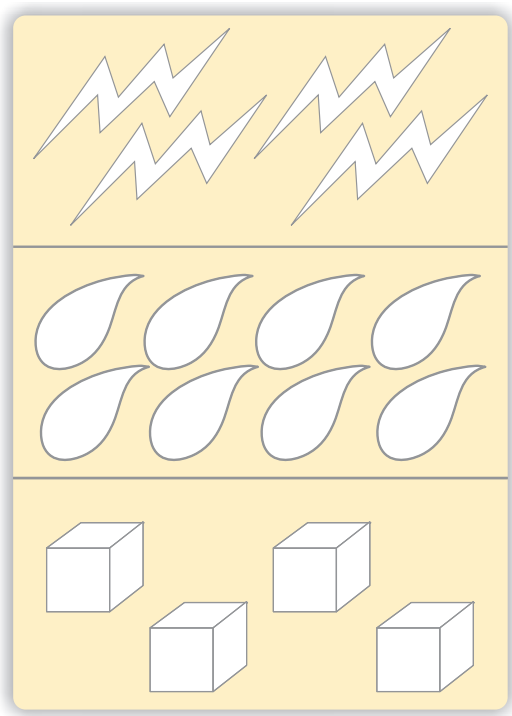
(2) Colour that fraction of the shape which is written below.



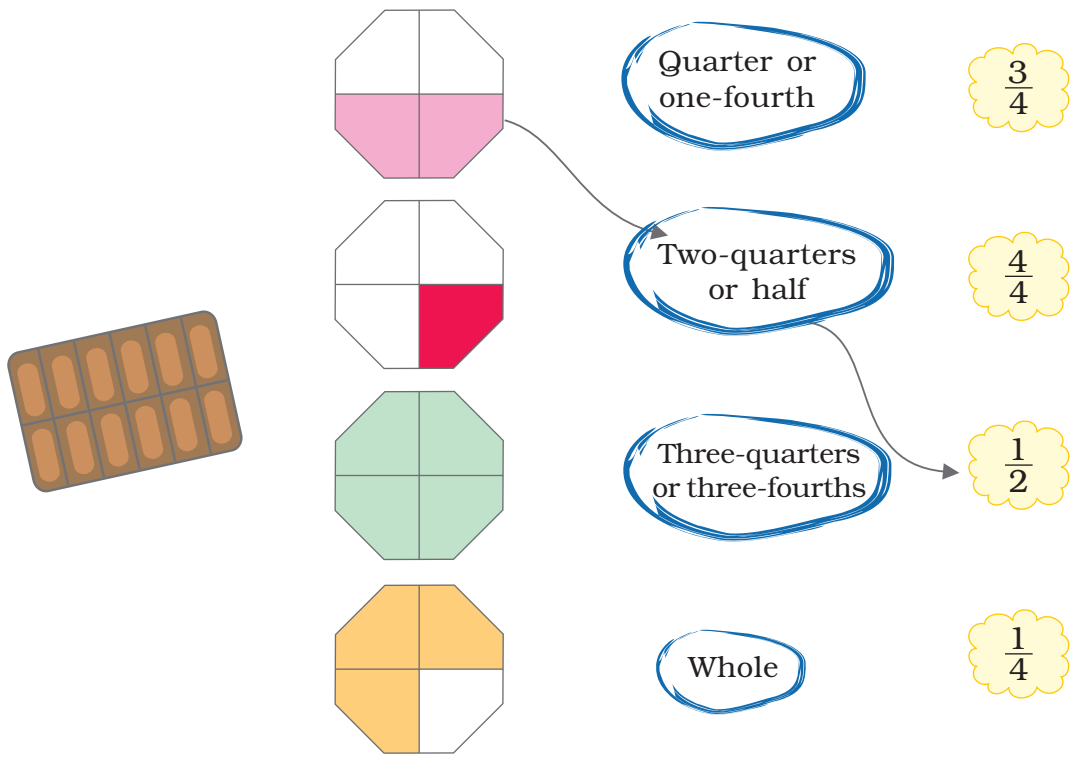
(3) Colour half the number of shapes as shown here.



(4) colour ¼ of these shapes.

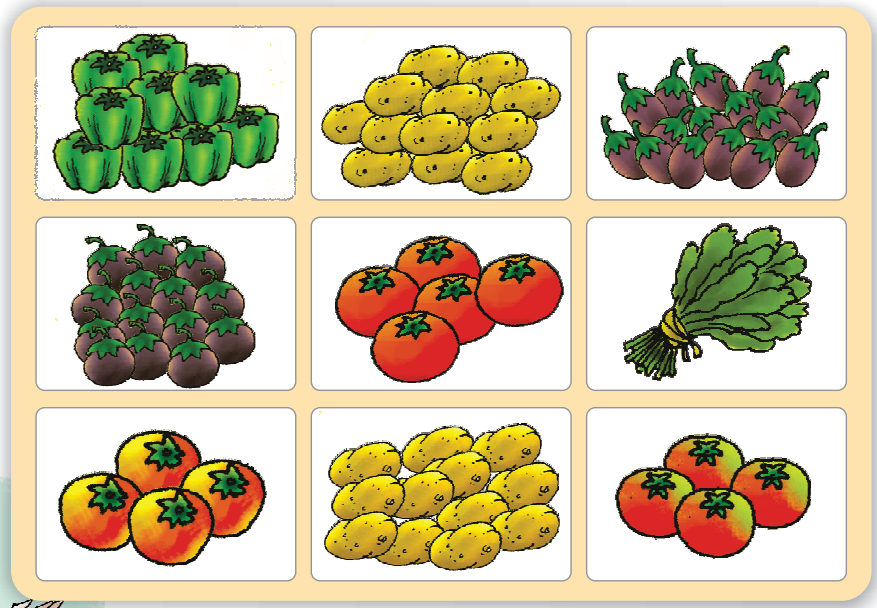


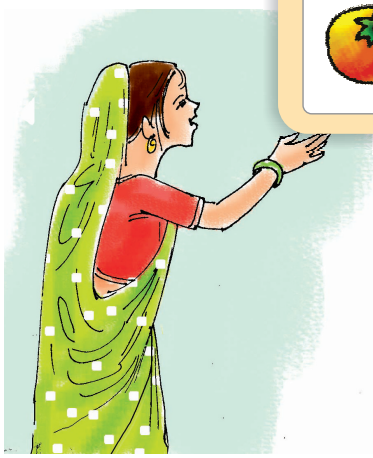
(5) Match the coloured part as shown.



The teacher may help the students to visualise two-quarters make a half.

(6) Challi Devi's field has 9 equal parts. She grows vegetables in these parts as shown below.





(a) Which vegetable grows in the biggest part of her field and what (fraction) of field?

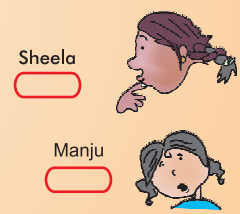
(b) On what fraction of the field does she grow potatoes?

(c) What fraction of the field is used to grow spinach? What fraction of field is used for brinjals?

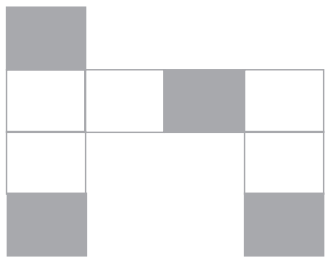
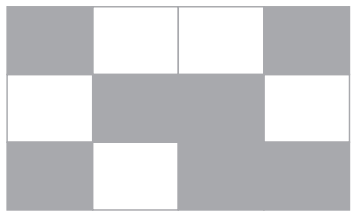
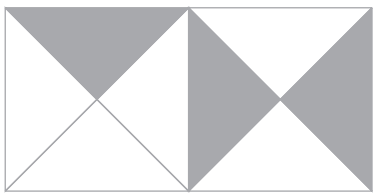
(7) Manju had a chocolate as shown. She gave one–fourth of it to Raji, one–third to Sugatha and one-sixth to Sheela. She ate the remaining part. How many pieces of chocolate did each get? Write here.

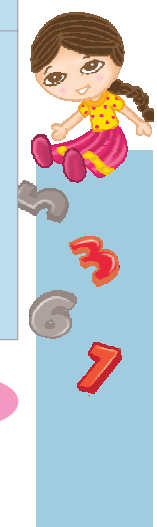






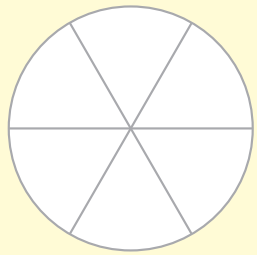
(8) Complete the following Table.

	Number of equal parts	Number of parts shaded	Fractions represented by shaded parts
	6	2	$\frac{2}{6}$
			
			
			
			



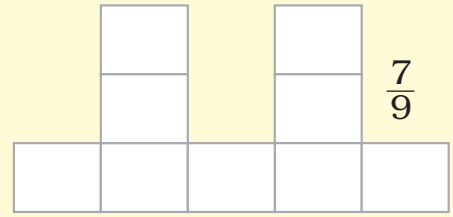
(9) Shade each figure to show the given fraction.

(a)



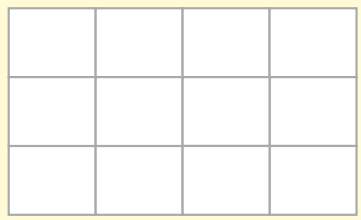
$\frac{5}{6}$

(b)



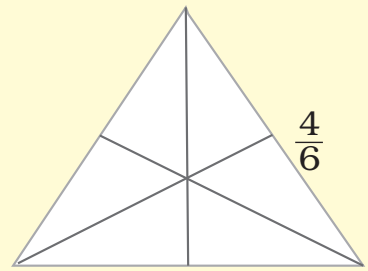
$\frac{7}{9}$

(c)



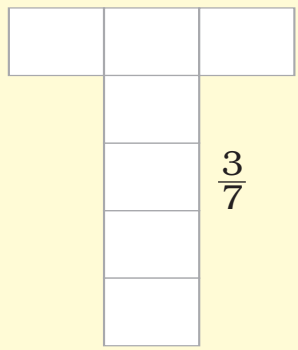
$\frac{5}{12}$

(d)



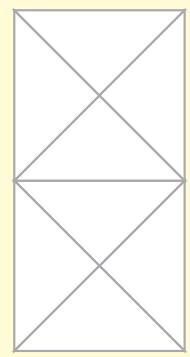
$\frac{4}{6}$

(e)



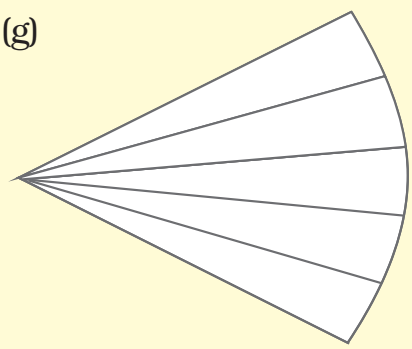
$\frac{3}{7}$

(f)



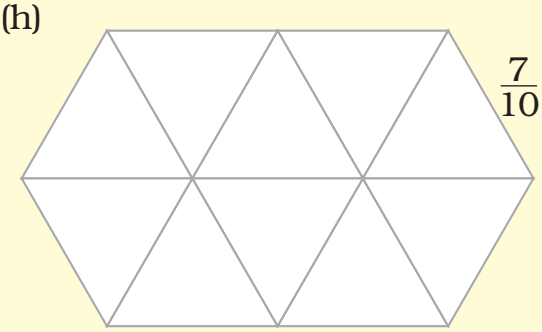
$\frac{3}{8}$

(g)



$\frac{2}{5}$

(h)



$\frac{7}{10}$

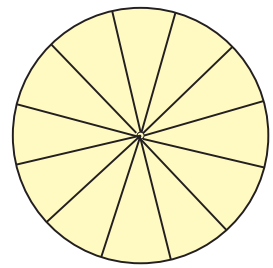
A Game

Who colours the circle first?

This game is to be played in groups of 4. Each player has to make a circle as shown. Each one has to make 15 tokens on slips of paper. Write $\frac{1}{2}$, $\frac{1}{3}$, $\frac{1}{4}$, $\frac{1}{6}$, $\frac{1}{12}$, $\frac{2}{12}$, $\frac{3}{12}$, $\frac{4}{12}$, ... $\frac{11}{12}$ to make your tokens.

Shuffle the tokens and make a pile in the middle of the group. Now you are ready to start the game.

The first player takes a token from the pile, colours that part of the picture, and puts the token under the pile. The next player does the same, and so on. The winner is the one who first colours the circle completely.



Who won the game?

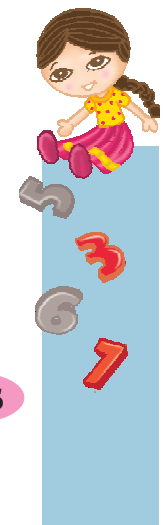
What are the winner's tokens?

Write the tokens you got.

What part of the circle did you colour?

Decimals

Those fractions whose denominators are 10, 100 and so on (for example $\frac{14}{10}$, $\frac{24}{100}$) are called decimal fractions, but they are better known in a different notation. These fractions are therefore represented as 1.4, 0.24 respectively. The number of digits to the right of the decimal point keeps track of the number of zeros in the respective denominators for example 1 in 1.4, 2 in 0.24. We will have more details about the decimal fractions in Class VI onwards.



In the above activity, if one player has already coloured $\frac{1}{2}$ of the circle and she gets a token of bigger than $\frac{1}{2}$ her chance of colouring goes waste and has to wait for her next turn.

GEOMETRY



1. Identification of 3-D Shapes

Salma was having books, exercise books, pencil box, tiffin box in her school bag.





She was told by her teacher that all these shapes are called cuboids. All of these have length, breadth and height (thickness).

Nita was her friend. Both were guessing the names of the shape of a pencil, a ball die and an ice cream cone. Can you help them?

Write three objects from your surroundings in each column of the following shapes:

	Cuboid/cube	Cylinder	Sphere	Cone
1.				
2.				
3.				

These shapes are 3-D shapes.

3-D shapes are those which do not lie completely on a plane paper sheet.

Spatial intuition or spatial perception is an enormously powerful tool of learning geometry. Therefore, it starts with introduction of familiar objects.

2. Lines

Whose line is it?

Today, there is a cricket match in Fatima's school. Fatima, Jasbir and Raima have each brought their own stump from home.

They keep these in a corner of the room.

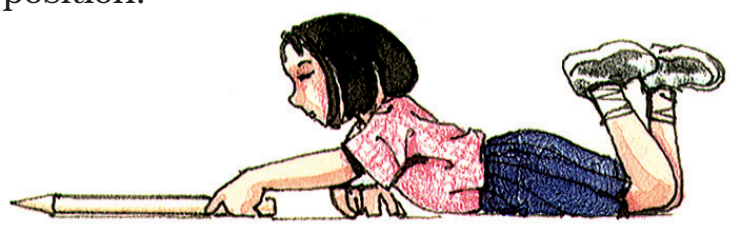
Fatima keeps her stump in standing (vertical) position.

Jasbir keeps his stump in slanting (inclined) position.

Raima keeps her stump in sleeping (horizontal) position.



Fatima



Raima



Jasbir

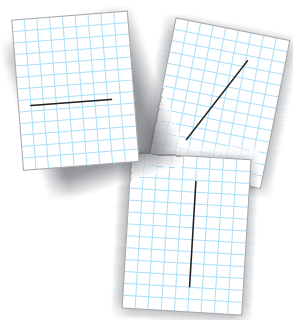
To show others how they have kept their stumps, they draw lines in a notebook.

Fatima draws a standing line.

Jasbir draws a slanting line.

Raima draws a sleeping line.

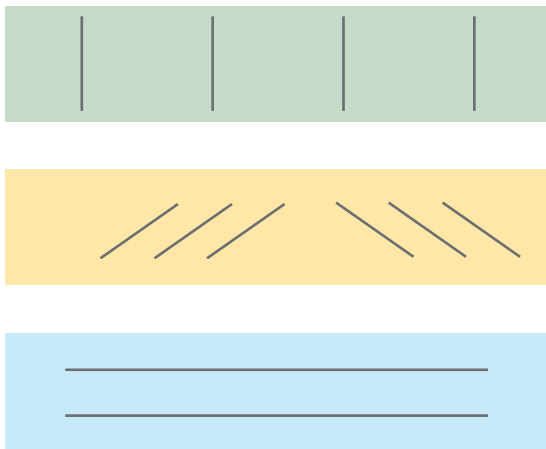
Match the picture of each child with the correct line.

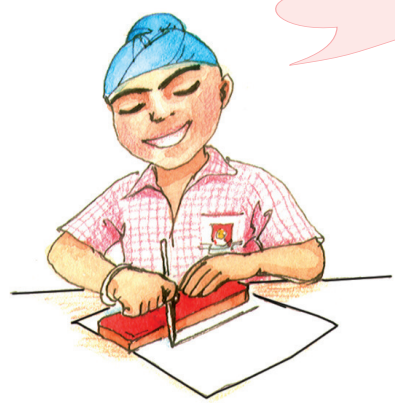


Here are some standing lines, slanting lines and sleeping lines. These are straight lines. Now draw some more such lines.



Formal learning of geometry starts with learning of plane figures.



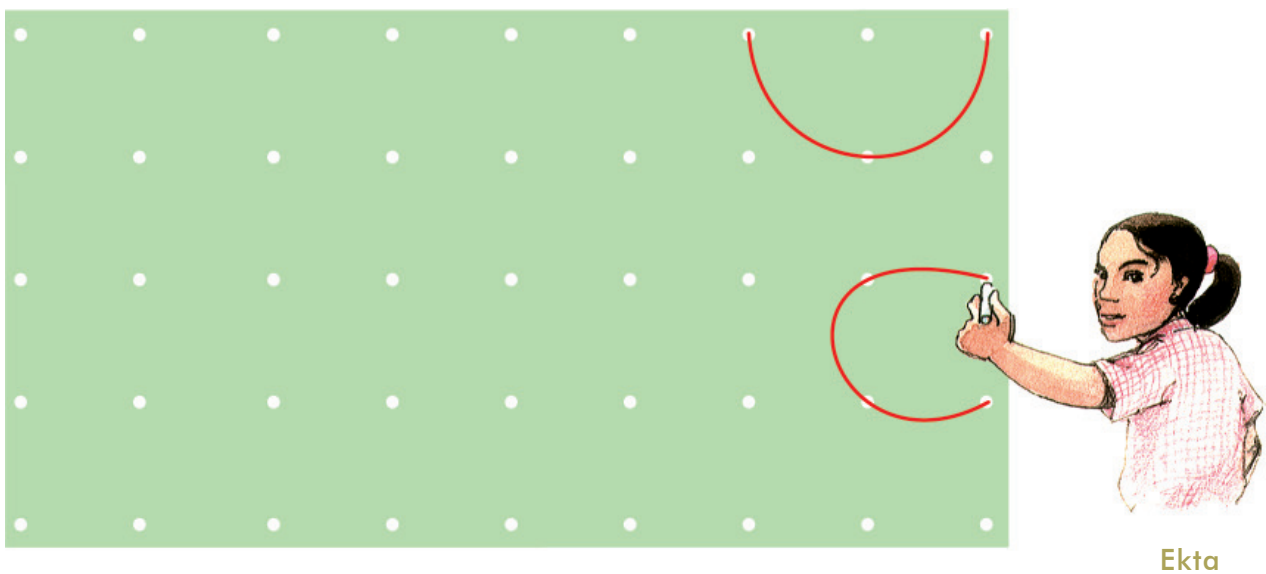






Ekta's lines are not straight. These are curved.

Draw more curved lines by joining the dots.

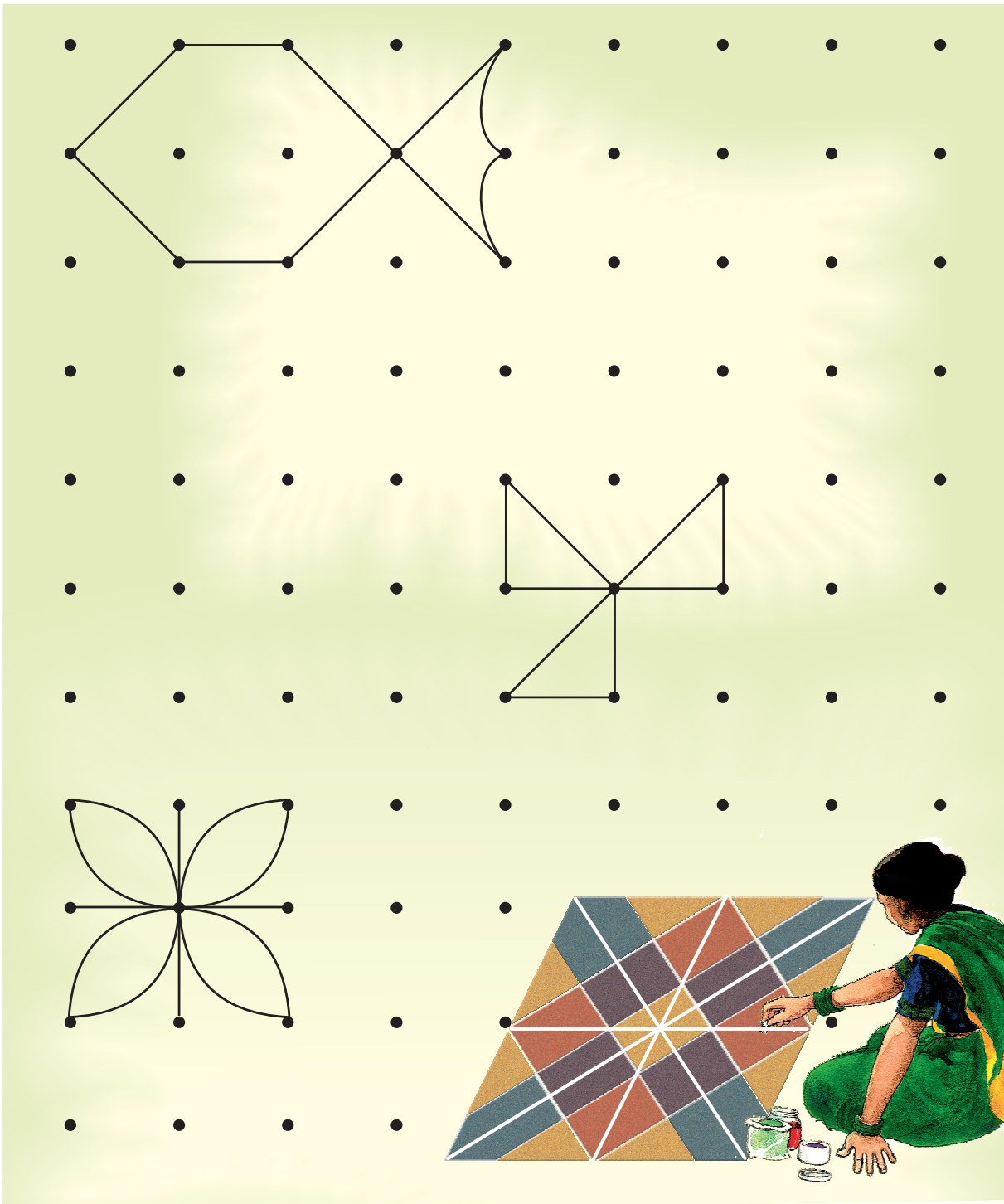


Ekta

Designs with dots

Join the dots with curved or straight lines.

Make your own designs.



3. Identification of 2-D shapes

Collect things—namely' a bottle cap, a matchbox cover, a sharpener, an eraser, a spoon, a coin of Re 1, a die, set-squares of geometry box etc.

Trace each of these on your notebooks. Ask your friends to guess their shapes. Some of the shapes will be as follows:

(i)

rectangle

(ii)

square

(iii)

circle

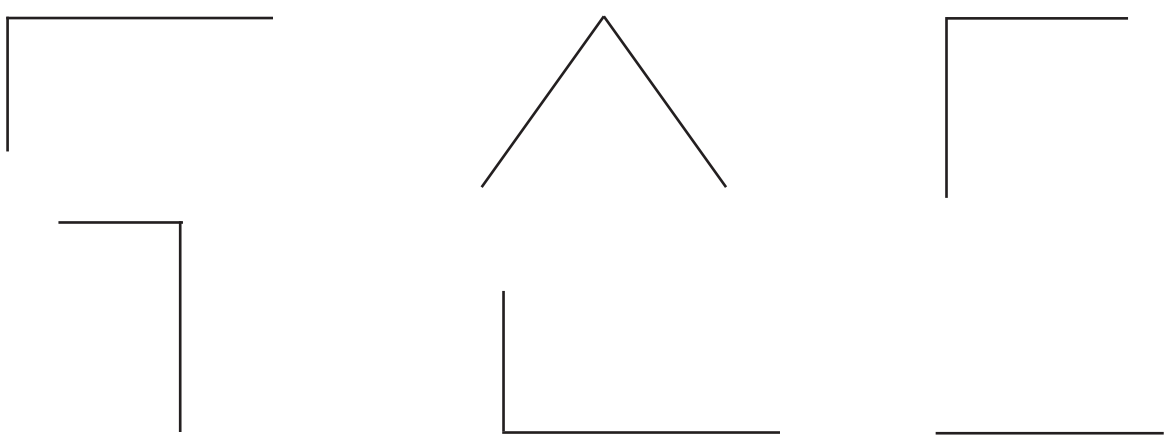
(iv)

triangle

Write the names of the objects whose traces are in the respective shapes in the following table:

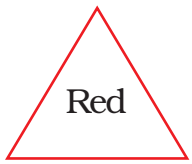
Rectangle	Square	Circle	Triangle	Others
1. Matchbox cover	Die	Bottle cap	Set-square	Potato
2.	.....	.....	.....	.....
3.	.....	.....	.....	.....
4.	.....	.....	.....	.....

Complete these figures to make two squares, two rectangles and two triangles.



Have fun with shapes

Colour the clown following the directions given below.



Triangles



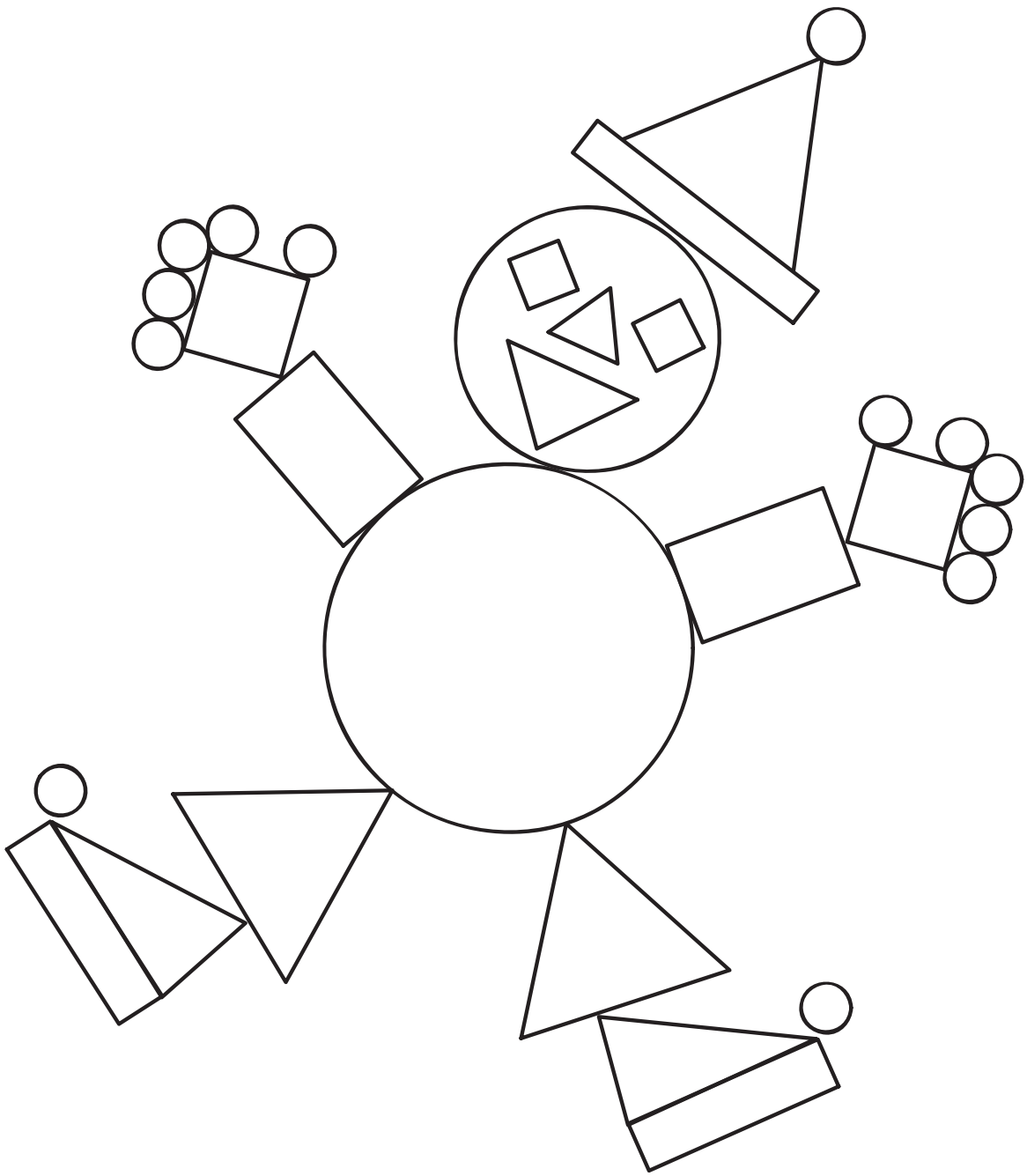
Rectangles



Squares



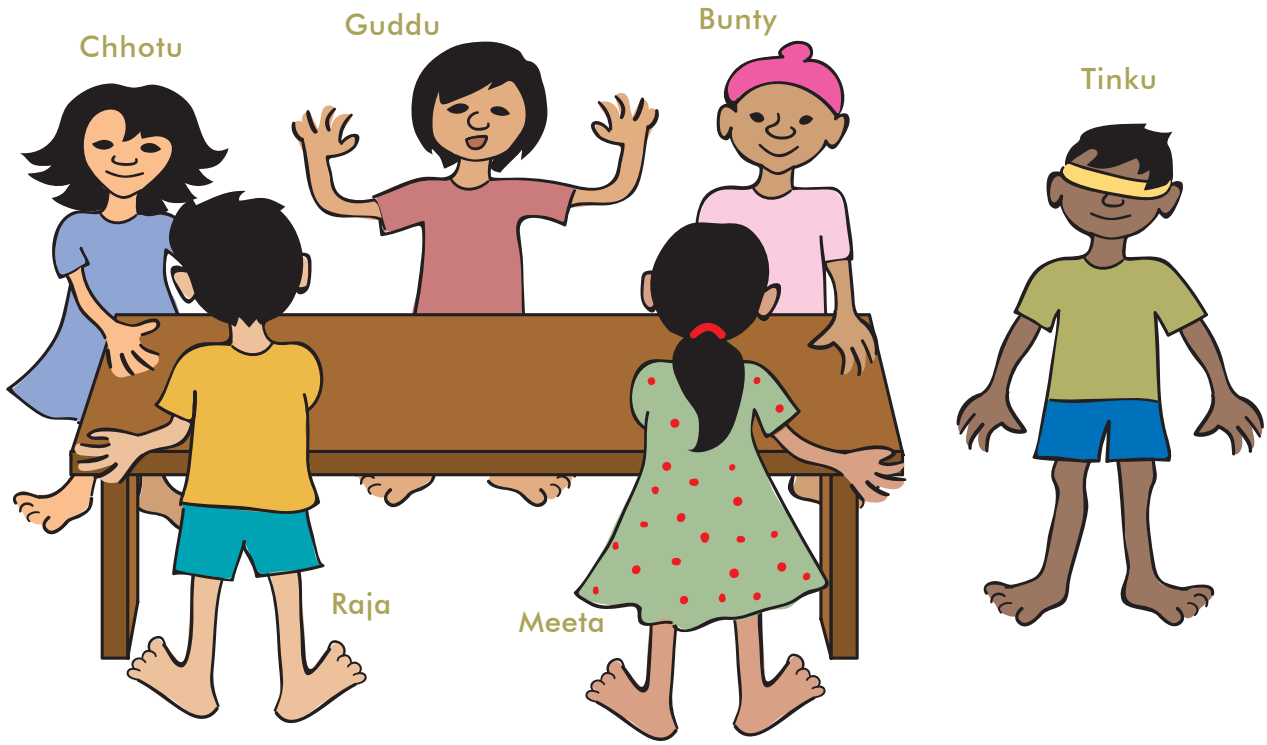
Circles



4. Counting Edges and Corners of Some Shapes.

Edges and Corners

Meeta and her 5 friends were playing a game. Tinku was blindfolded and asked to keep clapping as long as he wished while the others would move round a table. The moment Tinku stopped clapping, everybody would stop wherever they were. The child who was not at a corner would be out. Then she/he would be blindfolded.

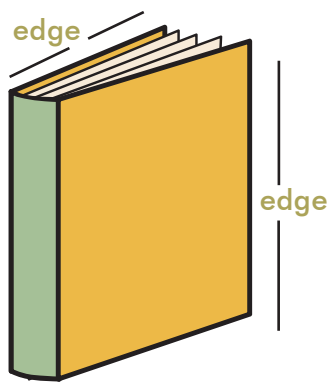


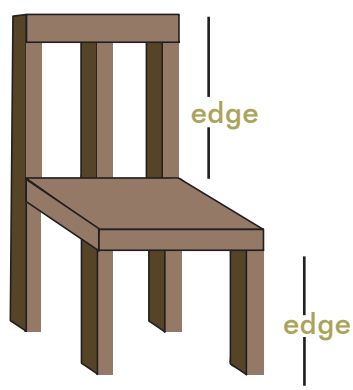
a) Looking at the picture given above, can you tell who is out?

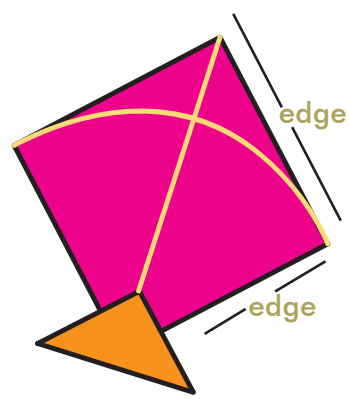
b) Where is Guddu standing?

c) Can this game be played around a round table? Why?

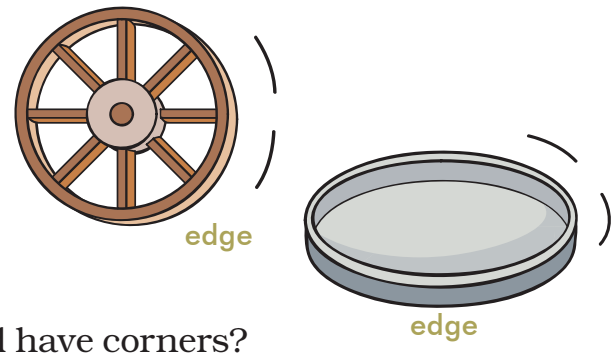
Many things around us have **straight** edges. For example:







Other things have **curved** edges. For example see the pictures beside.



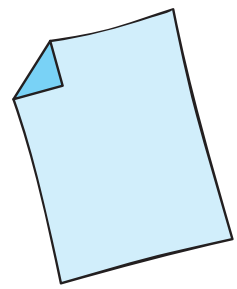
(a) Look around you and identify things with straight edges and those with curved edges.

(b) List the things with straight edges and have corners?

(c) List the things with curved edges and have corners?

(d) Try to find things which have both straight and curved edges.

Activity



(1) Take a rectangular sheet of paper.

(2) Count its corners.

(3) Now fold one of its corners.

(a) How many corners does it have now?

(b) How many corners will you get by folding

(i) 2 corners? (ii) 3 corners? (iii) 4 corners?

(c) Can you fold this paper in such a way that it has only three corners? You are allowed only two folds.

What shape will you get?

(4) Repeat the above activity with a square sheet of paper.

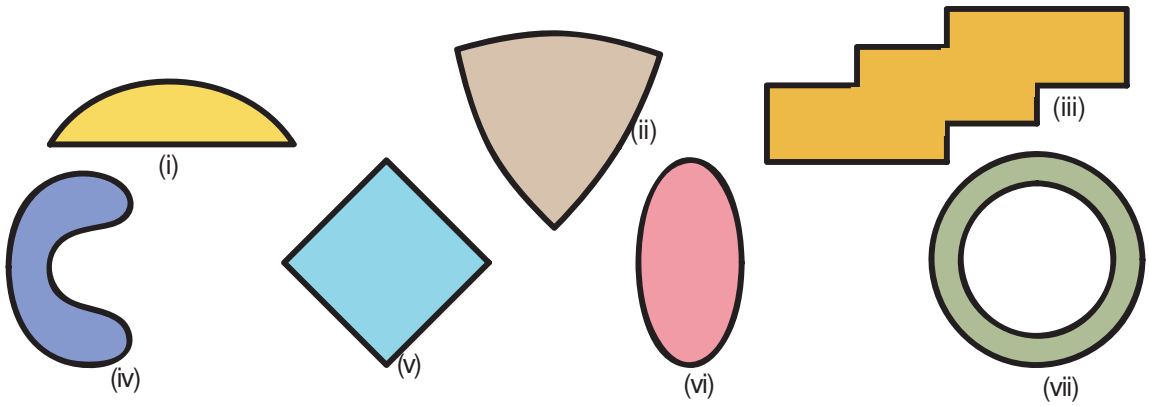
(5) Can you fold all corners of the square sheet in such a way that the number of corners remains unchanged?

Look at the following table and tick (✓) the names of things that have corners. Also count and write the number of edges and corners in each of them.

Name of thing	Whether it has corners	Number of edges	Number of corners
Die 	Yes		8
Ball			
Eraser 			
Triangle			
Sheet of paper			

In the following figures, tick (✓) to those which have corners.

Do these figures have curved lines?



Using only straight lines, can you draw a closed figure which has no corners?

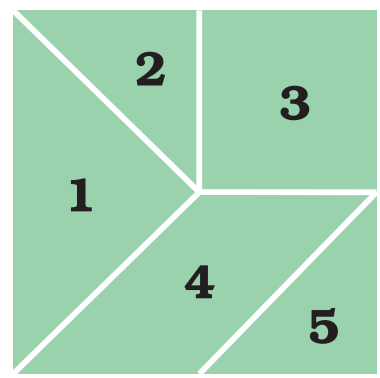
5. Creating Shapes Using Tangram Pieces

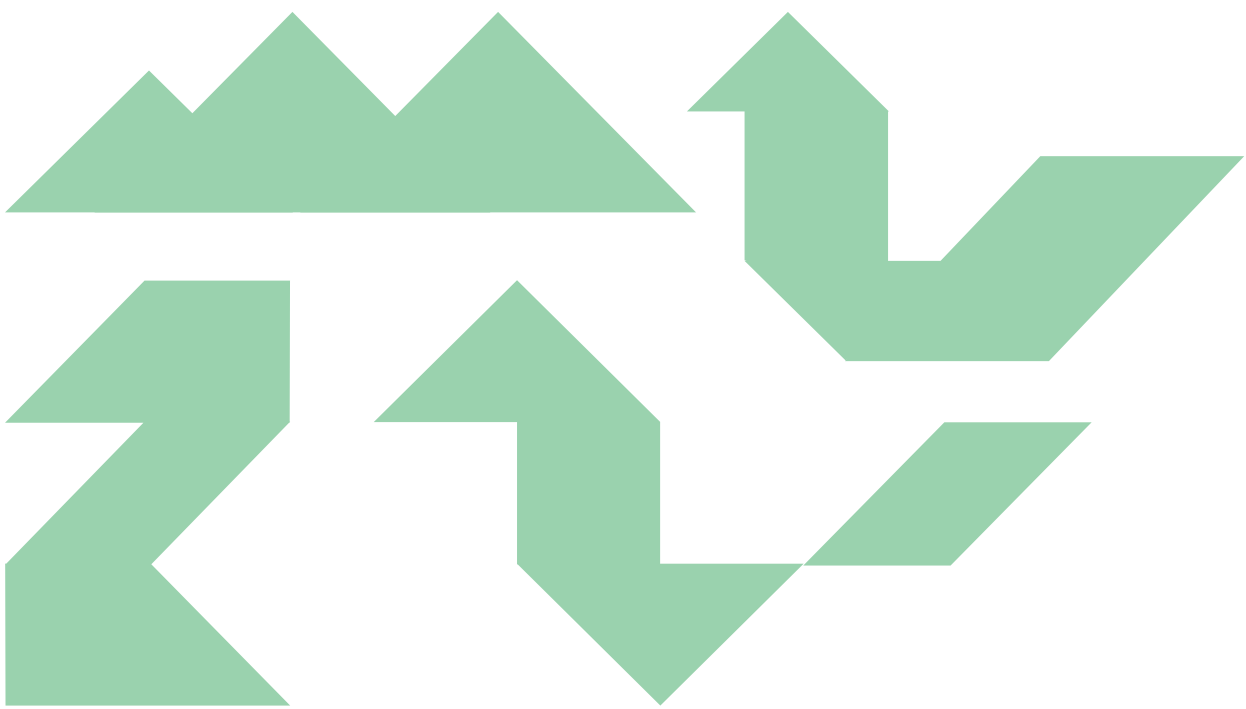
Tangram

The tangram is an old Chinese puzzle. From the pieces of the tangram, we can make many shapes of animals, people and things.

The set of five pieces as shown in the figure is called the *5-piece tangram*.

Use these five pieces to make the following figures.

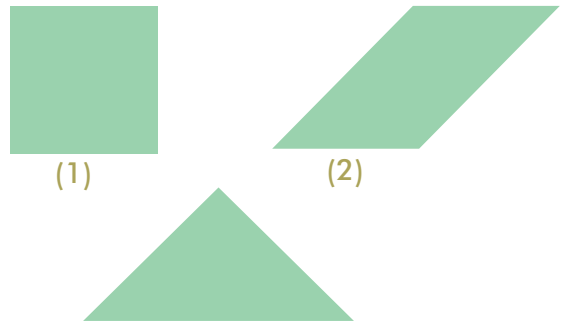




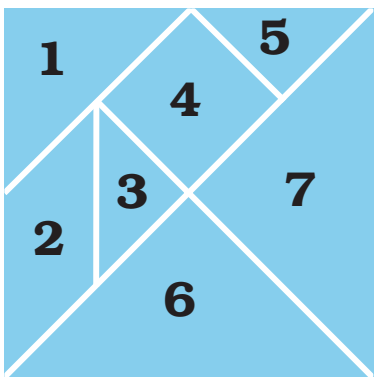
(1) How many triangles do you have in your set? Are all of them equal in size? Find out.

(2) Use the two small triangles in the tangram set to get the following shapes:

(3) Which two pieces of the tangram set are exactly same? Find out.



(4) Take pieces 4 and 5 from the set and find out on which side of the triangle you can join the other piece.

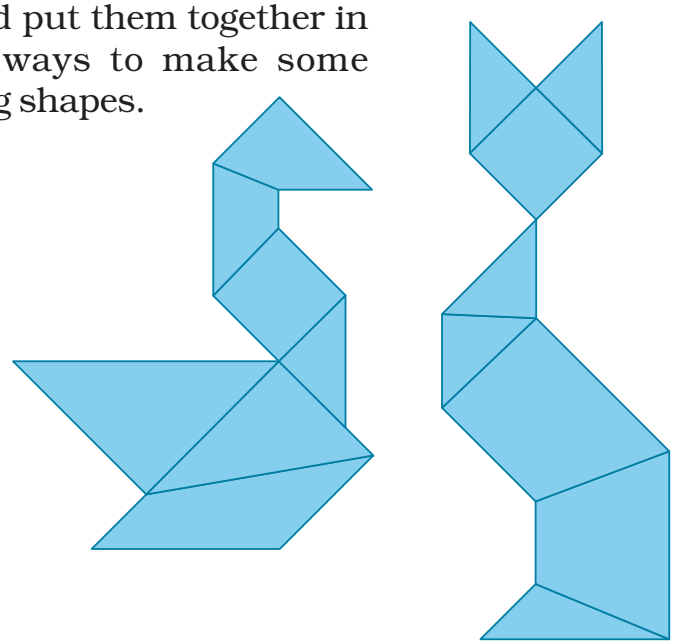


The 7–piece tangram

Here is the picture of a seven–piece tangram.

Children can take out these pieces and put them together in different ways to make some interesting shapes.

Try making these shapes.



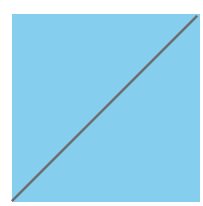
Now try making the following shapes using only the pieces written here.



(i) Use only triangles



(ii) Use pieces 1, 2, 3 and 5

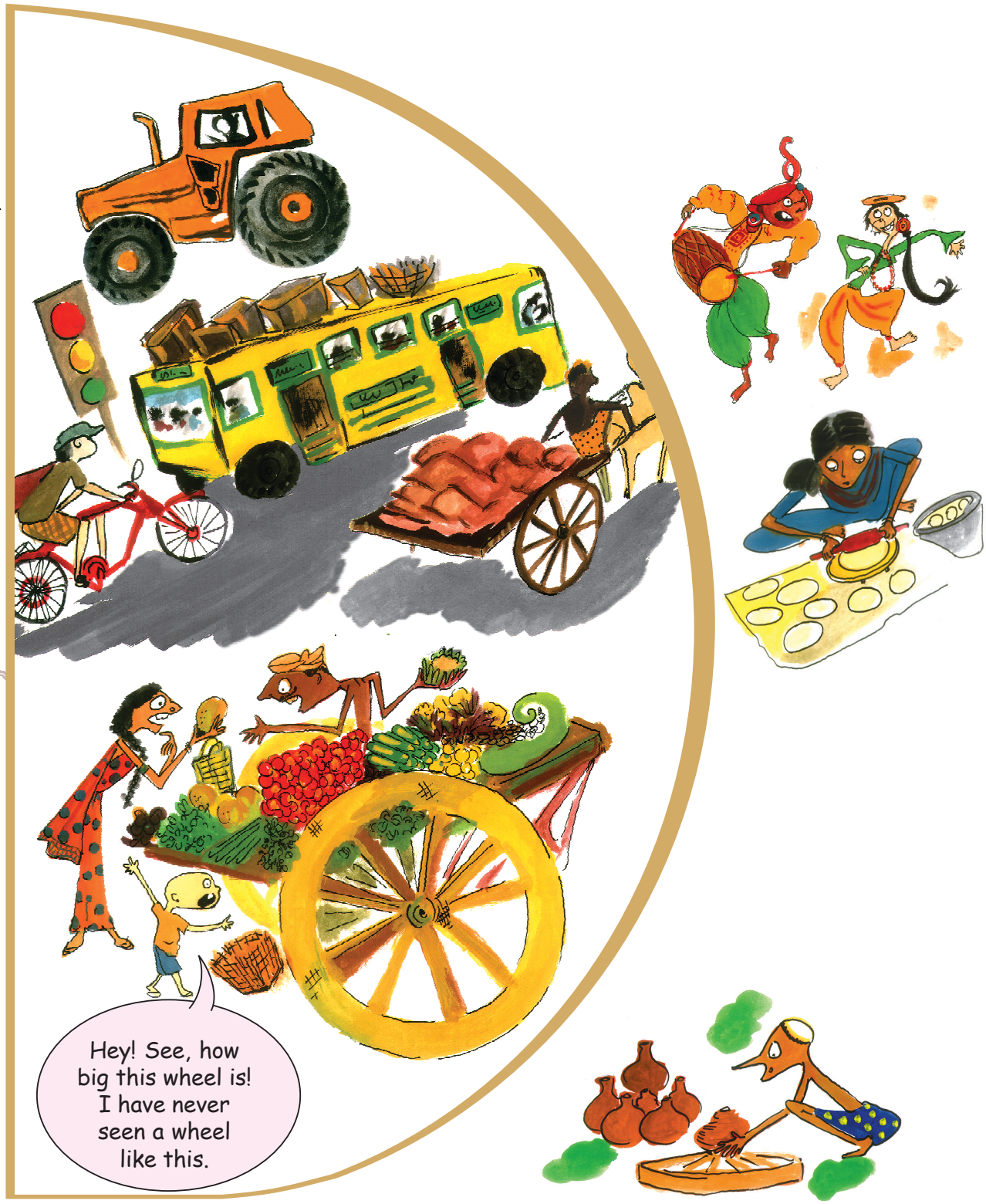


(iii) Use only two triangles



(iv) Use pieces 1, 2, 3 and 5

6. Circle - Centre, Radius and Diameter



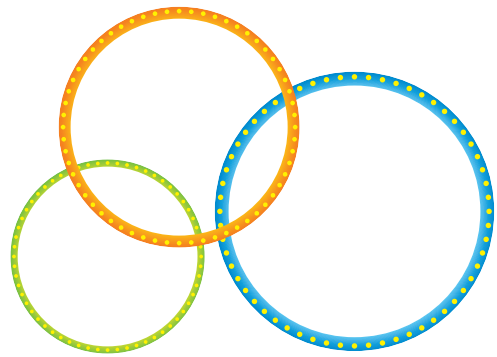
You must have seen many such round things around you.

List some more in your notebook.

Round Bangle

Have you ever gone to a bangle shop?





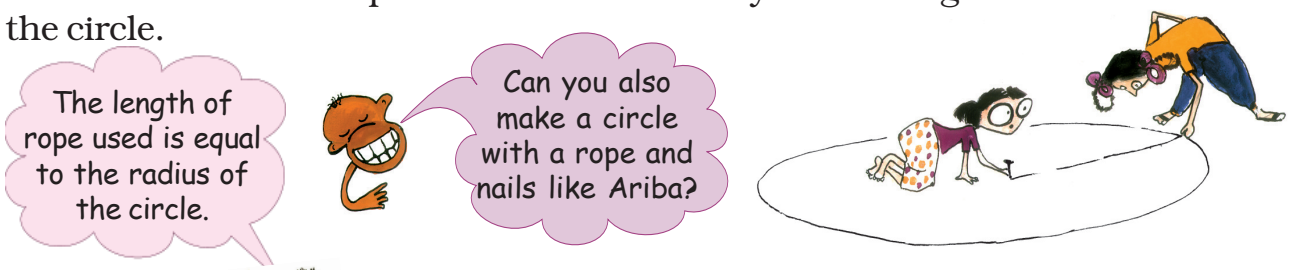
- Guess which of these bangles is of your size.
- Take a wire and make a bangle for yourself. Can your teacher wear this bangle? _____
- A bangle can be used to trace a circle. What are the other things around you that you can use to trace a circle?

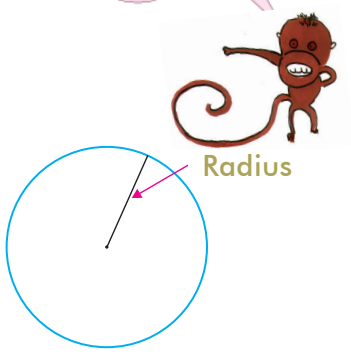
_____ _____ _____ _____

_____ _____ _____ _____

Making a circle with a rope

Ariba decided to use nails and a thread to make a circle on the ground. She took a thin rope and tied nails on both ends of the rope. Then she made a circle with the help of her friend. Look at the picture and see how they are making the circle.





- Do the activity in small groups. Each group should take a rope of a different length. See the circles made by different groups.
- Which group made the smallest circle? _____

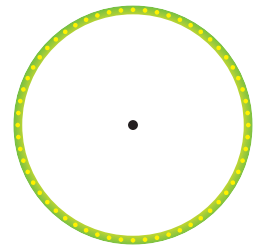
  How long was their rope? _____
- Does a longer rope make a bigger circle? _____
- What was the radius of the smallest circle? _____

The purpose of this activity is to help children make different circles, measure the lengths of their radii and see how the size of a circle changes with its radius.

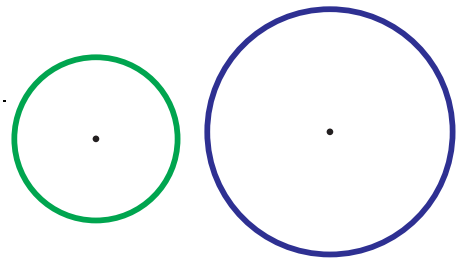




- Draw the radius of this circle using a thread. Measure the length of the radius.



Now see what your friends have drawn. Discuss the length of the radius they measured. Is it the same as yours?



- Draw the radii of these circles.

Guess which circle has the longer radius. _____

Measure the radii of both the circles using a ruler.

Write the length of radius of each circle.

- Radius of the green circle is _____
- Radius of the blue circle is _____

Find out

- Measure the radii of the wheels of a bicycle or a bullock-cart. You can use a thread or a measuring tape.

  Are both the wheels of a bicycle or a bullock–cart of the same radius? _____

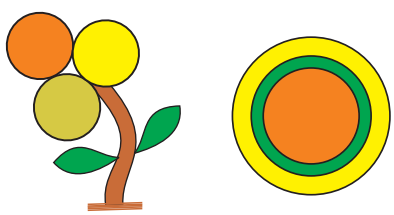
- Have you seen a tractor or a road roller? _____
- Which is the biggest wheel you have ever seen?_____
- Are all the wheels of a tractor or road roller of the same radius?_____



Think and Discuss

- Lali and Kali are tied to a pole with ropes. Kali has a longer rope. Who can look for more grass to eat? _____

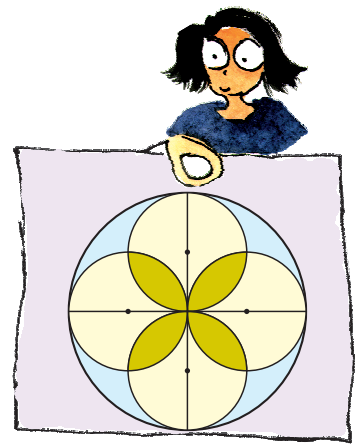
Daljeet's design





Daljeet has made these designs using a compass.

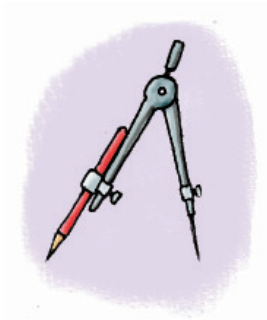
Many interesting exercises of making and measuring the radius of circles of different sizes can be held. They can also make wheels and carts.



His sister came and started making more designs with him.

Do you want to make such designs? _____

To make such designs you will need to use a compass.





Using a compass

- Have you seen a compass before? How will you use this to make a circle?

  (a) Open your compass.

  (b) Press the tip of the compass on the paper. Hold the compass from the top.

  (c) Without moving the tip, try to move the pencil around.

  Do you get a circle? _____

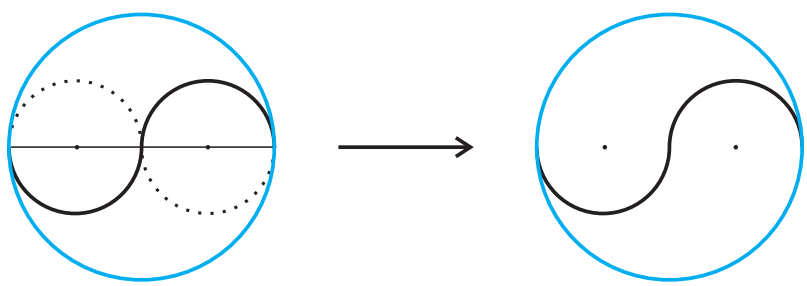
Look for a mark where you had kept the tip of the compass.

This mark is the centre of your circle.

- Is this circle better than the one you made earlier without a compass? Draw the radius of this circle and measure it.
- Now you can make your own designs like Daljeet had made. How many did you make?

Guess how this design has been made. Use a compass to make a similar one to the given in the box.

You can make the design using circles like these.



Encourage children to explore their own designs with a compass. This will also give them more practice in drawing circles with a compass.



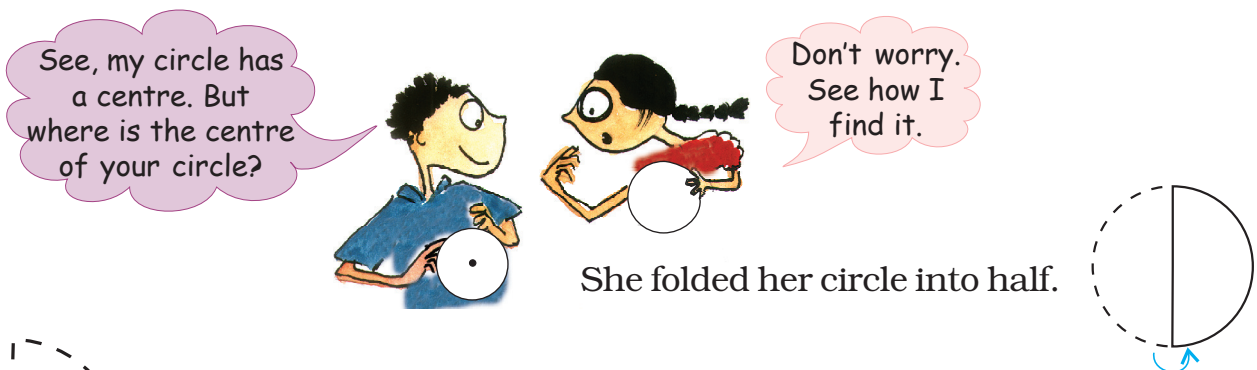
Activity

(A) Finding the centre of a circle.

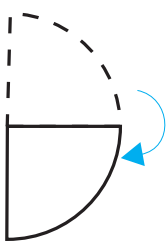
Sadiq and Samee[illegible] to make circles for themselves.



Then they cut their circles out.



She folded her circle into half.



The length of the crease is called the **diameter** of the circle.

Then she folded it again like this.

She opened the folded circle.

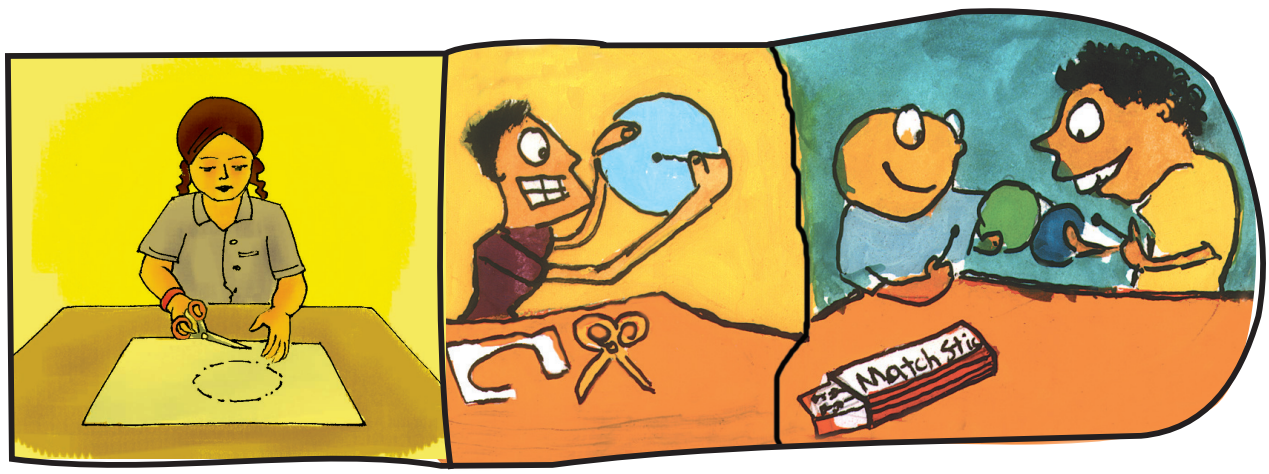


Can you see that the diameter is twice the radius of the circle?_____

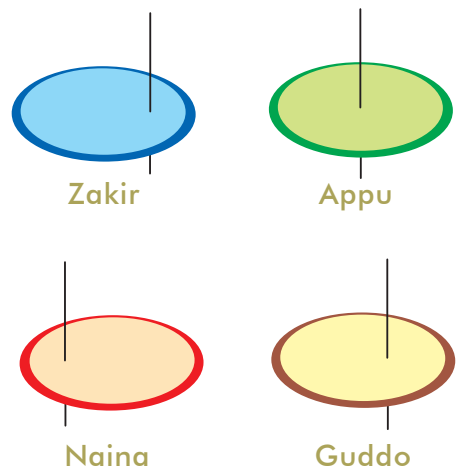
- Now you trace a circle on a paper using a bangle. Cut it out. Then find its centre like Sameena did.

(B) Let us spin a top

Zakir, Appu, Naina and Guddo trace a circle on a cardboard and cut them out. They made a hole and put a matchstick in their circles.

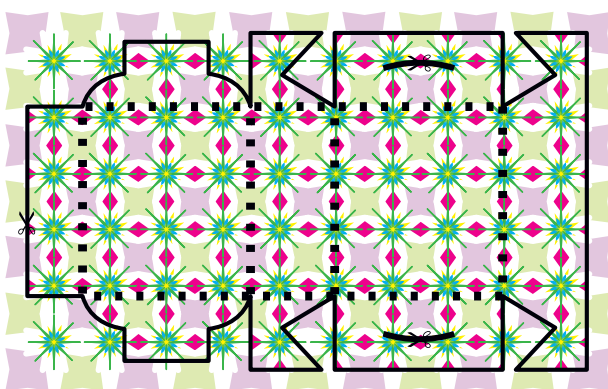


Now everybody was excited to spin their tops which looked like this.



Guess

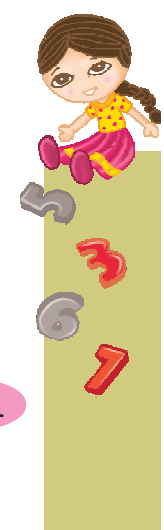
- Whose top will spin a little? _____
- Whose top will spin the best? _____
- In whose top is the stick nearest to the centre? _____



7. Drawing 3-D objects in 2-D

Sweet Box

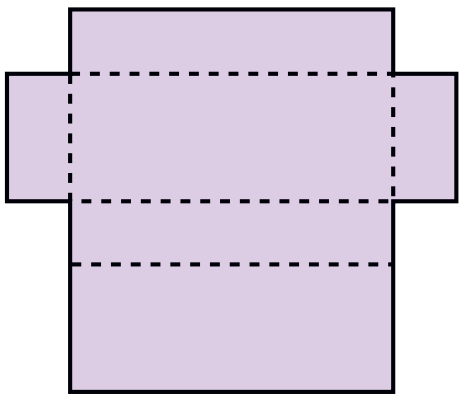
Ramya went to buy sweets. The shopkeeper took a paper cut-out and quickly made a lovely pink box for the sweets!

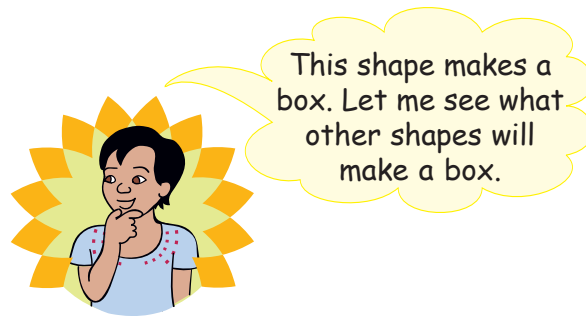


- Look at the photo and make your own box. Use the cut-out given above. How fast can you fold it?



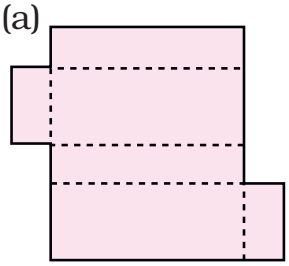
After coming home Ramya unfolded the box. She removed the extra flaps so the cut-out looked like this.



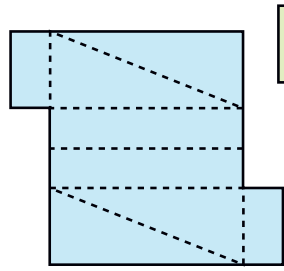


- She made four more shapes. Each is to be folded along the dotted lines. You have to find out which of these can be made into a box by folding.

(a)



(b)



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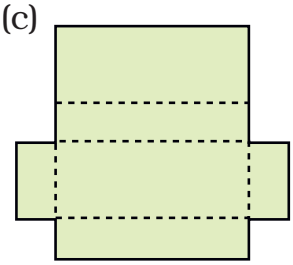
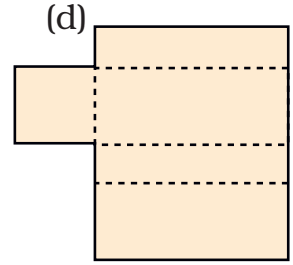


(d)



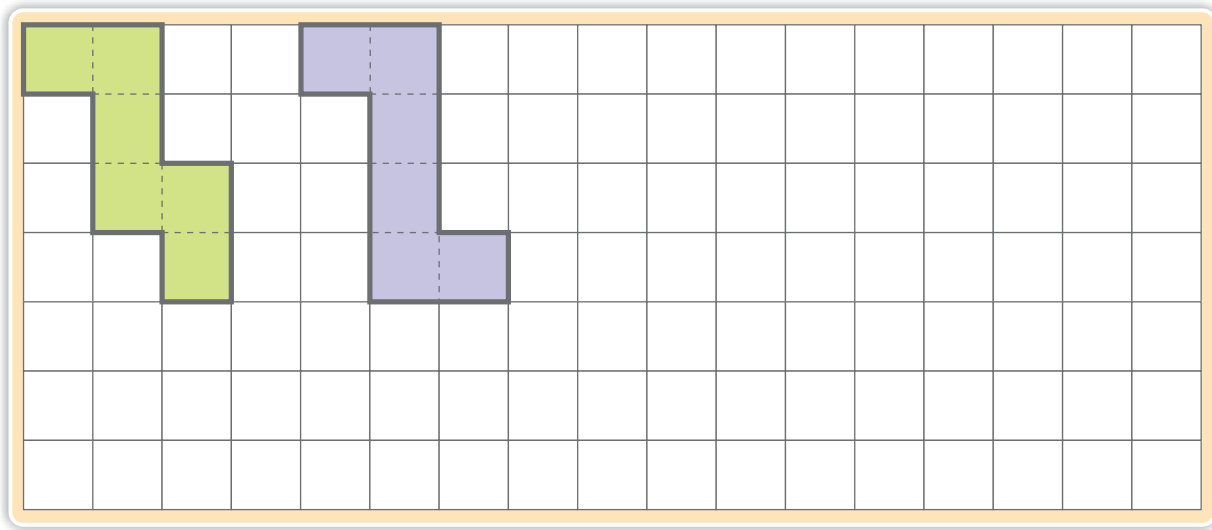
Shapes that fold into a cube

- Buddha wants to make a paper cube using a squared sheet. He knows that all the faces of a cube are squares.



Like edges and corners in 3-D shapes, the teacher may help the student to identify different faces of some 3-D shapes like a cuboid which has six rectanglular faces.

He draws two different shapes.

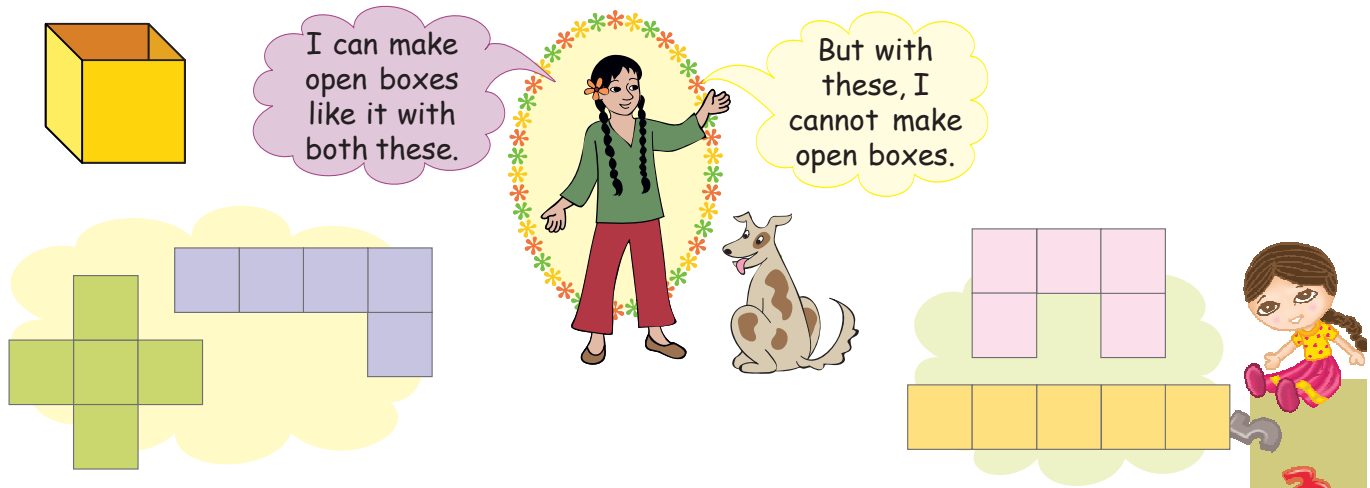


- Will both these shapes fold into a cube?
- Draw at least one more shape which can be folded into a cube.
- Draw one shape which can not be folded into a cube.
- Look around and discuss which things around you look like a cube.List a few.

Nets for an open box

Draw 5 squares of sides of unit length, say 1 centimetre and arrange them to form different shapes.

If they cut these shapes and fold them, some of those will fold into an open box (box without a top).

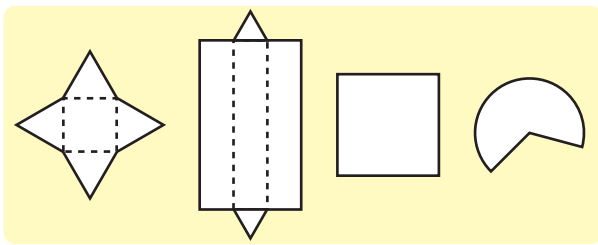


This unit focuses on visualisation of 3-dimensional shapes and how they can be represented on a paper (in 2 dimensions). The representations used here are nets (like the ones above) and perspective drawings.

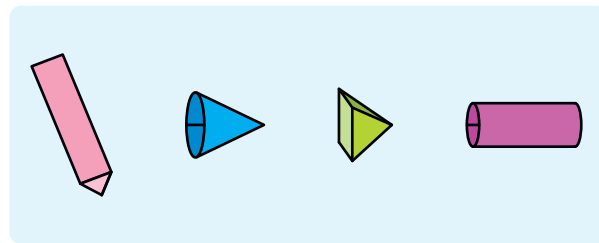
- Draw more shapes which will not fold to make an open box.

Boxes and Boxes

All boxes are not cubes. Here are some different kinds of boxes. Match the shapes (nets) in A with boxes in B into which it will fold.



A

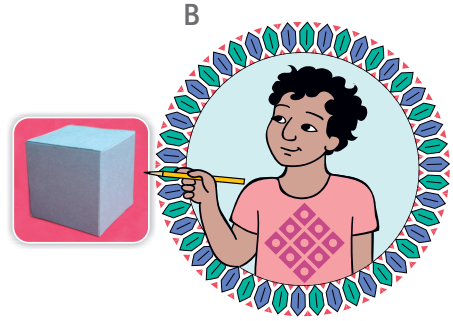


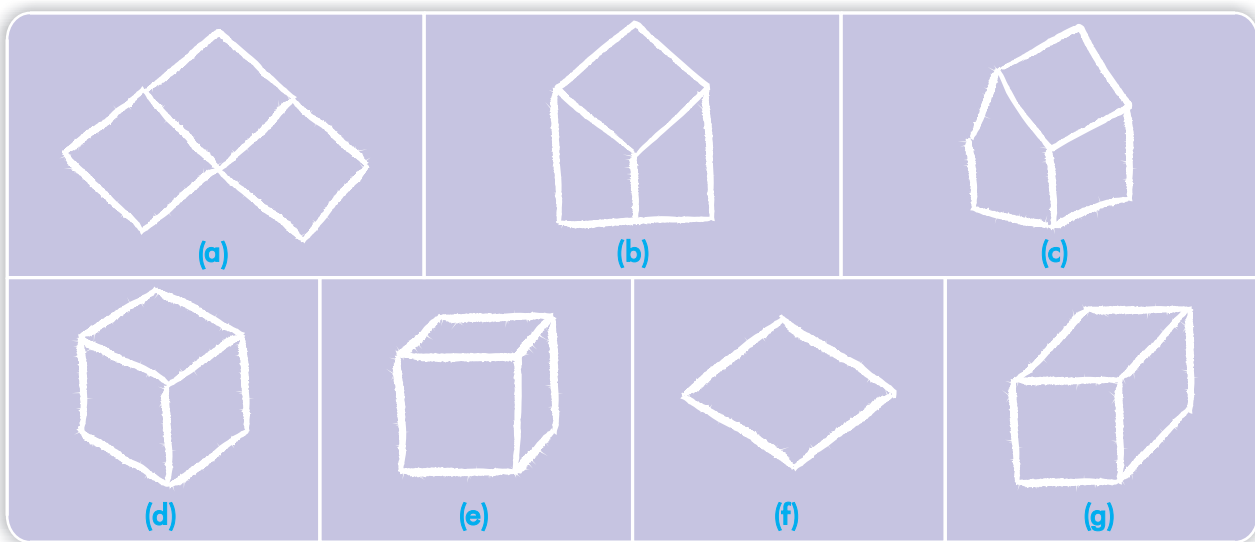
B

A Deep drawing of a cube

Soumitro and his friends made deep drawings of a cube.

These are their drawings.





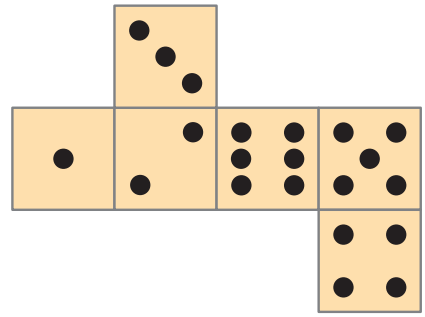
Children can be asked

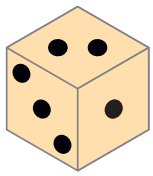
- Which of the drawings look correct to you? Discuss.
- Can you add some lines to make drawing (f) into a deep drawing of the cube?

Making mental images of shapes is an important mathematical ability. Children will need many activities to visualise the net of a box, to think of how it looks when flattened, and also to check which nets do not make a box.

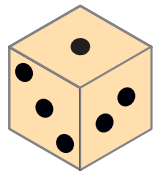
A Puzzle

This cut-out is folded to make a cube die.

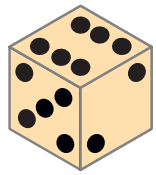




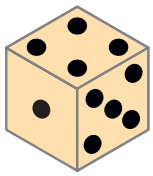
(a)



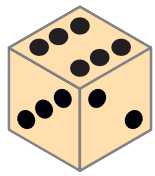
(b)



(c)



(d)

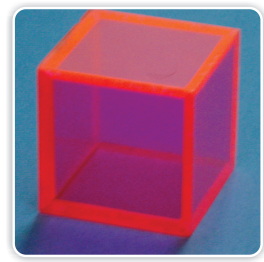


(e)

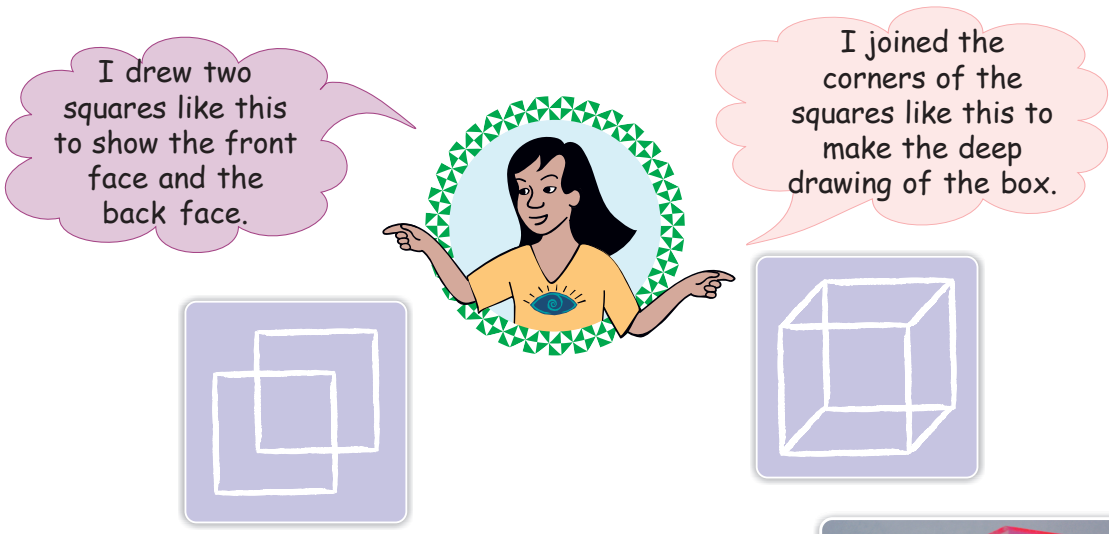
Children can be asked that which of these are the correct deep drawings of that cube?

A simple way to draw a cube

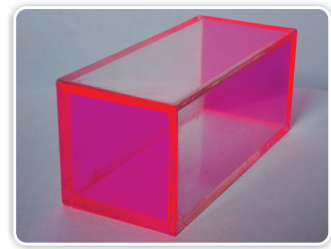
Chanda wants to make a deep drawing of this cube.



She draws the cube like this.



- In the same way make a deep drawing of a box which looks like this.



The 2-D representation of 3-D objects is a matter of convention and is learnt by children through experience. Here the conventional way of drawing the cube is given.

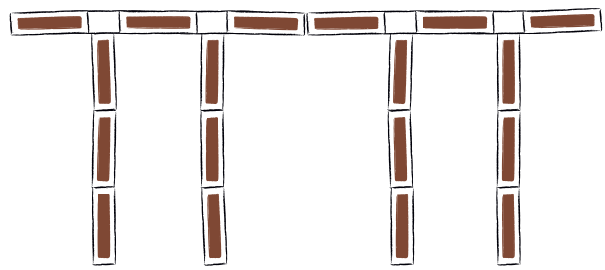
Matchbox Play

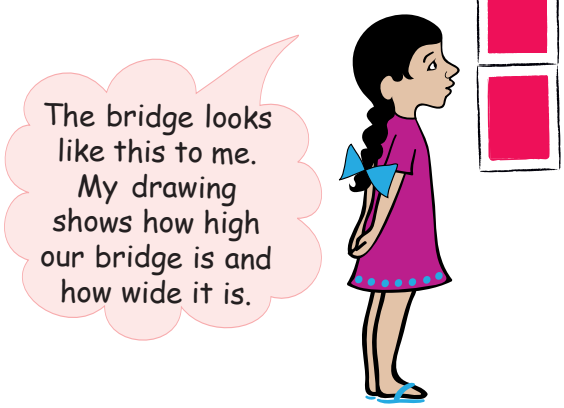
Ishita, Reena and Pratigya made this bridge using matchboxes.

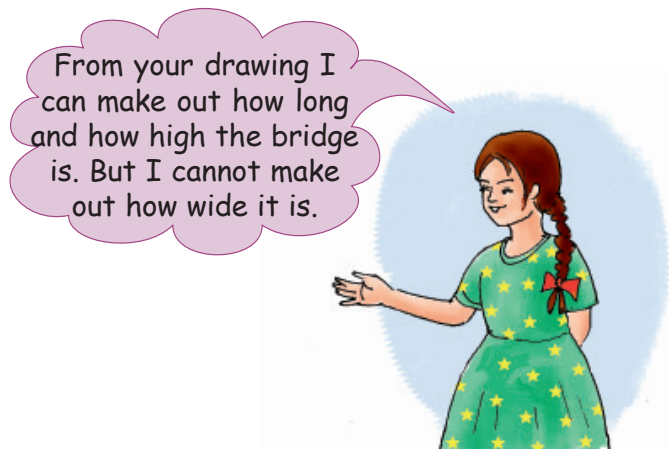


Reena and Pratigya made drawings of the bridge.









- If you look at the bridge from the top, how will it look? Choose the right drawing below.

(a) 

(b) 

Objects like matchboxes, cartons etc. can be used to create structures and their perspectives from different angles can be viewed, drawn and discussed among children.

- Look at the photo and try to make a deep drawing of this bridge.



Practice Time

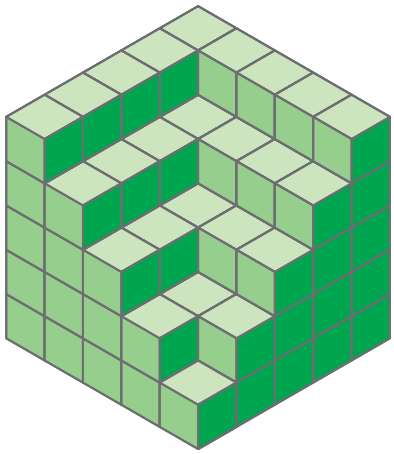


(1) Make drawings to show how this bridge will look

(a) From the top

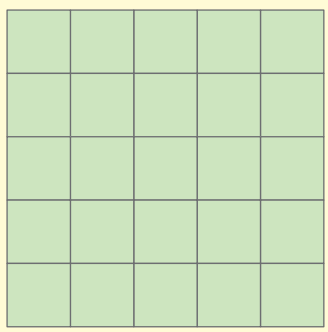
(b) From the front

(c) From the side

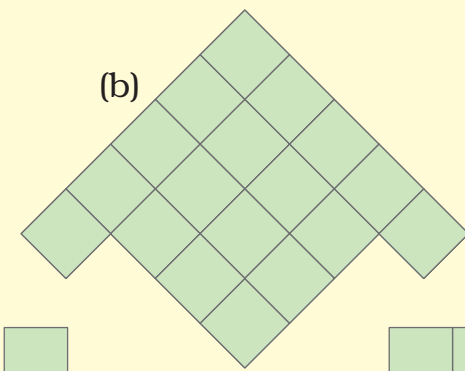


(2) How many cubes are needed to make this model?

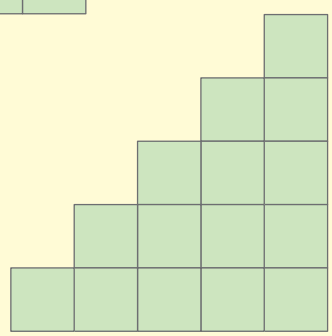
Here are some drawings of the model. Mark the correct top view drawing with 'T' and the correct side view drawing with 'S'.



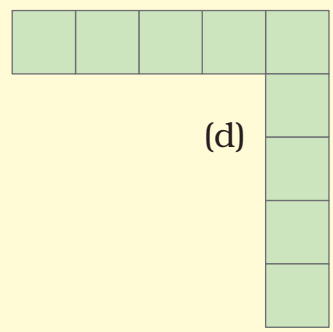
(a)



(b)



(c)



(d)



8. Shapes and Angles

Rohini and Mohini are twin sisters. They love doing the same things. One day when they were making shapes with matchsticks, Shaila gave them a challenge.



Rohini made this shape.

Mohini —Is it a closed shape or an open shape?

Rohini — It is a closed shape.

Mohini — How many sides are there?

Rohini — It has 6 sides.

Mohini made this.

Now you give the answers.

Is it a closed shape? _____.
Does it have 6 sides? _____.

But it is not the same as the one made by Rohini. So Mohini tried again.

This is what she made.

Before this activity discussion about closed and open figures should be taken.

Is it a closed shape with 6 sides? _____

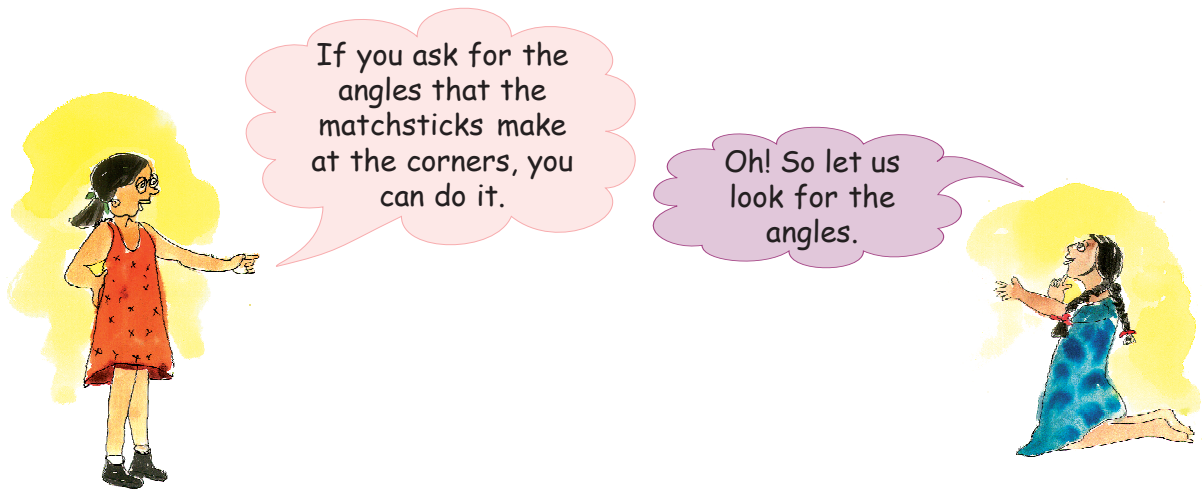
Is it the same as the one made by Rohini? _____

Is there some way to say in what way these shapes are different?

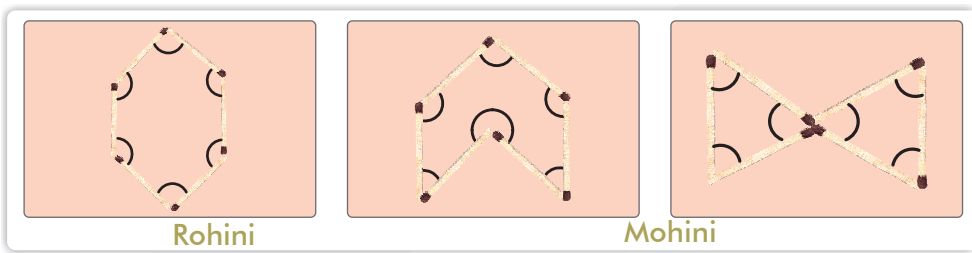
Mohini tried again but got different shapes. Guess and make two more shapes Mohini could have made.

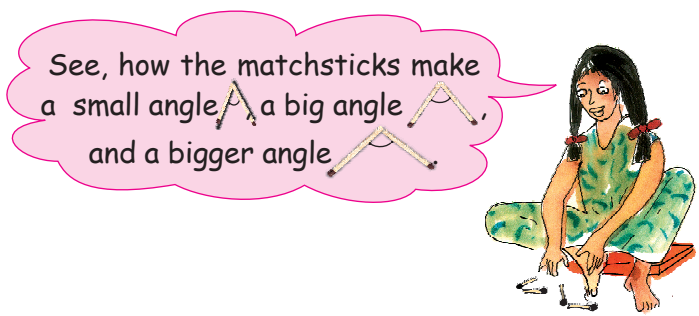
Now look at the closed shapes given above. In these shapes each pair of match sticks has a common point. At each of these common point, an angle is formed.

Mohini is now tired of trying and asks Shaila what to do.



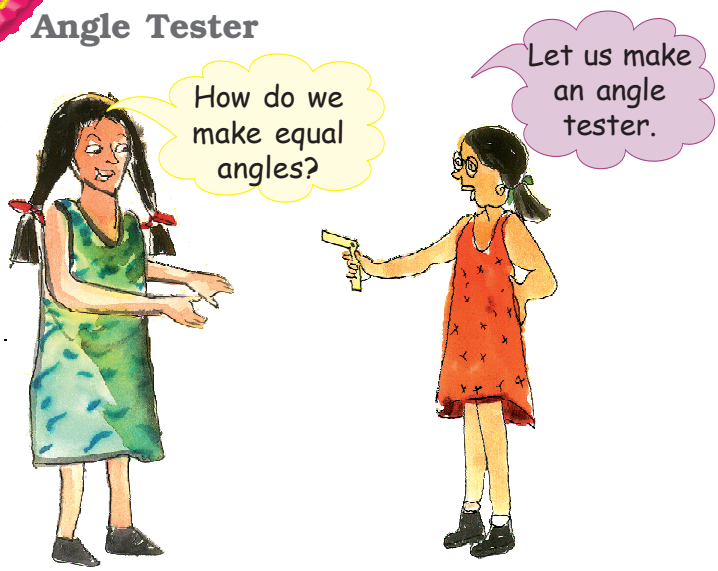
Look at the angles marked in these shapes. Can you see the difference?





It is important to encourage children to think about the way in which shapes can differ even when the number of sides is the same. This will help them to get a sense of how angles determine the shape of a polygon.

Angle Tester



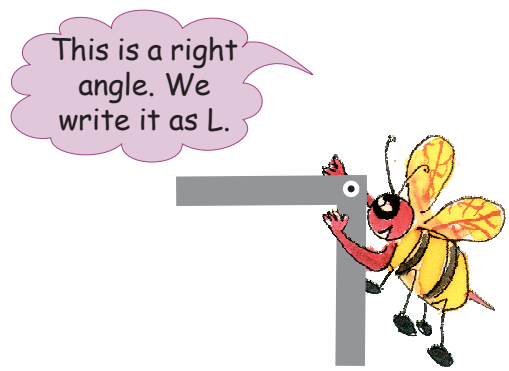
- Cut two strips from a cardboard sheet.
- Fix them with a drawing pin or such that both the strips can move around easily.



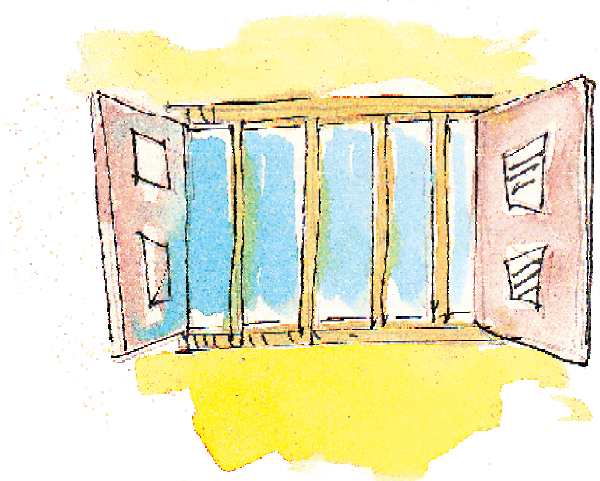
Rohini and Mohini went all around with the angle tester to look for different angles in their class.

Rohini tested the angle at the corners of the Maths book and the pencil box.



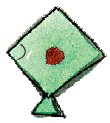


- Go around with your tester and draw here those things in which the tester opens like the letter L. Are you sure they are all right angles?

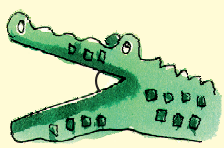


Practice Time

(1) Look at the angles in the pictures and fill the table.

Angle	Right angle	More than a right angle	Less than a right angle
			✓
			
			
			
			

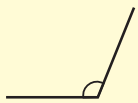
(2) Draw anything of your choice around the angle shown.
Also write what kind of angle it is. The first one is done.





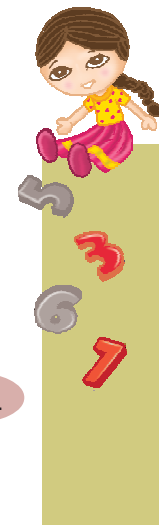


Less than a right angle





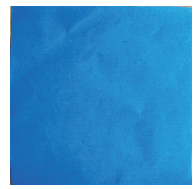




Activities

(1) Angles by paper folding

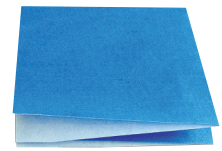
(a) Take a square sheet of paper.

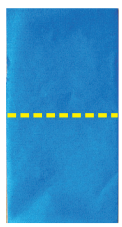




(b) Fold it in half.

(c) Fold it once more and press it.





(d) Open the last fold so that the sheet is folded in half.

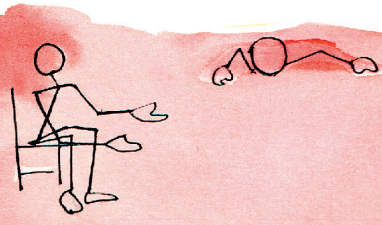
(e) Take one corner and fold it to meet the dotted line.



On the paper you will find lines making a right angle, an angle less thana right angle and an angle more than a right angle.

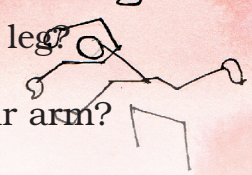
Look for each of the angles and mark them with different colours.

(2) Angles with your body









Can you make these angles?

(a) A right angle with your hand?

(b) An angle less than a right angle with your leg?

(c) An angle more than a right angle with your arm?

(d) An angle more than a right angle with your body?

Try them out. It's fun! Draw them in your notebook using stick–drawings like these.

(3) Angles in Alphabet



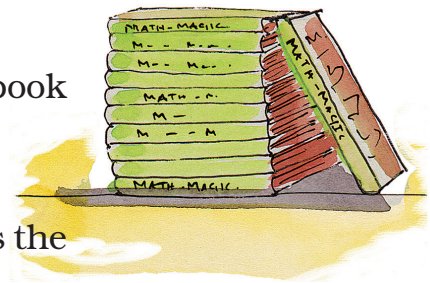
SUKHMAN

In my name there are 11 right angles. There are also 10 angles less than a right angle and two angles more than a right angle.

- Write 3 names using straight lines and count the angles.

Name	Number of right angles	Number of angles more than a right angle	Number of angles less than a right angle

(4) Making slides

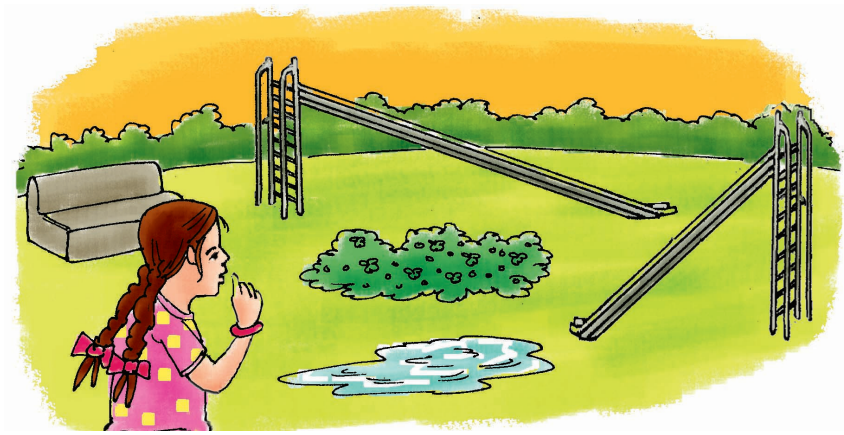


(a) Put 10 books on top of each other. Keep one book slanting to make a slide.

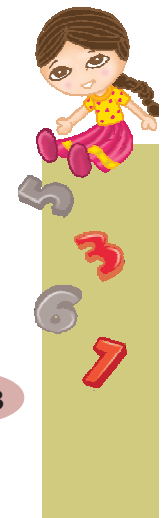
(b) Now do this with six books.

Roll a ball from the top. From which slide does the ball roll down faster?

Which slide has the smaller angle?



Children should be encouraged to identify different angles after they make stick-drawings.

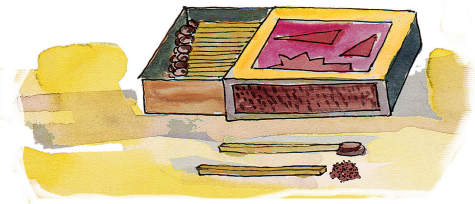


These are two slides in a park.

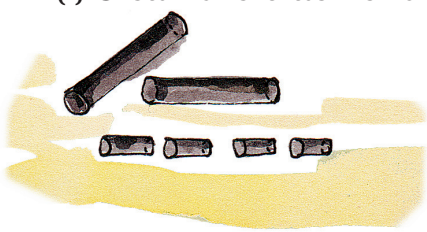
- Which slide has a larger angle?
- Which slide do you think is safer for the little boy? Why?

9. Changing Shapes

- Things you need — used (or new) matchsticks and a piece of rubber tube used in cycle valves.

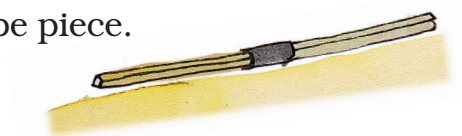


(i) Clean the black end of the matchsticks.

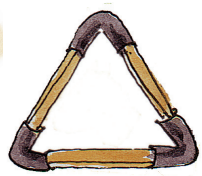


(ii) Cut small pieces of the tube (about 1 cm long).

(iii) Push two matchsticks into each end of a tube piece.

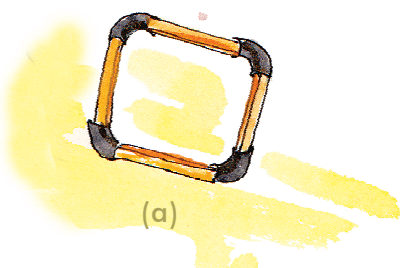


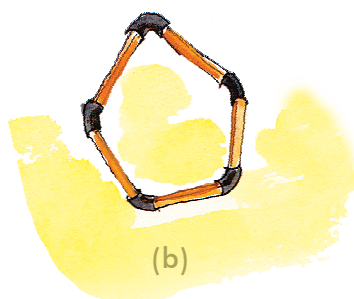


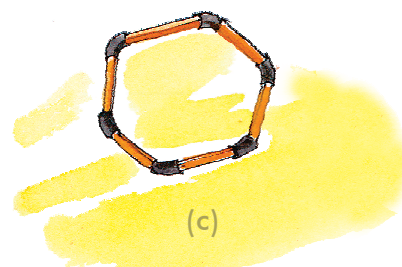


(iv) Add more matchsticks to form a triangle.

Now make these 4, 5, 6 sided shapes by using tube pieces and matchsticks.

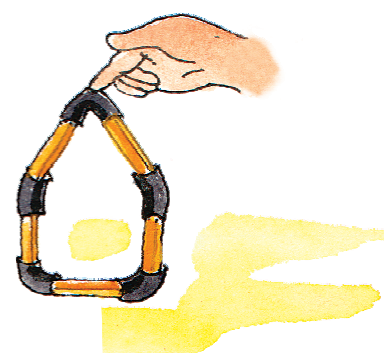






- Find out how many angles are there in each of these shapes and mark them.

Now push each shape downwards with the tip of your finger as shown in the figure.



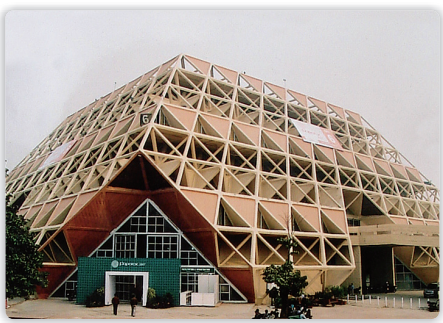
Does the angle change when pushed down by the finger?

- Find out and write their results in the table given here.

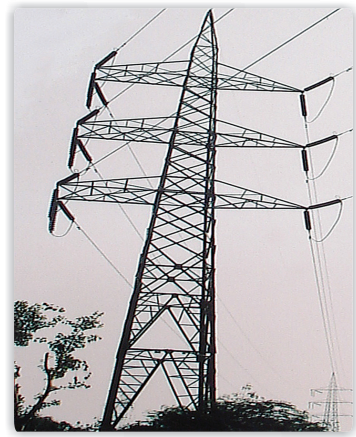
Shape	Change in angle Yes/no

Shapes and Towers

Look for triangles in the pictures below.

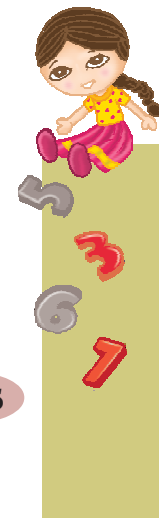




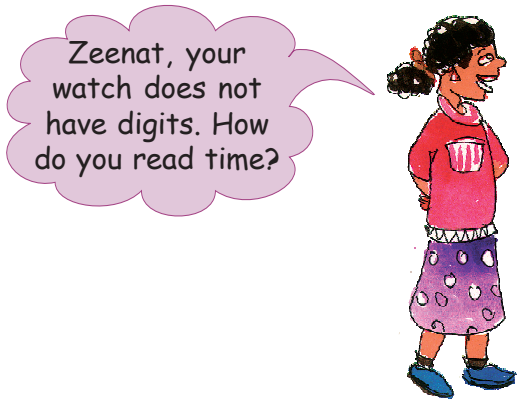


- From the activity 'Changing Shapes' can you guess why triangles are used in these towers, bridges etc?
- Look around and find out more places where triangles are used.

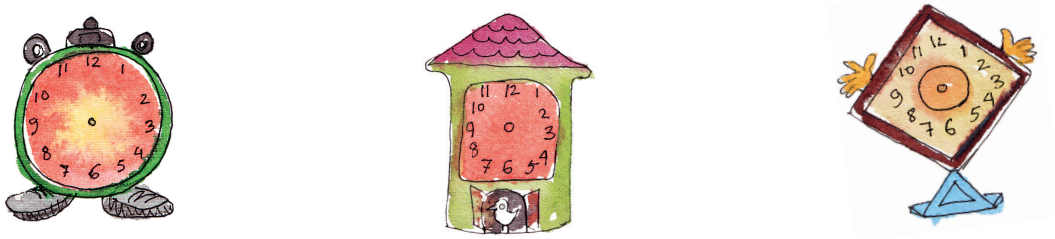
Triangles are shapes which are strong and do not change easily when pressed. In fact, children can also observe how different shapes are made stronger by using diagonal beams (like in the bridge) which divide shapes into triangles.



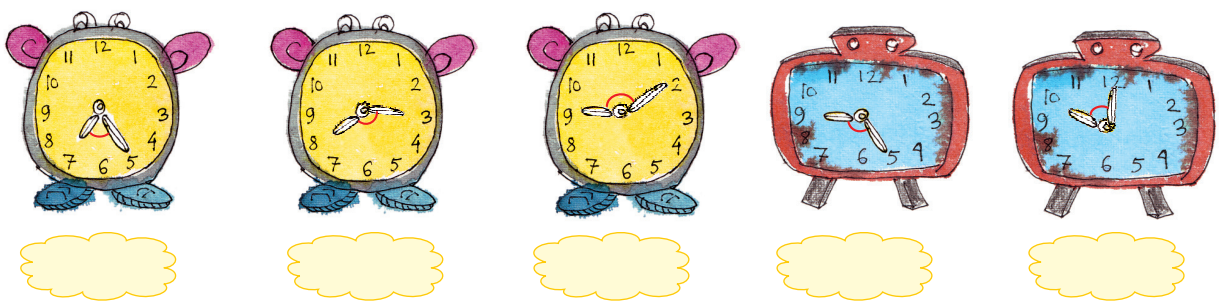
10. Angle and Time



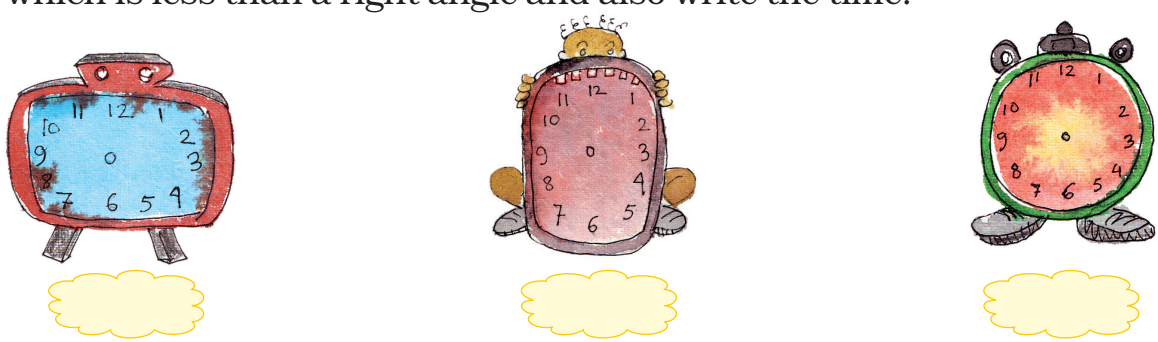
- There are many times in a day when the hands of a clock make a right angle. Now you draw some more.



- Write what kind of angle is made by the hands at these times and also write the time.



- Draw the hands of the clock when they make an angle which is less than a right angle and also write the time.

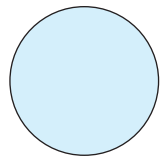


Activity

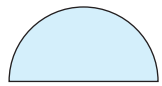
(a) Making a degree clock

An angle can be measured in degrees. Degree is written as º .

(1) Cut a circle out of paper.



(2) Fold it into half.



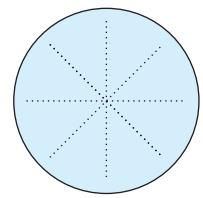
(3) Fold it once again into a quarter.



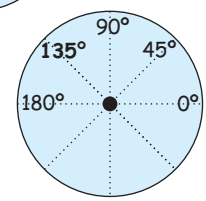
(4) Fold it once more.



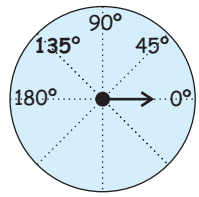
(5) Open the paper. You will see lines like this.



(6) Now mark 0º, 45º, 90º, 135º and 180º as shown.

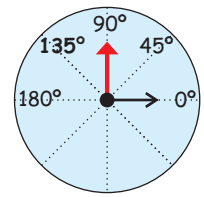


(7) Paste it on an old card.



(8) From the centre draw one hand.

(9) Make a red hand with a thick paper and fix it to the centre with a drawing pin, so that it is free to move.

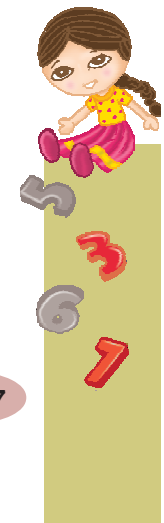


Your degree clock is ready.

- Use your degree clock to measure the corner angle of your pencil box, book. _____ is the measure of the right angle.
- Can you guess how many degrees is the measure of the angle which is
  - (a) ½ of a right angle _____
  - (b) ⅓ of a right angle _____
  - (c) 2 times of a right angle _____

An angle of 90° is the right angle.





(b) Angles in a paper aeroplane

(1) Take a square sheet of paper. 

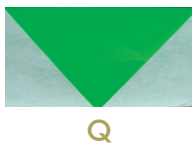




(2) Fold it in half and open it.

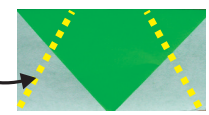
(3) Fold the corners to the centre. Your paper looks like this.

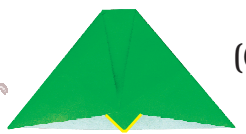




(4) Fold the green triangle such that P touches Q.

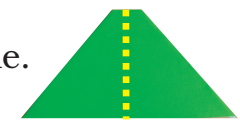
(5) Fold the top two corners of this rectangle along the dotted lines.

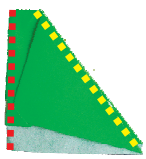




(6) Your paper will look like this. There is a small triangle in the picture which has to be folded up.

(7) Turn it over and fold it in half along the dotted line.





(8) Now, to make a wing fold the yellow edge over the red edge.

(9) Turn it and do the same on the other side as well.



Your plane is ready to fly. How well does it fly?

- Find the angles of 45° and 90° when you open your plane.

The teacher may demonstrate the activity with any square paper. In the aeroplane there are folds of 45°, 90° and other angles.

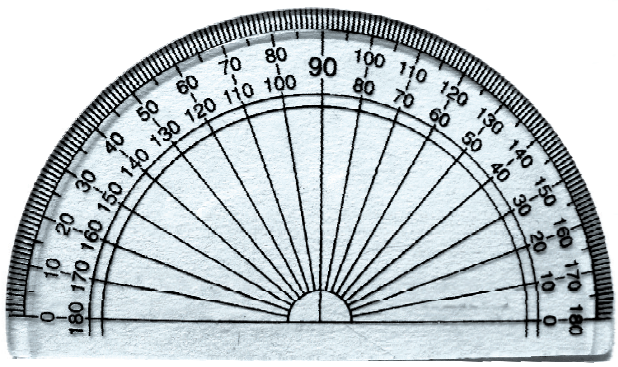
(c) Angles with Yoga

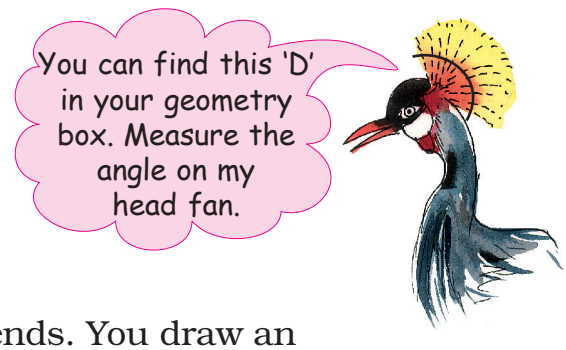
Rubina is doing Yoga. These are the pictures of different *Asanas*. She does everyday.



- Measure as many angles as you can, made by different parts of the body, while doing *Asanas*.

(d) The D game





You can play the 'D' game with your friends. You draw an angle. Your friends will guess the measure of that angle. Then you use the 'D' to measure it. The difference between the measured angle and the guess will be your friend's score. The one with the lowest score will be the winner.

Come on, play!

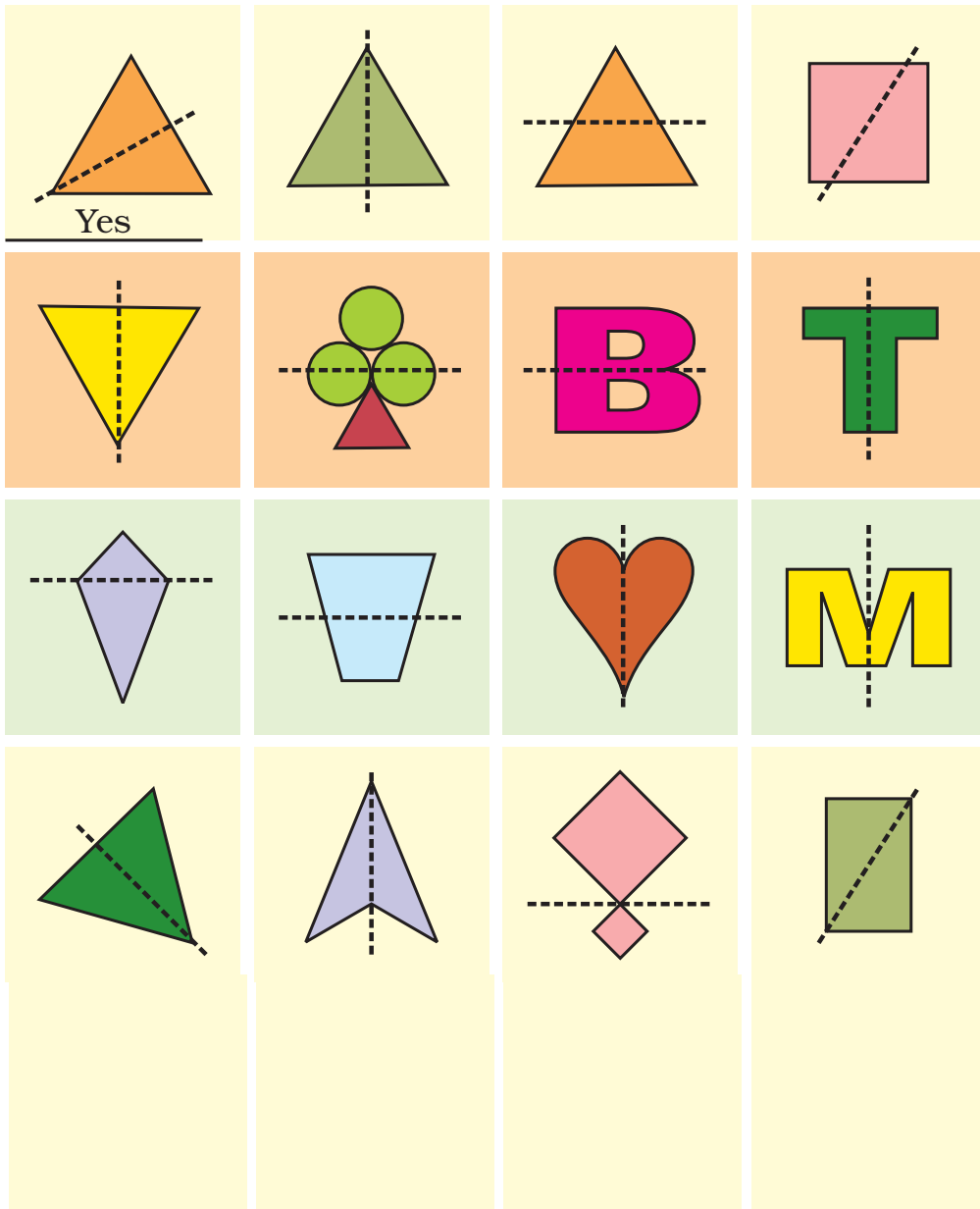
Draw Angle	Guess	Measure	Score

Take this opportunity to introduce the 'D' (protractor). Children will need some help to read the measure of the angle, but they need to do so only approximately.

11. Idea of Symmetry

Mirror–Halves

Look at the pictures given below. Does the dotted line divide each picture into two mirror halves? No! It is only in some cases the dotted lines divide the picture into mirror halves. Such pictures, are said to be symmetrical about the dotted lines. These lines are known as the lines of symmetry of these pictures.



The teacher should explain the children that by two mirror-halves we mean one is image of the other when a mirror is placed along the dotted line. In square and rectangle given above, the dotted line cuts each into identical halves, but note that they are not mirror-halves?

Practice Time

(1) Using a dotted line, try to divide, if possible, the following pictures into two mirror–halves.

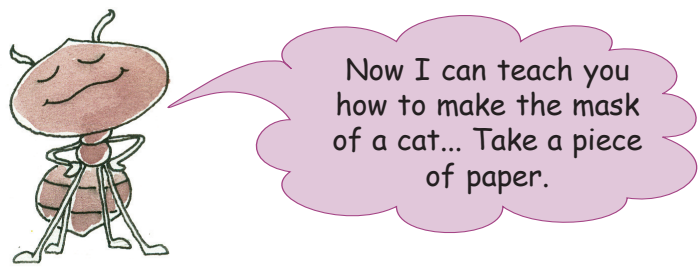


(2)

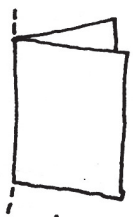


Activity

Making a Mask



1. Fold it along the middle.



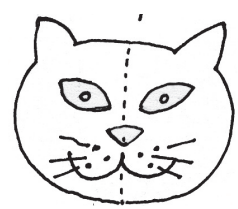
2. On one side draw the figure.





3. Cut it out using a pair of scissors.

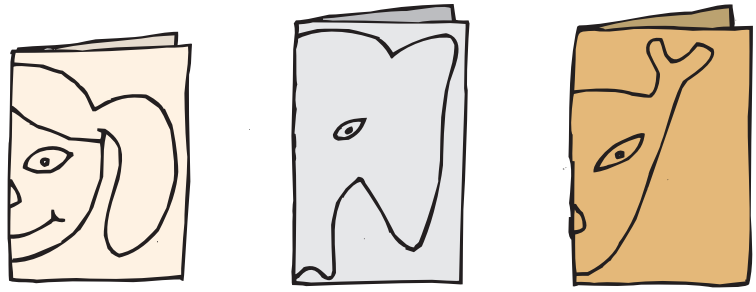
4. Now open the fold and make the eyes, nose etc on the other side.





5. Colour it and tie a rubber band or a ribbon on its back. Your mask is ready.

You can make more such marks by taking help by following pictures:



12. Mirror half and Reflection

Let's make patterns from a drop of colour

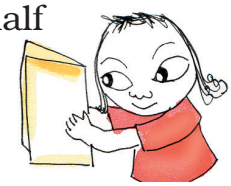


Make your pattern

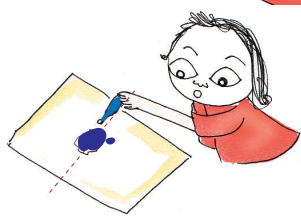
Take a sheet of paper



Fold it into half



Open the fold and put a drop of colour on the middle line



Fold it twice and press it to spread the colour



Open it and see a beautiful pattern

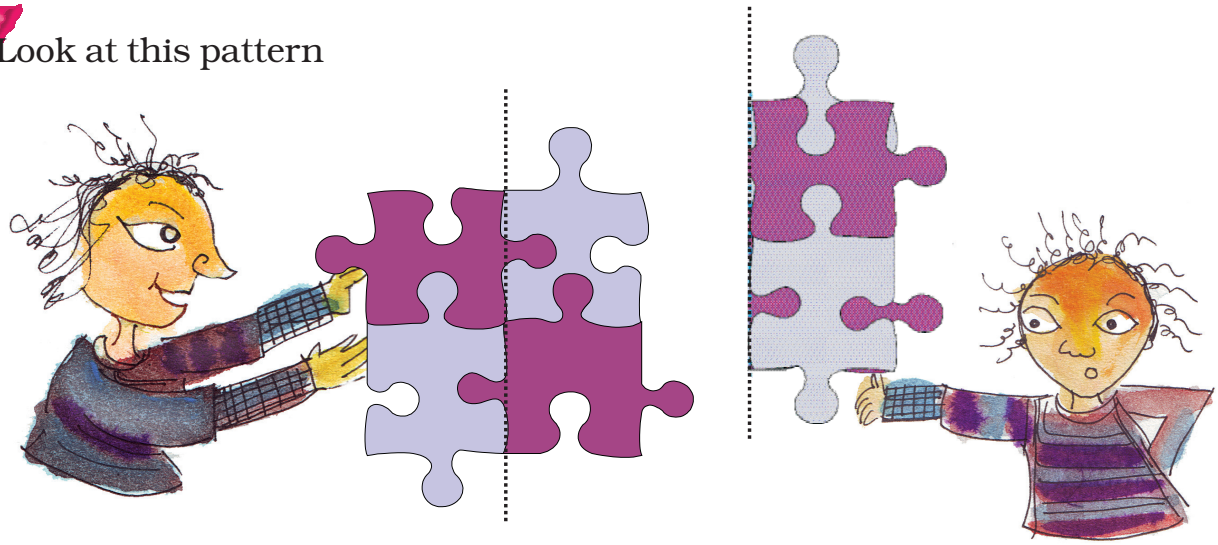


Can you cut this pattern in such a way that you get two similar mirror–halves? In how many ways can you do it?

The above patterns are known as **ink-blot devils**.



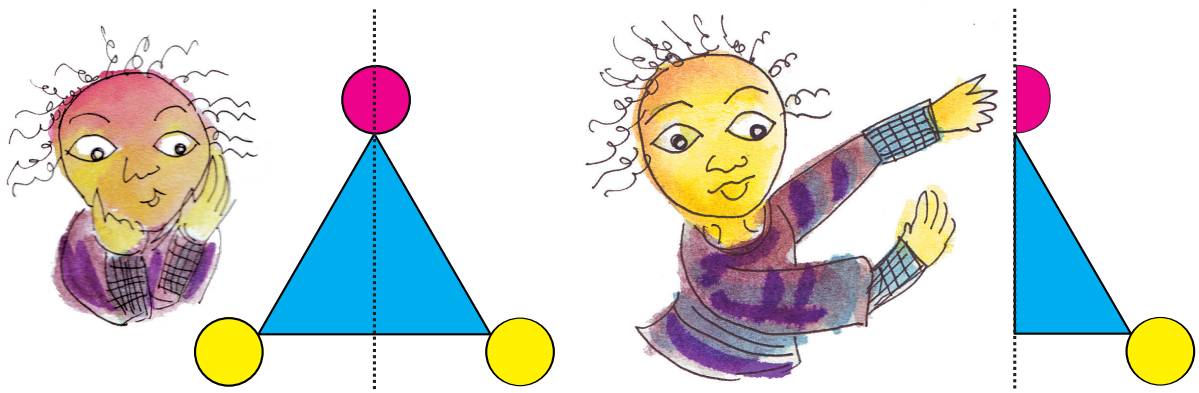
Look at this pattern



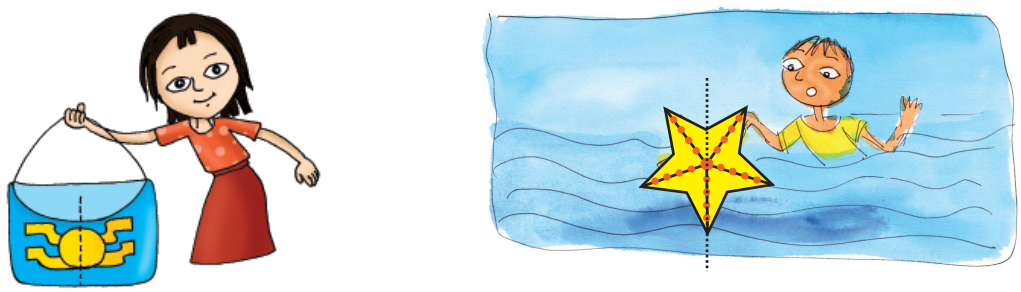
The dotted line divides the shape into two halves. But if you fold it along the dotted line, the left half does not cover the right half completely. So the two halves are not mirror halves

Now look at another shape.

If you fold it along the dotted line, one half will cover the other half completely. So the two halves are mirror halves.



Now imagine the same for these pictures.



On the next page, children need to understand that even though the shape is symmetric, the colour scheme of the figure can make it asymmetric (e.g. in shapes 10 and 12). Encourage children to look for symmetry based on the shape as well as the colour scheme.

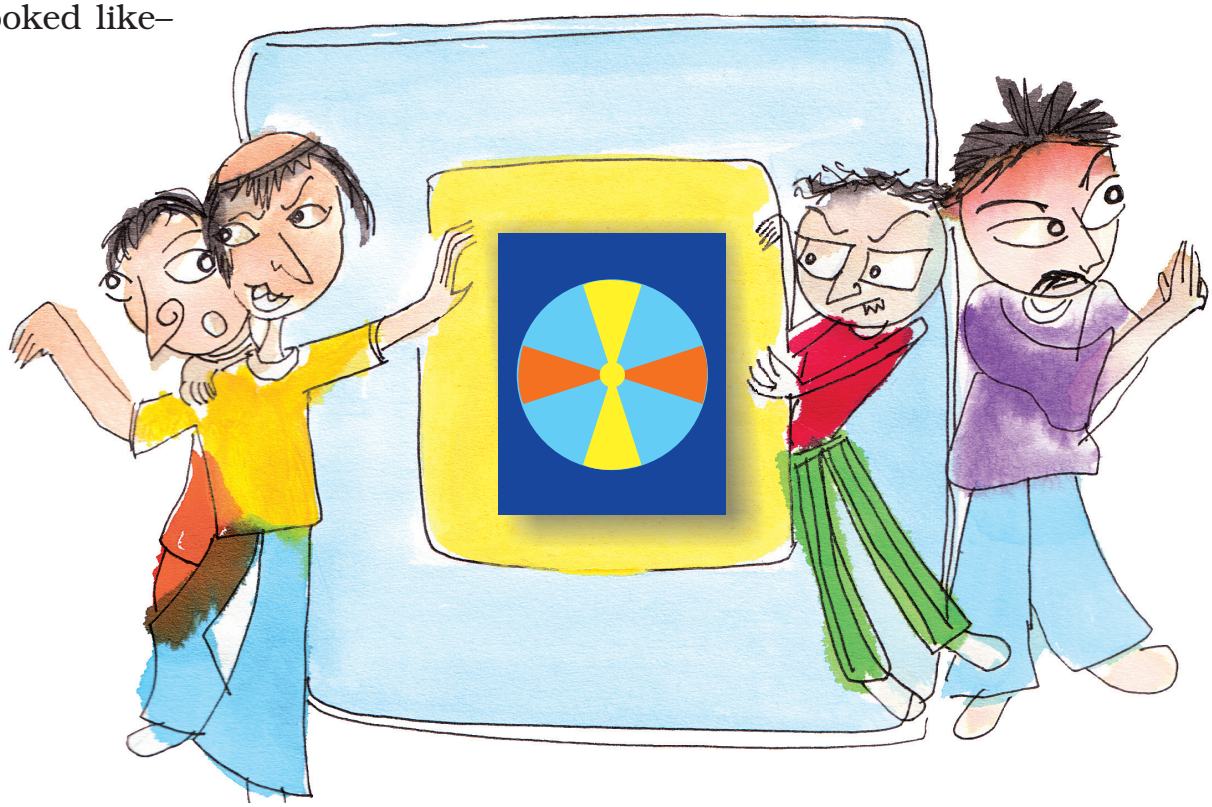


Which shapes are divided into two mirror–halves by the dotted line?

13. Rotation

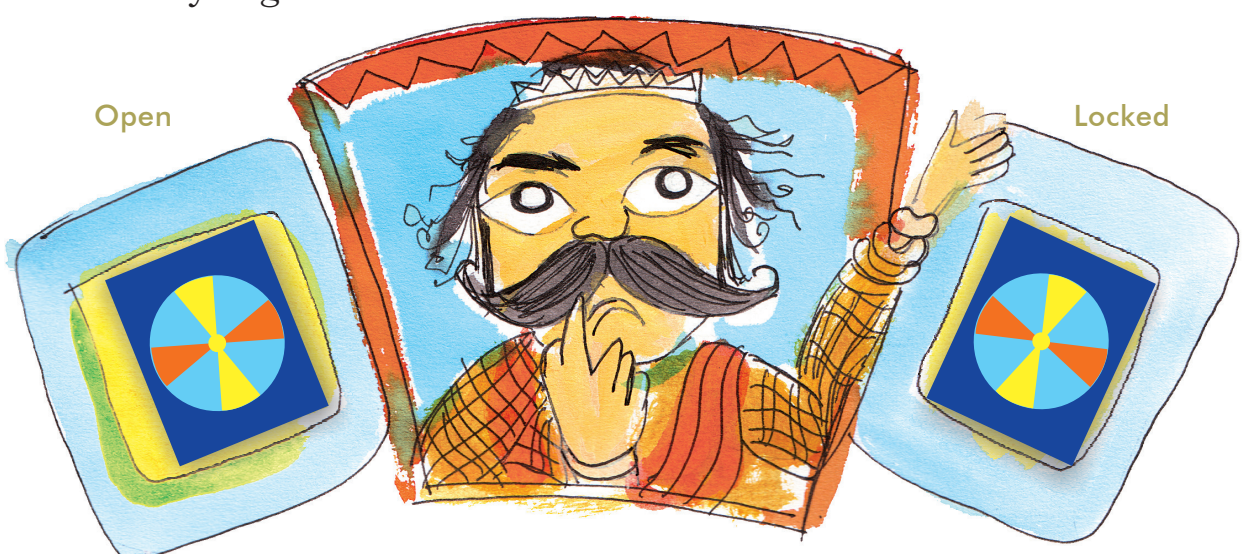
Half-a-Turn

Once there was a king. He was upset because thieves kept stealing costly jewels from his locker. Here is what the locker looked like–



The locker could be opened by giving its handle half–a–turn. Another half-turn and the locker would be locked again.

The king would often leave the locker open thinking it was locked. Can you guess the reason?

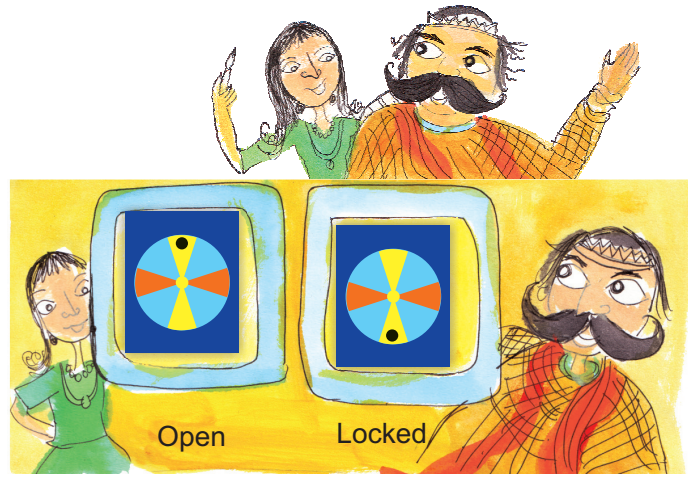


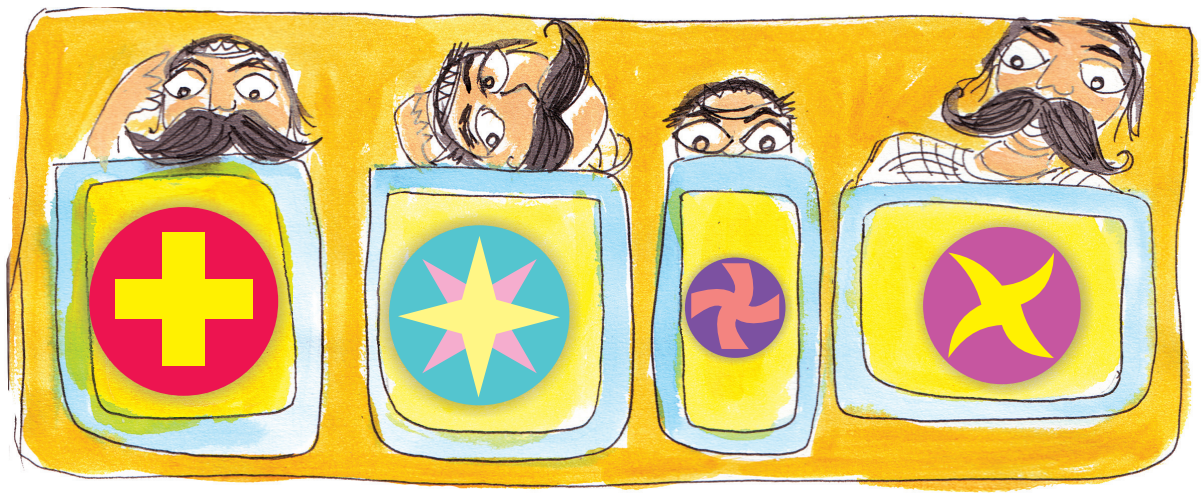
One day his clever daughter gave him an idea which he liked very much. Now he never got confused.

Can you guess what the idea was?

The king's daughter asked him to put a dot on one of the yellow blades.

The king had many such lockers with different handles. Check if, on giving them half-a-turn, he can get confused with these too.





What will you do to solve the problem for each of these?

Same after ½ turn?

Guess which of the shapes below would look the same after half-a-turn.



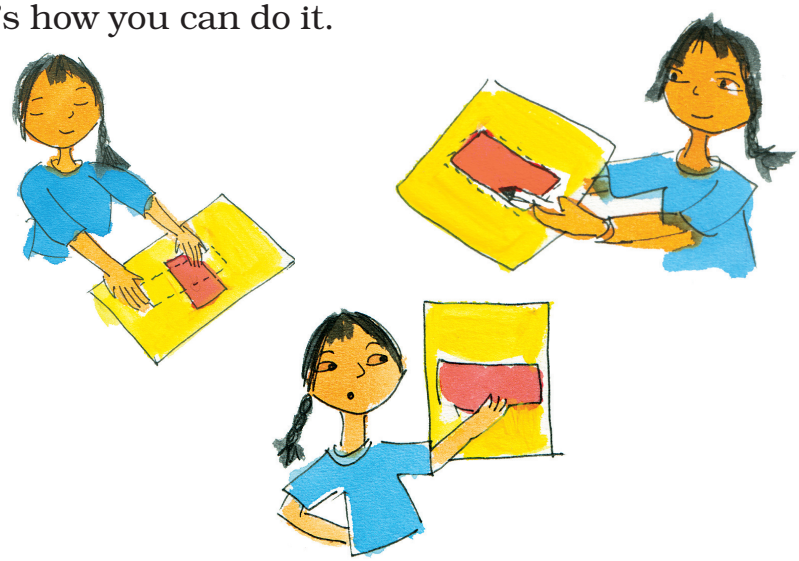
Teacher may emphasise that a turn is always about some point. Here in each of all the shapes, the point has been assumed to be respective centre of the figure.

Do you find it difficult to tell? If yes, then there is a way to check your guess. Here's how you can do it.

Take any one of the shapes.

Trace its outline on a sheet of paper.

Now keep the shape on its outline and give it a half-turn. See if the shape fits its outline.



Practice Time

(1) Find out which letters in the English alphabet look the same after half–a–turn.

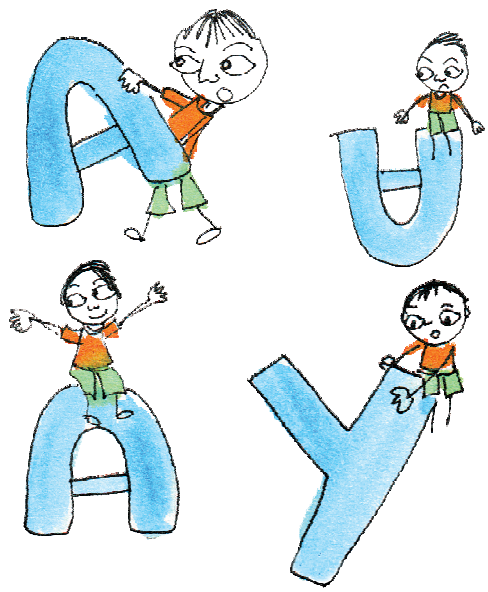
(2) Which of these English words read the same on half-a-turn?

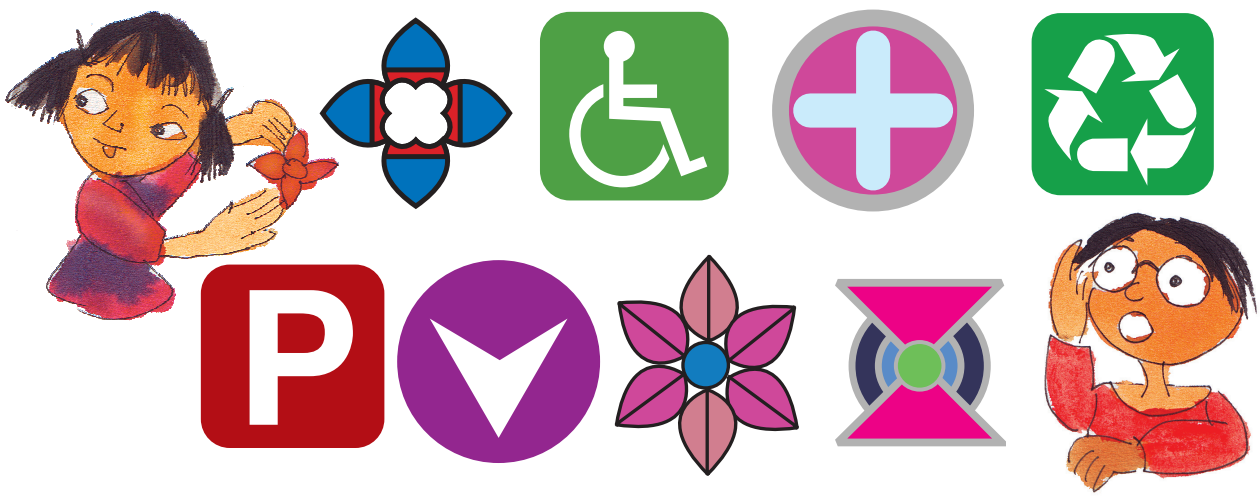
ZOOM, MOW, SWIMS, SIS, NOON

(3) Give half-a-turn to the numbers from 0 to 9. Find which of them still looks the same.

- Half-a-turn can also be visualised by rotating the book upside down.

(4) Which among the following pictures will look the same on half-a-turn?





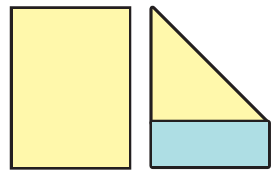
Activity

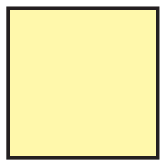


Have you ever seen a windmill? What is it used for?

Let us make a toy windmill.

(1) Take a sheet of paper.

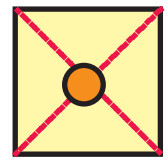


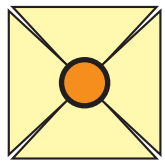


(2) Fold it as shown in the picture.

(3) Cut out the blue part of the paper. Your sheet of paper will now look like a square.

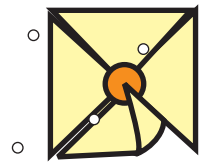
(4) Fold it along the red lines and then open the fold. Draw a circle on the sheet as shown in the picture.

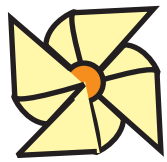




(5) Cut along the red lines till you reach the circle. The paper will look like this.

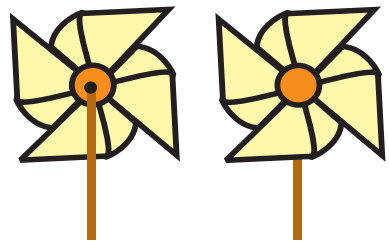
(6) Take a pin and make holes on the four corners as shown in the picture.





(7) Now fold the corners such that all the holes lie one on top of the other.

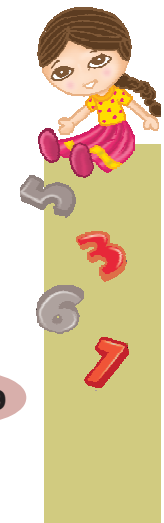
(8) Pass the pin through the holes and fix it on a stick.





Your windmill is ready. Run with it and see how fast it moves.

- Does your windmill look the same on $\frac{1}{4}$ of a turn?
- Does it look the same on half-a-turn? Discuss.

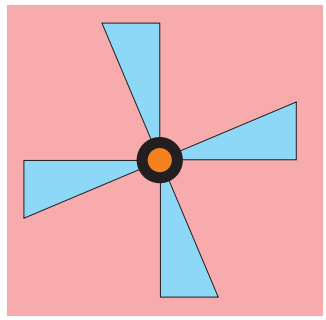


One-fourth turn

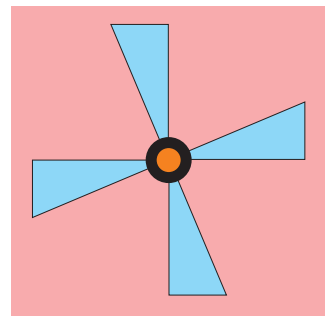
Does the fan look the same on $\frac{1}{4}$ turn?







Before turning it

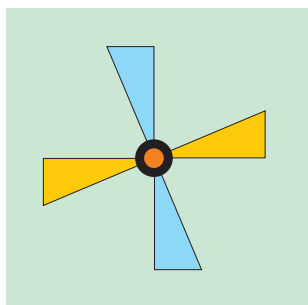


After $\frac{1}{4}$ turn





Will this fan also look the same after $\frac{1}{4}$ turn? Draw in the yellow box.



Before turning it

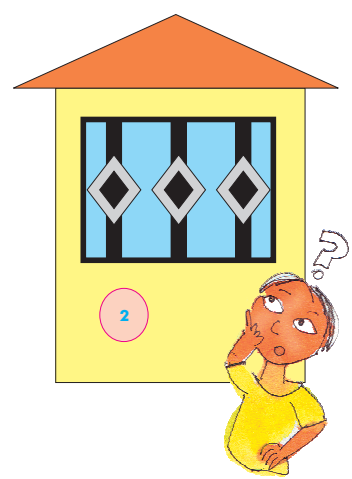
After $\frac{1}{4}$ turn

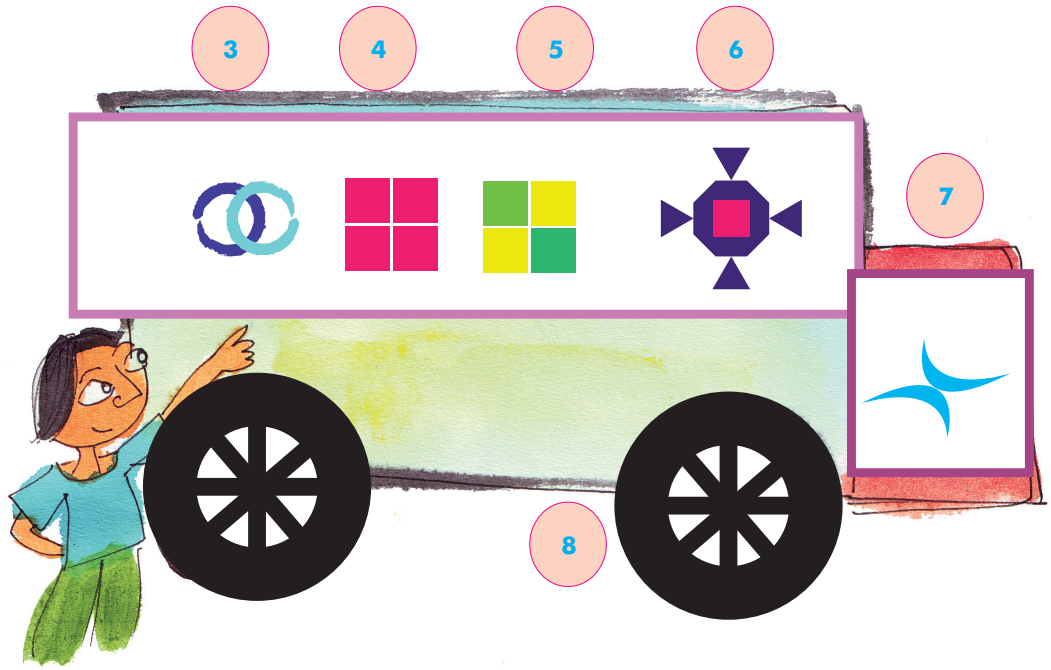
Practice Time

(1) • Among the following shapes, find out which one would look the same after $\frac{1}{4}$ turn. Put a (✓).

• Put a (✗) on the shapes that will not look the same after half-a-turn.



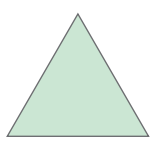




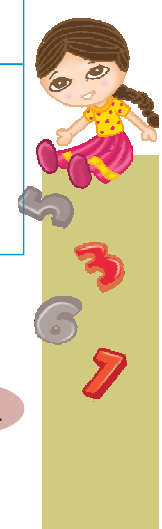
(2) Try and change the shapes in such a way that the new shape remains the same on giving it half-a-turn.

(3) Draw what the following shapes would look like on $\frac{1}{4}$ turn and half-a-turn.



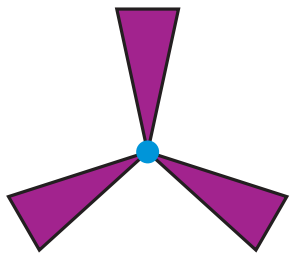
	on ¼ turn	On-half-turn
(a) 		
(b) 		
(c) 		

(4) Which of the above shapes do not look the same on $\frac{1}{4}$ turn? Which shapes do not look the same on $\frac{1}{2}$ a turn?

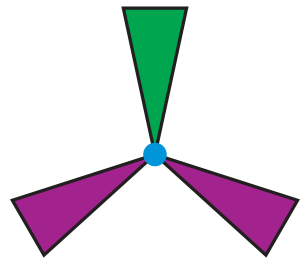


One- third turn

Which fan will look the same on a $\frac{1}{3}$ turn?

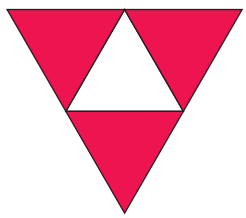


(a)



(b)

- Draw this shape after $\frac{1}{3}$ turn.

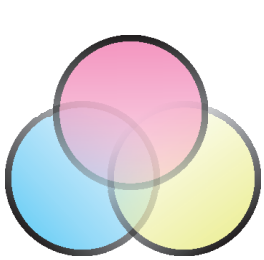


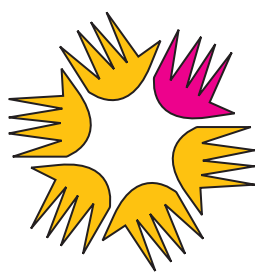
Shape after $\frac{1}{3}$ turn

Practice Time

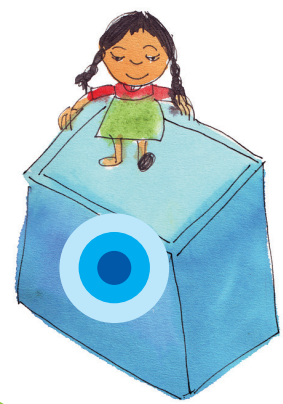
Look at the following shapes —

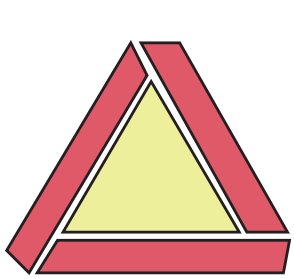
Find out which of these figures look the same on $\frac{1}{3}$ turn.

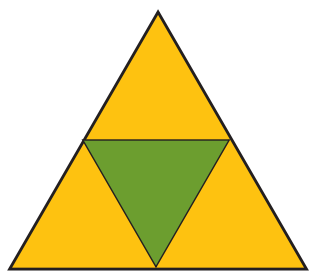
















LENGTH

1. How Long?

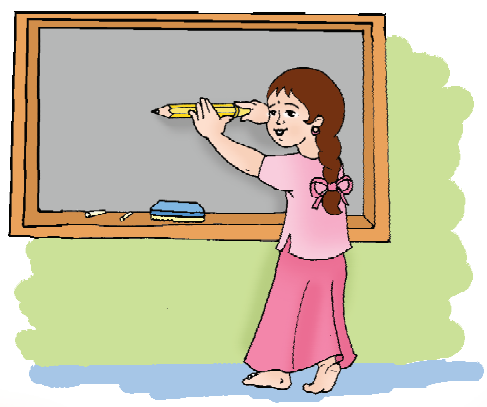
Measurement by non-standard units



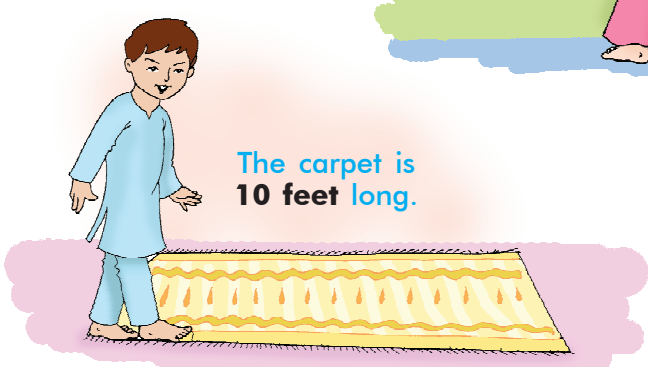
My table is _____ handspans long.



My pencil is _____ handspans long.



My classroom blackboard is _____ pencils long.



The carpet is **10 feet** long.



But, my mat is **6 feet** long.

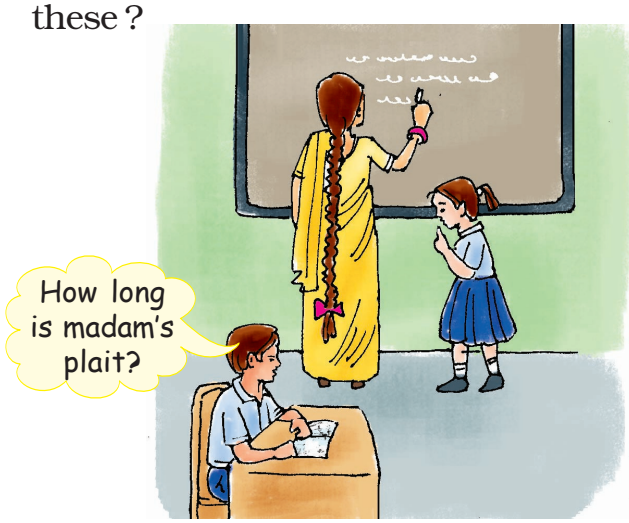
In the beginning the teacher should encourage the sense of measurement using non-standard units.

Handspan and fingers?

Ishita wants to find out the lengths of a few things using her handspan. These are shown in the picture.



- Can she use a handspan to find the lengths of all these ?



- Which things around you are less than your handspan? Name them.
- What would you use to find the lengths of those things?

Check your guess

Guess the lengths or heights of the things shown below. Find the length to check your answer.

Name of the thing	My guess	My result
Glass 	_____ fingers	_____ fingers
Bucket 	_____ handspans	_____ handspans
Your hand 	_____ matchsticks	_____ matchsticks
Teacher's Table 	_____ handspans	_____ handspans
Your nose 	_____ fingers	_____ fingers
Water bottle 	_____ fingers	_____ fingers
Your hair 	_____ handspans	_____ handspans

Demonstrate the correct use of units like fingers, handspans and matchsticks.
Ask children to take an object and measure it using different units.

Cat's food — rat or milk?



- Use your fingers to find out the distance between the rat and the milk. _____ fingers
- How far is the cat from the rat? _____ fingers
- How far is the cat from the milk? _____ fingers
- What will the cat reach first the rat or the milk? _____
- Can the rat save itself ? How?
- Tell a story using this picture.
- How long is the rat's tail? _____ fingers
- Who has longer whiskers? The rat or the cat?



Practice Time

(1) Measure

(a) My bag is _____ handspan long.

(b) My classroom is _____ feet long.

(c) Window in my class is _____ pencils long.

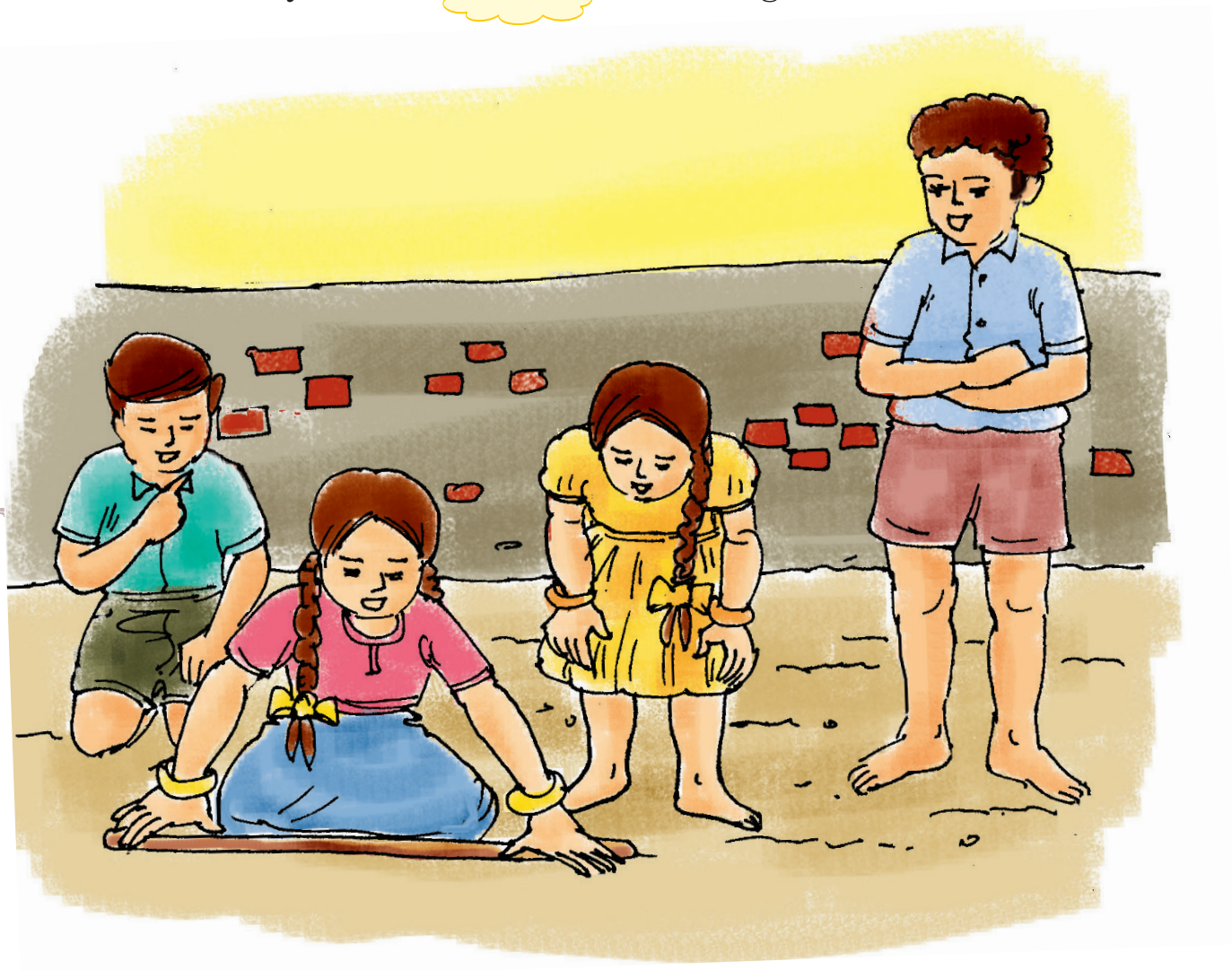


(2) Play *Gilli-danda* with your friends and use the *danda* to measure.

(a) My classroom is _____ *danda* long.

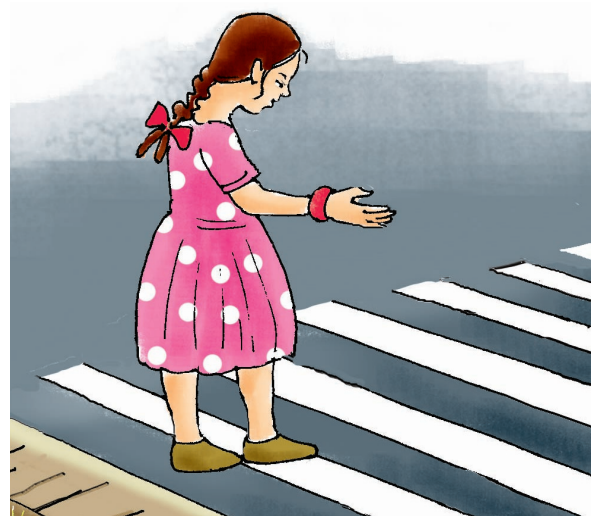
(b) My black board is _____ *danda* long.

(c) Window in my class is _____ *danda* long.



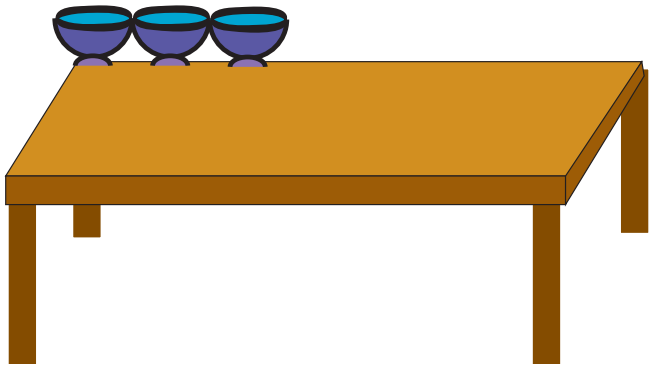
2. How Many?

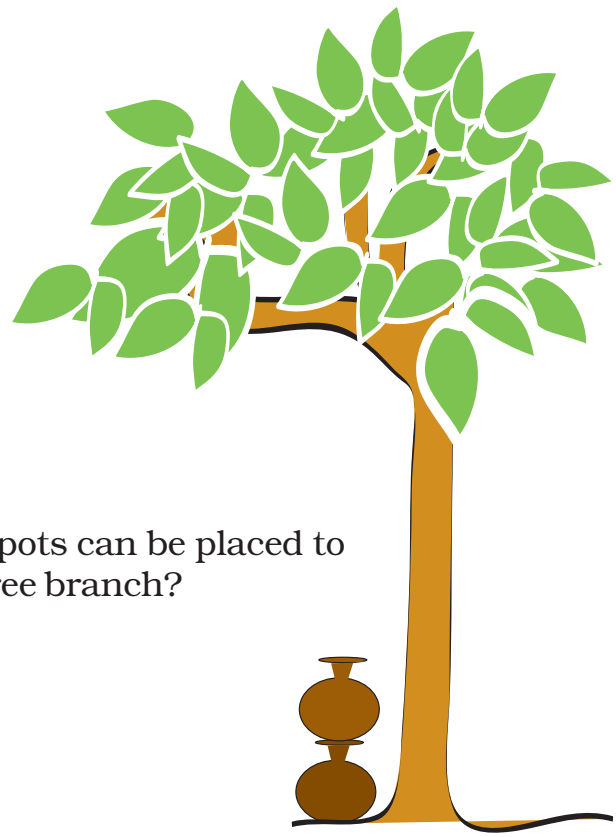




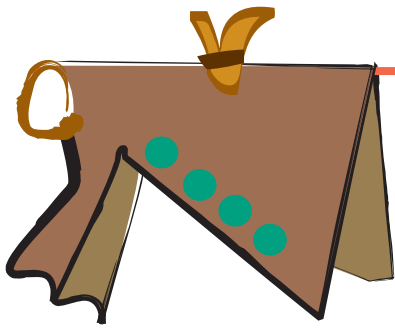
- In how many steps will Rubina cross the road?

- How many cups can be placed in a line (along the edge) on this table?





- How many pots can be placed to reach the tree branch?

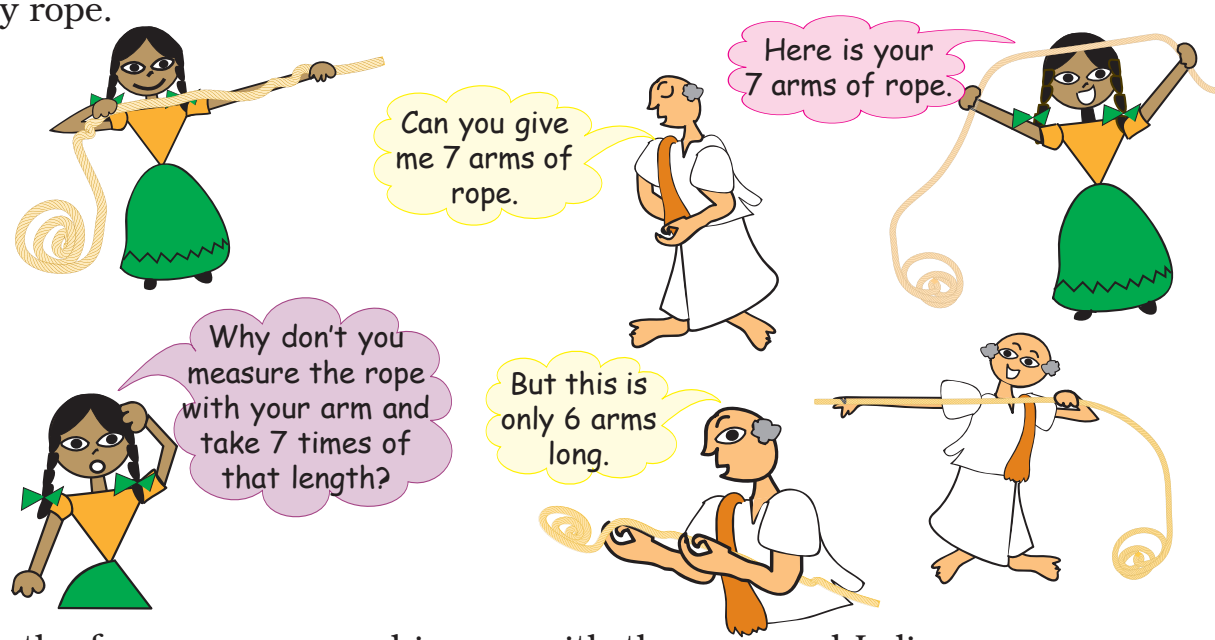


- How many shirts can be hung on this wire?



3. Long and Short

Lali is selling things at her father's shop. A farmer comes to buy rope.



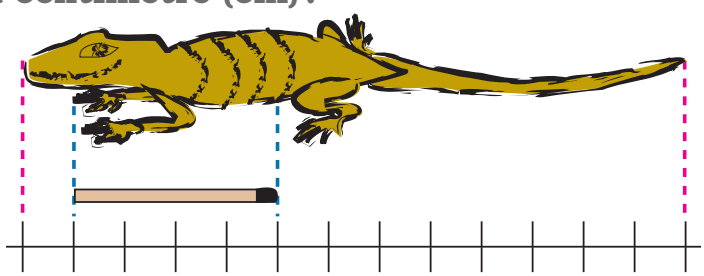
So, the farmer measures his arm with the rope and Lali gives him 7 times that much rope.

Measure your arm and your mother's arm. What is the difference?

You can see that there is a difference between the measure of your mother's arm and your arm. When we measure using things which are different from person to person then they are called **non-standard** units, just like handspans and fingers.

Non-standard units give different answers, while to get one unique answer for measurement we need **standard** units. One such unit is **Centimetre** (also written as cm)

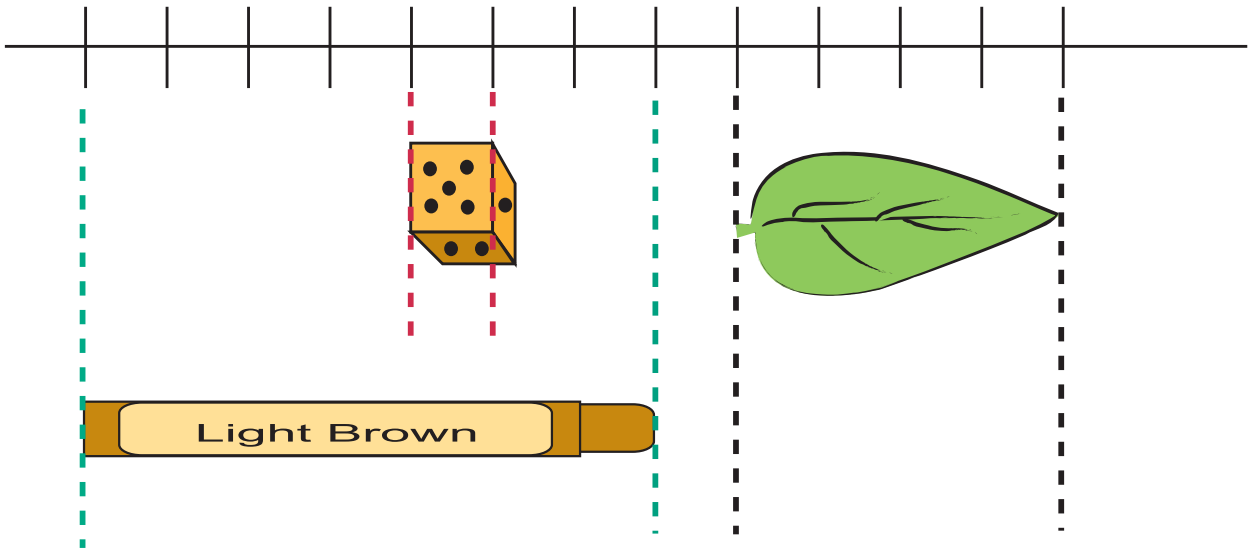
How much is a centimetre (cm)?



Children should be encouraged to look around and see how lengths of different things are measured in different ways using local or non-standard units. For example, rope, garlands or cloth may be sold by the cubit, handspan, fingers, etc. They also need to do activities of measuring lengths (and distances) with their own body parts.

The matchstick is 4 centimetres long.

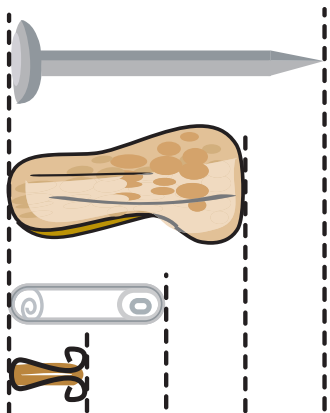
The lizard is 13 centimetres long.



The die is 1 centimetre from every side.

The leaf is _____ centimetres long.

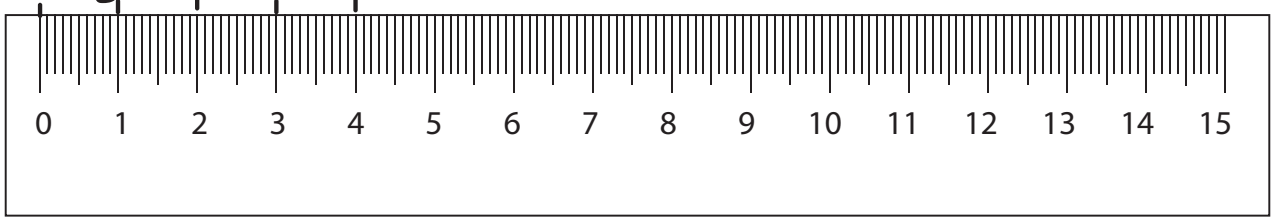
The wax colour is _____ centimetres long.



Now, look at a scale that you find in a geometry box. How many centimetres does it have? _____

The small scale that you mostly use in school is like this one.

Is it easier to start measuring from the 0 mark? Look at the things drawn near the scale and find out their lengths.



(a) What are the little lines on the scale used for?

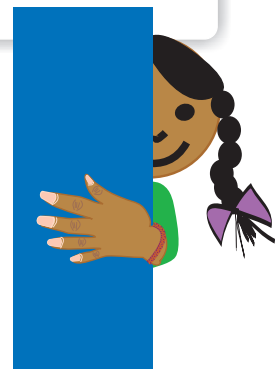
(b) Look for things that are

- About 10 centimetres long _____



- Between 10 and 20 centimetres long _____
- Less than 1 cm long. _____

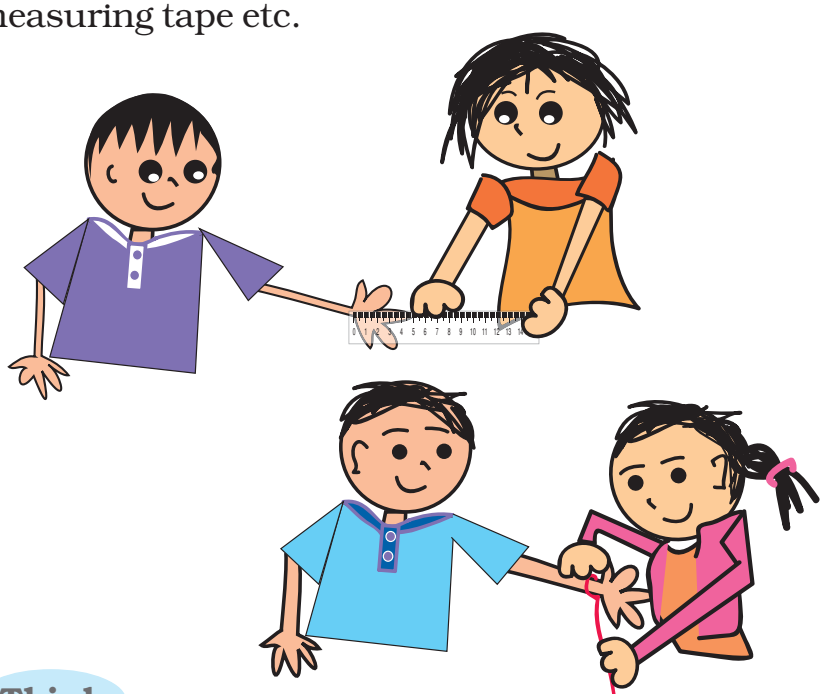
(c) Draw some of them here.



Measuring Tape

Bring a measuring tape.

Guess the lengths of different parts of your body and check if your guess is correct. You can use a scale, string, measuring tape etc.



Think

How will you know the number of centimetres if you measure with a rope, shoe-lace, thread etc.?

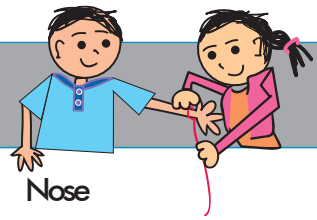
Activity

Making a measuring string

(1) Take a string

(2) Use the scale to make the markings.

(3) Colour the string after every 1 cm. (You can use 3 different colours.)

	My measurement	My friend's measurement
Nose	_____ centimetres	_____ centimetres
Around the wrist	_____ centimetres	_____ centimetres
Around the head	_____ centimetres	_____ centimetres
Ear	_____ centimetres	_____ centimetres
Hand (tip of middle finger to elbow)	_____ centimetres	_____ centimetres

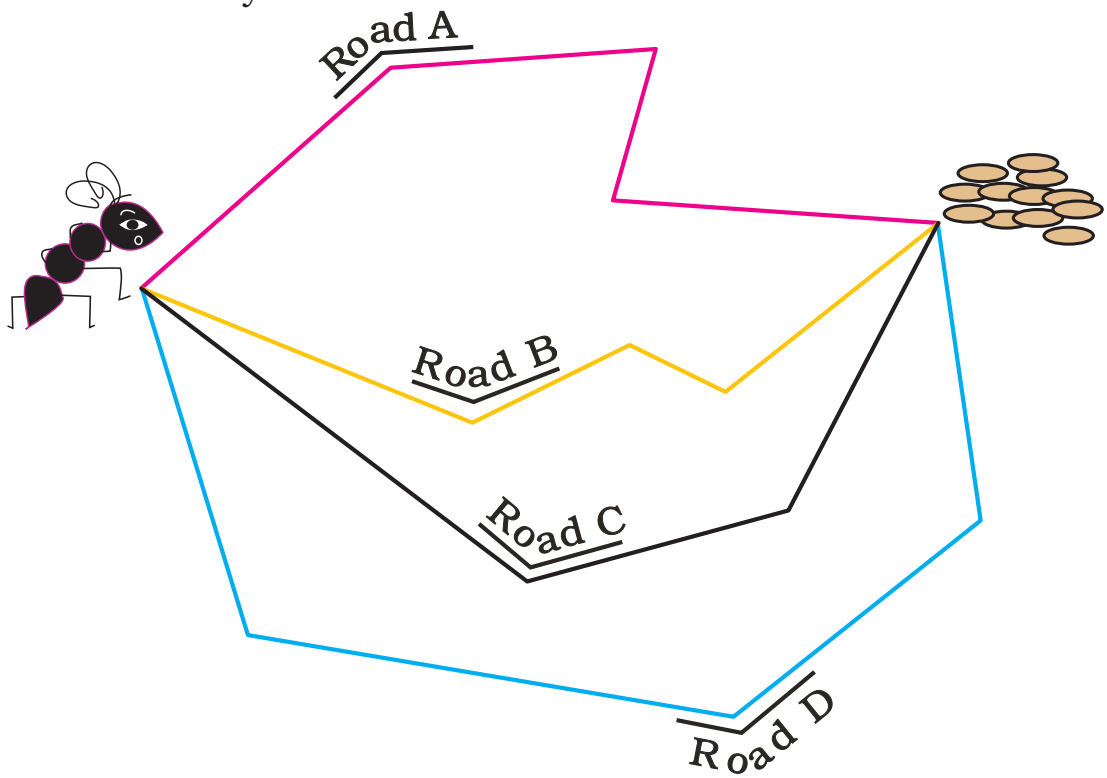
Compare your measurement with your friends'.

- Who has the bigger head and who has the smaller head?
  _____, _____
- Who has the longer hand (from middle finger to elbow)?
  _____
- Which is longer, your ear or your nose? _____
- Is any of your nails more than 1 centimetre long? _____



Gibli and the grains

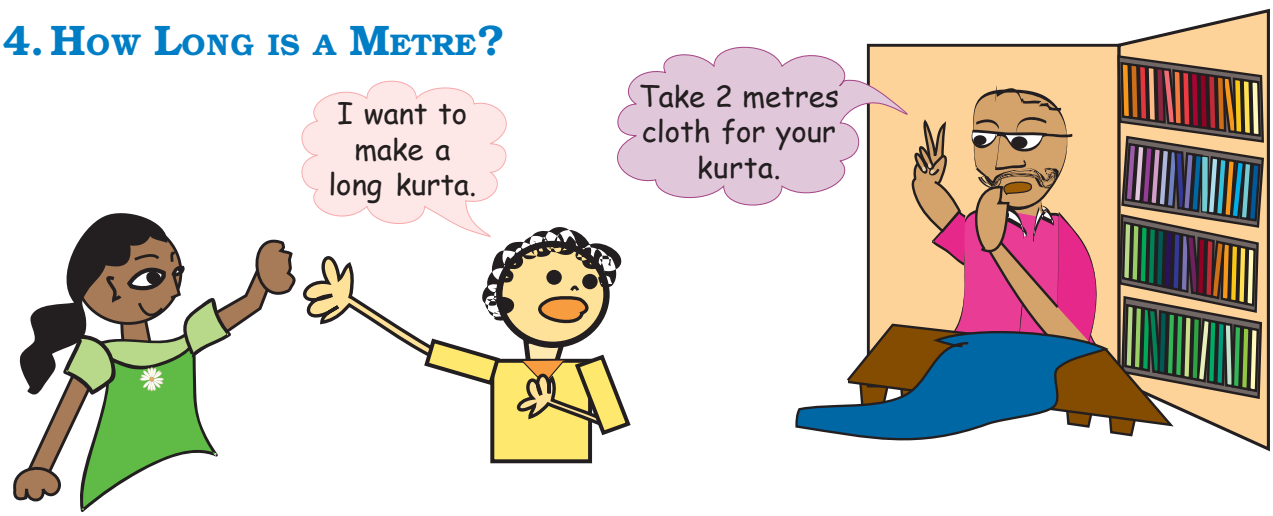
Ant Gibli has to reach the grains. She is looking for the shortest road. Can you tell her which one is the shortest?



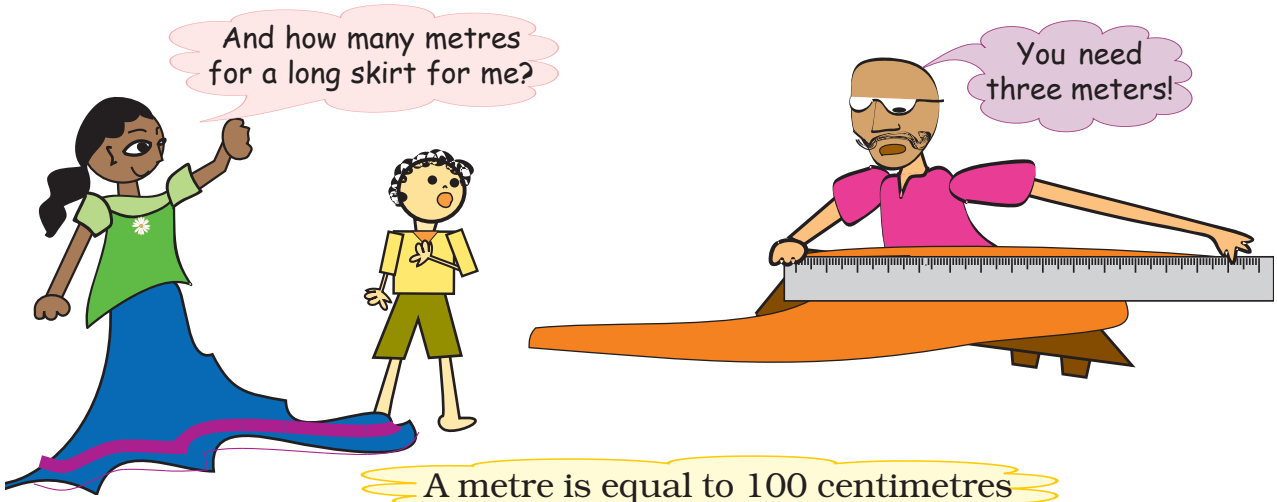
Can you draw a road shorter than these? What is the length of that road? _____

(Hint: Join the two objects by drawing a line.)

4. How Long is a Metre?

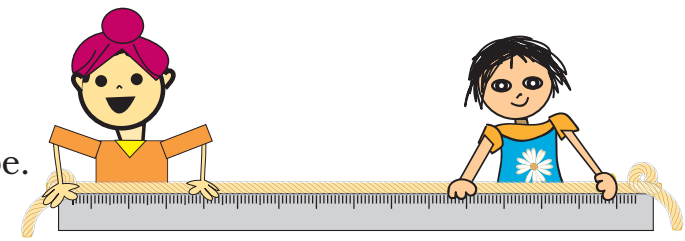


It is more important for children to be able to get an estimate of a metre as related to known things, such as, their own heights, rather than do tedious exercises of converting metres to centimetres, etc.



Activity

(1) Let us make a metre-rope

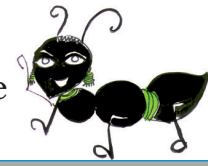


You must have seen shopkeepers measuring cloth with a metre rod.

- Use a metre rod and a rope.
- Make a knot at one end of the rope.
- Keep the metre rod with the rope.
- Mark 1 metre on the rope and make a knot there.
- Now the length between the two knots is 1 metre. This is your metre-rope.

If you don't get a metre rod use a measuring-tape and mark 100 centimetres on the rope. 100 centimetres are equal to 1 metre, so you get the metre-rope.

(2) Guess and check



- Find some things that look 1 metre long.
- Use your metre-rope to find which of these things are more or less than 1 metre.

Name of the things	More than 1 metre	Less than 1 metre
Length of table	–	–
Width of table	–	–
Width of door	–	–
Length of door	–	–
	–	–
	–	–





Some children have marked a 1 metre height on a wall of their class.

You can also mark 1 metre on one of your class walls.

Now make a chart of the heights of your friends.

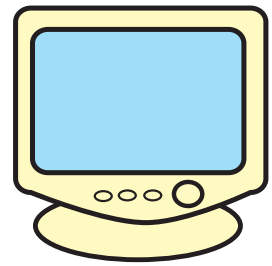
To measure in centimetres, you can use your small scale.

Name	Taller/Shorter/Equal to 1 metre	How many centimetres more or less than a metre
Monica	Taller	4 centimetres
_____	_____	_____
_____	_____	_____
_____	_____	_____
_____	_____	_____



5. Centimetres or Metres?

Which of these will you measure in centimetres and which will be in metres?



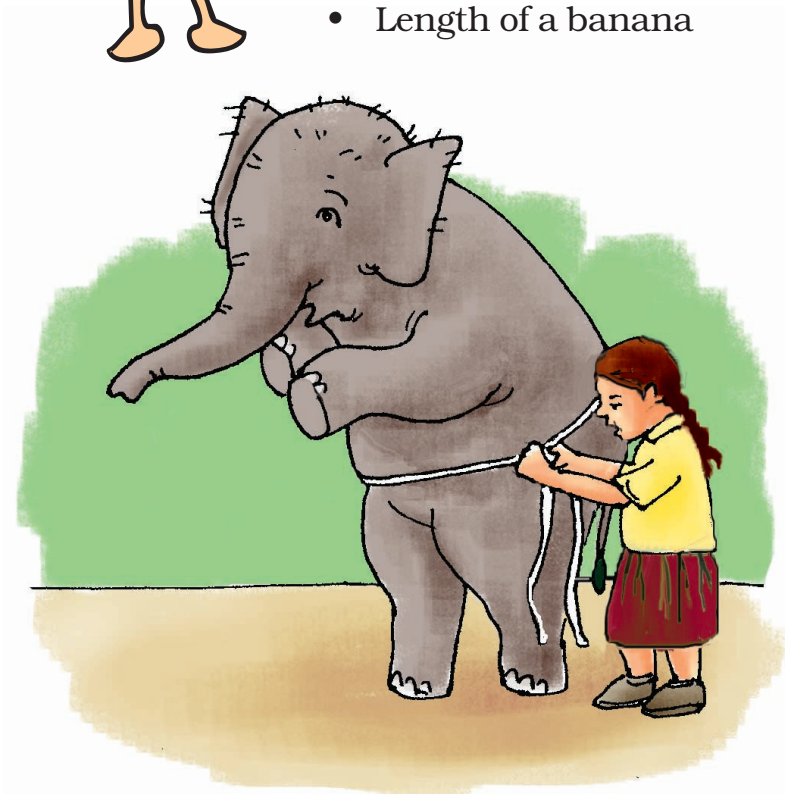
- Width of a Television screen



- Length of a *Pagdi* worn by Sikhs
- Height of a 1-year old child



- Length of a banana



- Waist of an elephant
- Height of a sugarcane
- Depth of a well



- Height of your mother
- Distance from classroom to school gate
- Length of your father's arm



Now we know that

100 centimetres = 1 metre

or 100 cm = 1 m

Practice Time

(1) Convert in centimetres

(a) 12 m = 12 × 100 = 1200 cm.

(b) 5.60 m (5 metres and 60 centimetres) = _____ cm.

(2) Convert in metres

(a) 900 cm = _____ m.

(b) 1500 cm = _____ m.

(c) 560 cm = _____ m.

(3) Write in Metres

3 metres 45 centrimetres 3.45 metres

99 centimetres _____ metres

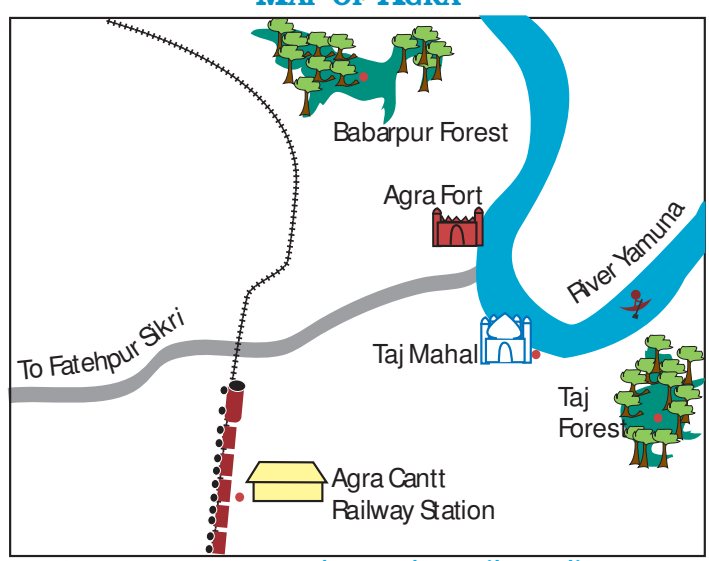
1 metre and 5 centimetres _____ metres

Trip to Agra

Marie and Baichung are going with their family to Agra. They get down at Agra Cantt Railway Station and take a rickshaw to Taj Mahal. After 3 hours, they start for Agra Fort, again in a rickshaw. In the afternoon they take a bus to go to Fatehpur Sikri.

Now look at the distances between these places (for kilometres we write km).

Map of Agra



(shows the railway line.)

Students should be informed about the decimal representation of basic fractions like $\frac{1}{10}$, $\frac{1}{100}$ as 0.1, 0.01 and its applications as given above.

Children must be encouraged to speak of a kilometre in the context of a story or narrative because in the beginning they may not be able to perceive of bigger units such as a kilometre. The map of Agra is an exercise with a narrative involving children with familiar images (icons) to help the initial understanding of mapping in 2 dimensions.

- Agra Cantt Railway Station to Taj Mahal – 5 km
- Taj Mahal to Agra Fort – 2 km
- Agra Fort to Fatehpur Skikri – 40 km

Now find from the map —

(a) Which is farther from Agra Cantt Railway Station —

- Taj Mahal or Fatehpur Sikri? _____

(b) Which of these is nearer to the railway line?

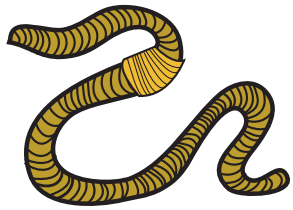
- Babarpur Forest or Taj Forest _____
- Agra Fort or Taj Mahal _____

(c) Which is closer to the river Yamuna:

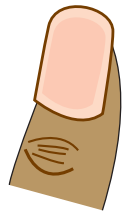
- Taj Mahal or the Agra cantt Railway Station? _____

Match the Correct Length

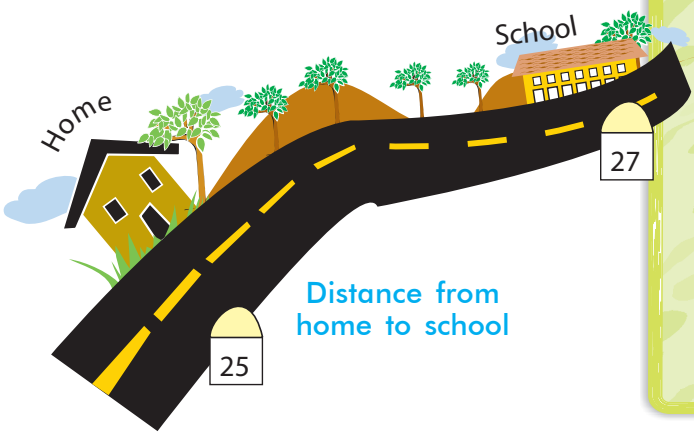
Draw lines to match each picture with how long it can be.



Length of an earthworm



Width of a finger nail



Distance from home to school

2 kilometres

5 metres

10 centimetres

1 centimetre

1 metre



Height of a child in class 1



Length of a Sari

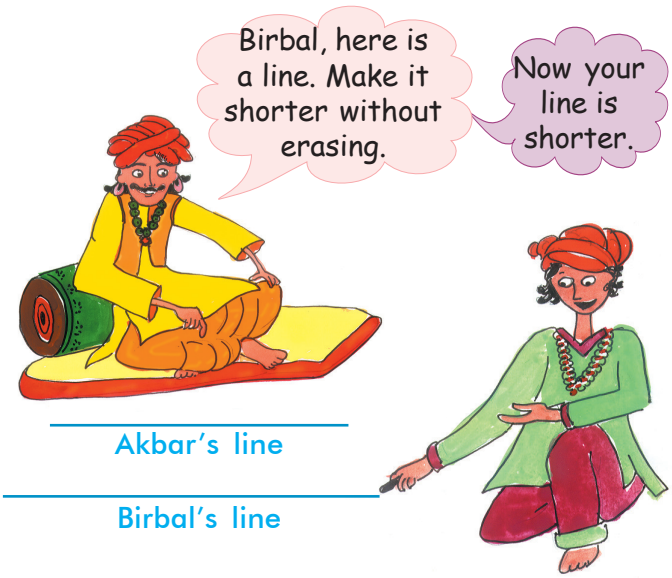


6. The Shorter Line

Akbar was a famous king. He had a smart minister called Birbal. Once Akbar asked him a difficult question. He drew a line on the floor.

Look at the picture and explain how Birbal made Akbar's line shorter.

Now can you be as smart as Birbal? Make his line shorter without erasing it. Just think - is there any longest line?



How tall have you grown?

Do you remember the last year you measured your height?

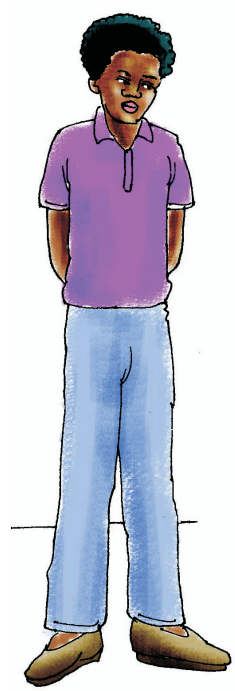
Do you think you have grown taller?

How much? _____ (cm)

Have your friends also grown taller?

Find out and fill the table below.

Friend's Name	Last year's height (in cm)	This year's height (in cm)	How many cm has she grown?





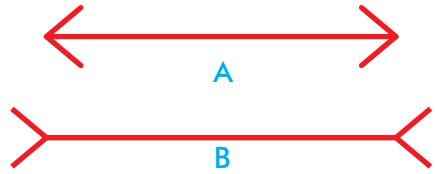
Jhumpa once read a list of the tallest people in the world. One of them was 272 cm tall! That is just double of Jhumpa's height. How tall is Jhumpa? _____ cm.

The long and short of your family!

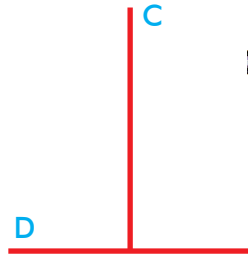
- Who is the tallest in your family? _____
- Who is the shortest in your family? _____
- What is the difference between their heights? _____

Our eyes get confused?

Which line is longer? A or B? Measure each line and write how long it is in centimetres. How good is your guess?









Which line is longer? C or D? Measure each line.

How good is your guess?

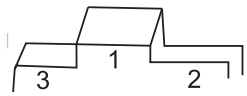


Practice Time

(1) A school at Malappuram has its sports day. The first five children recorded their long jump as:

Teena	3.50 m
Meena	4.05 m
Rehana	4.50 m
Anu	3.05 m
Amina	3.35 m





Teena jumped 3.50 m which is 3 m and 50 cm.

But how far did Anu jump? ____ m and ____ cm

Who is the winner in the long jump?_____

Write the names of the I, II and III winners on this stand.

Do you remember that 1 metre = 100 centimetres? So one centimetre is 1/100 of a metre.

We also write 1 cm as _____ m

(2) Here are the Indian Records and World Records of some long and high jumps.

Sports	World Record	Indian Record
High Jump (Men)	Javier S. (2m 45cm)	Chandra Pal (2m 17cm)
Long Jump (Men)	Mike P. (8m 95cm)	Amrit Pal (8m 8cm)
High Jump (Women)	Stefka K. (2m 9cm)	Bobby A. (1m 91cm)
Long Jump (Women)	Galina C. (7m 52cm)	Anju G. (6m 83cm)

Find out from the table —

(a) How many centimetres more should Chandra Pal jump to equal the Men's World Record of trans high jump?

(b) How many centimetres higher Bobby A. should jump to reach 2 metres?



Remember that
1m = 100 cm
Half metre = ?

(c) Galina's long jump is nearly

(i) 7 metres (ii) 7 and a half metres (iii) 8 metres

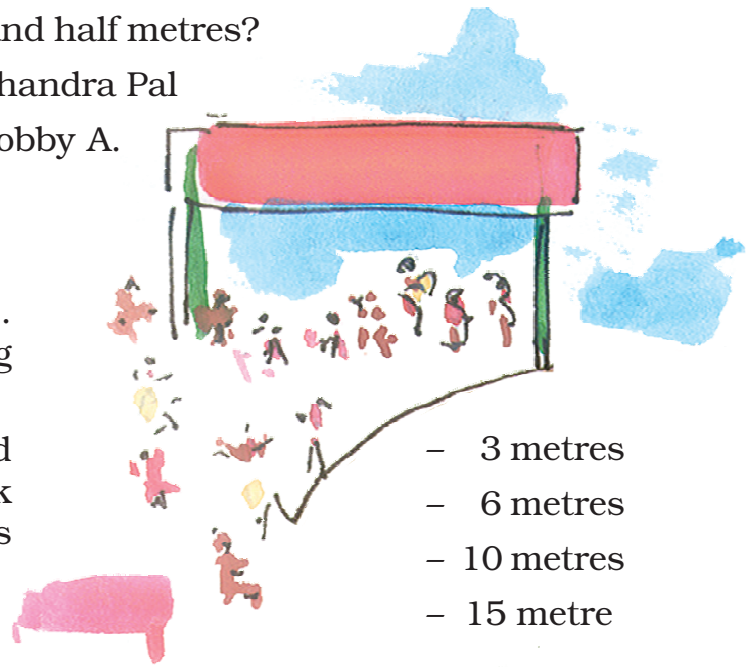
(d) Look at the Women's World Records. What is the difference between the longest jump and the highest jump?

(e) If Mike P. could jump _____ centimetres longer, his jump would be full 9 metres.

(f) Whose high jump is close to two and half metres?

(i) Stefka K. (ii) Chandra Pal

(iii) Javier S. (iv) Bobby A.



(3) Inter-school Sports Meet

Race

This is a 100 metre race for girls. Arundhati is nearest to the finishing line. She is about 6 metres from it.

Behind her is Rehana. Konkana and Uma are running behind Rehana. Look at the picture. To answer the questions below choose from these distances:

– 3 metres
– 6 metres
– 10 metres
– 15 metre



(a) How far is Rehana from Arundhati? _____

(b) How far ahead is Rehana from Konkana and Uma? _____

(c) How far are Konkana and Uma from the finishing line? _____

Have you heard about a 1500 m or 3000 m race? (You remember that 1000 metres make 1 kilometre and 500 metres make half a kilometre.)

* So you can say —

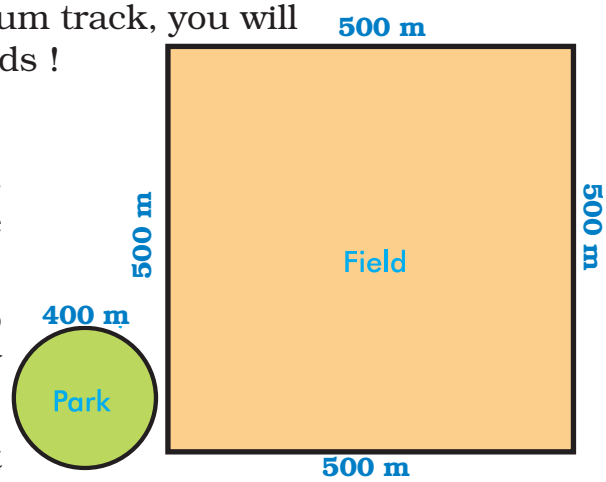
In a 1500 metres race people run _____ km

In a 3000 metres race people run _____ km

(4) Have you heard about marathon race in which people have to run about 40 kilometres? People run marathon race on roads because the track of a stadium is only 400 metres and number of participants are too many.

10 rounds of a stadium track = _____ km

So, if you run a marathon on a stadium track, you will have to complete _____ rounds !



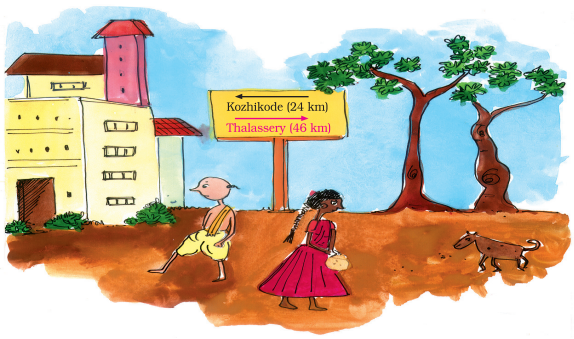
(5) Running Exercise

The doctor has told Prabha Devi to run 2 km every day to stay fit. She took one round of this field. How far did she run?

The field was very far from her home. So she chose a park nearby. The boundary of the park was about 400 metres long.

(a) How many rounds of the park must Prabha Devi run to complete 2 km?

(b) One day the weather was very good and a cool breeze was blowing. She felt so good that she kept running till she got tired after 8 rounds. That day she ran _____ km and _____ metres!



(6) From Kozhikode to Thalassery

Subodh is going to wards Kozhikode which is 24 kilometres (km) away. Manjani is going to wards Thalassery which is 46 km away in the opposite direction.

How far is Kozhikode from Thalassery?

_____

(7) Write in metres

(a) 2km = _____ m.

(b) 10km = _____ m.

(c) 33km = _____ m.

(8) Write in kilometres

(a) 3000m = _____ km.

(b) 7000m = _____ km.

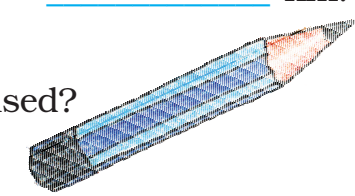
(c) 12000m = _____ km.

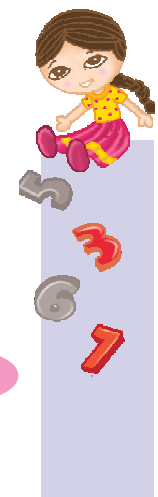
7. Centimetre and Millimetre

What was the length of the smallest pencil you have used?

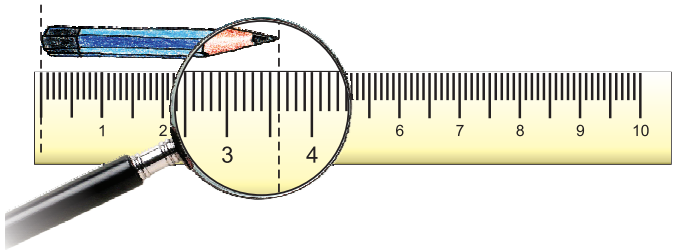
How long is this pencil? Guess _____ cm

Measure it using a scale. How good is your guess?





We can see that Anju used a lens to make it look bigger.



It is more than 3 centimetres.



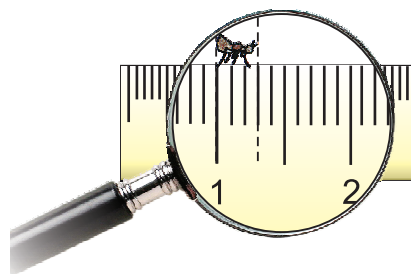
Here one centimetre has 10 equal parts. So each part is one-tenth of a centimetre. One-tenth of a centimetre is called one millimetre (mm).



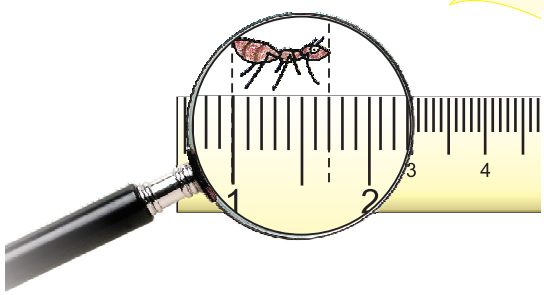
See I am 3 mm long.



Oh, so this pencil is 3 centimetres and 6 millimetres long.



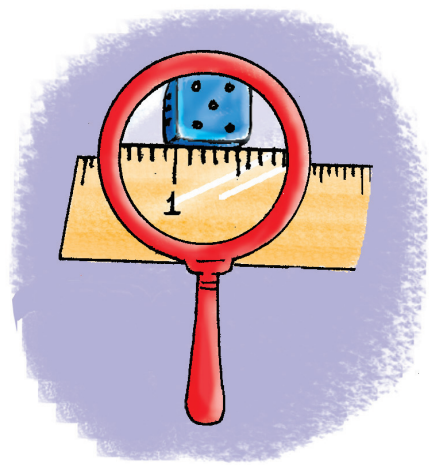
But I am longer! Seven-tenth of a centimetre or _____ millimetres



We also call one-tenth of a centimetre as 0.1 centimetre. We read it as 'zero point one centimetre'.

So one millimetre is the same as 0.1 cm.

- What is the length of this die? _____ mm. What is its length in centimetres?



Frogs

Have you seen frogs? Where? How many different types of frogs have you seen? Are all the frogs of the same length? Here are two interesting examples.

Gold Frog

This kind of frog is among the smallest in the world. Its length is only 0.9 cm!





Guess how many such frogs can sit on your little finger!









Bull Frog

But this is among the biggest frogs. It is as long as 30.5 cm!

What does 0.9 cm mean? It is the same as _____ millimetres. We can also say this is nine-tenths of a cm. Right?

So 30.5 cm is the same as _____ cm and _____ mm.

About how many of the big frogs will fit on the 1m scale?

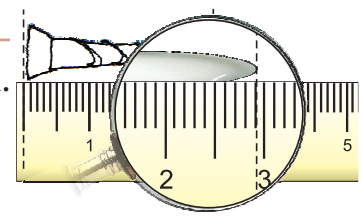
_____

If they sit in a straight line, about how many of the small frogs will cover 1m? _____

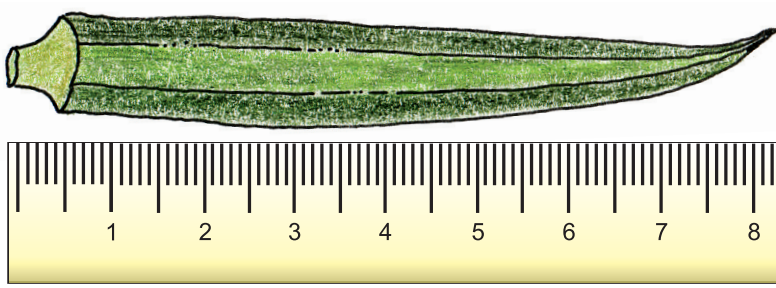


Practice Time

(1) Length of the nail — 2 cm and ____ mm or 2. ____ cm.

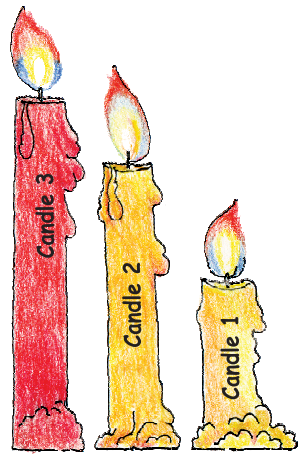


(2) The length of this lady finger (*bhindi*) is _____ cm and _____ mm. We can also write it as _____ cm.





(3) Using the scale on this page find the difference in length between candle 1 and candle 3.



	Lenght in cm and mm	Length in cm
Candle 1		
Flame 1		
Candle 2		
Flame 2		
Candle 3		
Flame 3		

(4) Convert to centimetres

(1) 4mm = _____ cm (2) 19mm = _____ cm

(3) 300 mm = _____ cm (4) 50.5 mm = _____ cm

(5) Convert to millimetres

(1) 20 cm = _____ mm (2) 70 cm 5mm = _____ mm

(3) 9m = _____ mm (4) 3m 750mm = _____ mm

The longest rupee notes?

What is the length of a 100–rupee note? Guess, Measure it using a scale.

Now guess the length and width of many other things. Measure and find the difference between your measure and your guess.



Size	Your guess in cm		Your measure in cm		Your measure in mm	
	length	width	length	width	length	width
100 Rupee note						
10 Rupee note						
20 Rupee note						
5 Rupee note						
Post card						
Maths book						

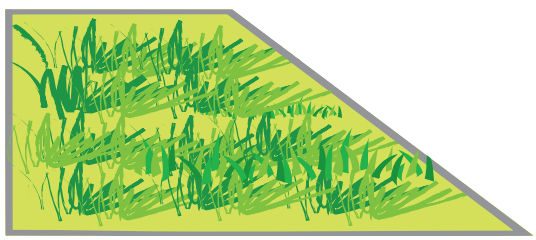
The teacher may advise the children not to include flame length in candle length .



PERIMETER AND AREA

1. Boundary

Shyama is a farmer. She grows wheat in her field.





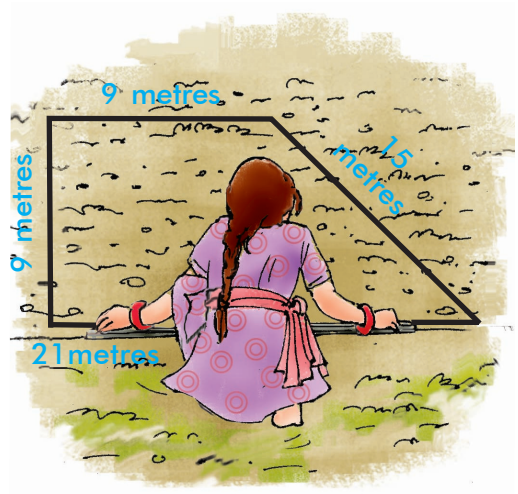
I need a fence around my field to protect it from stray animals. How much barbed wire should I buy?

Shyama needs to find the length of the boundary of the field. Can you find it from this picture? See the length of each side written near it.

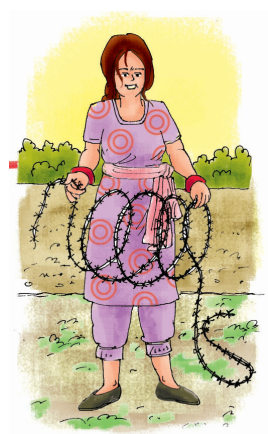
9 m +15 m +21 m +9 m = _____

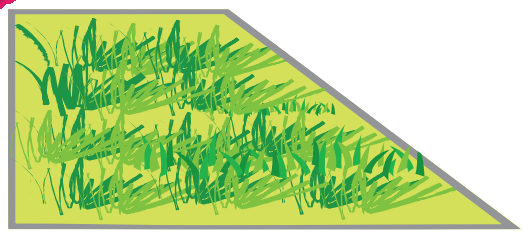


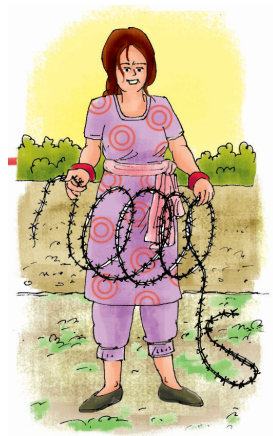
Uhm---m! The boundary is 54 metres long.

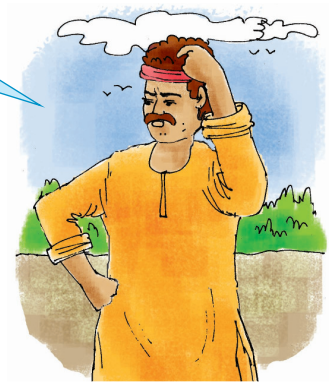


Shyama bought a roll of 70 m wire for the fence.









Ganpat

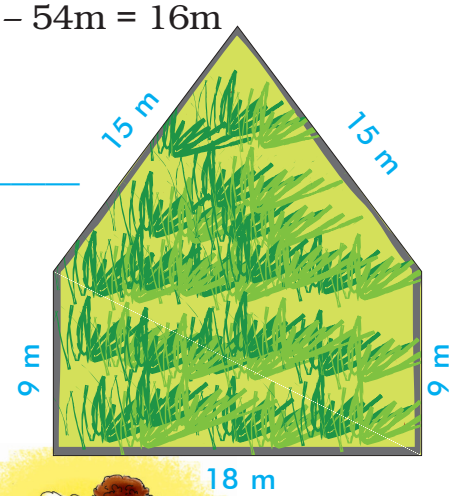




How much wire did Shyama give to Ganpat? 70m – 54m = 16m

Ganpat thanked Shyama and started fencing his own field. But he needs more wire for it.

- How long is the boundary of Ganpat's field? _____
- How much more wire will Ganpat need for fencing his field? _____
- Whose field has the longer boundary? (Shyama's or Ganpat's)
- Can you say that Shyama's field has the shorter boundary? (Yes/No)





Discussion

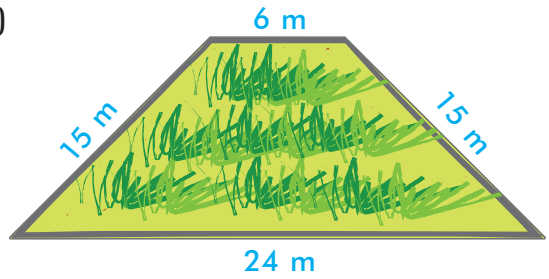
Give three examples of the situations where you need to find the length of the boundary.

1. _____
2. _____
3. _____

Practice Time

(1) Here are pictures of some more fields. Find out which one has the longest boundary. Also, find which one has the shortest boundary.

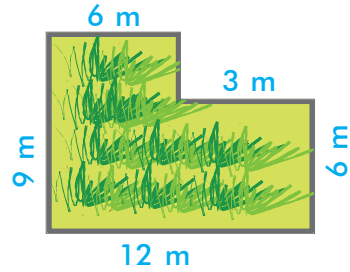
(a)



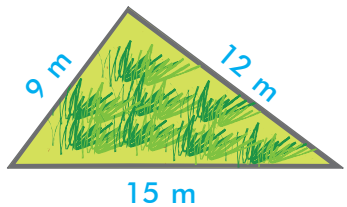
Boundary = _____ m

(b)

Boundary = _____ m



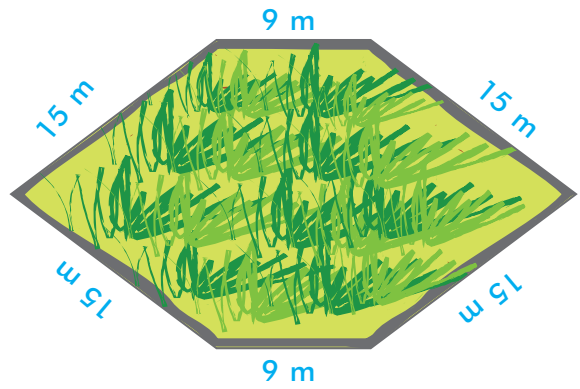
(c)



Boundary = _____ m

(d)

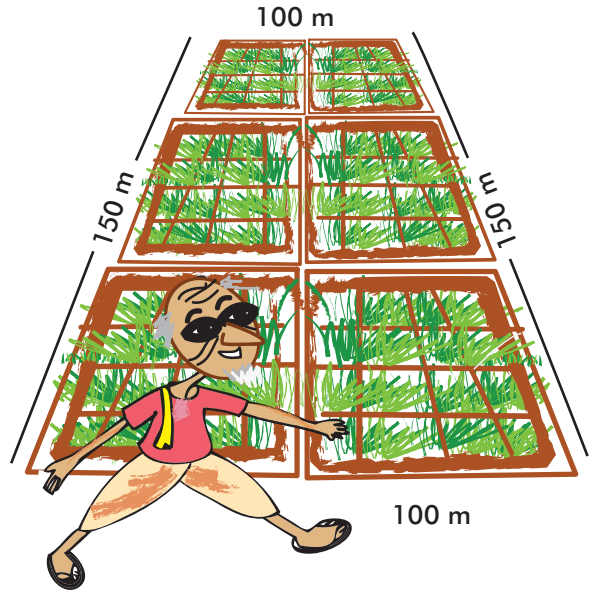
Boundary = _____ m



Longest Boundary is of field _____.

Shortest boundary is of field _____.

(2) Chandu's father is called the 'young old man' in his village. At 70 years of age, he is fully fit. He goes for a walk around his field every morning. Everyday he takes four rounds of the field.



(a) What is the distance covered by him in one round? _____

(b) What is the total distance he covers everyday?

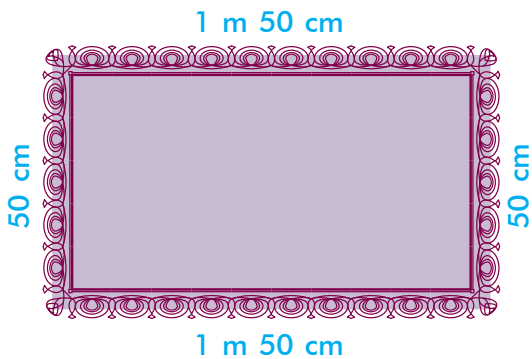
4 × _____ = _____ m = _____ km

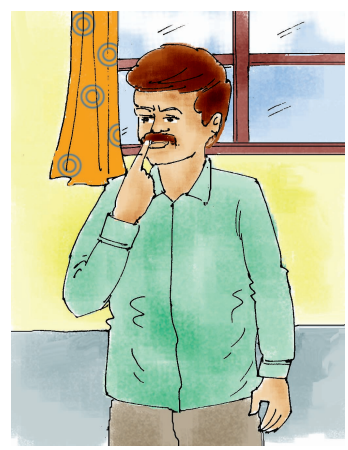
(Hint : 1km = 1000m)

(3) Shyama's husband works in a tailor's shop. He has to fix some lace around a table cloth.

He bought a 100 metre roll of lace.

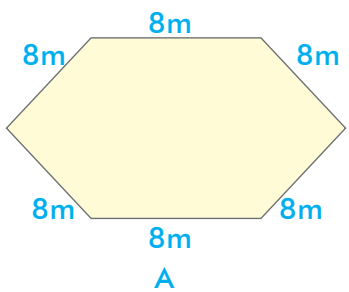
(a) Look at the picture of the table cloth and tell how much lace is used for one table cloth. _____

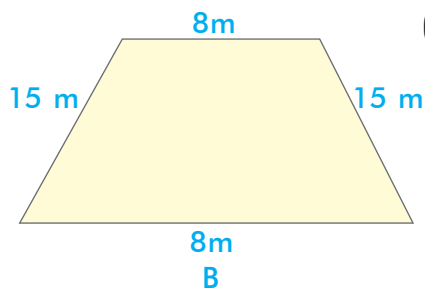




(b) How much lace will be used in 3 such table clothes? _____

(c) How much lace will be left in the roll? _____





(4) There are two playgrounds. Children have to run along the boundary of these. For which playground will they have to cover more distance?

Tick the correct answer.

(a) Playground A

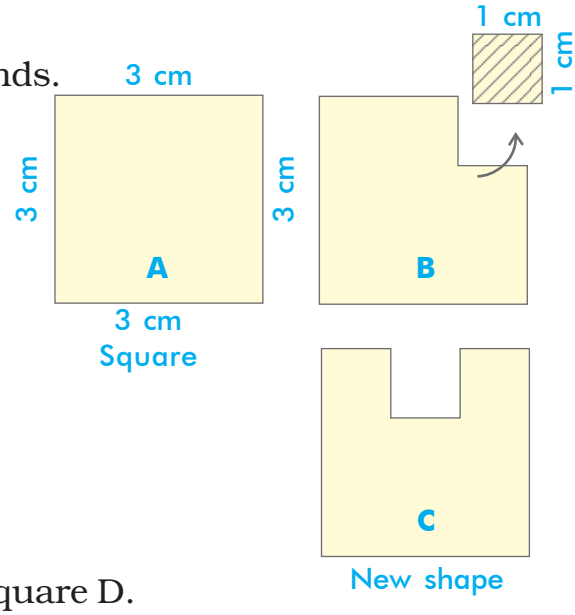
(b) Playground B

(c) Same distance in both the playgrounds.

(5) Square A has a boundary of 12 cm.

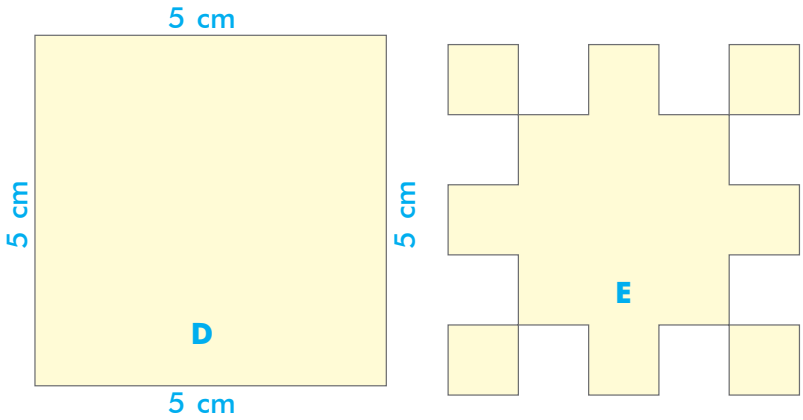
(a) From a corner of this square, a small square of side length 1 cm is cut off. Will the boundary of remaining part B be less or more? Find the length of its boundary.

(b) If you cut a square of side 1cm from square A to get shape C, what will be the length of the boundary of C?



(6) (a) Find the length of the boundary of square D.

(b) 8 squares each of side 1 cm are cut out of the square D (so that it) it looks like shape E. What is the length of the boundary of shape E?



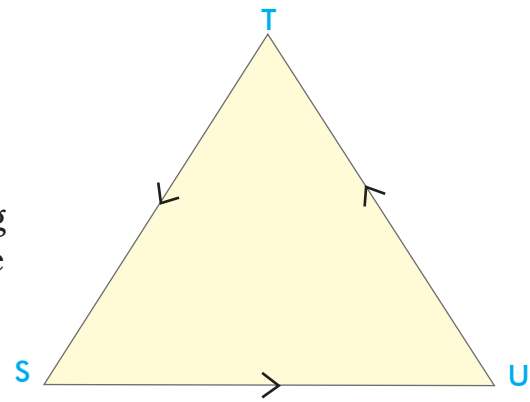


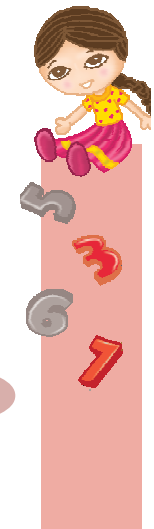
2. Perimeter

Till now we have found the length of boundaries of different figures/shapes.

Length of boundary is also called perimeter of the figure.

Take a wire. Make a triangle by bending it at two points T and U as shown in the figure. Start from the point S and move along the sides of the wire then you again reach the point S. The total

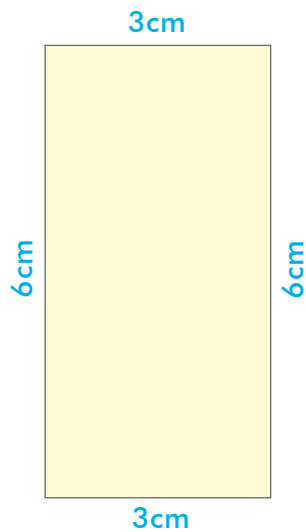




distance covered is equal to the length of the wire used to make the triangle. Repeat the process by bending the wire at several places to form different closed shapes. Every time you will get that the boundary is equal to the length of the wire which is the perimeter of the closed figure.

In fact, the perimeter of a closed figure is the total distance covered along the boundary of the figure when you go around it once.

Perimeter of a rectangle



You know that

Perimeter = Sum of all sides

= 3cm + 6cm + 3cm + 6cm = 2 × 6cm + 2 × 3cm = _____ cm.

We find

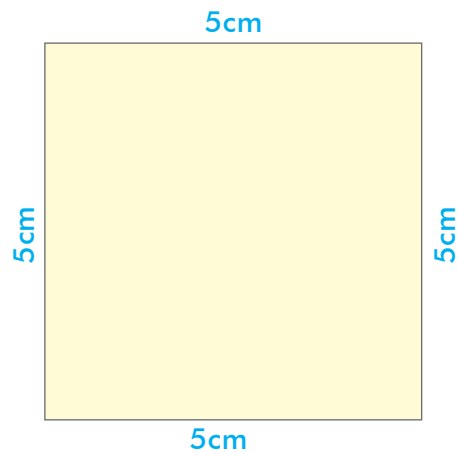
Perimeter of a rectangle = 2 × length + 2 × breadth.
= 2 × (length + breadth)

Perimeter of a square

Perimeter = Sum of all sides

= 5cm+5cm+5cm+5cm

= 4 × 5cm = _____ cm



Perimeter of a square = 4 × side of the square.

Practice Time

(1) The floor of a room is in the form of a square of side 8m. Find its perimeter.

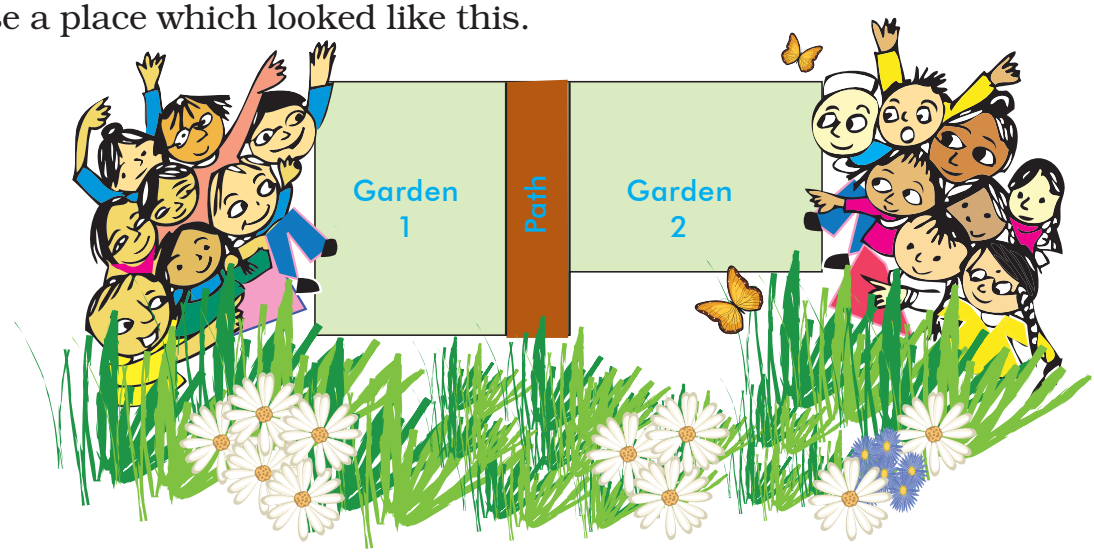
(2) Find the perimeter of a rectangle whose length and breadth are 150cm and 1m respectively.

(3) Seema wants to fix border on two quilts. Each is 2m 40cm long and 1m 20cm broad. Find the total length of the border.

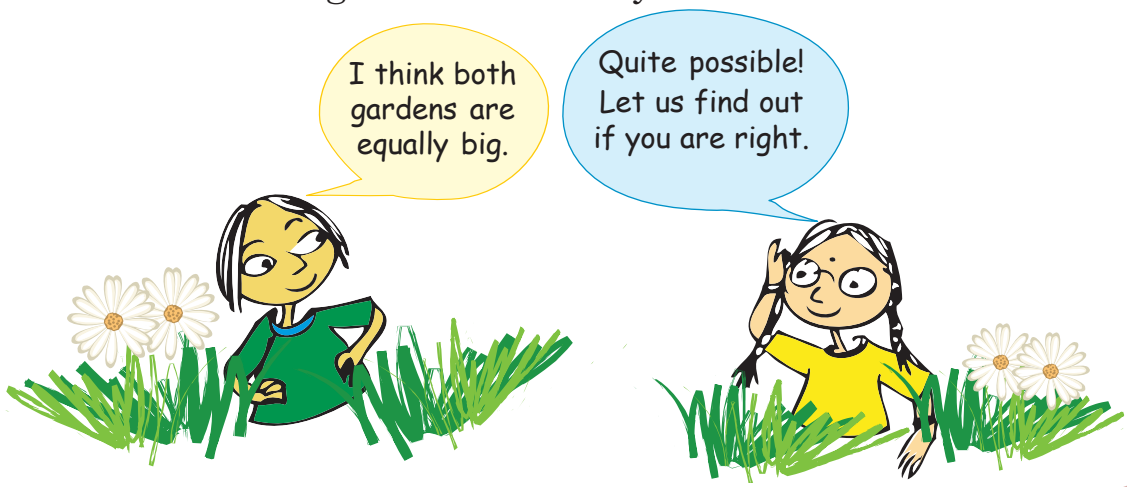
(4) A hockey field is 91 metres 40 cm long and 55 metres wide. How long is the boundary of the field?

3. Area

The students thought of making a vegetable garden. They chose a place which looked like this.



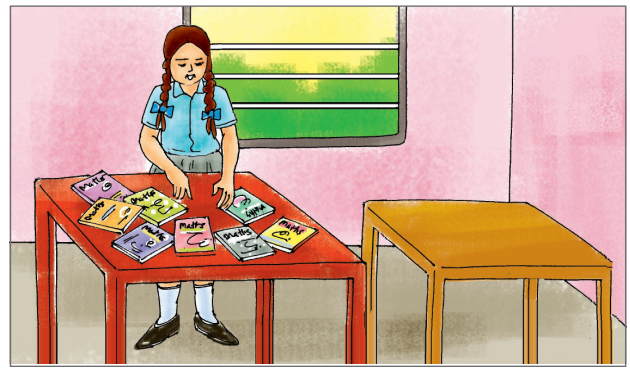
Students of both the classes thought that garden 1 was bigger. So both wanted to take garden 1. Suddenly Neetu said –



- How will Neetu find out if the two gardens are equal.

To solve this problem, let us perform the following activities.

Activities



(1) Look at the table in your classroom. Guess how many Maths books you can place on it.

(Remember — The books should not overlap. Do not leave gaps between the books.)

Write your guess here. _____

Now check if your guess was right. How many books could you place? 8 books can be placed.

We express it by saying that area of the table-top is equal to 8 Maths book.

What is the difference between your guess and the actual number of books? _____

(2) Now look for another table.

(a) Is this table bigger than the last table? Yes/No

(b) Make a guess how many Math books can be kept on this table. _____

(c) Check if your guess was correct.

How many Math books could you keep? _____

(d) Area of this table is _____ Maths books.

(e) The difference between the areas of the two tables is _____ books.

Should we always use the Maths book for finding areas?

We may use a square of side of one centimetre (or one metre or one kilometre) to answer this. Let us perform one more activity.

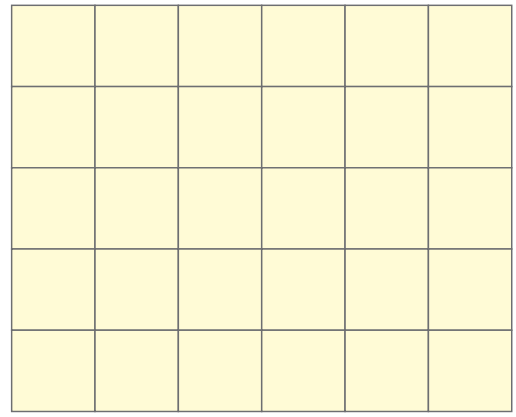
Cover the first table with matchboxes in the same way such that no gap is left and there is no overlapping. How many matchboxes could you place? _____

What is the area of the table now? _____ matchboxes

Is the answer same in both cases? _____

From the above two activities, we observe that if we take different units for measuring the area of a region, we get different answers. To obtain a unique answer, we need a standard unit for measuring the area of the region.

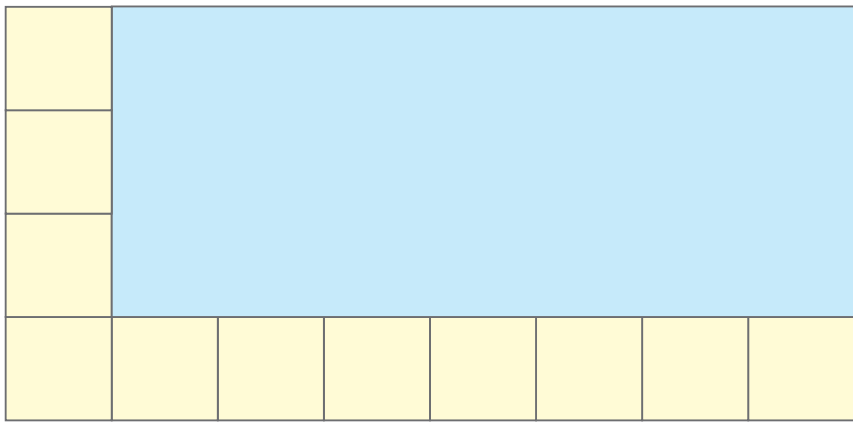
We take a square of unit length (say, square of side 1 cm) as the standard unit for area.

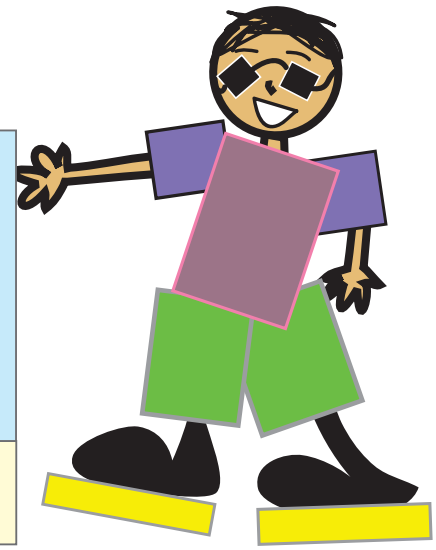


(3) (a) How many small squares of side 1 cm are there in this big square? _____. We may say that area of big square is _____ small squares. Area of square of side 1cm is taken as 1 square centimetre. So, area of the big square is _____ × _____ = _____ square centimetres.

(b) Can you think of another way to know the total number of small squares without counting them ?

(4) Guess how many squares of side one centimetre can fill this blue rectangle.





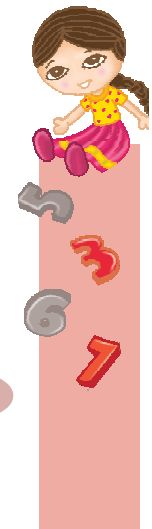
Write your guess here. _____

Check your guess by your drawing of unit squares to cover this rectangle.

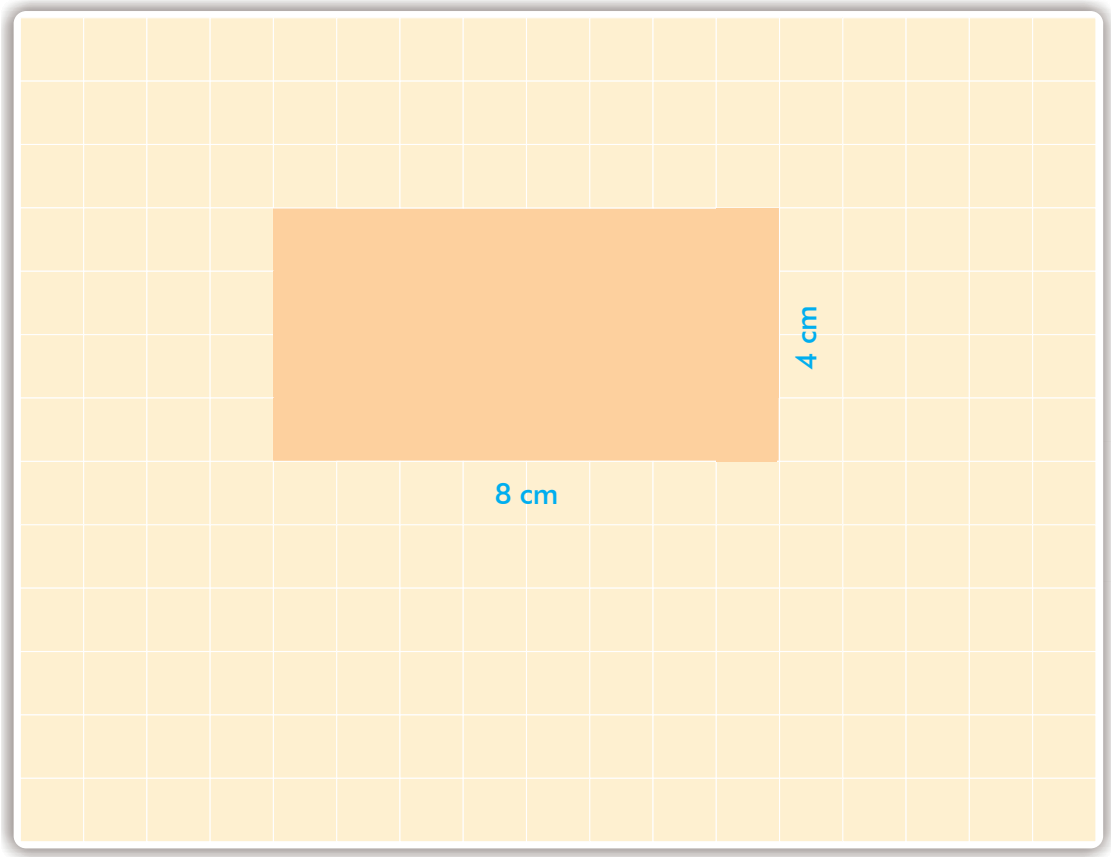
Area of the blue rectangle is _____ squares of side 1cm.

(5) Let each square in the given square grid is of side 1cm. Draw a rectangle having sum of length of all sides 24cm.

One such figure is drawn for you.

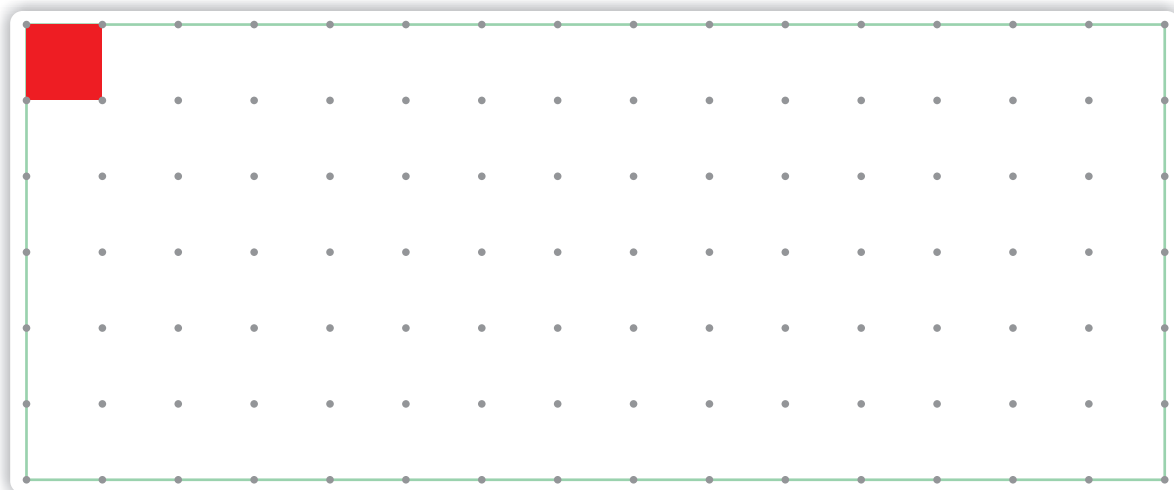


Which is the biggest shape rectangle (which encloses maximum number of squares)? Which is the smallest shape (Which encloses minimum number of squares)?



PRACTICE TIME

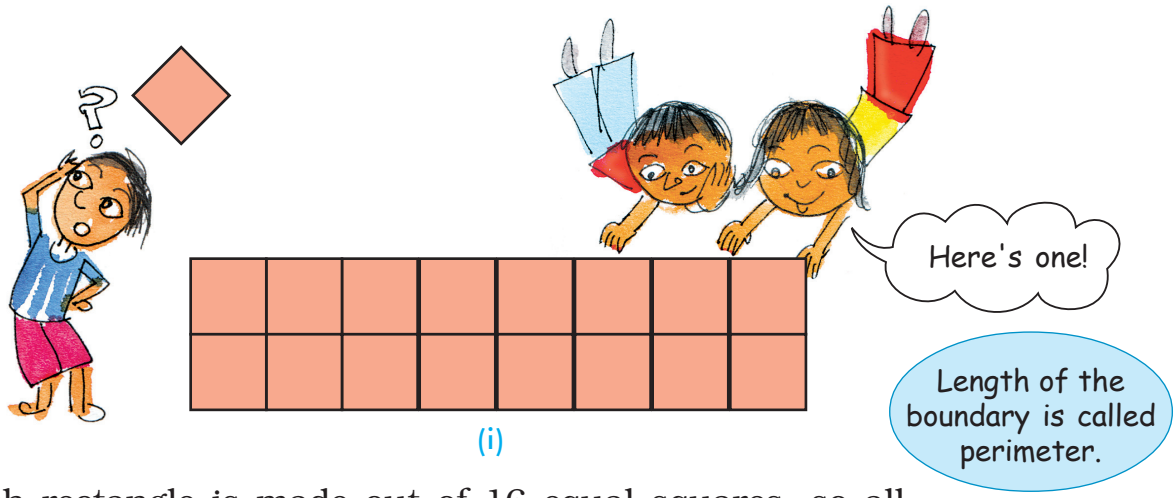
(1)



Here length and breadth should be in numbers only and not in fractions.
When students draw many rectangles with sum of four sides 24cm, one could make a square of side 6cm. Here the teacher can tell the property that every square is a rectangle but every rectangle can not be a square.

Measure the side of the red square on the dotted sheet. Draw here as many rectangles as possible using 16 such squares.

(a) How many rectangles could you make? _____



(i)

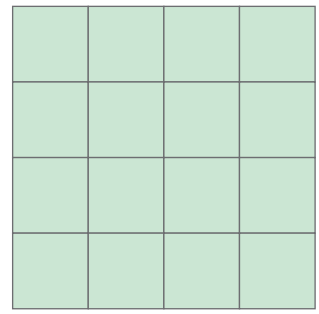
Each rectangle is made out of 16 equal squares, so all have the same area (16 square centimetres) but the length of the boundary will be different.

The other possible rectangles are shown below.

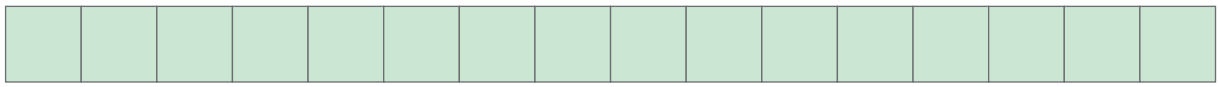
In (i), the length of the boundary (perimeter) is _____.

In (ii), the length of the perimeter is _____.

In (iii), the perimeter of the rectangle is _____.



(ii)



(iii)

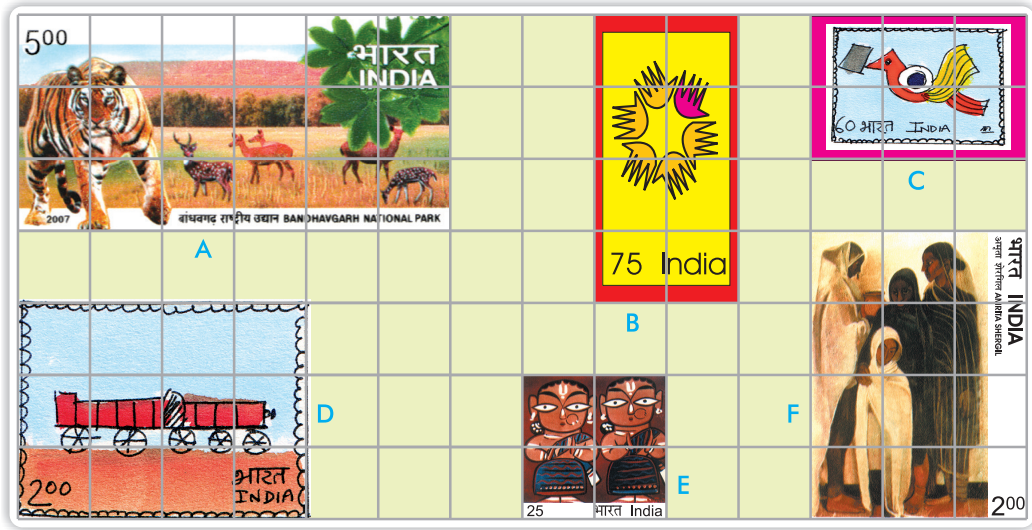
- Here rectangle (iii) has the largest perimeter.
- Here square (ii) has the smallest perimeter.

Can you think of some situations where we need to find area?

One could be – while tiling the floor

Teacher may encourage students to think of some situations from their daily life where the use of area is required.

(2) Measure Stamps



Look at these interesting stamps and answer the following.

(a) How many squares of one centimetre side does stamp A cover? _____

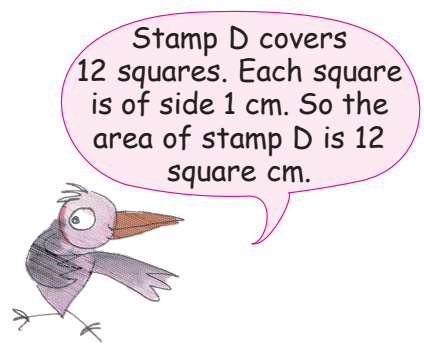
And stamp B? _____

And stamp C? _____

And stamp D? _____

And stamp E? _____

And stamp F? _____



(b) Which stamp has the biggest area? _____

How many squares of side 1 cm does this stamp cover? _____

How much is the area of the biggest stamp? _____ square cm.

(c) Which two stamps have the same area? _____

How much is the area of each of these stamps? _____ square cm.

(d) The area of the smallest stamp is _____ square cm.

The difference between the areas of the smallest and the biggest stamp is _____ square cm.



Guess

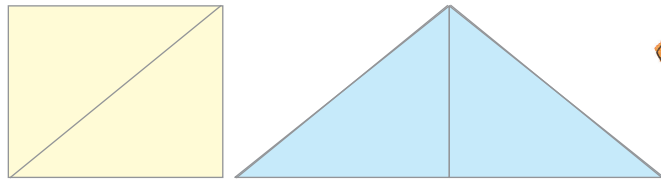
(a) Which has the bigger area — one of your footprints or the page of this book?

(b) Which has the smaller area—two ten-rupee notes together or a hundred-rupee note?

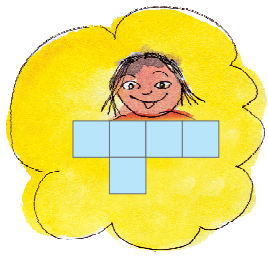


(c) Look at a 10 rupee-note. Is its area more than hundred square cm?

(d) Is the area of the blue shape more than the area of the yellow shape? If yes, then why?



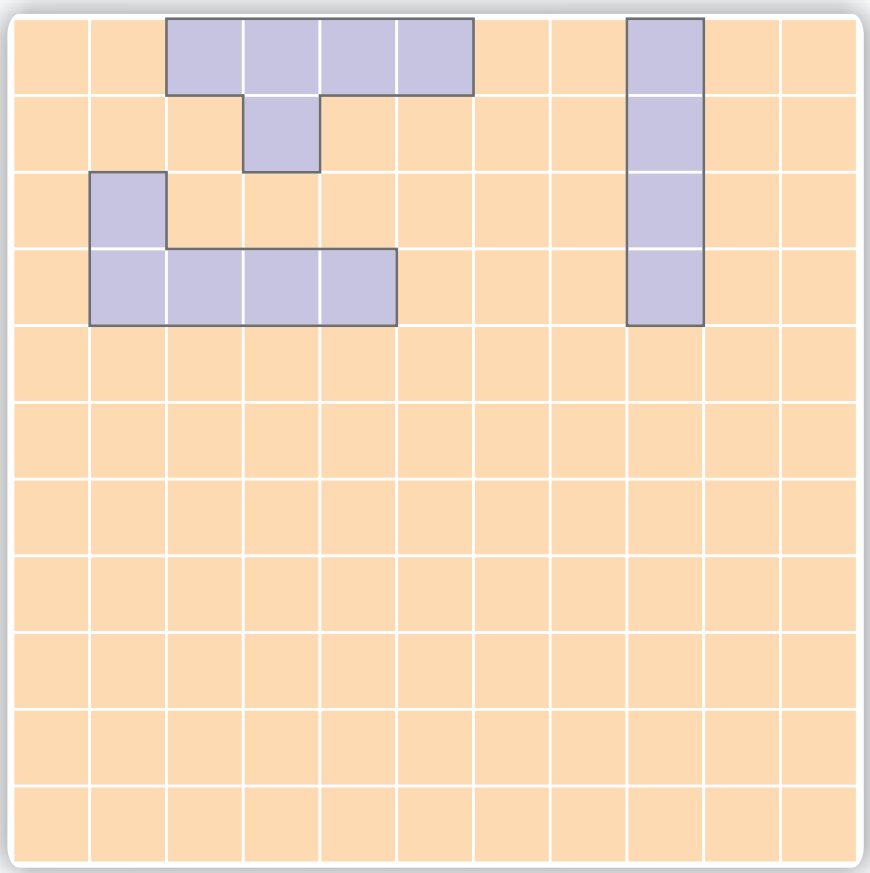


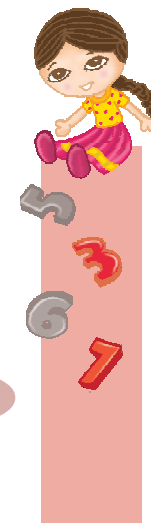


(e) Is the perimeter of the yellow shape more than the perimeter of the blue shape? If yes, then why?

(3) **Puzzle with five squares**

Measure the side of a small **square** on the squared paper given below. Make as many shapes as possible using 5 such squares. Three are drawn for you.



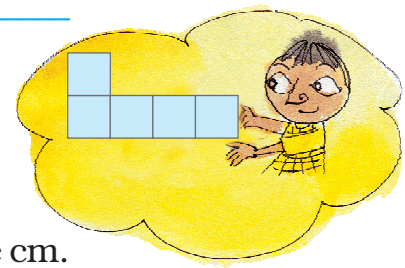


(a) How many different shapes can you draw? _____

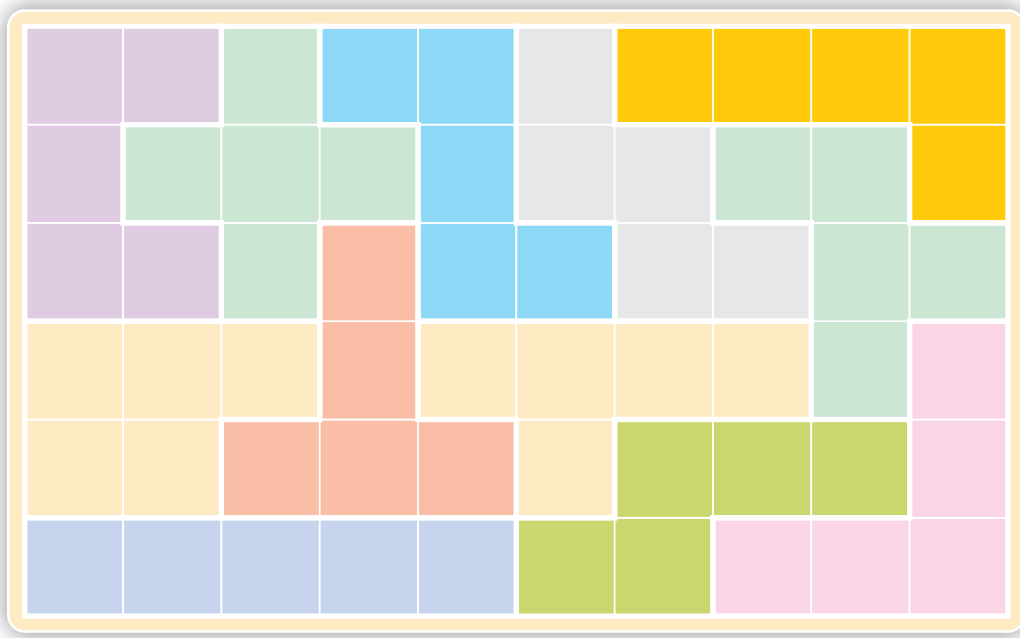
(b) Which shape has the longest perimeter?
How much? _____ cm

(c) Which shape has the shortest perimeter?
How much? _____ cm

(d) What is the area of the shapes? _____ square cm.



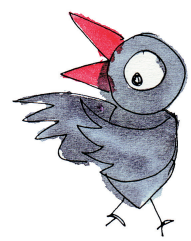
Did you get all the 12 shapes using 5 squares?



All 12 shapes are arranged here to make a rectangle.

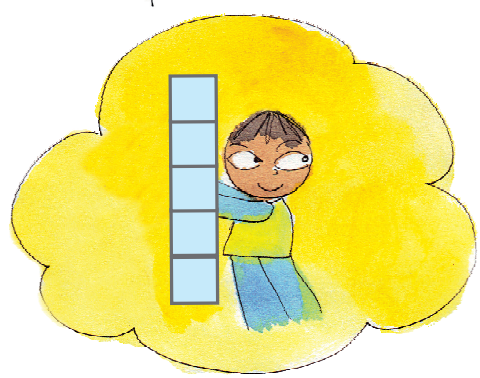
This is a 10X6 rectangle as there are 10 rows and 6 columns.

you will be surprised to know that there are more than 2000 ways in which these shapes make 10 x 6 rectangle.



Draw all the 12 shapes on a sheet of cardboard and cut them.

Try to arrange these 12 shapes in some other way to make a 10 × 6 rectangle. Could you do it?



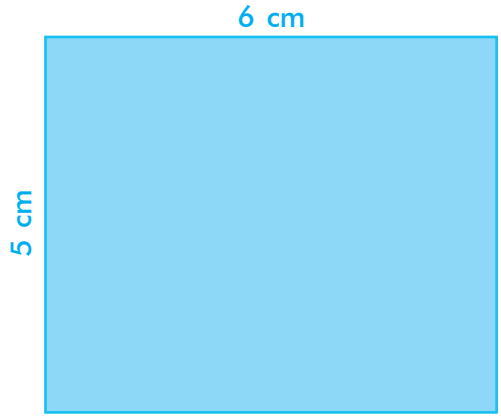
4. Whose Slice is Bigger?

Parth and Gini bought aam paapad (dried mango slice) from a shop.

Their pieces looked like piece A and piece B respectively.

Both could not make out whose piece was bigger.

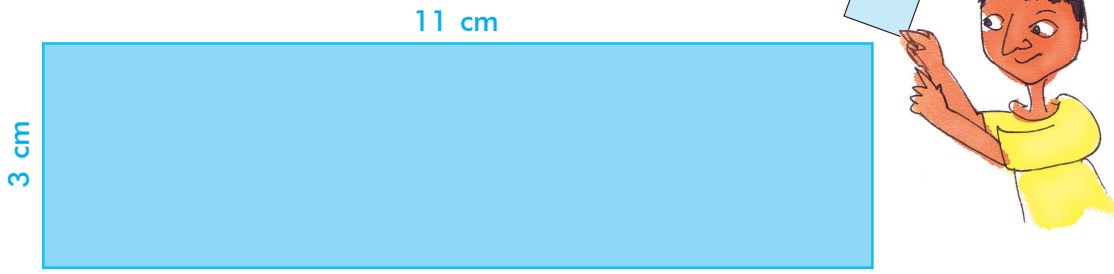




Piece A

- Suggest some ways to find out whose piece is bigger. Discuss.

A friend of Parth and Gini showed one way, using small squares.



Piece B

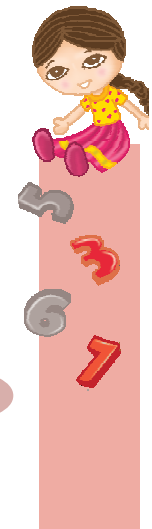
The length of piece A is 6 cm.

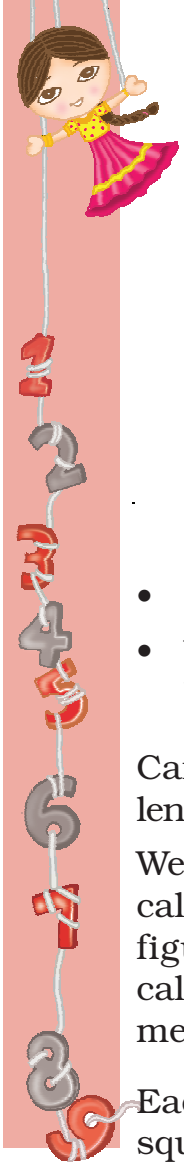
So, 6 squares of side 1 cm can be arranged along its length.

The width of piece A is 5 cm.

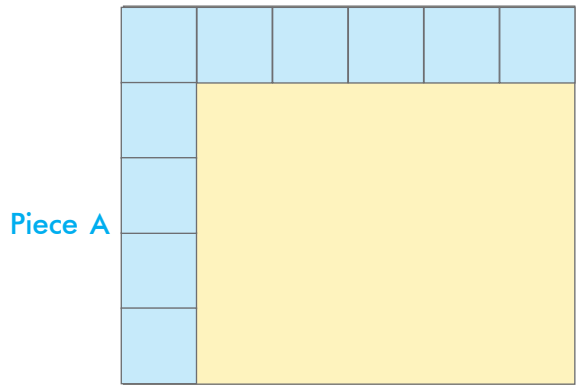
So, 5 squares can be arranged along its width.

- Altogether how many squares can be arranged on it? 6×5
- So the area of piece A = $6 \times 5 = 30$ square cm





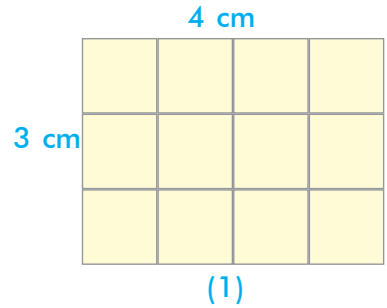




- In the same way, the area of piece B is 11× 3 = 33 square cm.
- Who had the bigger piece? _____ How much bigger? _____

Can you say that the area of a rectangle is length × breadth? Yes/No

We have found that area of any given figure can be calculated by counting number of squares that the figure has. This method is time consuming for calculating area of given figures. There is another method, let us see—



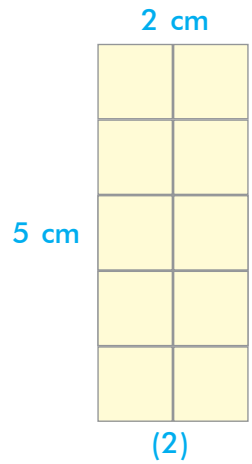
Each of the above rectangles has been divided into squares of side 1 cm.

As it is said earlier, we find area of rectangle by counting the squares along length and breadth.

Now if we see rectangle (1), length = 4 cm

breadth = 3 cm

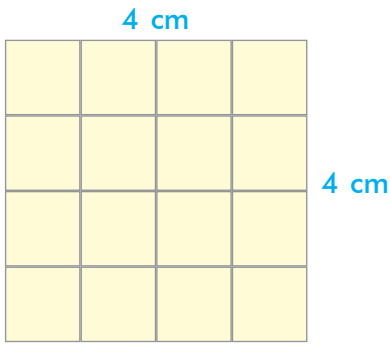
Area of the rectangle = length × breadth = 4 × 3 = 12 square centimetres



Similarly for rectangle (2), length = _____

breadth = _____

Area = _____



For a square —

Area of square = side × side

= 4 × 4 square cm

= 16 square cm

Can you now solve the problem of choosing Garden 1 and Garden 2 as given in the beginning?

Activity

Cover with stamps

This stamp is a square of side 2cm. Its area is 2 × 2 = 4 square cm. Guess how many such stamps will cover this big rectangle.



Check your guess

(a) Measure the yellow rectangle. It is 14 cm long.

(b) How many stamps can be placed along its length? 7

(c) How wide is the rectangle? 8 cm

(d) How many stamps can be placed along its width? 4

(e) How many stamps are needed to cover the rectangle? _____

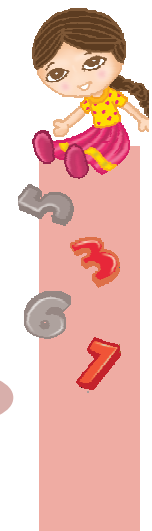
(f) How close was your earlier guess? Discuss.

(g) What is the area of the rectangle? _____ square cm

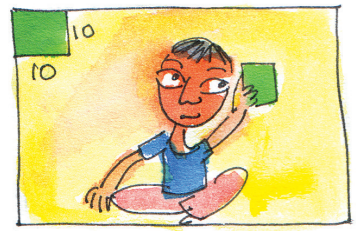
(h) What is the perimeter of the rectangle? _____ cm

(i) Area of the rectangle ÷ Area of the stamp = 112 ÷ 4 = _____

(j) Is the same as number of stamps in (e) above? _____



Practice Time

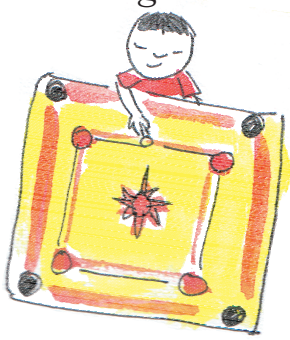


(1) Anvi plans to tile her kitchen floor with green square tiles. Each side of the tile is 10 cm. Her kitchen is 5 m in length and 4 m wide. How many tiles will she need?

(2) The fence of a square garden is 20 m in length. How long is one side of the garden?

(3) A thin wire of 20 centimetres long is formed into a rectangle. What is the perimeter of the rectangle? If the width of this rectangle is 4 centimetres, what is its length? What is the area of the rectangle?





(4) A square caromboard has a perimeter of 320 cm. How much is its area?

(5) Sanya, Aarushi, Manav and Kabir made greeting cards. Complete the table for their cards.



Whose card	Length	Width	Perimeter	Area
Sanya	10 cm	8 cm		
Manav	11 cm		44 cm	
Aarushi		8cm		80 square cm
Kabir			40 cm	100 square cm

6. My Belt is Longest!

Take a thick sheet of paper length 14 cm and width 9 cm. You can also use an old postcard.

(a) What is its area? What is its perimeter?

(b) Now cut strips of equal sizes out of it. Size of any strip should not be of width less than 1 cm.



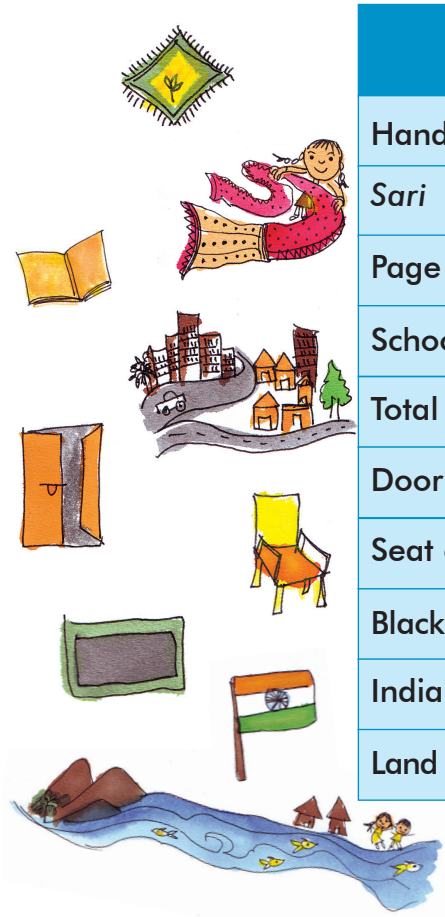
Using tape join the strips end-to-end to make a belt.

- How long is your belt? _____
- What is its perimeter? _____
- Whose belt is the longest in the class? _____

Discuss

- Why did some of your friends get longer belts than others?
- Is the area of your belt the same as the area of the postcard? Why or why not?
- What will you do to get a longer belt next time?

(7) Look at the table below. If you were to write the area of each of these, which column would you choose? Make a (✓).



	Square cm	Square metre	Square km
Handkerchief	✓		
Sari			
Page of your book			
School land			
Total land of a city			
Door of your classroom			
Seat of chair			
Blackboard			
Indian flag			
Land over which a river flows			

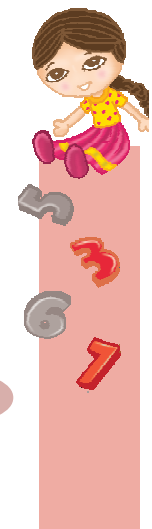
(8) Draw a square of side 3cm on a grid paper. Write A on it. Draw another square with double the side. Write B on it. Answer these —

(i) The perimeter of square A is _____ cm.

(ii) The side of square B is _____ cm.

(iii) The area of square B is _____ square cm.

(iv) The area of square B is _____ times the area of square A.



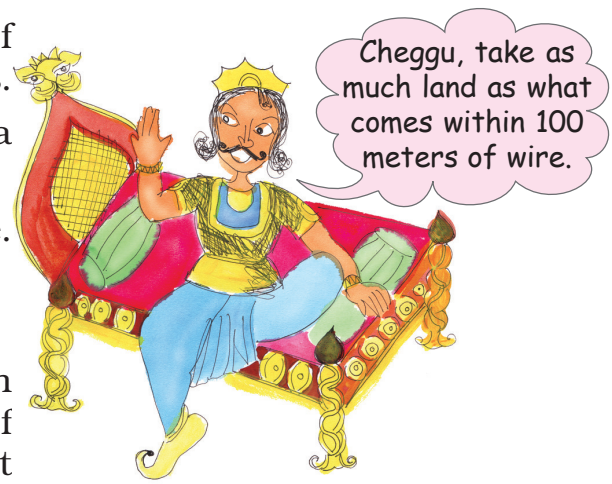
(v) The perimeter of square B is _____ cm.

(vi) The perimeter of square B is _____ times the perimeter of square A.

King's Story

The King was very happy with carpenters Cheggu and Anar. They had made a very big and beautiful bed for him. So, the king wanted to give some land to Cheggu, and some gold to Anar as gifts.

Cheggu was happy. He took 100 metres of wire and tried to make different rectangles.



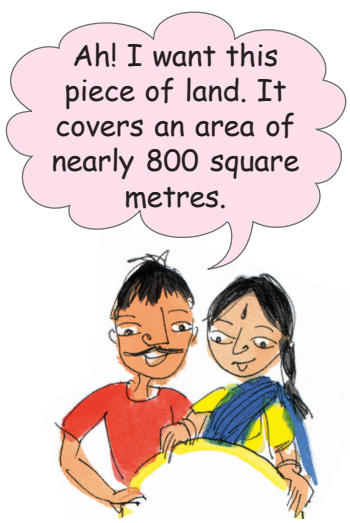
He made a 10 m × 40 m rectangle. Its area was 400 square metres.

So he next made a 30 m × 20 m rectangle.

- What is its area? _____ Is it more than the first rectangle? _____
- What other rectangles can he make with 100 metres of wire? Discuss which of these rectangles will have the biggest area.

Cheggu's wife asked him to make a circle with the wire. She knew it had an area of 800 square metres.

- Why did Cheggu not choose a rectangle? Explain.

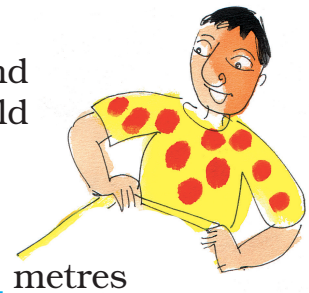




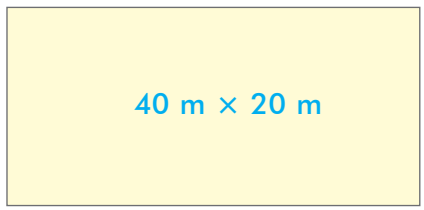
So Anar also tried many different ways to make a boundary for 800 square metres of land.

At this stage students are not expected to know how area of a circle is maximum for a given perimeter. Teacher may just inform them that the truth of this statement will be learnt by the students in higher classes.

- He made rectangles A, B and C of different sizes. Find out the length of the boundary of each. How much gold wire will he get for these rectangles?

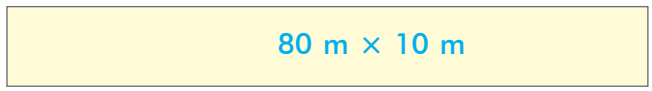


A



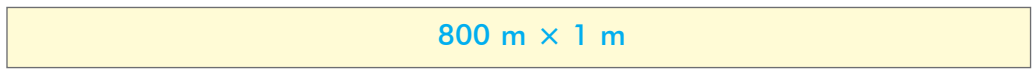
Gold wire for A = _____ metres

B



Gold wire for B = _____ metres

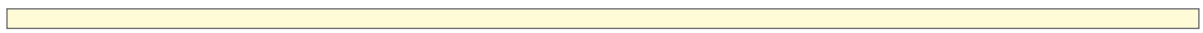
C



Gold wire for C = _____ metres

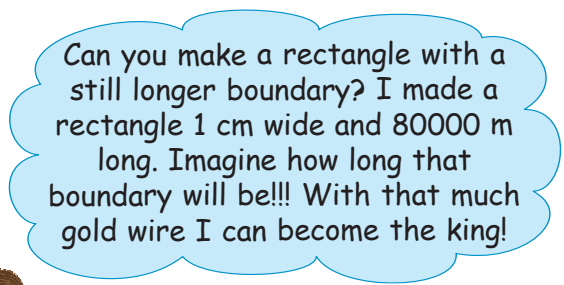
But then Anar made an even longer rectangle.... See how long!

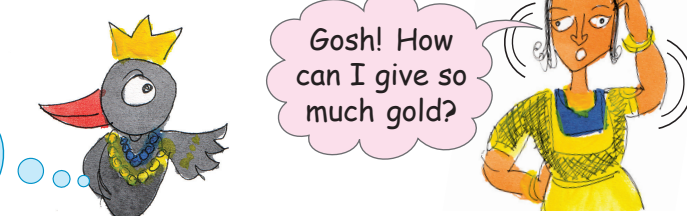
D



So he will get _____ metres of gold wire!!

Now do you understand why the king fainted!!!





Practice Time

(1) Find the area of rectangles whose length and breadth respectively are

(a) 2m, 120cm (b) 10cm, 9cm

(2) The floor of a room is 6m long and 5 metres 20 centimetres wide. How many square tiles of side 10cm are required to cover the floor leaving no gaps.

(3) The side of a square table-cloth is 2 metres. What is its area?

(4) Which playground is bigger?

(a) The one measuring 120m in length and 50m in breadth.

(b) The other measuring 110m in length and 62m in breadth.



INTRODUCTION TO VOLUMES

1. Estimating Volume of Liquid

Make and enjoy a lemon drink

You will need



Half a lemon



A pinch of salt

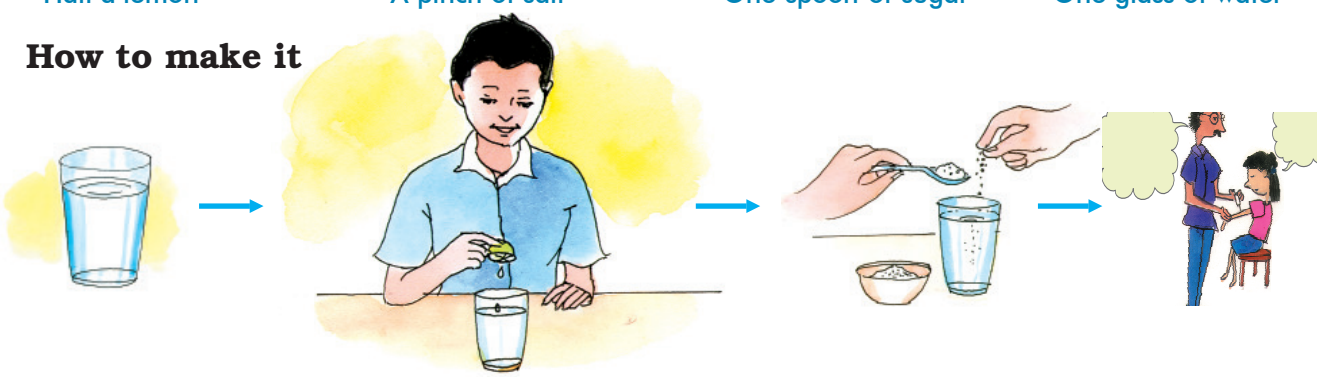


One spoon of sugar



One glass of water

How to make it



First make a guess and then find out.

How many drops of lemon juice do you get from  half a lemon? _____

How many drops of lemon juice do you get from  a full lemon? _____

How many drops of lemon juice fill one  spoon?

_____

Enjoy your lemon drink!

_____

The concept of volume should be introduced with the use of familiar non standard units. To make a drink in the activity, locally available material can be used or the name of the drink can also be substituted. The focus should be on concept of volume.

For making 6 glasses of lemon drink —

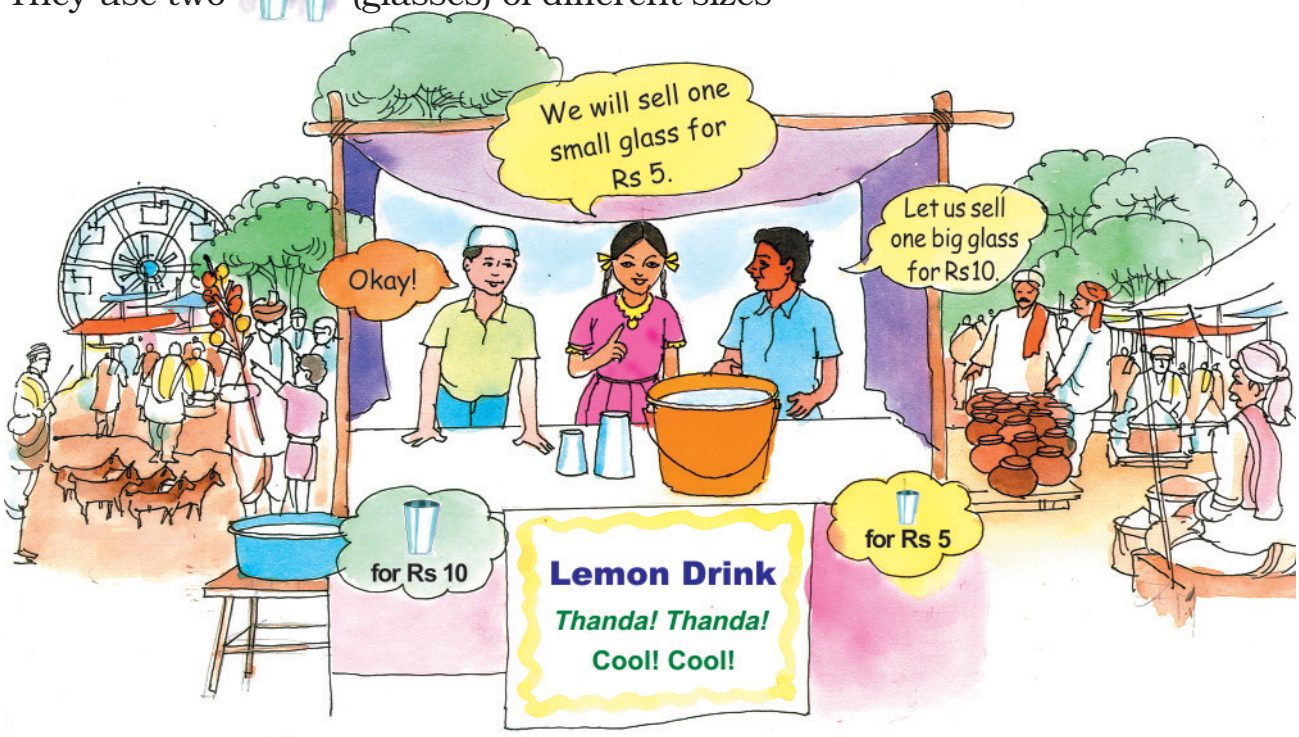
How many lemons will you need? _____

How many spoons of sugar will you take? _____

Lemon drink stall at a village fair

There is a fair in Chaitra's village. Chaitra, Nazim and Aneesh want to put up a stall to sell lemon drink. They make a  bucket full of lemon drink.

They use two  (glasses) of different sizes



Aneesh got a  (jug).

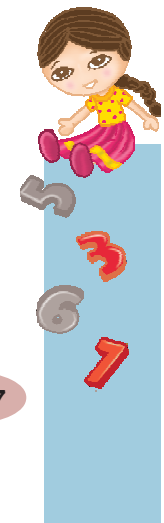
Do you think it is easier to pour into a  from a  than a  (bucket)?

Nazim found that two big  fill the  .

Shabnam wants to buy one  full of lemon drink.

How much does she need to pay? _____

Chaitra found that two small  fill one big 



How many small  of lemon drink will fill the  _____

How many small  will fill half the  ?

Fun in Filling Vessels

Find out how many  (cups) of water will fill your  (bottle).

First guess and then try it out.

Now, fill a different  (bottle) with the same cup.

Which bottle holds less water?

Try it with another  (bottle).

Which bottle holds the least water?

Do you observe that the third bottle holds least water.

We may say that **volume** of water in the third

bottle is less than that of first or second bottle.

Guess and check

Sunaina and Jaspreet brought different vessels

from the kitchen. They had a  , a  , a  (mug),

a  (pot) and a  (bowl).

They filled each of these with a  (cup).



Guess which vessel holds the least water. _____

Which vessel holds the most water? _____

Now, you collect different vessels from your kitchen.

Use the same  to fill each of them.

Count the number of cups of water each of them can hold.

First guess and then do it.

The vessel you used	Cups of water to fill it
	

Filling Pots

Naseem and Abdul had to fill their pots each with water. Both pots were equally big and heavy. So they went to the tap again and again, filled their own bottles and poured water into the pots.

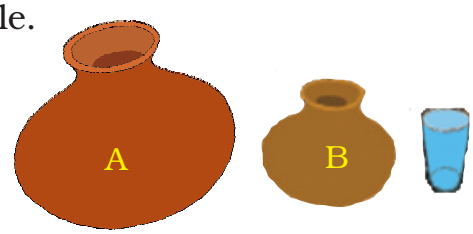


Naseem had to fill her bottle 16 times from the tap. But Abdul had to fill his bottle only 8 times.

- Why did Naseem go more times than Abdul?
- Naseem's bottle can hold _____ (twice/half/three times) as much water as Abdul's bottle.

How many glasses?

Pot B holds 11 glassful of water. Pot A holds twice as much water as pot B. How many glasses of water are needed to fill pot A?



In class, children need to speak about their daily experiences of measuring liquids and comparing the sizes of different containers. They must get many opportunities to use words like 'glassful', 'bucketful' etc. They will also get familiar with ideas such as 'half', 'twice', 'four times' the amount of water, and a sense of how much one litre is.

2. Estimating and Measuring Capacity



Bottles and Buckets



Have you heard of 'litre'? List three items where the word 'litre' is used, e.g., 1 litre (1L) milk. Get a 1 litre bottle (can be an empty bottle of water, oil etc.). Now collect some more bottles and a mug, jug, glass, bowl, etc. at your house. Use the 1 litre bottle to check which of these holds more than 1 litre and which one holds less than 1 litre. Make a small drawing if you like.







Less than 1 litre	More than 1 litre
bowl 	big cooking pot 

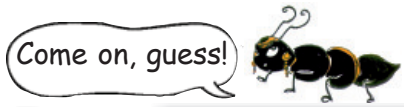
- Now look at the buckets in your house.
- Guess how many litres of water they can hold. If a bucket can hold 10 litres of water, we say that the capacity of the bucket is 10 litres (10L).
- Use a 1 litre bottle and check if your guess is right for all the buckets.

Bucket	My guess	My measure
Bucket 1		
Bucket 2		
Bucket 3		

Match the right pairs



(to measure milk)



About 12 litres

Less than half a litre

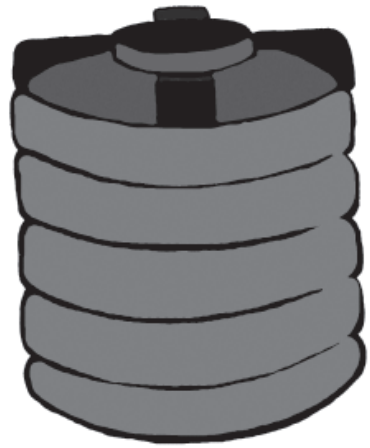
About 5 litres

1000 litres

half a litre



(bucket)



(water tank)



(water *suraahi*)

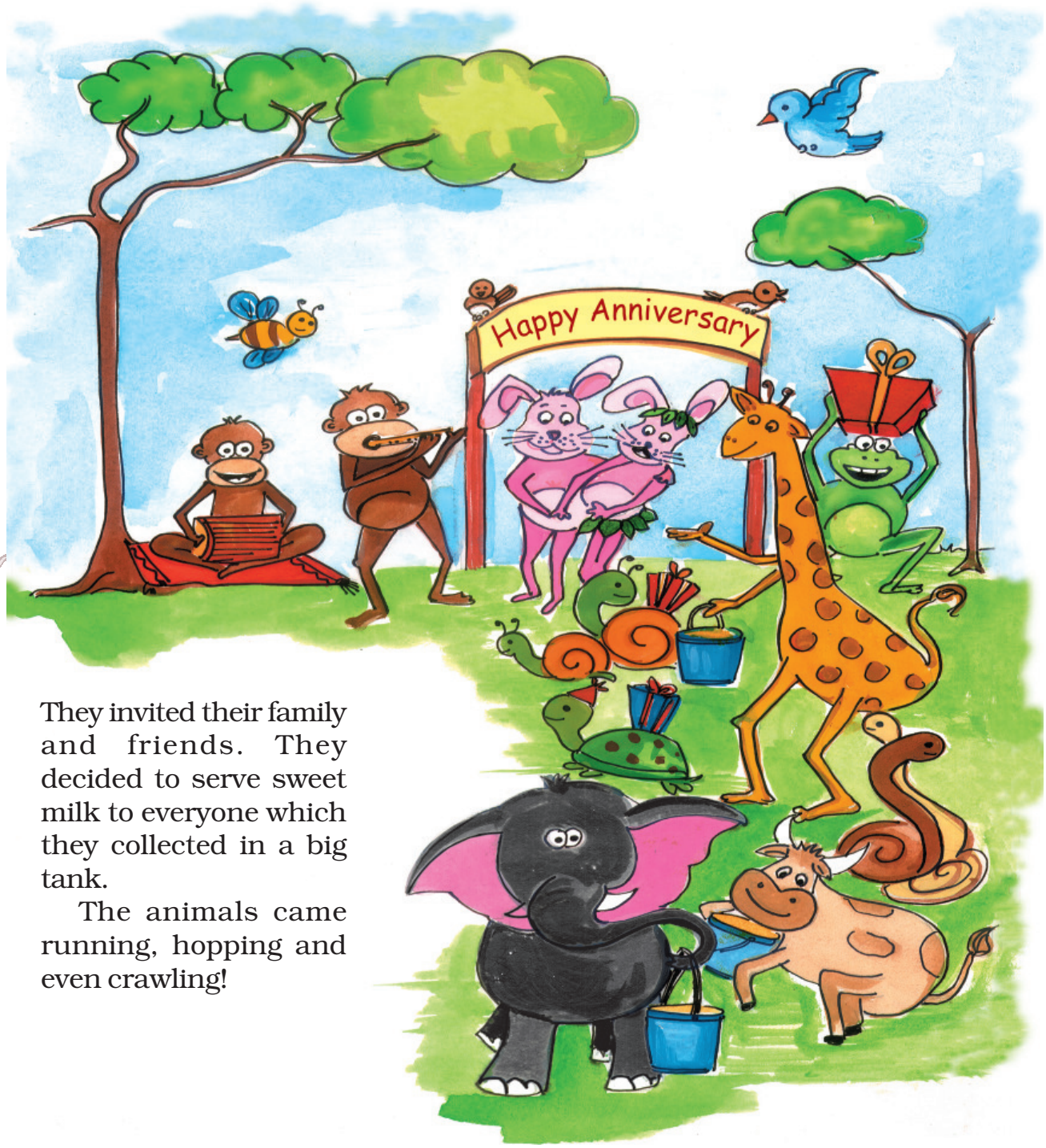


(eye-drops bottle)



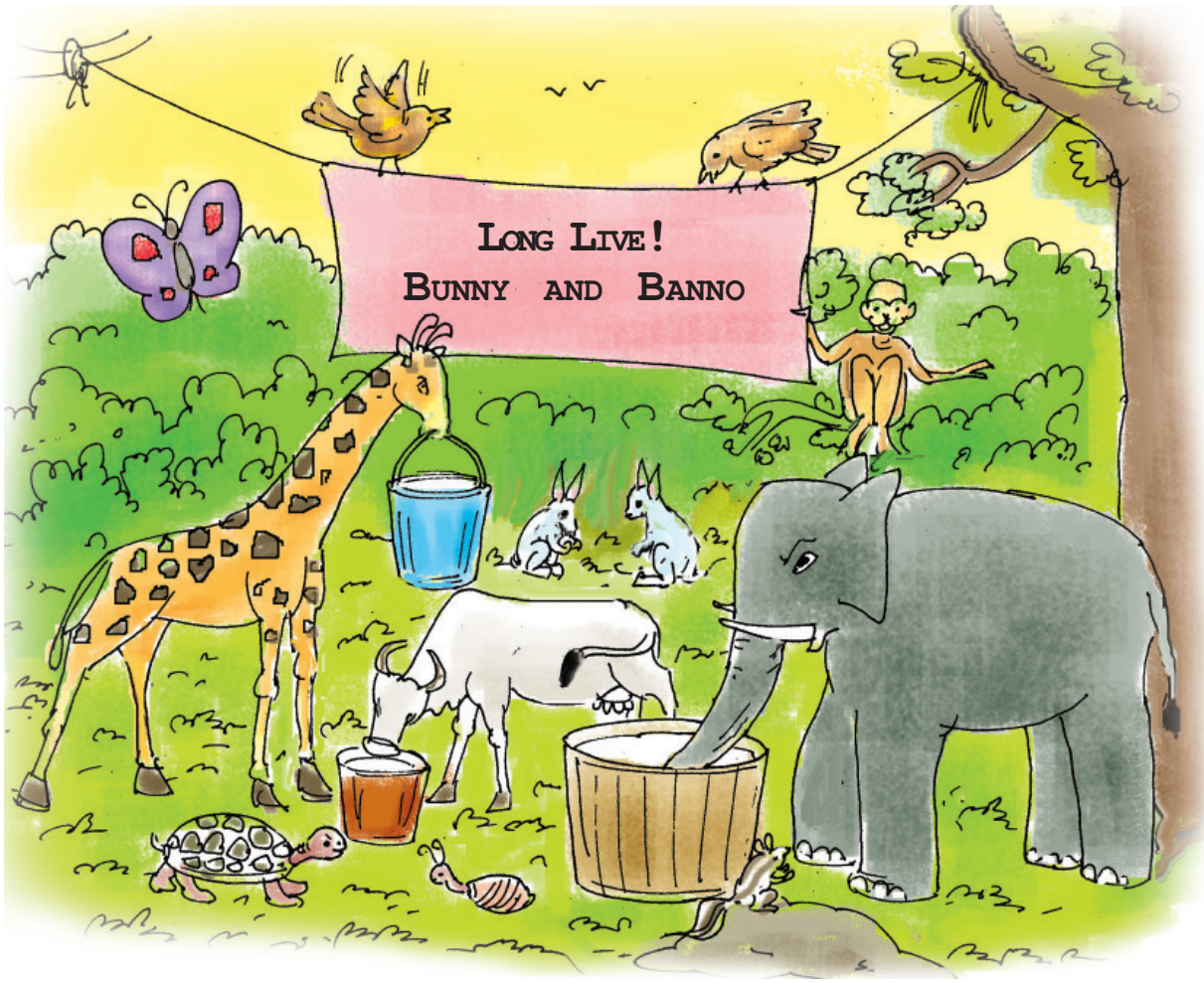
3. Bunny and Banno Celebrate their Wedding Anniversary

Bunny and Banno (rabbits) were married last year. They decided to have a party one year after their wedding.



They invited their family and friends. They decided to serve sweet milk to everyone which they collected in a big tank.

The animals came running, hopping and even crawling!



The elephant is drinking 50 litres of milk.

The giraffe has _____ litres of milk.

The cow is drinking _____ litres of milk.

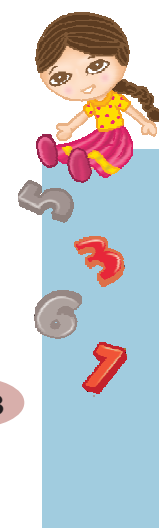
Then came the squirrel. She said, "I can't drink 1 litre of milk, please give me only 500 millilitres."

The donkey asked, "500 millilitres of milk? Isn't that more than a litre?"

The fox said, "Come on, you should know that one litre is 1000 millilitres (mL). So 500 millilitres is half a litre."

The frog hopped along with nine other friends. He said, "Oh, we only want 100 millilitres each!"







"OK.! here is your milk", said the cat, while serving the milk. She took 10 glasses and poured 100 millilitres of milk in each glass.





The donkey looked confused and asked, Ten glasses of 100 mL each. How much is that?

The fox got another chance to show off ! He said, "Ah, That is simple!" 10 times hundred millilitres is _____ millilitres = _____ litre.

So, 10 × 100 mL = _____.



Look, a group of ants is marching here!, the grass hopper said.

"The milk is finished. Now what can we do?," said the cat sadly.

Don't worry, they won't drink much. Each of them will take only one millilitre through out the party. That is all. I will share my milk with them", the elephant said and wiped the cat's tears with his ear.

"How many are you altogether?", the elephant asked.

"We are only one thousand", said the ants.

The cat said, "Oh no, one thousand! We have to give milk to 1000 ants!"

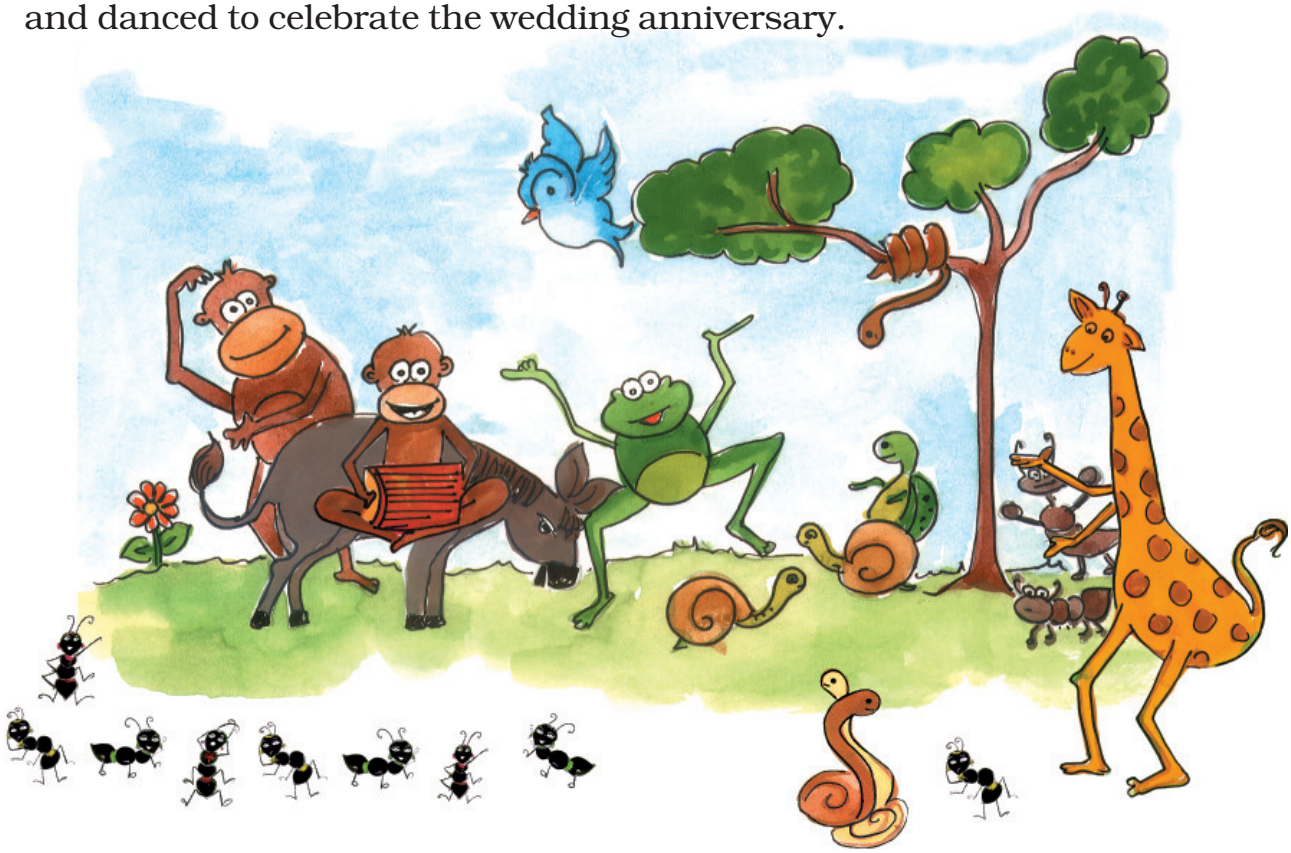
After thinking the elephant said, "No problem, I can manage."

Each ant drinks 1 millilitre of milk.

So, 1000 ants drink: 1000 ? 1 mL = _____ mL = _____ L

"Ah! they will need the same as the ten frogs", said the donkey.

All the ants drank the milk. Everyone was happy. They sang and danced to celebrate the wedding anniversary.



Look Around

Look at these pictures. Now look for some other things we get in packets or bottles like these. Make your own list.

Packet	How many mL or L?
Milk	500 mL

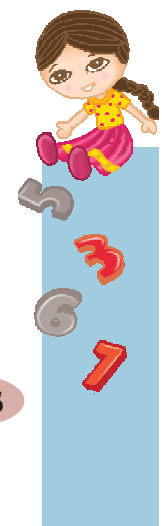








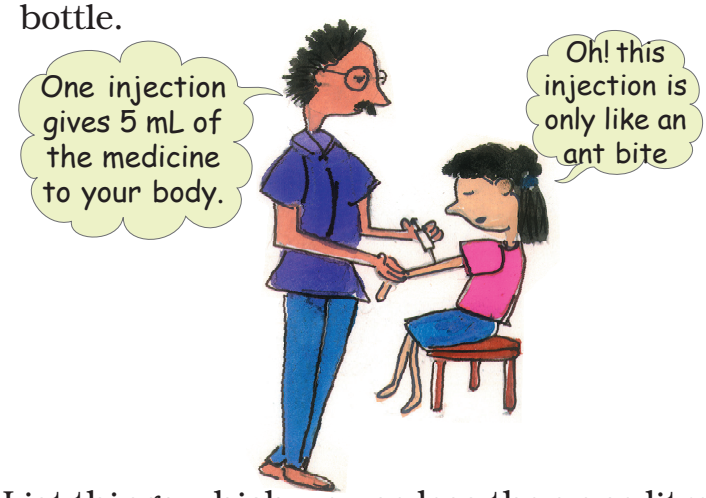




Rani's Measuring Bottle

Rani's got an empty 250 mL coconut oil bottle. Look at the picture and discuss what she did to make her big measuring bottle.





Neetu in Hospital

Neetu has to take 3 injections in a day for 5 days.

How much medicine will she need for one day? 3 × 5mL = 15 mL

How much medicine in all for 5 days? _____.



List things which we use less than one litre at a time.

- Eye drops
- _____ _____
- _____ _____
- _____ _____

List things which we use more than one litre at a time.

- Water for taking bath
- _____
- _____
- _____



Practice Time

(1) Amina's water bottle holds one litre of water. She drank 250 mL of water and her friend Govind drank 150 mL. How much water is left in her bottle?

(2) Yusuf runs a tea shop. For making a glass of tea he uses 20 mL of milk. Yesterday he made 100 glasses of tea. How much milk did he use?

To make a measuring bottle, children may use a wide-mouthed and transparent bottle so that markings can be made easily. The activity aims to develop measurement skills in children and involves both making and handling apparatus (such as measuring bottle) in the mathematics classroom.

(3) Radha's grandma was ill. The doctor gave her a bottle with 200 mL of medicine. She has to finish the medicine taking every morning for 10 days.



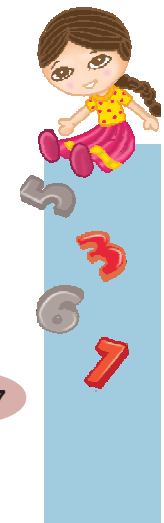
How many millilitres of medicine does she have to take every morning? _____



(4) Meena is a milk woman. She distributes milk to four families everyday. She gives 1L milk to one family, 2L milk to the second family, 500 mL milk to the third family and $1\frac{1}{2}$L milk to the fourth family. How many litres of milk in total has she distributed in a day?

(5) Convert the given litres (L) into millilitres (mL)

$\frac{1}{2}$ L = _____ mL	$\frac{3}{4}$ L = _____ mL
$\frac{1}{3}$ L = _____ mL	$1\frac{3}{4}$ L = _____ mL
$\frac{2}{5}$ L = _____ mL	



Drops and Drops Make an Ocean

Is there any tap in your school or your home which is leaking?

How much water do you think is wasted through a leaking tap?



Place your measuring bottle (jar) below the leaking tap so as to catch all the drops in the bottle. Note the time. After one hour check how much water is in the bottle.

Find out how much water is wasted in a day. _____

In a week? _____

In a month? _____

In a year? _____

A Puzzle

Chelannur village has a milk society. Geetha and Ammini went there to buy 4 litres of milk. But the milk man could not find the one litre measure. He had only 3 litre and 5 litre bottles with him. But he gave them exactly 4 litres of milk.

Explain how he did this.

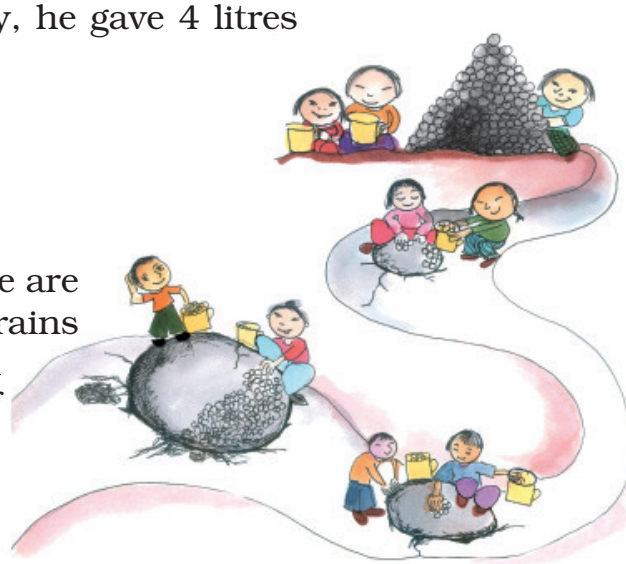
A Strategy

He took 5 litre bottle and filled it completely. Then he poured milk from this bottle to a 3 litre-bottle and filled it completely. Now, 2 litres of milk was left in the 5 litre bottle.The man poured this 2 litres milk into a container and again repeated the same. This way, he gave 4 litres milk to Geetha and Ammini.

Can you give some other strategy?

Estimating Space

Filling Potholes



This is a small town near Kohima. There are some potholes in the road. Before the rains come, children want to fill the holes with pebbles. They bring pebbles in mugs of the same size.

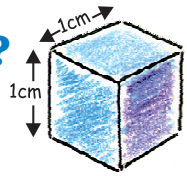
Hole A gets filled with 9 mugs of pebbles.

Hole B gets filled with 18 mugs of pebbles.

Hole C gets filled with 12 mugs of pebbles.

- Mark A, B, C on the right hole in the picture.
- Which is the biggest pothole?
- The volume of pothole B _____ mugs.
- If jugs are used, hole A gets filled with 5 jugs. How many jugs of pebbles are needed to fill hole B?

How many can fit in?





This is a cube whose sides are of 1 centimetre each. Such a cube is named as centimetre cube. See, your Math book is 1 centimetre thick. So guess how many such centimetre cubes will take the same space as your Math book?

Hey, my Math book is about ___ cm long. So ___ cm cubes will fit along its length.



And it is about ___ cm wide. So ___ cubes will fit along the width.

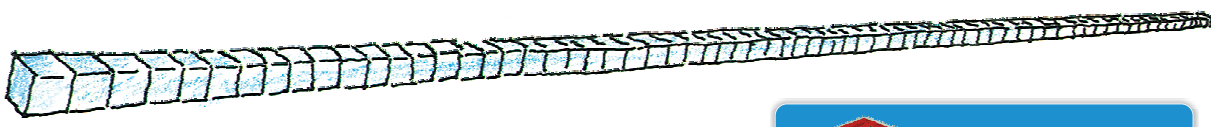


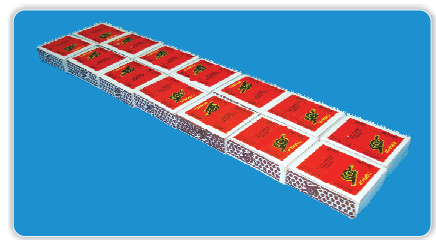


So total ___ cm cubes will fit on the Math book.



- Now if all these cubes are arranged in one line then how long will that line be? _____ cm





Matchbox Play

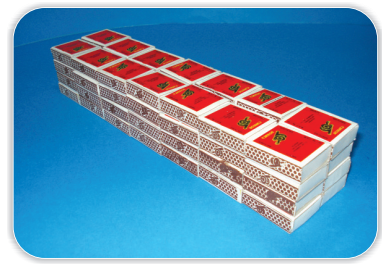
Tanu is making a stage with matchboxes.

She first puts 14 matchboxes like this in the first layer and then 14 matchboxes over it.



She makes 4 such layers and her stage looks like this.

She used _____ matchboxes to make this stage.



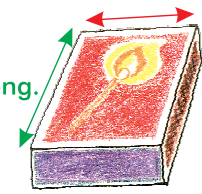
- The volume of one matchbox is the same as 10 cm cubes. Then the volume of this stage is same as _____ cm cubes.
- If all these cm cubes are arranged in a line, how long will that line be? _____ cm.
- Which has more volume — your Math book or Tanu's platform? _____

Activity

With your friends, collect many empty matchboxes of the same size. Measure the sides and write here.

My matchbox is _____ cm wide.

It is _____ cm long.



It is _____ cm high.

- Use 56 matchboxes to make platforms of different heights. Fill this table.

	How high is it?	How long is it?	How wide is it?
Platform 1			
Platform 2			
Platform 3			

The volume of each platform is equal to _____ matchboxes.

- Make deep drawings of the platforms you have made.

Mohan arranged his matchboxes like this.



- How many matchboxes did he use to make it? What is its volume in matchboxes? _____ matchboxes.
- Collect empty matchboxes. Arrange them in an interesting way. Make a deep drawing of it.

Practice Time

(1) A platform is made with 5 Math books. The volume of this platform is the same as _____ cm cubes.

(2) Guess the volume of these things in cm cubes.

The activity 'How many can fit in' requires a sense of the size of a cm cube. For finding the volume of different shapes, the teacher can make cm cubes and use matchboxes to make different models. Tanu's stage in an example where children calculate volume in terms of matchboxes, which may later be converted into cm cubes.

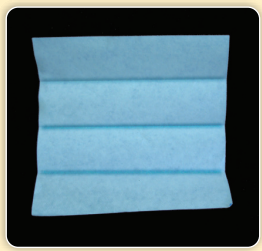
- A matchbox is about _____ cm cubes.
- A geometry box is about _____ cm cubes.
- An eraser is about _____ cm cubes.

How will you check your guess? Discuss.

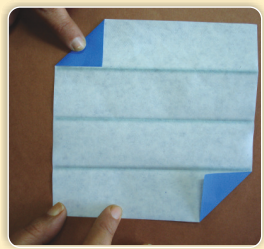


5. Making a Paper Cube

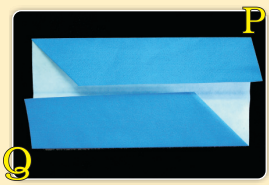
Rita and her friends are making a cube with paper. They cut a sheet of paper into a square of 19.5 cm side. They cut 6 such squares. Follow these photos to make your paper cube.



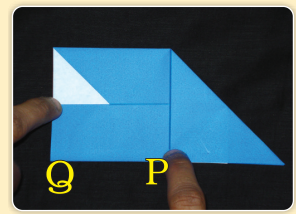
(1) Fold the paper into four equal parts to make lines like this.



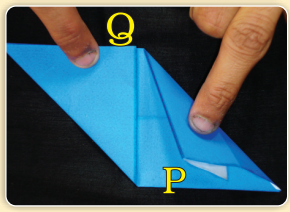
(2) Fold the top left corner and the corner opposite to it like this.



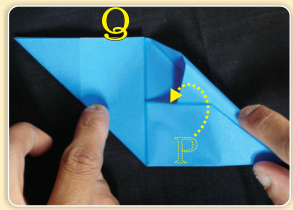
(3) Fold the top and the bottom edges to meet the centre line. Now fold corner P...



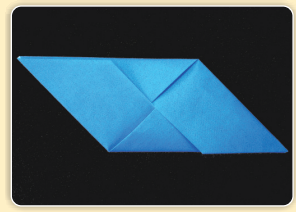
(4) So that the paper looks like this.



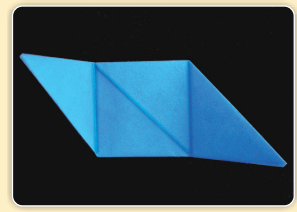
(5) Fold corner Q in the same way. The paper will look like this now.



(6) Lift corner P and slip it under the folded paper like this.

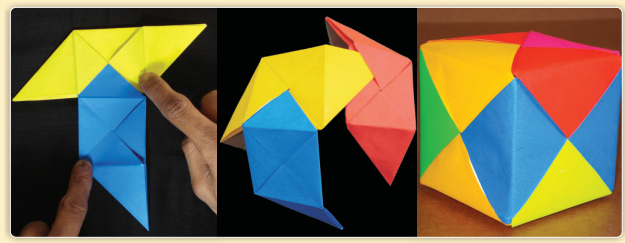


(7) Do the same for corner Q. The paper will look like this.



(8) Turn the paper and fold it to make lines like these.

(9) Each child should make one such piece. Six children will take their pieces and put one inside of another to make this paper cube. Each piece has 2 flaps and 4 pockets. While putting the pieces one inside of another, flap of one piece will be put inside the pocket of other piece systematically.



Encourage children to make different shapes of the same volume using identical units, for example, bricks or matchboxes. To calculate the sides of the platform, lengths can be rounded off to the nearest centimetre.

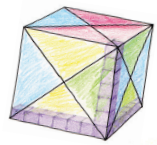
How big is your cube?

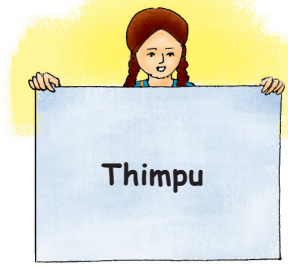


(a) How long is the side of your cube? _____

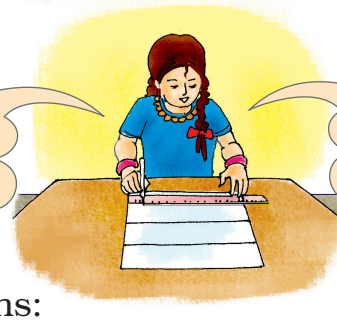
(b) How many centimetre cubes can be arranged along its:

- Length? _____
- Width? _____
- Height? _____





How many cm cubes in all do I need to make a platform as big as the paper cube?



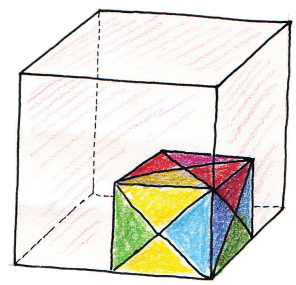
To make the first layer on the table how many cm cubes will I use?_____

How many such layers will I need to make a paper cube?_____

(c) Answer Thimpu's questions:

(d) So the total cm cubes = _____

(e) The volume of the paper cube is same as _____ cm cubes.

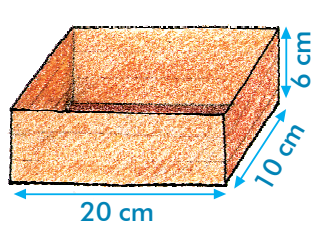


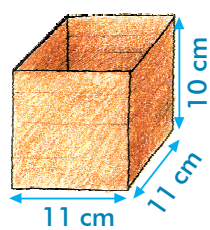
Rita made a big cube having double the side of your paper cube.

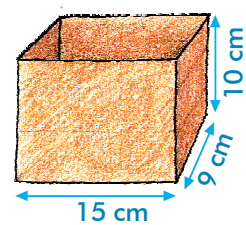
How many of your paper cubes will fit in it? Try doing it by collecting all the cubes made in your class.

Packing Cubes

Sita and Bindeshwari want to pack 4000 centimetre cubes in boxes. These are to be sent to a school. There are three different boxes available for packing.









If we begin with square paper of side 19.5 cm, then we get a cube of side 7 cm.

- What is your guess? Who is right? Sita is right.
- How can Sita and Bindeshwari test their guesses before packing the cubes in the boxes? Discuss with your friends.



Bindeshwari

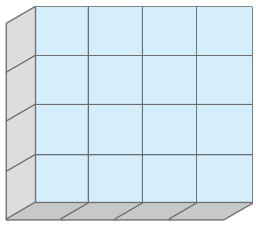
Look at Box A. In the first layer we can arrange 20 × 10 = 200 cubes. And 6 such layers can be packed. So in box A we can arrange 200 × 6 = 1200 cubes.

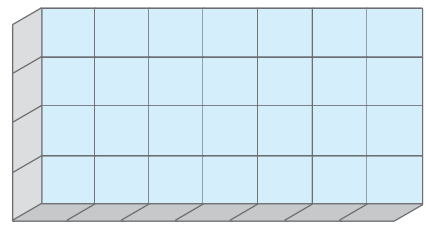


PRACTICE TIME

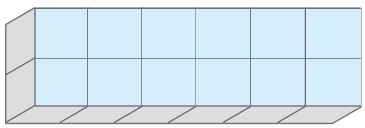
(1) Select the pair in which both the platforms are of the same volume?

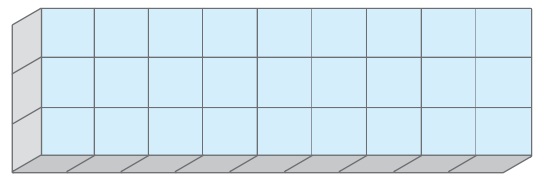
a)



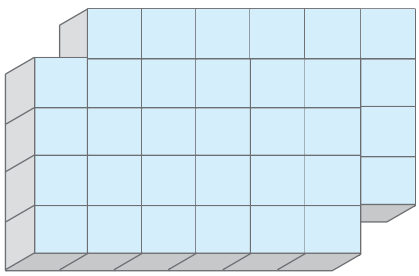


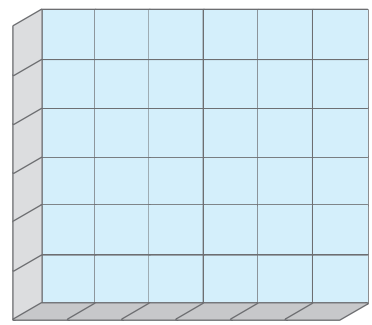
b)



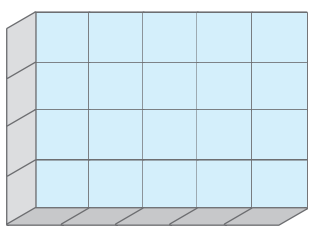


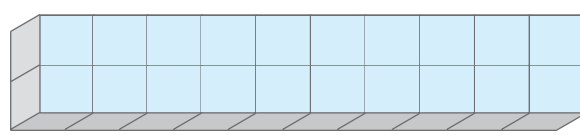
c)





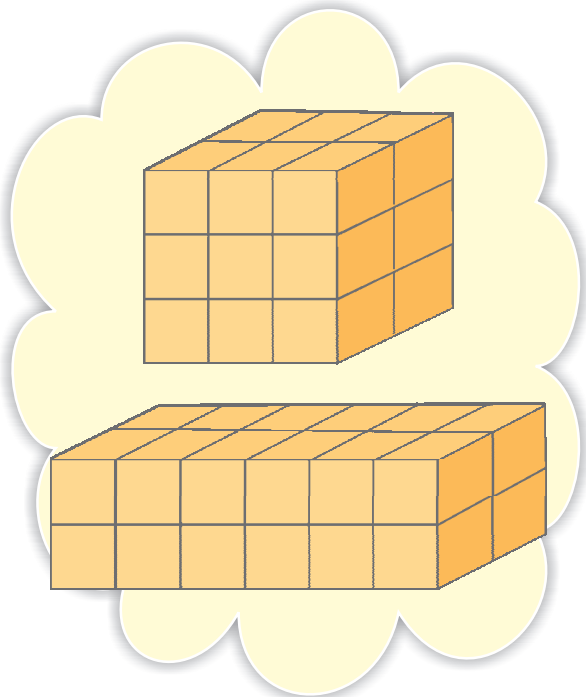
d)



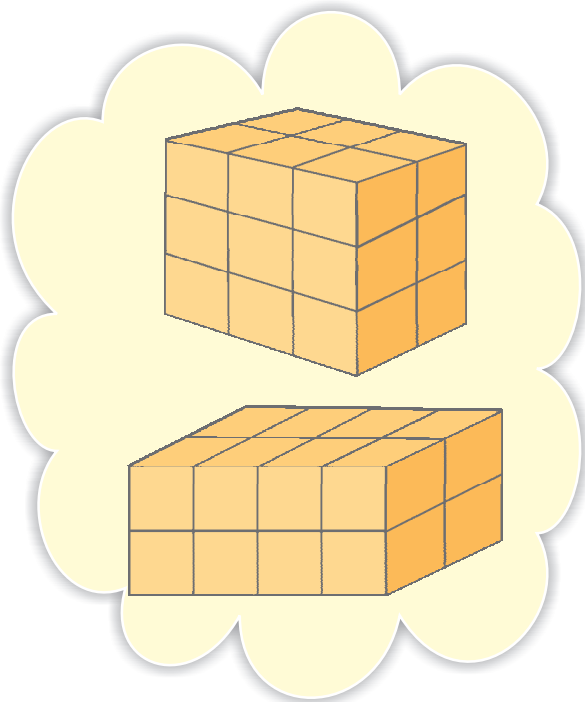




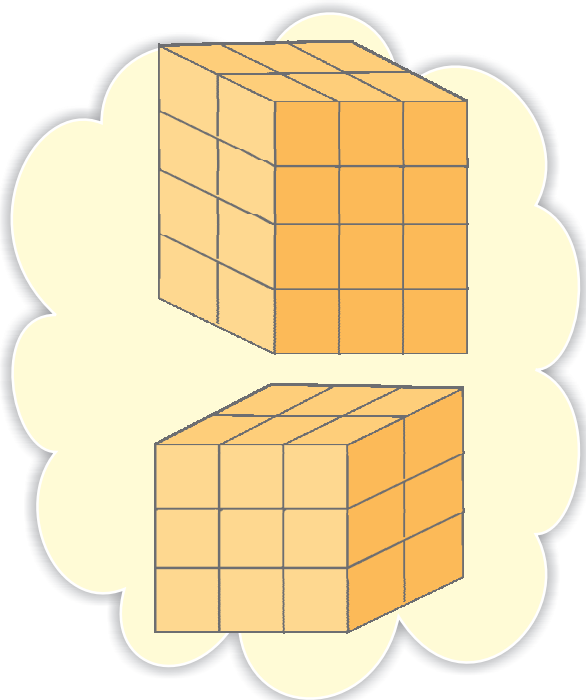
(2) Do the pair of solids in each of the following have the same volume? Write 'Yes' or 'No'.



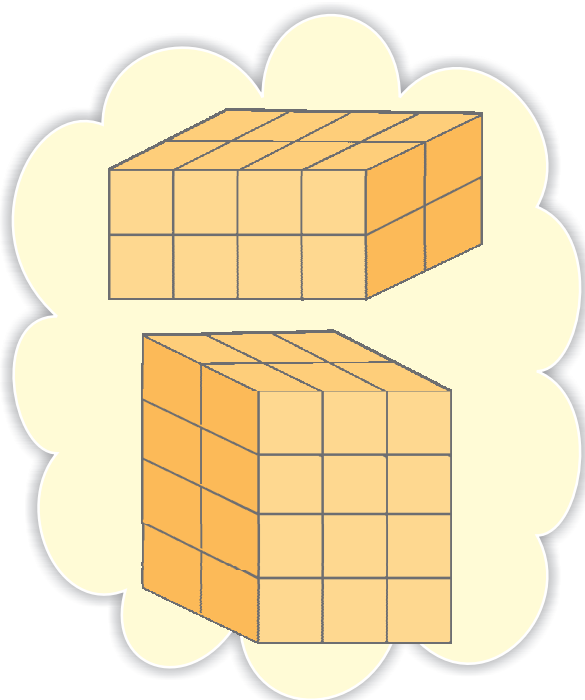
(a)



(b)

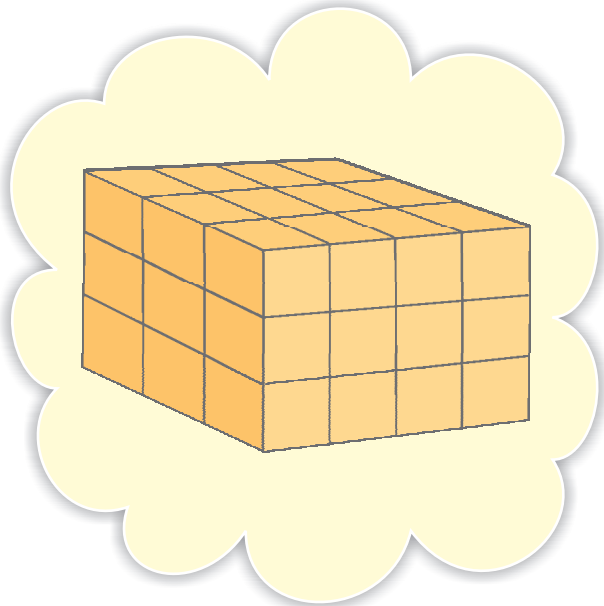


(c)

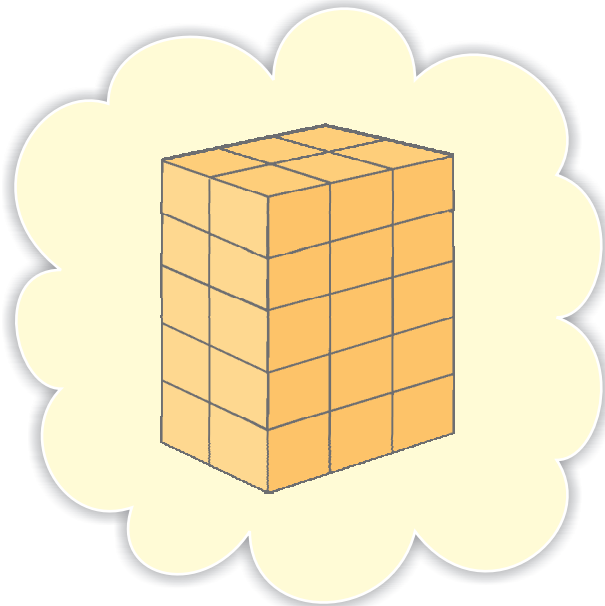


(d)

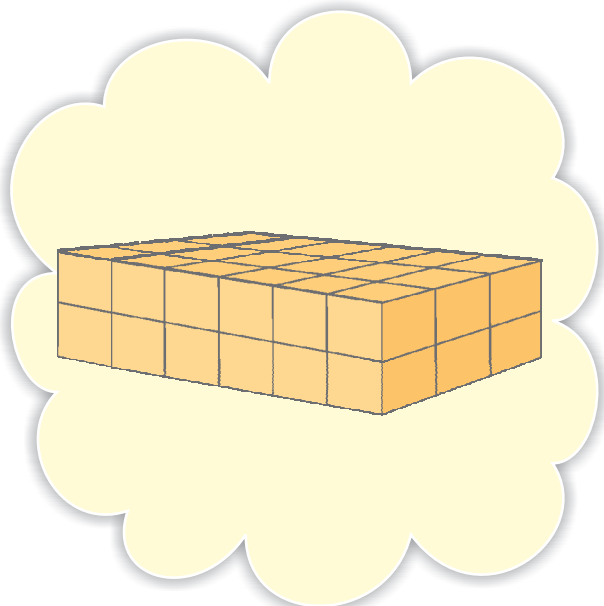
(3) Which solid is of the least volume?



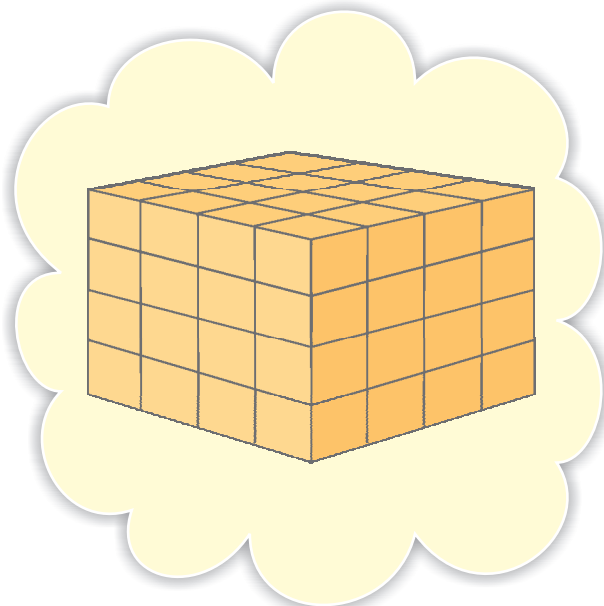
(a)



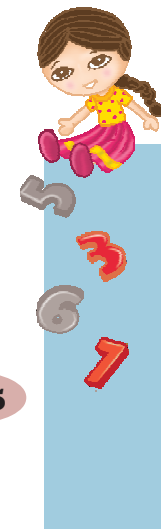
(b)



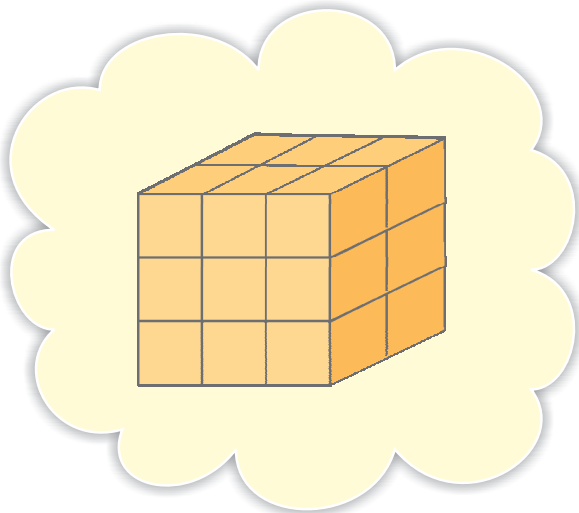
(c)

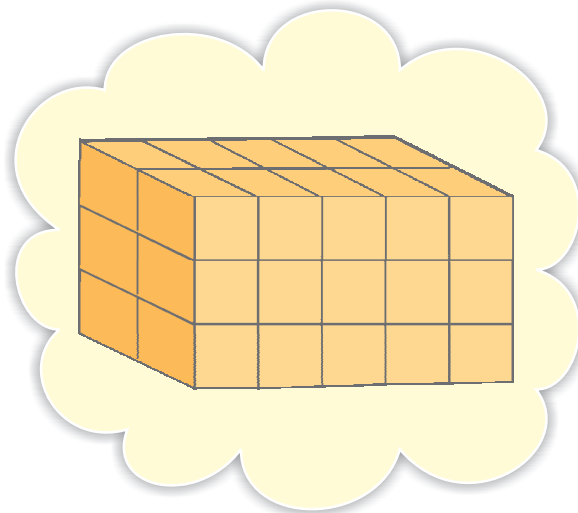


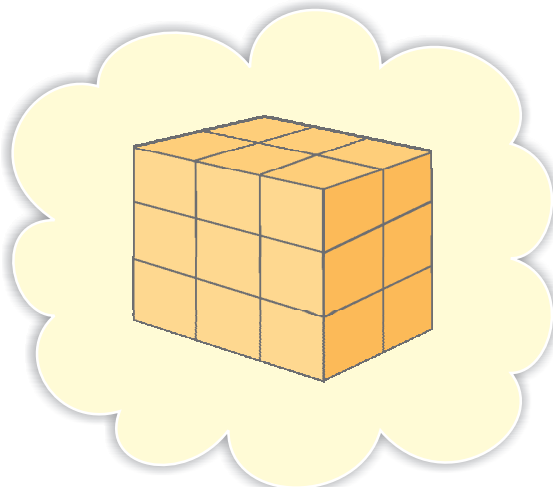
(d)

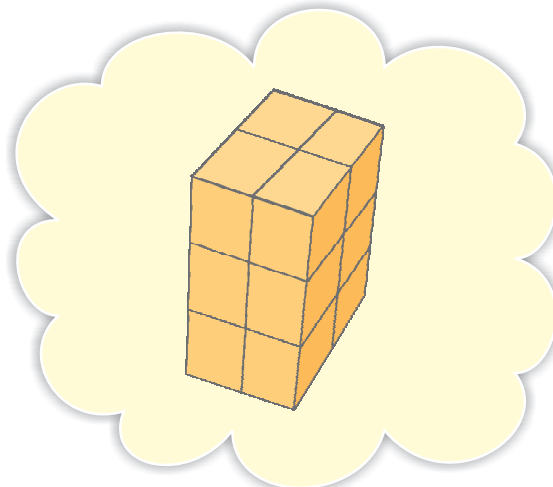


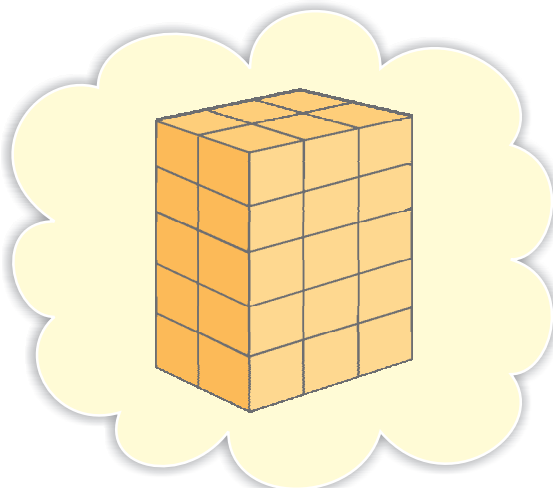
(4) Which solid is of maximum volume?

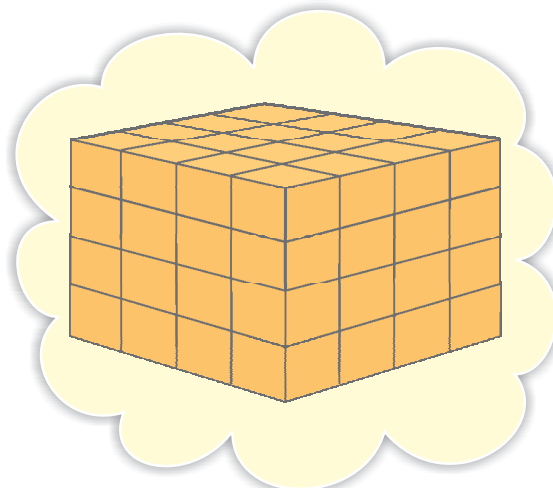








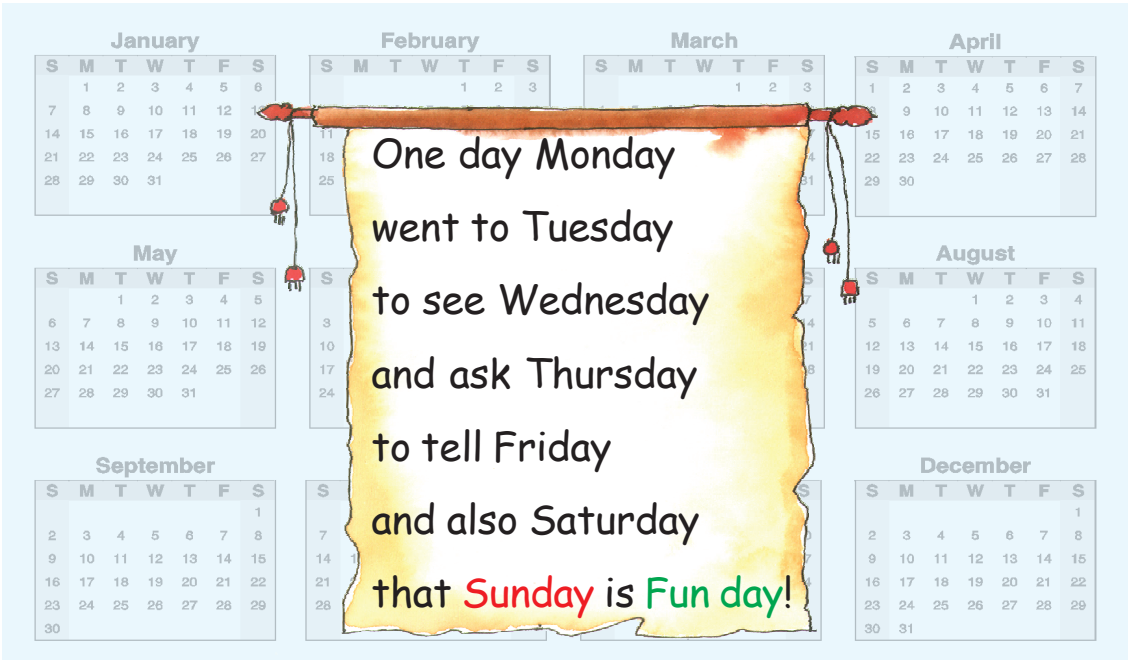






TIME

1. My Fun Day



Practice Time

(1) Is Sunday a fun day for you?_____

(2) Monday is happy to be the first day of the week. Now you tell —

(a) the third day of the week is _____.

(b) the fifth day of the week is _____.

(c) the second day of the week is _____.

(d) the last day of the week is _____.

While teaching this topic, the use of a calendar would be helpful. Encourage children to refer to a calendar to identify the order of days in a week.

(3) Which day will come

(a) After Sunday? _____

(b) Before Sunday? _____

(c) After Wednesday? _____

(d) Before Wednesday? _____

(e) 2 days after Sunday? _____

(f) 4 days after Wednesday? _____

(g) 7 days after Monday? _____





(4) Which day do you like most? Why?

(5) What (day) is today? _____

(6) Which day was it yesterday? _____

(7) Which day will it be tomorrow? _____

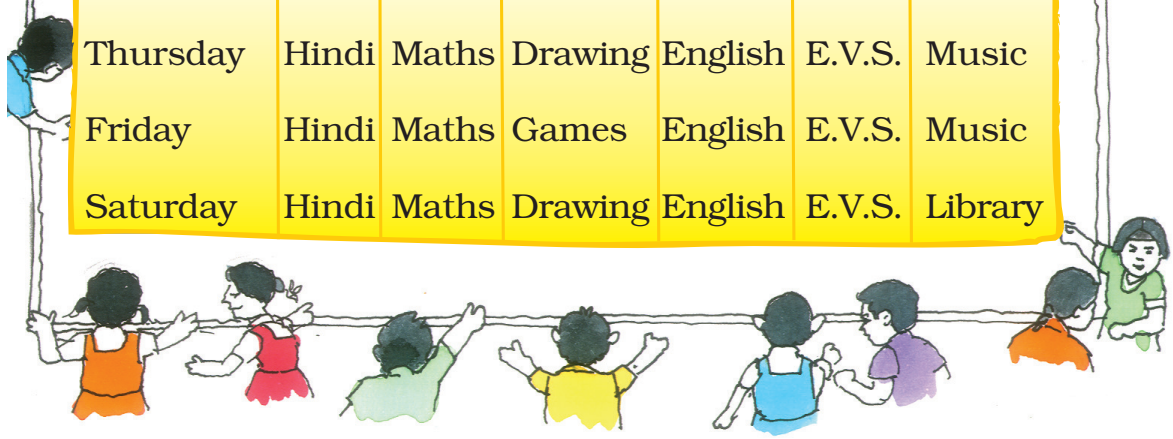
(8) Which day will it be the day after tomorrow? _____

(9) Which day was it the day before yesterday? _____

2. My Class Time Table

Time Table

Day \ Period	1	2	3	4	5	6
Monday	Hindi	Maths	Games	English	E.V.S.	Music
Tuesday	Hindi	Maths	Drawing	English	E.V.S.	Library
Wednesday	Hindi	Maths	Games	English	E.V.S.	Library
Thursday	Hindi	Maths	Drawing	English	E.V.S.	Music
Friday	Hindi	Maths	Games	English	E.V.S.	Music
Saturday	Hindi	Maths	Drawing	English	E.V.S.	Library



Look at the time table of the class and fill in the table (One of these has been done for you):

Period	On which days?
Drawing	Tuesday, Thursday and Saturday
Music	
Games	
Library	

3. Calendar

One day Sona, Thoibi and Zeba were talking about their favourite months.



Which month do you like the best? _____

Why? _____

2011



January

S	M	T	W	T	F	S
30	31					1
2	3	4	5	6	7	8
9	10	11	12	13	14	15
16	17	18	19	20	21	22
23	24	25	26	27	28	29

February

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

March

S	M	T	W	T	F	S
		1	2	3	4	5
6	7	8	9	10	11	12
13	14	15	16	17	18	19
20	21	22	23	24	25	26
27	28	29	30	31		

April

S	M	T	W	T	F	S
					1	2
3	4	5	6	7	8	9
10	11	12	13	14	15	16
17	18	19	20	21	22	23
24	25	26	27	28	29	30

May

S	M	T	W	T	F	S
1	2	3	4	5	6	7
8	9	10	11	12	13	14
15	16	17	18	19	20	21
22	23	24	25	26	27	28
29	30	31				

June

S	M	T	W	T	F	S
			1	2	3	4
5	6	7	8	9	10	11
12	13	14	15	16	17	18
19	20	21	22	23	24	25
26	27	28	29	30		

July

S	M	T	W	T	F	S
31					1	2
3	4	5	6	7	8	9
10	11	12	13	14	15	16
17	18	19	20	21	22	23
24	25	26	27	28	29	30

August

S	M	T	W	T	F	S
	1	2	3	4	5	6
7	8	9	10	11	12	13
14	15	16	17	18	19	20
21	22	23	24	25	26	27
28	29	30	31			

September

S	M	T	W	T	F	S
				1	2	3
4	5	6	7	8	9	10
11	12	13	14	15	16	17
18	19	20	21	22	23	24
25	26	27	28	29	30	

October

S	M	T	W	T	F	S
30	31					1
2	3	4	5	6	7	8
9	10	11	12	13	14	15
16	17	18	19	20	21	22
23	24	25	26	27	28	29

November

S	M	T	W	T	F	S
		1	2	3	4	5
6	7	8	9	10	11	12
13	14	15	16	17	18	19
20	21	22	23	24	25	26
27	28	29	30			

December

S	M	T	W	T	F	S
				1	2	3
4	5	6	7	8	9	10
11	12	13	14	15	16	17
18	19	20	21	22	23	24
25	26	27	28	29	30	31

Practice Time

(1) Names of some of the months are missing in the list given below. Fill in the blanks with names of those months.

January, February, _____, April, _____, June, _____, August, September, October, _____, December.

(2) Look at the calendar to find out

(a) Which is the first month of the year? _____

(b) Which month comes after March? _____

(c) Which month comes before August? _____

(d) Which is the last month of the year? _____

(e) Which months have 30 days?

_____

(f) How many months have 31 days? _____

(g) How many days are there in February? _____

(h) How many days together are there in May and June?

_____

(i) How many Sundays are there in July? _____

(j) What is the day on your birthday? _____

(k) How many days make a week? _____

February is different

4 months have thirty days

7 months have thirty-one

February is the shortest month

In some years it jumps for fun.



Encircle the following dates in the calendar.

(a) 26th January

(b) 15th August

(c) 2nd October

(d) 14th November

Is there something special about these dates? Discuss with your friends.

Find out

How many days do you get for your summer holidays? _____

How many winter holidays do you have? _____

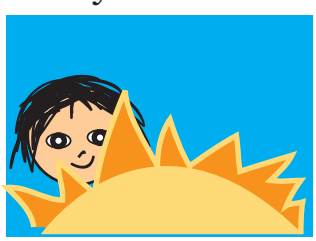
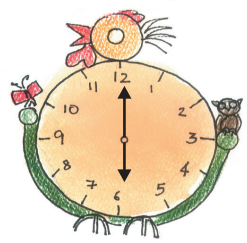
4. Time on a Clock

One day in the life of Kusum

Let's see what Kusum does every day.

Write down the time for each picture.

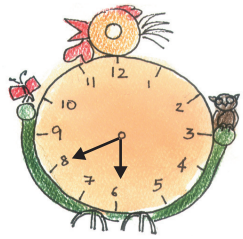
For some pictures the time is already written and you must draw the hands on the clock. In others you have to write the time shown by the clock.

Activity	Time in clock	Time (in words)
 Kusum gets up early in the morning.		At Six O' clock in the morning
 She brings water from the hand pump.		At Six-thirty in the morning

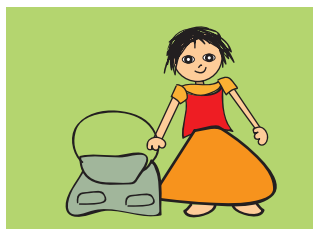
The picture on page 251 shows a popular way to remember long and short months. Starting with January, the long months sit on the knuckles, while short months are in the spaces between. One calendar to be made available in the class.Teacher may tell the students about a leap year in which February has 29 days instead of 28 days.



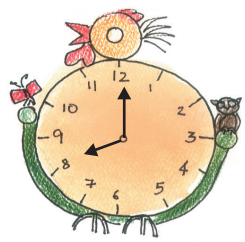
She cleans her house



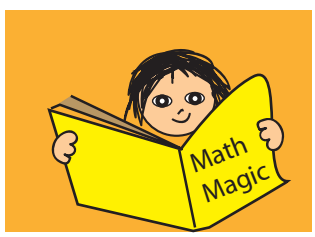
_____



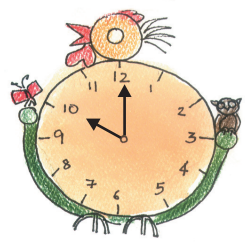
She goes to school



At Eight O' clock



She is studying in school.



_____



She comes back from school.



One O'clock in the afternoon



She takes lunch with her brother and grandmother.



_____

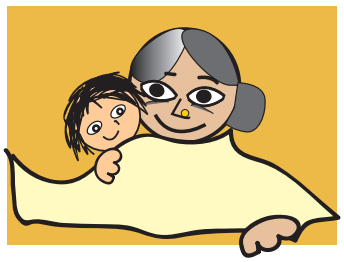
Teacher may point out that at six-thirty the hour hand will be in between 5 and 7 mark etc.



She plays with her friends.



Five-thirty in the evening



She listens to a story from her grandmother before she sleeps.

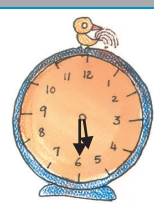
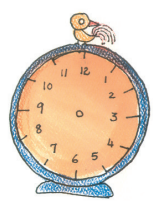
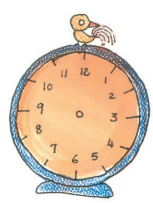


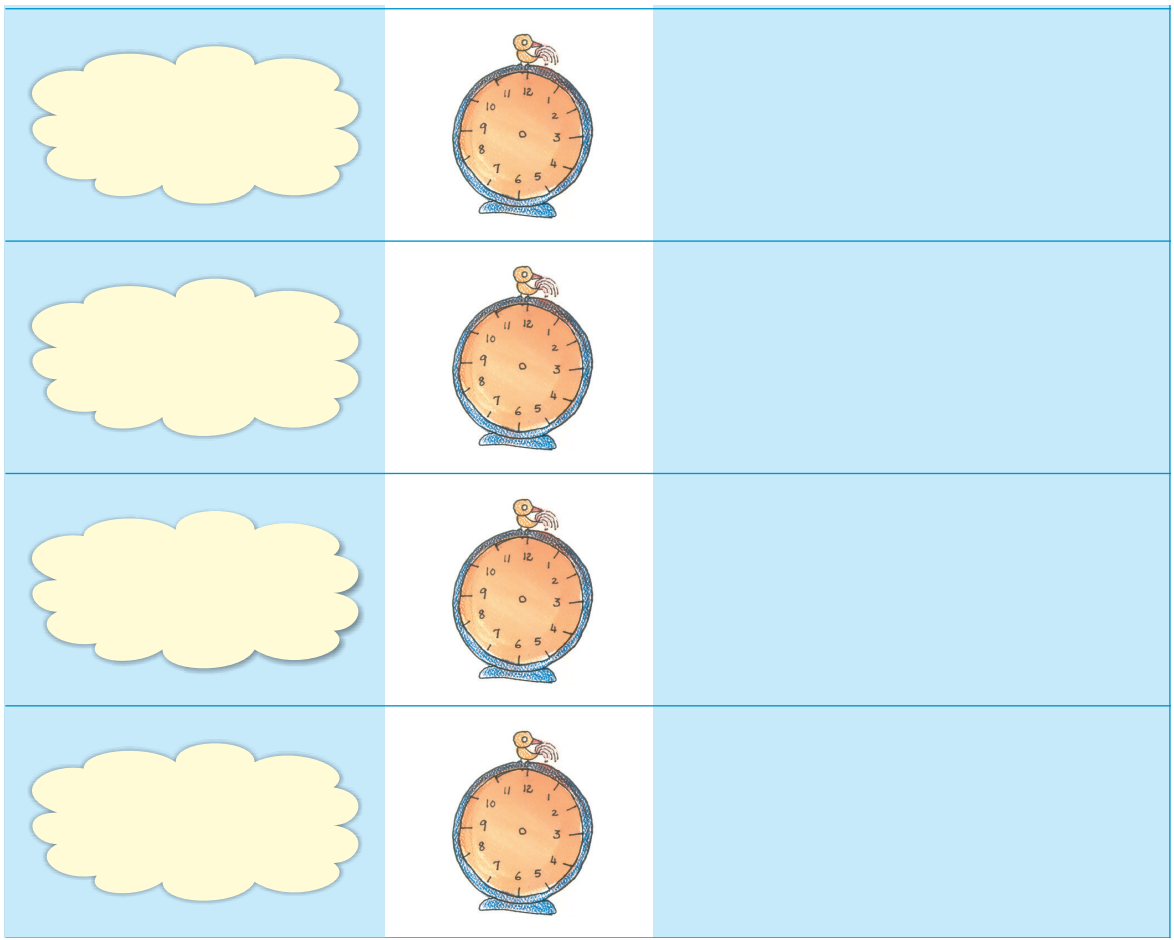
Nine O' clock at night

PRACTICE TIME

(i) Now prepare a chart showing your own daily routine.

Time of the day

	In words	On the clock	What do you do at this time?
(a)	At five-thirty in the morning		Get up in the morning
			_____
			_____

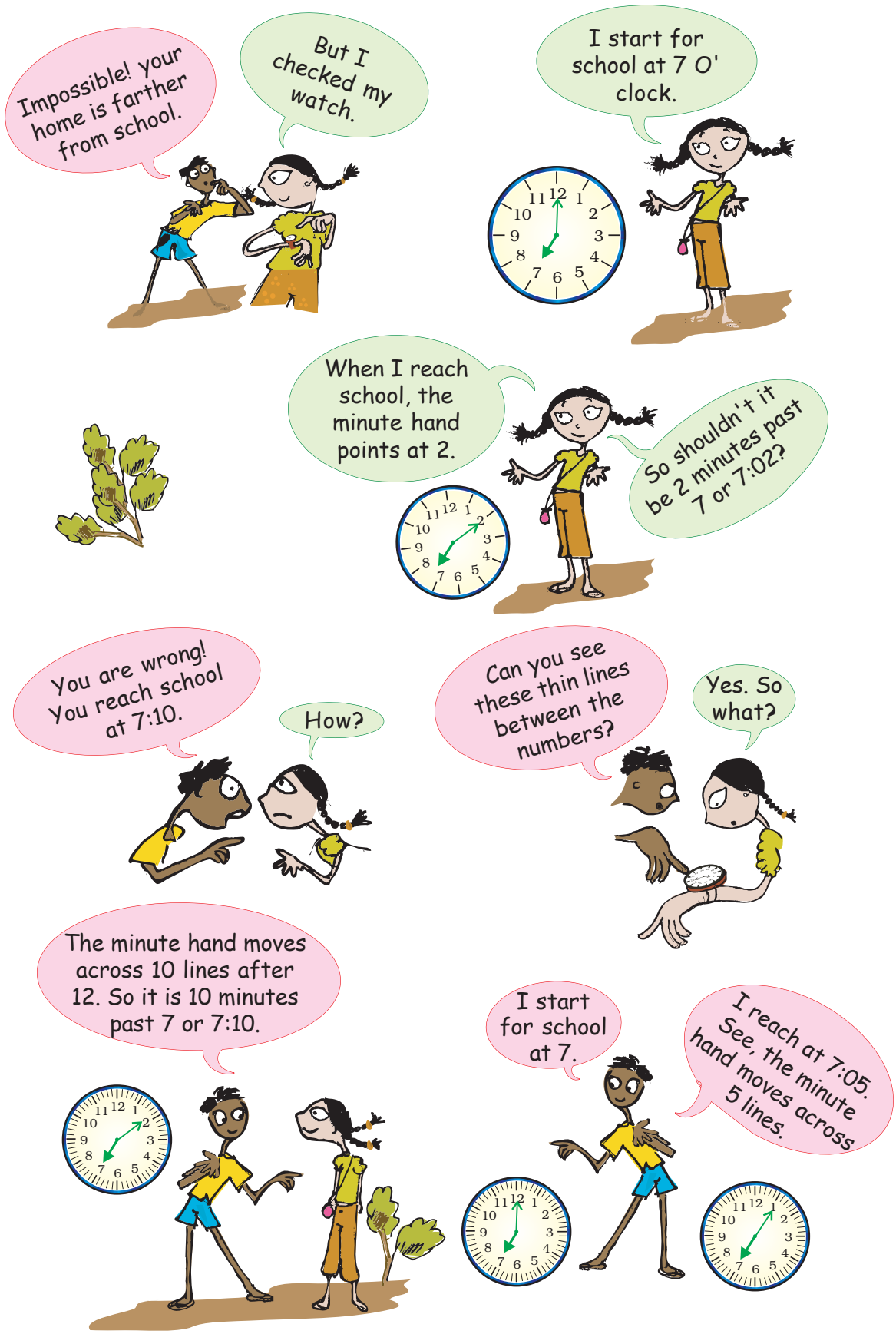


There are _____ minutes in one hour.

5. Reading Time From a Clock

Pamposh and Shazia were discussing whose home is farther from school.




Impossible! your home is farther from school.
But I checked my watch.
I start for school at 7 O' clock.
When I reach school, the minute hand points at 2.
So shouldn't it be 2 minutes past 7 or 7:02?
You are wrong! You reach school at 7:10.
How?
Can you see these thin lines between the numbers?
Yes. So what?
The minute hand moves across 10 lines after 12. So it is 10 minutes past 7 or 7:10.
I start for school at 7.
I reach at 7:05. See, the minute hand moves across 5 lines.

Practice Time

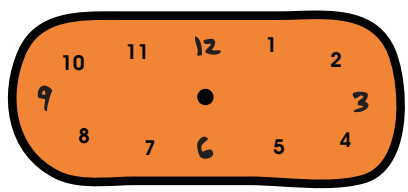
(1) Three friends read time from a clock. Who is right?

	Cheeku	Bittu	Pinki
	12:03	12:15	3:00
	7:25	5:07	5:35
	3:35	7:03	7:15

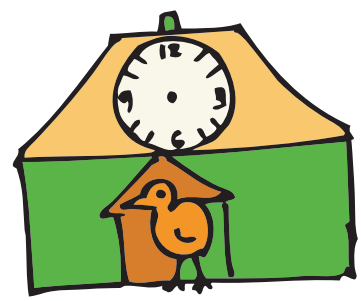
(2) Show the following times in the clock



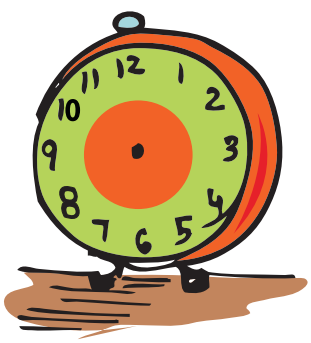
3:10



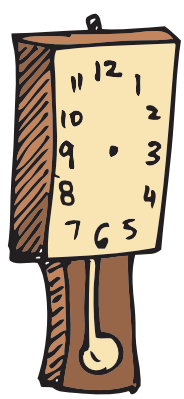
6:40



4:45



2:10



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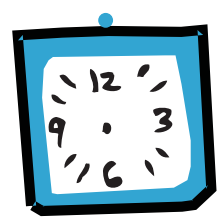
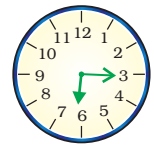
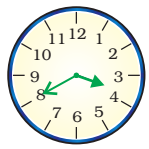
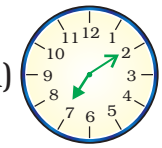
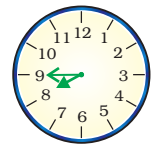


7:35

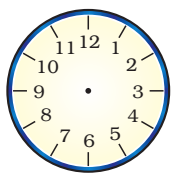
(3) Find out

- How long will it take for the minute hand to move from

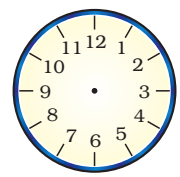
(a)  to  15 Minutes (c)  to  _____

(a)  to  _____ (d)  to  _____

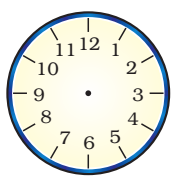
(4) Draw where the hands will be



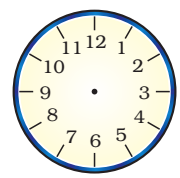
(a) 20 minutes after Six O' clock



(b) 10 minutes after Seven O' clock



(a) 30 minutes after Eight O' clock



(b) 15 minutes after Five O' clock

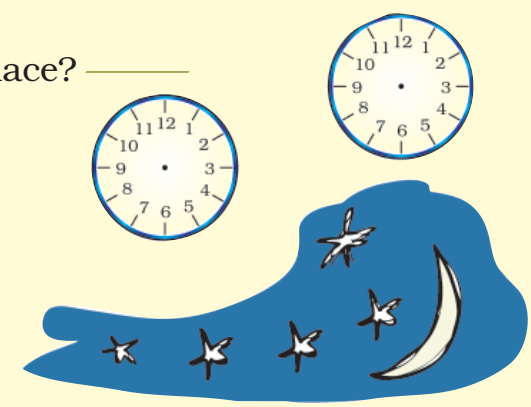
Do you like sky watching? If yes, then you should find this one interesting.

(a) At what time does the sunrise at your place? _____

(b) When does the sunset? _____

Does the sunrise and set at the same time every day?

Look at a newspaper and see the time of sunrise and sunset of that day.



6. How Long does it Take?



Have you seen someone knitting a sweater? Or someone weaving a cloth? Do try to find out from a potter how long it takes to make a pot. Also tell us if you take hours or minutes to have your bath! (Is it years since you last had a bath? Ha, ha!)

Think of many different activities that can take different time. Make your table as long as you can.

Takes minutes	Takes hours	Takes days
to bath	to stitch a shirt	to knit a sweater
to boil milk	to set curd	to weave a sari
	a school day	for a banana to ripe

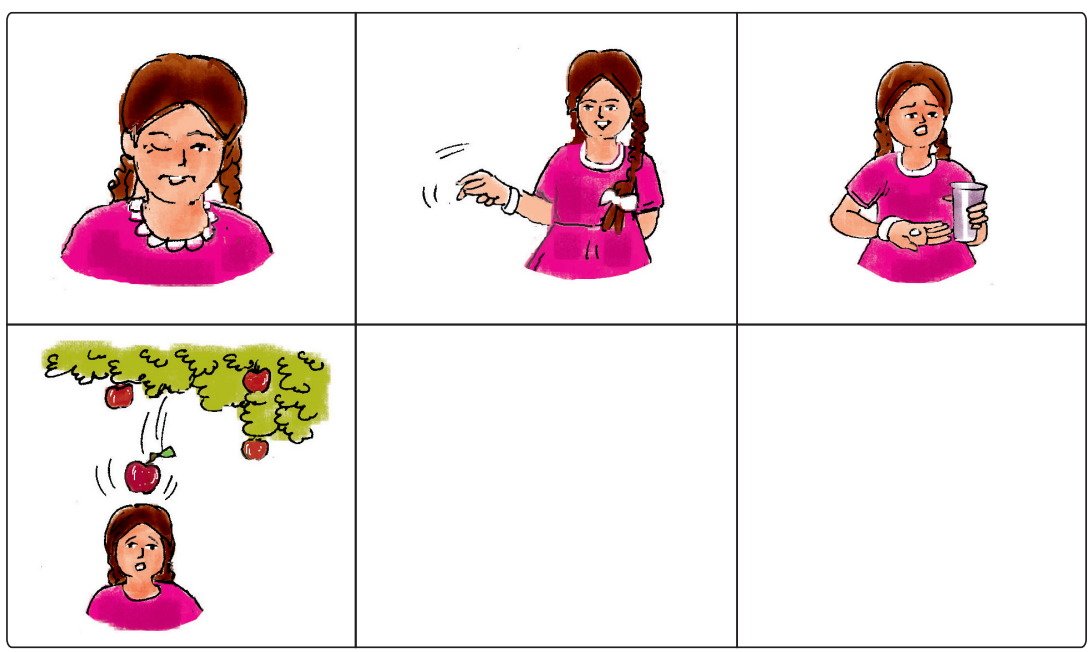


Think of some other things, some faster and some slower. Make a long list.

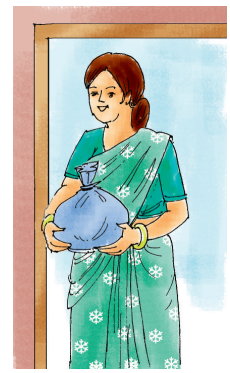
- Takes seconds

  to blink my eyes to snap my fingers to gulp my medicine

  for fruit to fall from a tree



- Takes months to grow wheat (from a seed to a big plant)
- to change weather from summer to winter
- to build a house.





PRACTICE TIME

(1) (a) How long does your school assembly take? _____

(b) How long is your lunch break? _____

(c) How long is your games period? _____

(d) Is it the same as all the other periods? _____





(2) Let's look at a clock again!

(a) The minute hand started from '2'. How many minutes will it take to come back to '2' again? _____

(b) What happens to the hour hand? Does it also move? How long will it take to move from one number to the next?

(c) Look around and list the activities that take about one hour to complete.

(i) _____ (iv) _____

(ii) _____ (v) _____

(iii) _____



(3) (a) How long does it take to cook dinner at home?

More than an hour/less than an hour.

(b) Which games take less than an hour to finish? _____

(c) How long does a football match take?

7. Holidays are Fun!



Huma's holidays had begun. She was very excited. She had made some wonderful plans and wanted to tell these to her cousin Shabana. So she wrote her a letter —

Ajmer
1/5/09

Dear Shabana aapa,

Hello!

How are you? I am fine here Aapa, my holidays have started from today! I am going to my Nani's place on 5/5/09. I will be back on 20/5/09. My school will reopen on 30/6/09. when does your school close? why don't you come here? we will have great fun!

Bye for now

Huma

Children will enjoy doing activities to see all the things they can do in one minute. Observing activities will give them a sense of time and also help them value the effort of others.

Shabana who stays in Nagpur, got this letter on 6/5/09.
She wrote back to Huma –

Nagpur
7/5/09

Dear Huma

Hello!

I am doing well here. I got your letter yesterday. Happy holidays! My school will close on 1st June 2009. it will reopen on 10th August. I will go on a school trip to Goa and will return on 7/6/09. I will try to come to Ajmer after that. Bye Bye for now

Shabana

Huma wrote her letter on 1/5/09. You remember how we write a date in numbers?

1/5/09 is 1 May 2009.



(a) Write which dates these stand for –

5/5/09 _____

20/5/09 _____

7/6/09 5 May 2009

1/1/10 _____

(b) Write these dates in numbers.

1 June 2009 _____

30 June 2009 01/06/09

10 August 2010 _____

(c) How long did it take the letter to reach from Ajmer to Nagpur? _____

(d) How many days will Huma spend at her Nani's place?

_____

(e) Fill in the table



	Dates		Number of days
	from	to	
Shabana's holidays			
Huma's holidays			

(f) Who has got longer holidays — Shabana or Huma?

8. Important Dates on Products

On 15 May 2009 Chandra went to a shop to buy butter. She checked the packet to see if this butter was safe to eat.



It was written on the packet —

Best before 180 days from the date of packing.

Then she checked the date of packing. It was 15/01/09.

Help him find out if she should buy this butter or not.

- In which month was the butter packed? _____
- Which month will it be 180 days after 15/01/09? _____
- Can Chandra eat it on 15th May 2009? _____
- Do you ever check the date of packing of things you buy?
- Have you seen medicines which have the expiry date written on them? It tells you after which date it is unsafe to take the medicine.

Which are the other things that come with an expiry date?





On a cough syrup it was written:

Mfg. date 07/08

This shows it was made in July 2008.

Exp. date 07/10

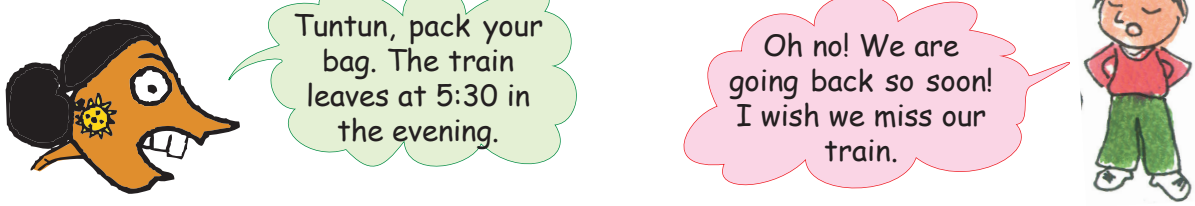
This shows the month and year till it is safe to take.

What month and year is written as 07/10 ? _____

Would it be safe to take the cough syrup in September 2009? _____

9. Tuntun Missed the Train

Tutun's school had closed for the summer holidays. She went to her grandma's place. She met her cousins there. She was enjoying herself and didn't want to go back home.



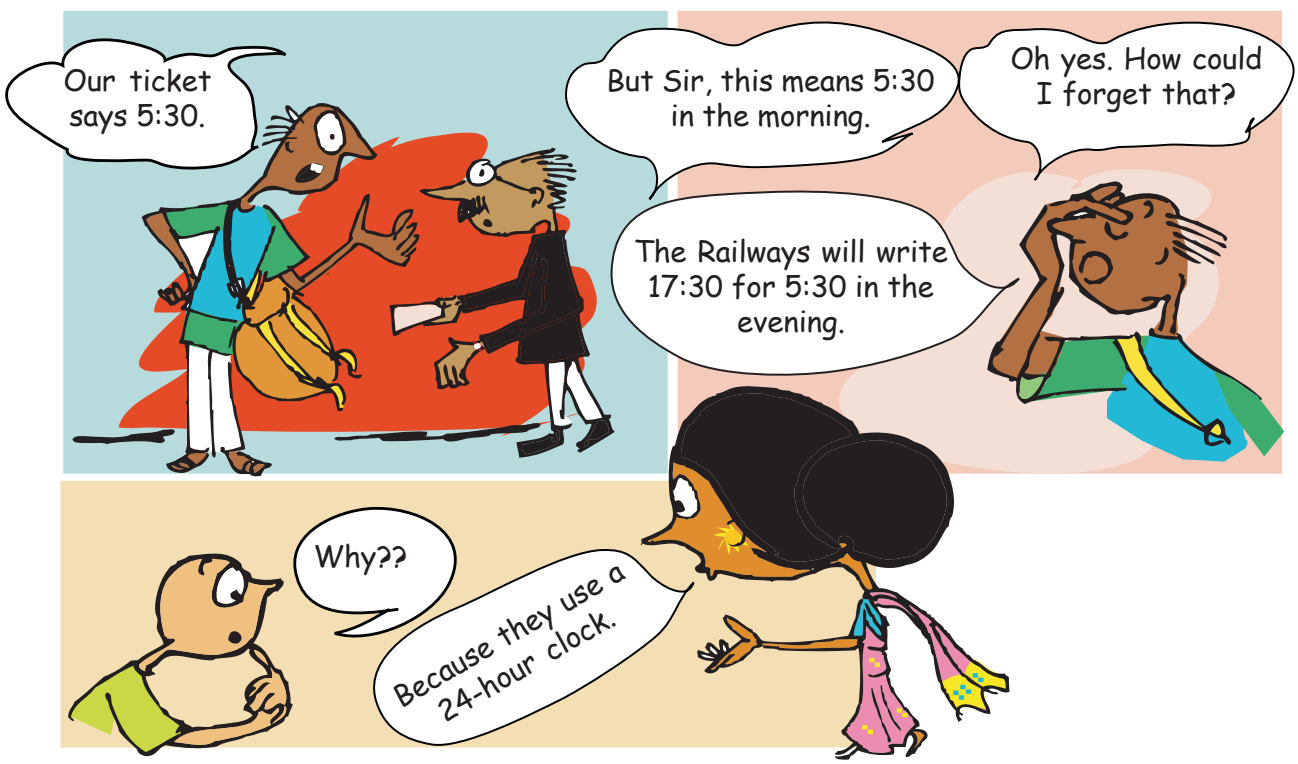
Children are not expected to know the words 'manufacturing' or 'expiry' dates, but only to recognise these as symbols that show when the medicine is made and till when it is safe to take. Teachers should encourage children to read and observe more such dates on different products.

Tutun and her parents reached the station at 5:15. But guess what? They had actually missed the train!



Can you guess why they missed the train?

Actually the train had left at 5:30 in the morning! Tutun's parents were upset. They asked the station master —



Look at this chart. It tells the difference between your watch and a 24-hour clock. Try to complete it.



Time by your watch (12-hour clock)	Time by a 24-hour clock
Nine O' clock in the morning	9.00 hours
One O' clock in the afternoon	13:00 hours
Two O' clock in the afternoon	14:00 hours
Three O' clock in the afternoon	_____
3:30 in the afternoon	15:30 hours
Six O' clock in the evening	_____
Nine O' clock in the evening	_____
Twelve O' clock at midnight	_____

Now can you tell why a 24-hour clock is called so?



Suppose a train leaves at 8:30 at night. The time written on the Railway ticket would be _____.

In a 12-hour clock, each time comes twice in a day.

So 5:30 in the morning is 5:30 am.

5:30 in the evening is 5:30 pm



What about 12:30 in the afternoon?



That is 12:30 pm.

After 12 O'clock (noon) we use pm till midnight.

(1) You must have noted the time of sunrise and sunset.
Write here using am and pm.

Time of Sunrise	
Time of Sunset	



(2) Where have you seen a 24-hour clock being used?

(i) _____

(ii) _____

(iii) _____

(3) How many hours are there in a day? _____



12 INTRODUCING WEIGHT

1. The Clever Donkey and Its Heavy Sack

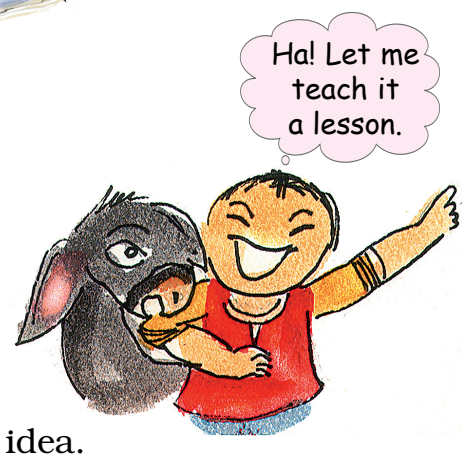
Sandesh has a donkey. It carries sacks full of salt on its back.

On the way to the market they have to cross a river.

One day, while crossing the river, the donkey slipped and fell into the river.

When it got up, the sacks felt very light.

- Guess why the sacks became lighter ?



The donkey was very happy. This also gave it an idea.

Next day, while crossing the river, the clever donkey decided to take a dip.

This time Sandesh understood the donkey's trick.

Next day Sandesh put sacks of cotton in place of salt.

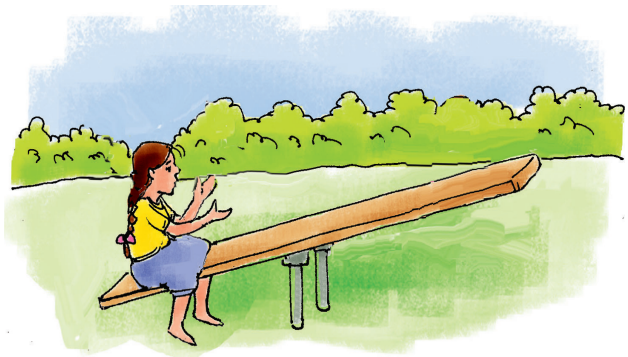
Children enjoy pictographs, they also help as visual aids for children who are yet not comfortable with reading.

- Now, what would happen to the  donkey when it dipped into the river? Why?

Ruby wants to ride a see-saw

Ruby needs a friend to ride a see-saw.

Rani comes to help Ruby.





But still Ruby cannot ride it.

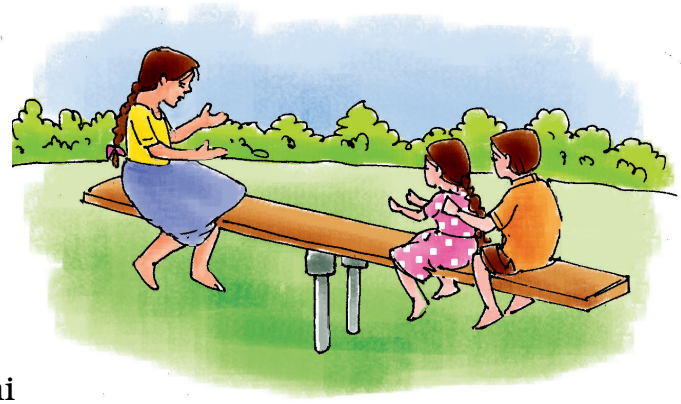
- Can you tell why? Circle the correct answer.

Ruby is heavier/lighter than Rani.

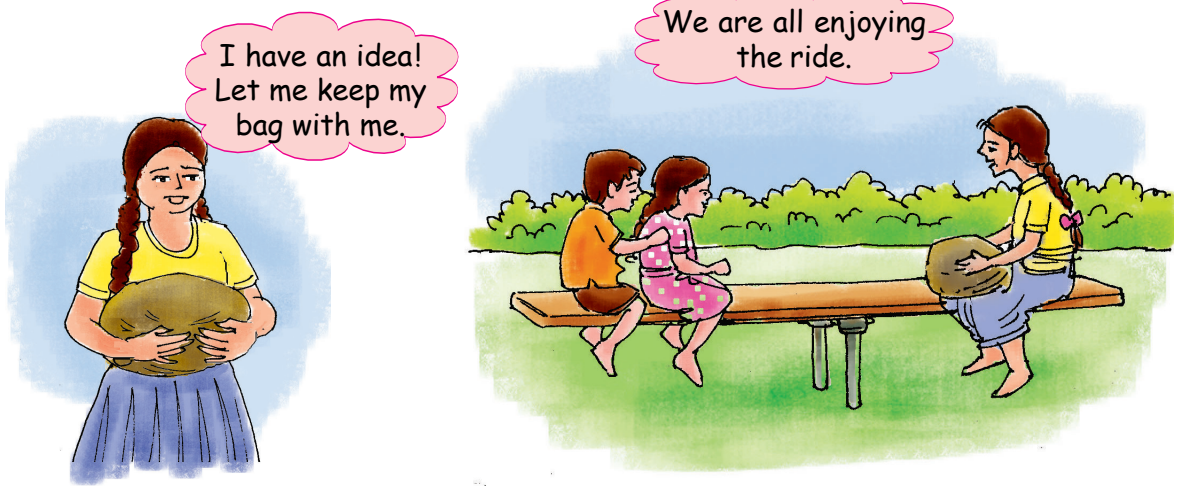
Aslam comes to help them.

Look at the picture.

- Can you tell why the see-saw turned this way?

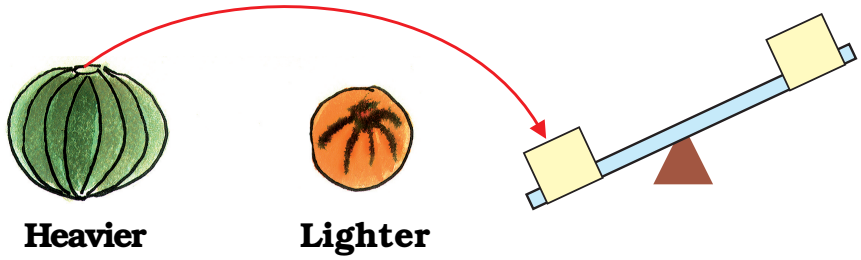


Ruby is heavier/lighter than Rani and Aslam together.



Heavier or Lighter

Match the things with the position of the see saw by drawing arrows and tell which is heavier and which lighter

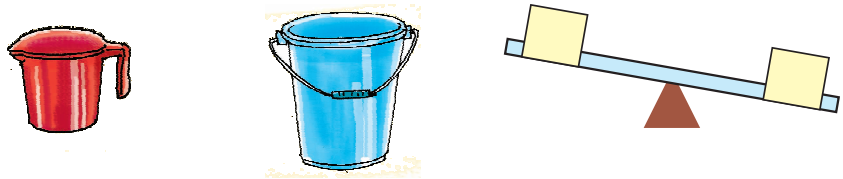


Heavier **Lighter**

(a)



(b)



How much can Simran carry?

Simran's father needs to move some things from the store of their house to the kitchen.

Simran along with her mother and sister wants to help her father.







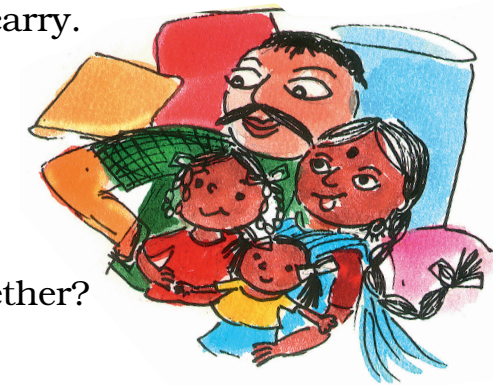
- Guess which bags/containers Simran can carry.
- Guess who can carry what —

  (a) Her father? _____

  (b) Her mother? _____

  (c) Her younger sister? _____
- Can Simran carry any two of these bags together?

  If yes, which ones? _____
- Which bags can you carry? Guess. _____



Gur (jaggery) and Groundnuts

Shabnam loved to eat jaggery (gur) and groundnuts.

One day she bought 1 kg of jaggery and 1 kg of groundnuts.

(you know that kilogram is also written as kg.)





- Are the groundnuts really more than the jaggery (gur) in weight or do they just look more?

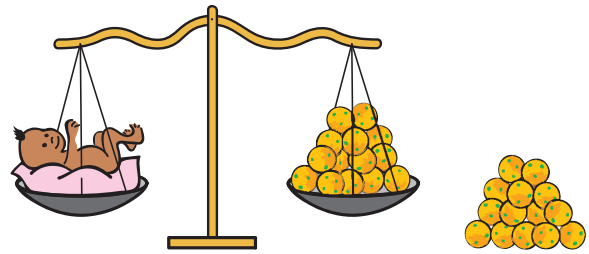
(1) 1 kg popcorn or 1kg sugar?

(2) 1 kg peas or 1kg potatoes?

Go to the market and check if your guess is right.



Double her weight



Kunjamma's parents have a different way of celebrating Independence Day because Kunjamma was born on that day. They buy sweets double of Kunjamma's weight and distribute them among poor people.

When Kunjamma was born, she was 3 kg. Today is Independence Day and Kunjamma is 5 years old. She is 26 kg now.

- Now guess her weight and the amount of sweets her parents distributed every Independence Day.

Kunjamma's age	Kunjamma's weight	Amount of sweets
At birth	3 kg	3 + 3 = 6 kg
1 year old	9 kg	_____
2 years old	_____	13 + 13 = 26 kg
3 years old	15 kg	_____
4 years old	_____	18 + _____ = 36 kg
5 years old	26 kg	_____

You can ask your parents how much a 2-year old or 4-year old child could weigh.



Yum-Yum Rice

Shugoto heard about a new dish on the radio. He tries to make it. When he notes down how to make it, he gets confused.

This is what he notes down —

(1) Pour **2 spoons** of water in the pot

(2) Boil the water and add

- **1 pinch** of daal
- **half kg** red chilli powder
- **1 bowl** salt

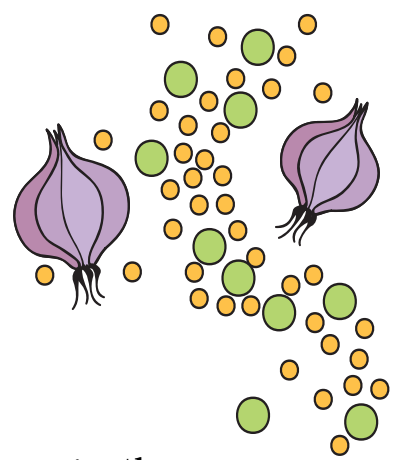
(3) Now put **a spoon** of rice

(4) Add **2** peas and **8** glasses of mustard seeds

(5) Finally add **1 kg** of onions

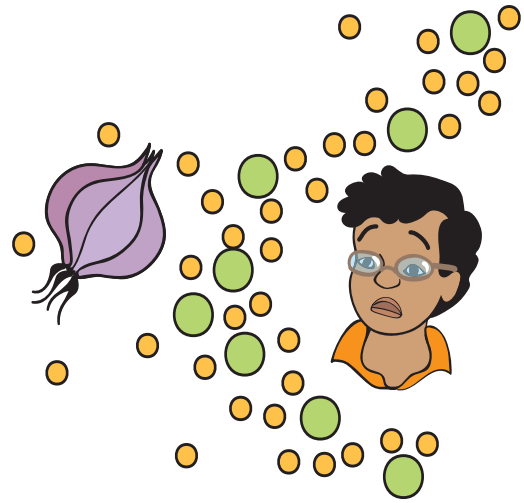
Mix everything and boil for 15 minutes.

But Shugoto feels there is something VERY wrong in the amounts of everything!!!





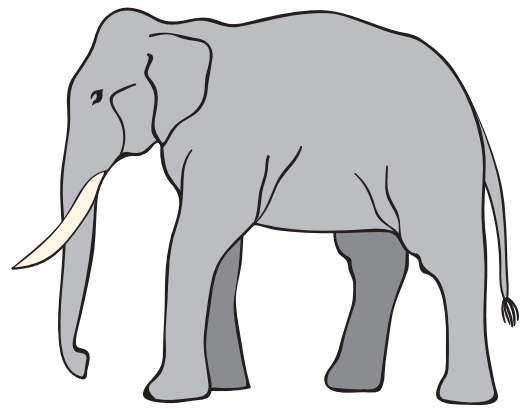
1kg	rice
Half kg	daal
_____	peas
_____	water
_____	onions
_____	salt
_____	mustard seeds
_____	red chilli powder

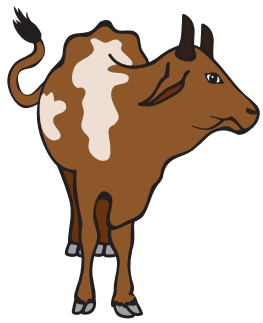


- Guess their weights and match.



10 kg
400 kg
Less than 1 kg
More than 1000kg
80 kg
2 kg









2. Measuring Weight

(i) Your school bag

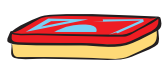
(ii) Geometry box

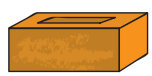
(iii) A brick

(iv) A big pumpkin

(v) Your pair of slippers



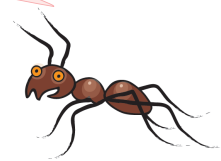








Guess which of the following things weigh more than 1 kilogram? Which ones will weigh less than 1 kilogram (kg)?

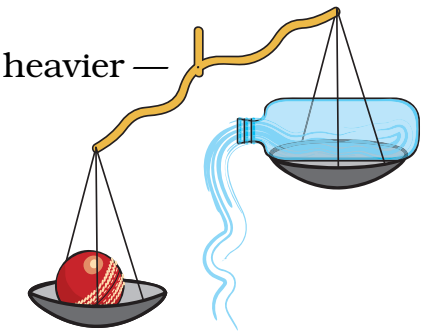


Bring a balance and a 1 kg weight. Check if your guess was right

Teacher may ask the children to lift objects weighing upto 1 kg before going to section 2 above.

Activity

(A) Use your balance to find which of the following is heavier —

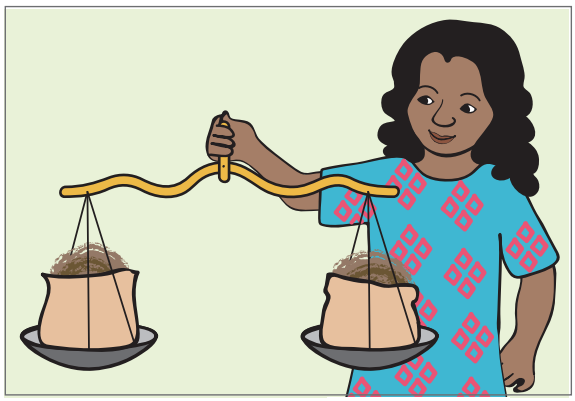


(i) A water bottle or a cricket ball

(ii) Your shoe or your pencil box

(iii) Your Maths book or Hindi book

(iv) Your bag or your friend's bag



(B) Weigh 1 kg of sand. Divide it equally into 2 bags. Use the balance to check if both the bags have equal weight.

Each bag of sand is half kg weight. Use it to weigh some other things around you.

(C) Make a list of

(i) Things weighing less than half kg.

(ii) Things weighing more than half kg.

Look for weights and balances

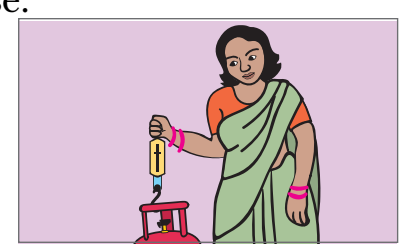
Make a trip to your nearest junk dealer, vegetable shop and grocery shop. Have a look at the weights they use.

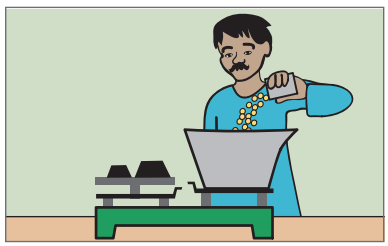
Find out

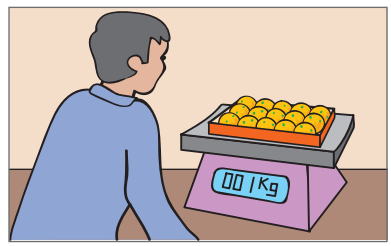
(i) Who uses the heaviest weight?

(ii) Who uses the lightest weight?

Have you seen any of these balances?

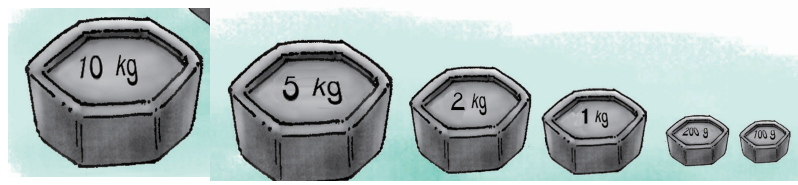








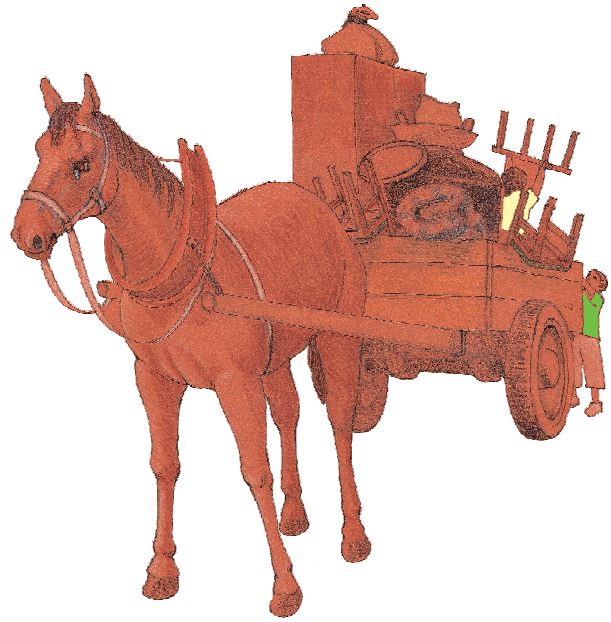
In which shop would you find the following types of weights?



Discuss with your friends.

Different activities will help children to guess and estimate weights of familiar things they see at home, at the grocery shop, etc. Guessing the weights of animals is an enjoyable exercise and helps them get a feel of larger weights. Teachers must bring a balance to class and give them a chance to weigh things themselves. The children may also make their own balances using indegineous materials.

How heavy? how light?



Jaiju and Mannu were shifting house. They loaded all their belogings on a horsecart. There were many things like — a water tank, five sacks of wheat, three tables, an almirah, four chairs, two mattresses, three sacks of rice, a bamboo ladder, pots and pans.

When they were ready to move. the horse did not move. They wondered why. Their father said that this horse was not well and would not pull a load heavier than 700 kg. Oh! But how heavy is this load? 0151 they asked.

Thing loaded	Weight
A sack of wheat	100 kg
A sack of rice	
Water tank	
Almirah	
A table	
A chair	
A mattress	
Bamboo ladder	
Pots and pans	

Father gave them some idea of the weight (given in the box here) of each thing.

- Find out the total weight they had loaded on the cart.

Now they decided to remove a few things from the cart.

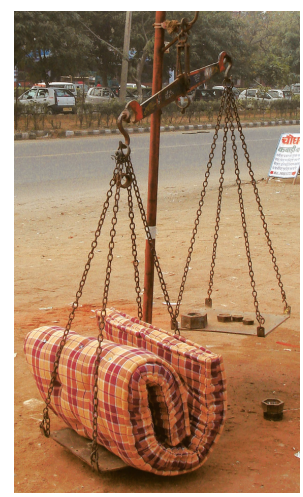
- Which things should be removed so that the weight of the load is not more than 700 kg?

_____

_____

_____

The things which were loaded on the cart were big in size and also very heavy. To measure the weight of such heavy and big things, we need a big balance.



Making Weights

Do this activity in pairs. You need a balance, weights, a cake of soap, plastic packets, sand and rubber bands. You can also take help of your elder brother/sister.

Get a new cake of soap. The packet will have the weight written on it. You can use this soap to make your own different weights.

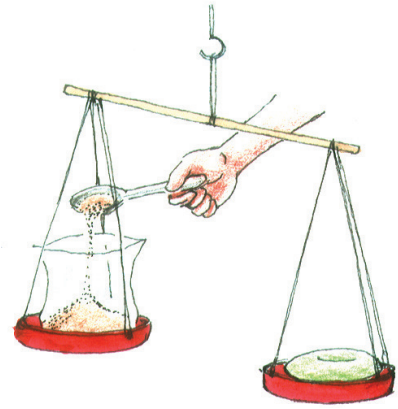
The soap weighs _____ grams (g).

Activity

Take a small plastic packet.

Put it in one pan of the balance. Put the soap in the other pan.

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





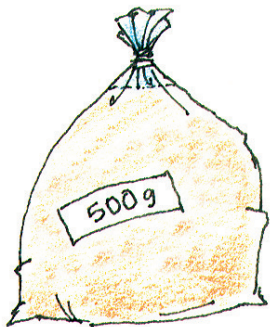
Close the packet with a rubber band or string. Now stick a strip of paper and write ' _____ g' on it.

If you put the soap and the weight you just made together in a pan, how many grams will both these weigh? _____

Now make different weights — 150g, 200g and 250g. You can use soaps of different weights for this.







Also make some bigger weights of 500g, 1000g and 750g
1kg = 1000g

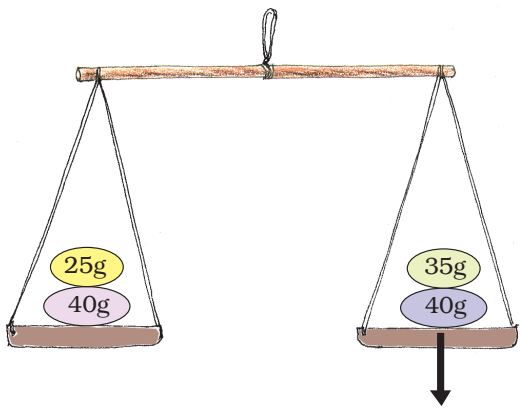
- Use your weights to weigh different things and write in your notebook.

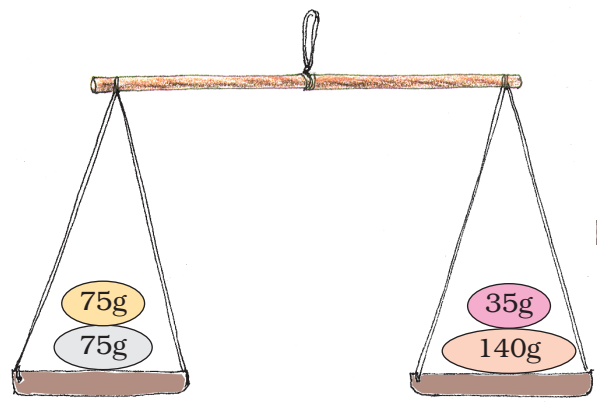
(You may note that kilogram is written as kg and 'gram' is also written as 'g').



Practice Time

(1) Which pan of the balance will go down? Show by drawing an arrow.









(2) Is the weight on any of the pans equal to 1 kilogram? Mark it.

(3) How many grams are there in 1 kg?

(4) How many grams are in half kg? _____ in one fourth kg?

(5) 2kg and 400 grams = _____ grams.

3. Grams and Kilograms

Name 5 things that we usually buy —

In grams	In kilograms
1.	1.
2.	2.
3.	3.
4.	4.
5.	5.



Dinesan went to shopping

Dinesan went to a shop and bought some things.

His younger brother tore the end of the bill where the units of weights were written.

- Guess and write the units of weights of each thing he bought — in g or kg.



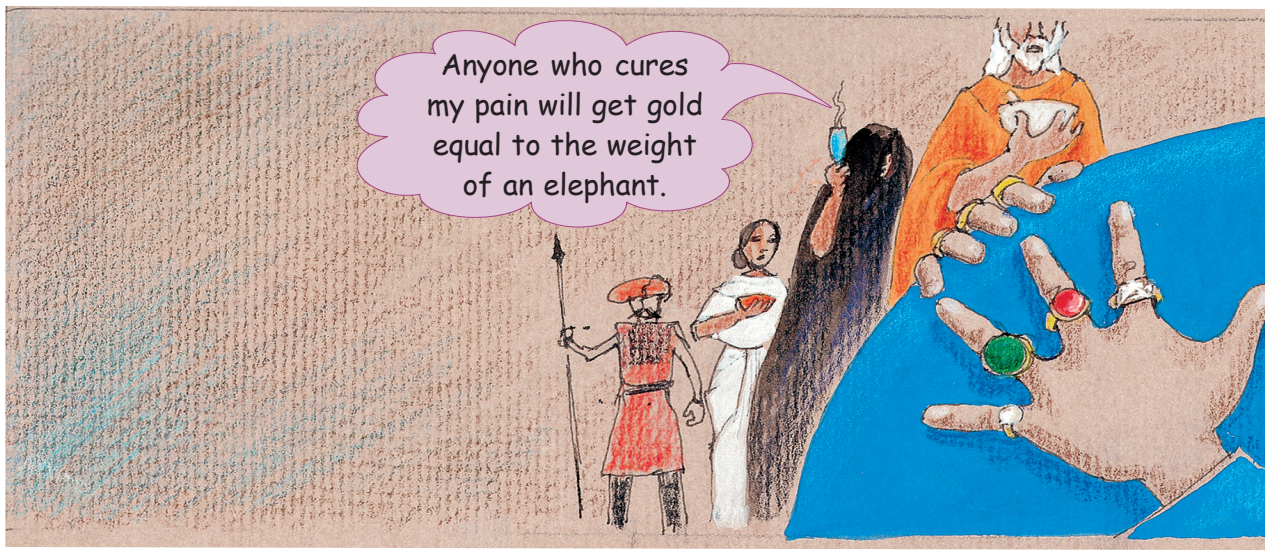
Items	Weight	
Rice	5	kg
Sugar	1	_____
Mustard seeds	10	_____
Wheat	3	_____
Dal	500	_____
Tea	250	_____
Pepper	25	_____

Elephant's weight

Once a king had pain in his stomach. None of the palace doctors could cure his pain.

The king then said:





One hearing this, doctors from all over the country come. But only Dr. Vaidika could cure him.



But, the greedy king didn't want to give her the gold. So, he thought of a trick.

Vaidika was unhappy when she reached home. She told her daughter the whole story.





Next morning, Dr. Vaidika invited the king near a river. The king came with an elephant, weights and a big boat.



Vaidika's daughter went into the river. She marked on the boat how much it sank in the river.



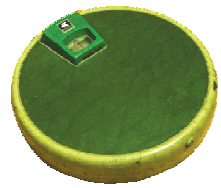
Then she asked them to bring the elephant into the boat. The boat sank deeper. So she marked the new water level on the boat.



Now imagine what happened next and complete the story. Discuss with your friends how Vaidika's daughter found the weight of the elephant.

How much the chair weighs

Anamika wants to weigh this chair using the weighing machine.





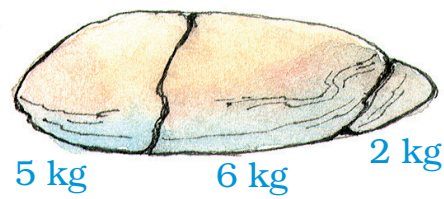
Can you suggest a way for doing this?

Broken Stones



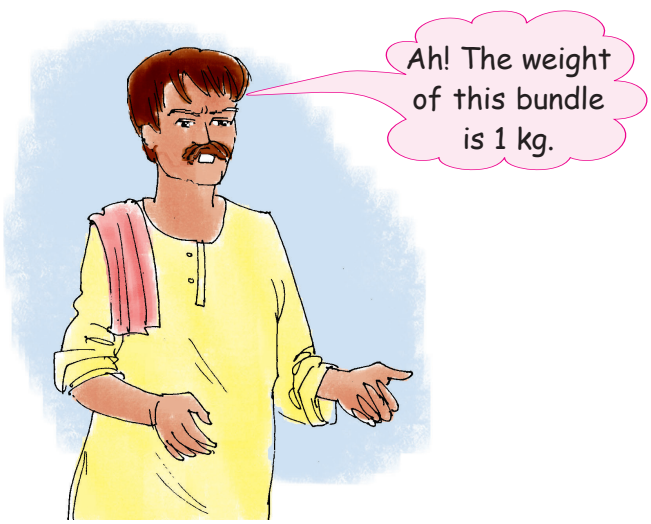
Abdu sells firewood. There was a stone in his shop which weighed 13 kg. He used it to weigh firewood.

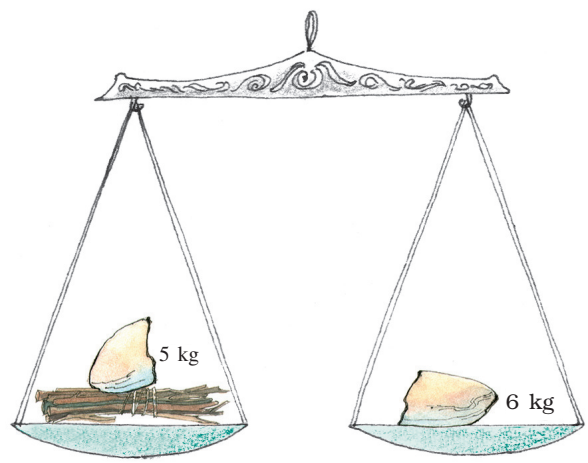
One day the stone fell down and broke into three pieces which weighed – 2kg, 5kg and 6kg.



But Abdu was very smart. He used those three pieces to weigh firewood of all weights — from 1kg to 13kg.

Here is how Abdu weighed 1kg of firewood.





- Now you show how Abdu will use these stone pieces to weigh —

(a) 4 kg of firewood



5 kg 6 kg 2 kg



(b) 3kg of firewood



(c) 7kg of firewood



Post Office

Have you ever been to a post office? _____

For what different purposes do people go there? _____

How much does a postcard cost? _____

How much does an inland letter cost? _____



भारतीय डाक INDIA POST **Postal Rates**

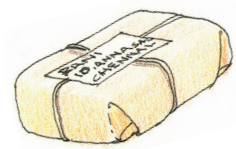
Postal Items	Postal Rates (in Rs)
Single post card	0.50
Printed post card	6.00
Inland letter	2.50
Letter weighing	
(i) 20 grams or less	5.00
(ii) For every additional 20 grams	2.00
Parcel weighing	
(i) 500 grams or less	19.00
(ii) For every additional 500 grams	16.00







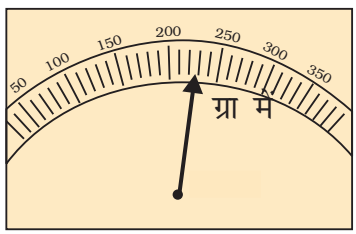
Look at the postal rates given in the chart and answer the following.



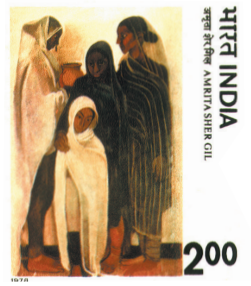
(1) How much will you have to pay for stamps on a letter weighing 50 grams? _____

(2) Akash wants to sent a parcel of the three copies Math textbook one each to his friends in Chennai. The book weighs 600g. Find the cost of posting the book. _____

(3) Read the weight shown in the picture. Find out the cost of sending a parcel of that weight.











Parcel weight = _____

Cost of stamps = _____



How many stamps?



Sheela needs stamps of Rupees 25 on a letter. She went to the post office. Only stamps of Rs 1, Rs 2, Rs 5 and Rs 10 were there at that time. Using those stamps can you show five different ways of making stamps of Rs 25? What is the heaviest letter she can sendusing stamps of Rs 25?

Am I fit or fat?

The chat shows the height and weight of children between 6 and 10 years old.



Name	Age	Height	Weight
Temshula	6	1 metre 10 centimetres	16kg
Sreekunth	10	1 metre 30 centimetres	23 kg
Rabiya	6	1 metre 15 centimetres	17 kg
Vineet	8	1 metre 18 centimetres	19.5 kg
Kavita	9	1 metre 35 centimetres	20 kg

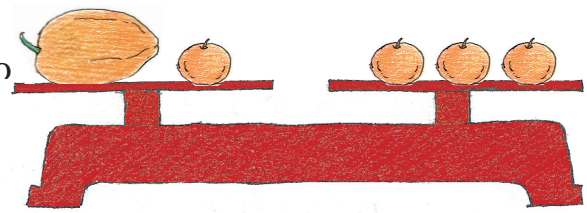


Now, you also fill the table by finding out the heights and weights of any five friends.

Name	Age	Height	Weight

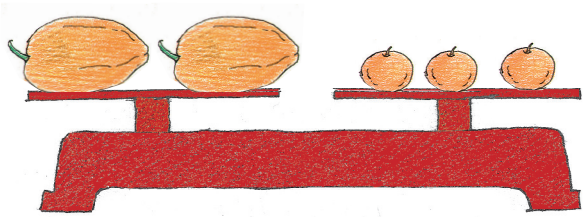
Puzzles

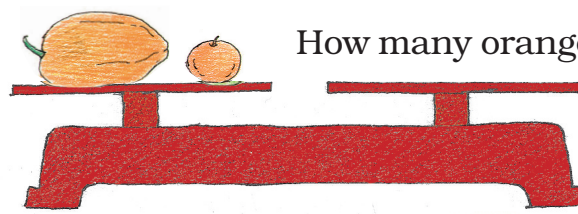
(1) How many oranges?



All oranges have equal weight. The two papayas have the same weight. The weights in the first and second balances are equal.

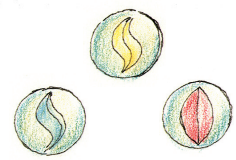
How many oranges balance the weight in the third?





How many oranges?

(2) Find that marble



There are 3 marbles of the same size but one marble is slightly heavier or lighter that the other two. Can you find which is that marble and if it is heavier or lighter? You can use a balance only two times.

5. Trek to Gangotri





The students of Class XII of some school are going on a trek to Gangotri. They have to pack their bags for six days and keep them light. They also have to take things that do not take too much space. Sothey will look for things that have both less volume and less weight. After all, they will carry their own bags while climbing the mountains!

They even dry the onions and tomatoes to make them light. One kg of onions or tomatoes becomes 100g when the water inside dries up.



Daily ration for one person

- Rice: 100g
- Flour (Atta): 100g
- Pulses (Dal): $\frac{1}{3}$ the weight of rice or flour
- Oil: 50g
- Sugar: 50g
- Milk powder: 40g
  (for tea, porridge, and hot drink)
- Tea: Around 10g
- Dalia: 40g for breakfast.
- Salt: 5g
- Dried onions: 10g
- Dried tomatoes: 10g



(a) For 6 days, each person will need

- Rice and flour– _____ g
- Pulses – _____ g
- Dried onions – _____ g

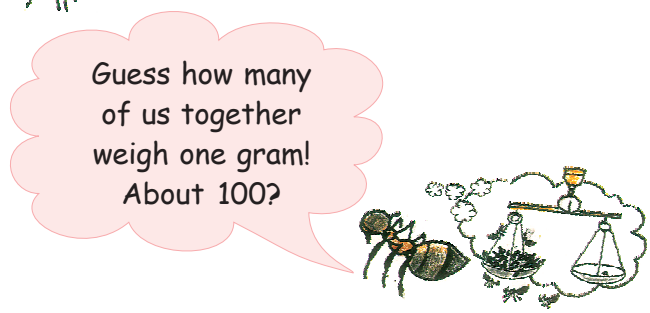


(b) How much of fresh tomatoes should be dried for 6 days and for 10 persons?

(c) What is the total weight of food (for 6 days) in each person's bag?

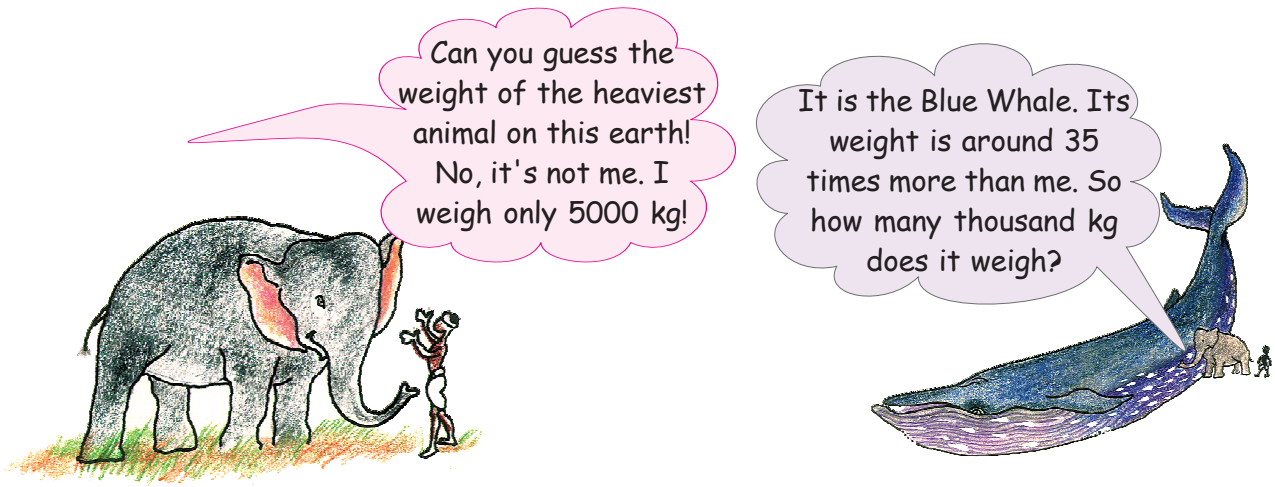






How heavy am I?

Do you remember the story of how Vaidika's daughter found the weight of an elephant? (See page - 279)



- Guess how many children of your weight will be equal to the weight of an elephant of 5000kg.
- At birth, a baby elephant weighs around 90kg. How much did you weigh when you were born? Find out. How much times is a baby elephant heavier than you were at birth?
- If a grown up elephant eats 136kg of food in a day then it will eat around _____ kg in a month.

  Guess about how much it will eat in a year.



6. Coins and Weights

Shahida works in a bank. She sits at the cash counter. Whenever there are too many coins she does not count them. She just weighs them.

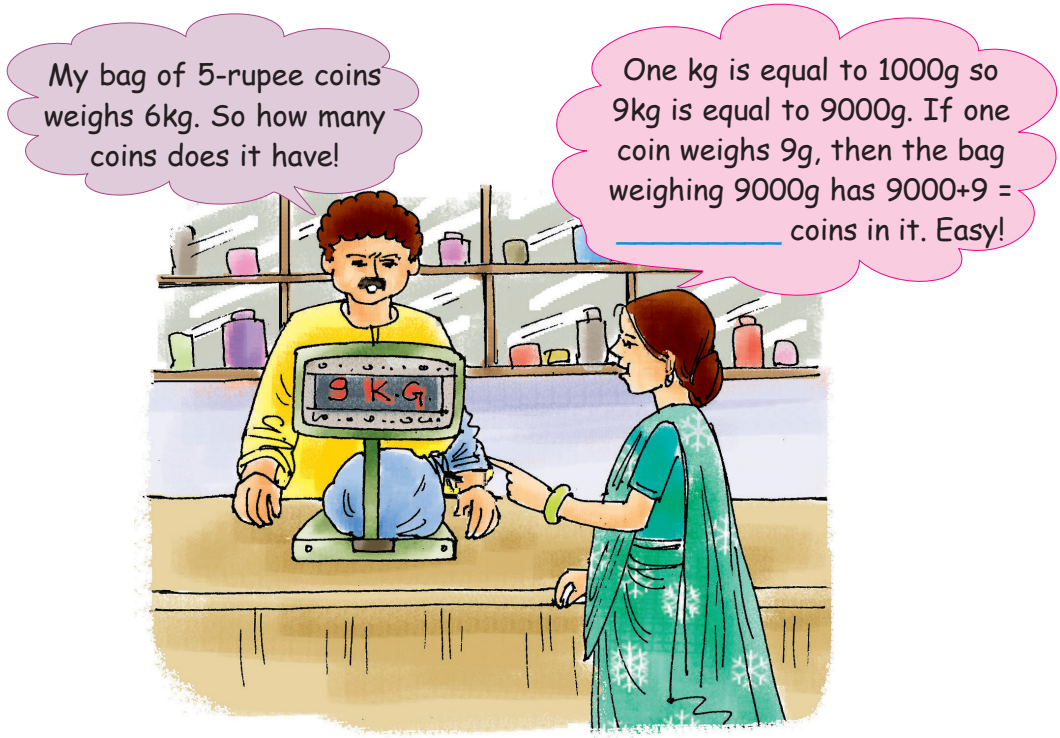


Weighing is so much easier! The weight of a 5-rupee coin is 9g. Tell me the weight of the sack and I will tell you the number of coins in it.





Can you hold these coins and say which is the heaviest?

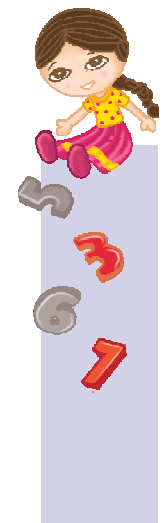


- How many 5-rupee coins will weigh
  (a) 18kg ?_____ (b) 54kg ?_____
  (c) 4500g ?_____ (d) 2kg and 250g ?_____
  (e) 1 kg and 125g ?_____

2250g can also be written as 2kg and 250g. Can you explain why?

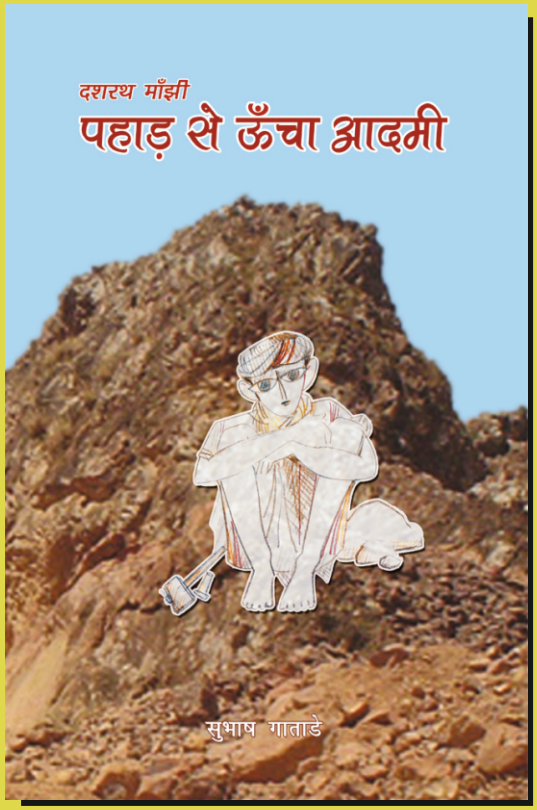
- A 2-rupee coin weighs 6g. What is the weight of
  (a) 2200 coins of 2 rupee ?_____ kg _____
  (b) 3000 coins of 2 rupee ?_____ kg
- If 100 coins of one-rupee weigh 485g then how much will 10000 coins weigh? _____ kg _____ g.

Rough Work





Rough Work



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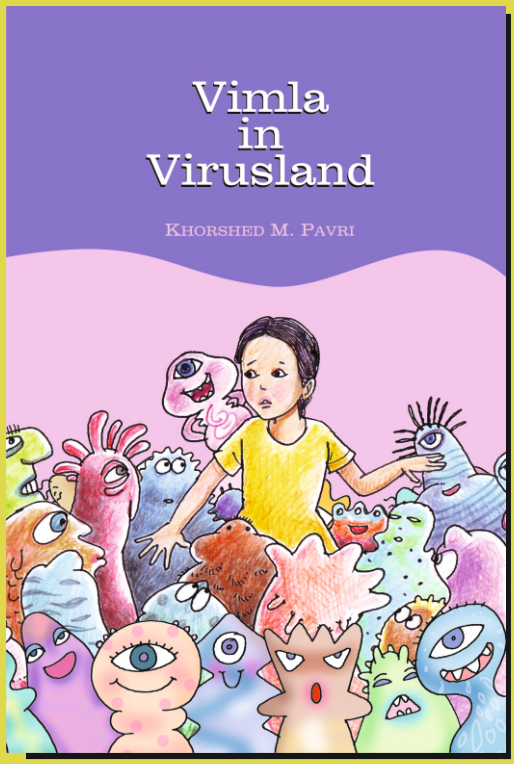

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