Alavi

Mathematics

Learner's Book

3

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Introduction

The Primary Mathematics brings together the world-class Cambridge Primary mathematics curriculum from Cambridge International Examinations. It is an innovative combination of curriculum and resources designed to support teachers and learners to success in primary mathematics through best-practice international maths teaching and a problem-solving approach.

The Cambridge curriculum is dedicated to helping schools develop learners who are confident, responsible, reflective, innovative and engaged. To this end, the textbooks provide support based on pedagogical practice found in successful schools around the world. This series is arranged to ensure that the curriculum is covered whilst allowing teachers to use a flexible approach.

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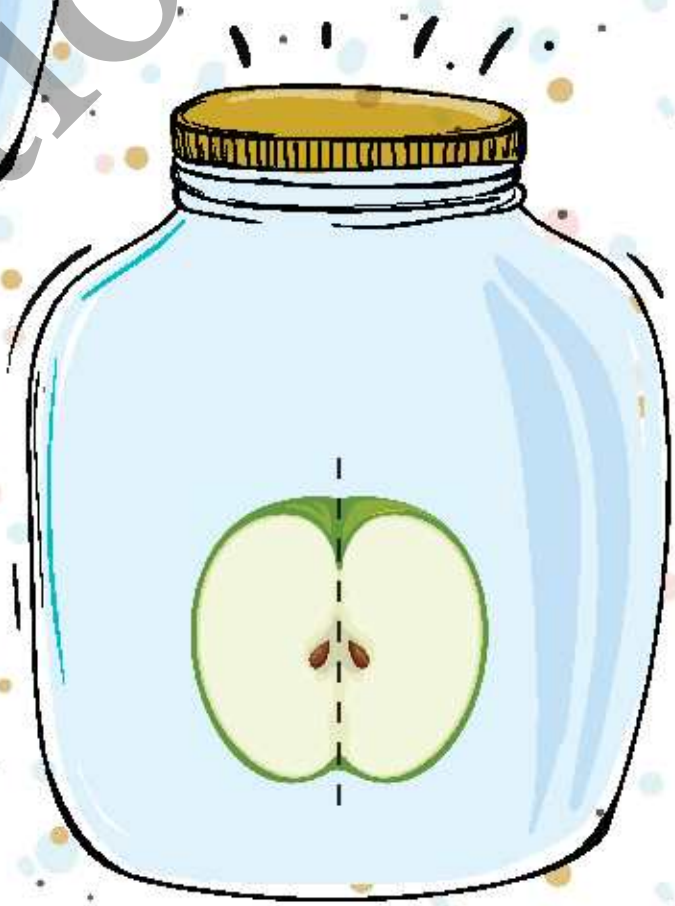
CHAPTER 1



What learners will learn and reinforce

The activities in this chapter give learners practice in the following topics:

Topic	In this topic, learners will:
1.1. Numbers	compare 3-digit numbers.
1.2. Before, after, between	write the number that comes before/ after/ between.
1.3. Greater than/ less than	identify if a number is less than/ greater than/ equivalent to a given number.
1.4. Adding and subtracting	practise adding and subtracting 3-digit numbers.
1.5. Symmetry	identify the line of symmetry and how it splits a shape into two halves.

Word bank

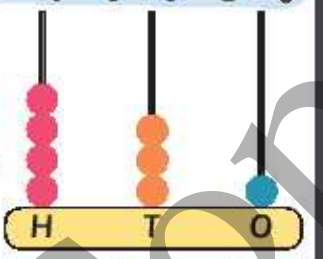
1	place value	2	hundreds	3	tens	4	ones	5	abacus
6	3-digit number	7	come after	8	come before	9	come between	10	less than
11	greater than	12	equal to	13	least	14	greatest	15	plus
16	minus	17	equal	18	line of symmetry	19	horizontally	20	vertically
21	diagonally								

1.1. Number

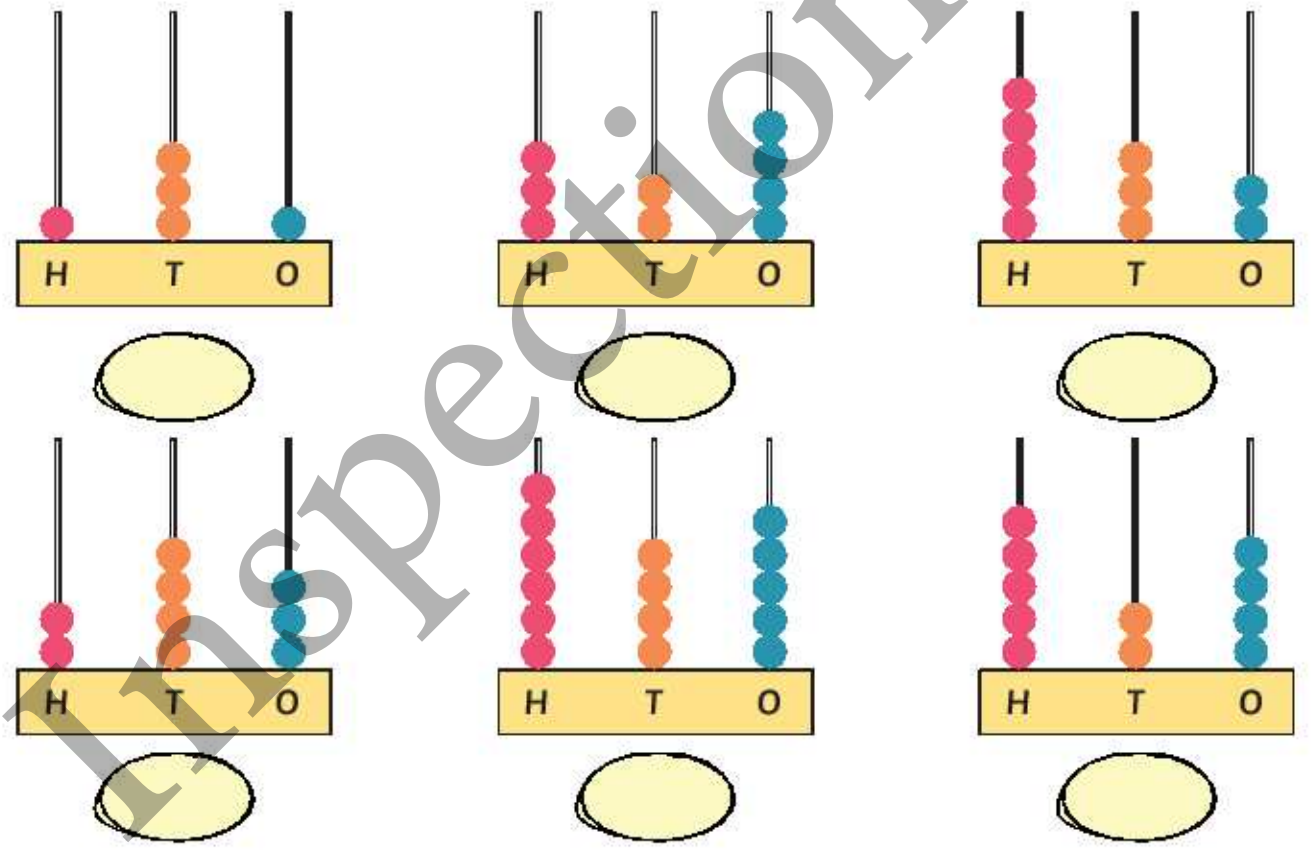
Hundreds, tens and ones

Remember

An abacus uses beads to represent numbers. Each stick has a different value. On these abacuses, they are hundreds, tens and ones.



1) The number of beads in each tower of the abacus tells you how many hundreds, tens and ones are in each number. Write a list of the numbers shown.



2) Put the numbers in order from the smallest to the largest.

3) Draw an abacus to show each of these numbers:

Here are four digits.

7	4	9	1

(a) Make the biggest three-digit number you can with any three of these digits.

(b) Make the smallest three-digit number you can with any three of the digits in question 1.

1.2. Before, after, between

Write the number that comes one before:

1) ....., 155 ....., 121 ....., 186

2) ....., 378 ....., 599 ....., 701

3) ....., 411 ....., 600 ....., 259

Write the number that comes after:

4) 734, ... 551, ... 287, ...

5) 414, ... 880, ... 699, ...

6) 108, ... 348, ... 99, ...

Write the number that comes between:

7) 214, ..., 216 589, ..., 591

8) 777, ..., 779 305, ..., 307

9) 880, ..., 882 98, ..., 100

Write all the even numbers between 515 and 535.

1.3. Greater than, less than

Comparing numbers

> Look and learn
> ◆ > is greater than
> ◆ < is less than
> ◆ = is equal to

Write > , < or = .

1) 521 < 542

2) 681 ☐ 914

3) 130 ☐ 119

4) 835 ☐ 816

5) 315 ☐ 315

6) 725 ☐ 35

Ordering numbers

Write the numbers in order from least to greatest.

1) 225, 98, 187, 309 ....., ..., ..., ...

2) 470, 417, 428, 459 ....., ..., ..., ...

Write the numbers in order from greatest to least.

3) 518, 377, 801, 495 ....., ..., ..., ...

4) 350, 96, 606, 428 ....., ..., ..., ...

5) 770, 765, 707, 777 ....., ..., ..., ...

Problem Solving: Critical Thinking

Solve the riddle.

I am a number less than 250 and greater than 245 I have 7 ones, what number am I?

I am an even number between 624 and 630. I have more than 6 ones. What number am I?

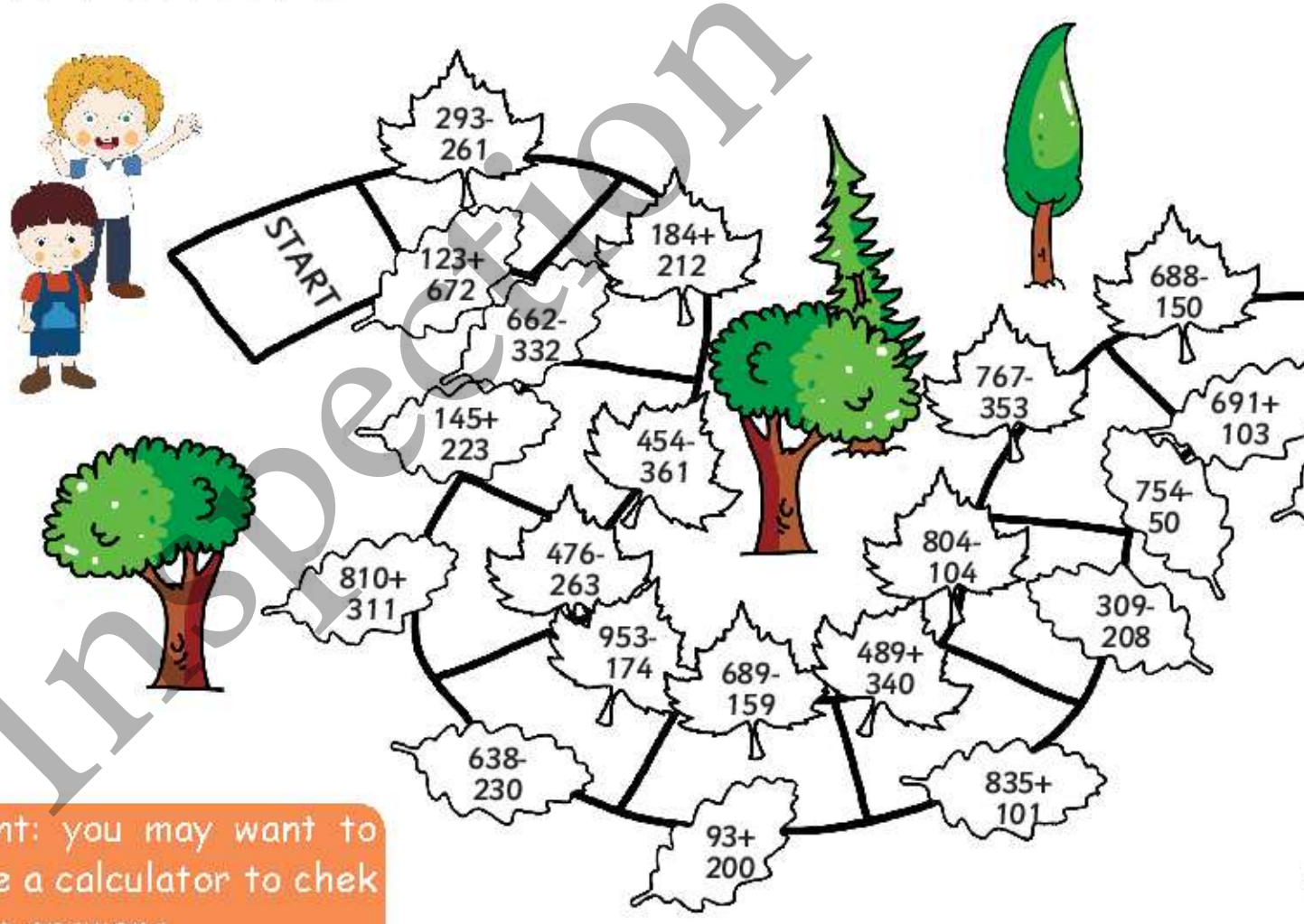
1.4. Adding and subtracting

Remember

Use what you know about adding and subtracting 10 and a hundred from a number.

You will need: a counter for each player (different colours), enough extra counters to cover all the calculations on the leaves, paper to record, and calculator for checking answers (optional).

This is a game for two players. Cover all the leaves with counters, to hide the calculations.



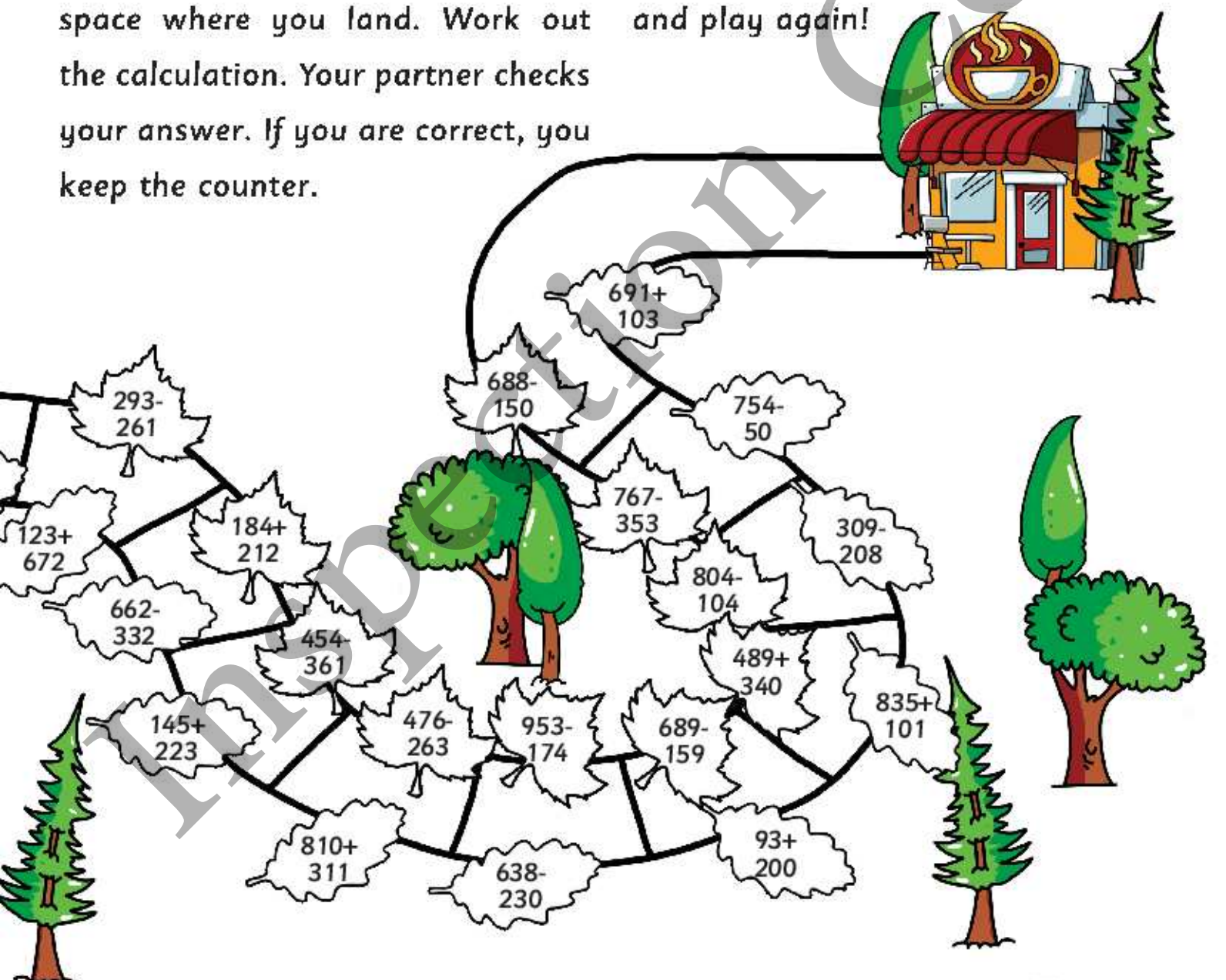
Hint: you may want to use a calculator to chek the answers.

Each player decides whether to collect leaves from the left side or the right side of the track. Both players place one counter on START. Walk through the wood, by taking turns to throw the dice. Move that number of spaces around the track. Pick up a counter from a leaf at the space where you land. Work out the calculation. Your partner checks your answer. If you are correct, you keep the counter.

Keep playing until you reach the cafe' at the end of the track.

Each count your counters. The winner is the player with the greater score. This is the number of counters you have collected.

If you both have the same score, put the counters back on the leaves and play again!



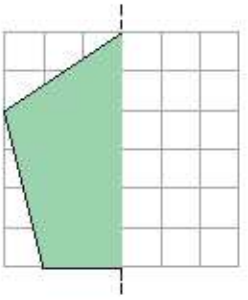
Symmetry

Remember

A line of symmetry splits a shape or pattern into two halves that are mirror images of each other. Shapes and patterns can have more than one line of symmetry.

Here is half a shape and its line of symmetry. Copy the diagrams and complete the shapes.

(a)



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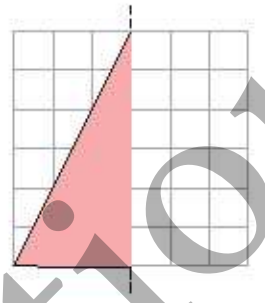

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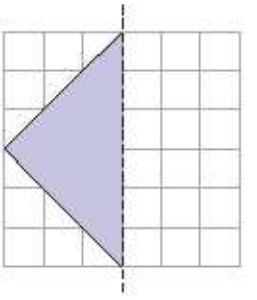
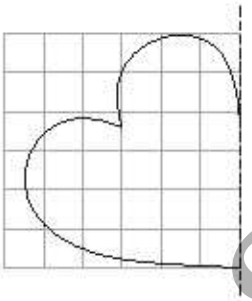


Copy the diagram and reflect the shape in the mirror line.



Hint: use a mirror to find and check the lines of symmetry.

Fold squared paper in half, horizontally, vertically or diagonally. Use the fold line as the line of symmetry.

Shade squares to make a symmetrical pattern with one line of symmetry.

Find the flags which have exactly two lines of symmetry.

United Kingdom

USA

Switzerland

Scotland

Syria

Bahamas

Cameroon

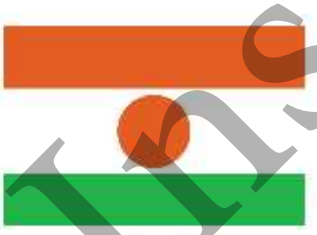
Spain

Trinidad and Tobago

Finland

Libya

Kazakhstan



Niger

Panama

Somalia

Macedonia

Can you find the line of symmetry in this symmetrial monument?

CHAPTER 2

What learners will learn and reinforce

The activities in this chapter give learners practice in the following topics:

Topic	In this topic, learners will:
2.1. What's the time?	identify the analogue and digital clocks and tell the time more precisely.
2.2. Cooking times	calculate how long cooking a food takes.
2.3. Rounding to the nearest 10 and 100.	round a given number to the nearest 10 and 100.

Word bank

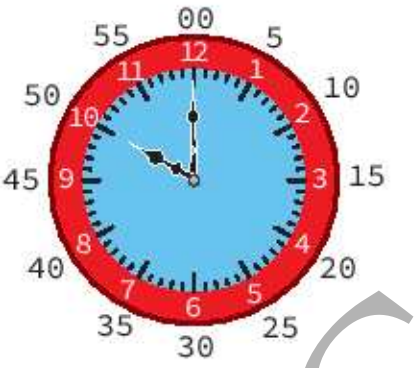
1	analogue	2	digital	3	quarter past	4	quarter to	5	half past
6	o'clock	7	take	8	hour	9	minute	10	round to
11	the nearest 10	12	the nearest 100	13	round up	14	round down		

2.1. What's the time?

You will need:
counters in 2 different colours.

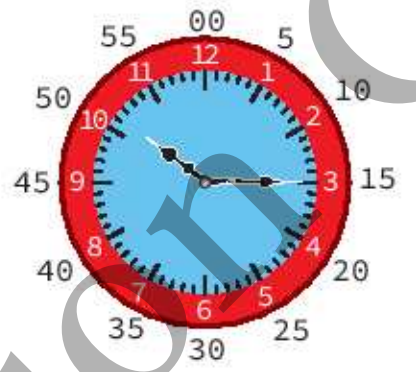
Analogue and digital clocks

◆ At o'clock times, the minute hand points to 12 on an analogue clock and a digital clock shows 00 minutes.



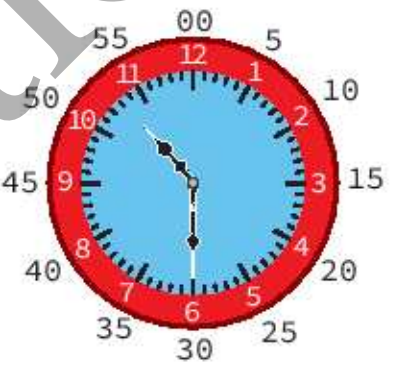
10 : 00

◆ At quarter past, the minute hand points to 3 on an analogue clock and a digital clock shows 15 minutes.



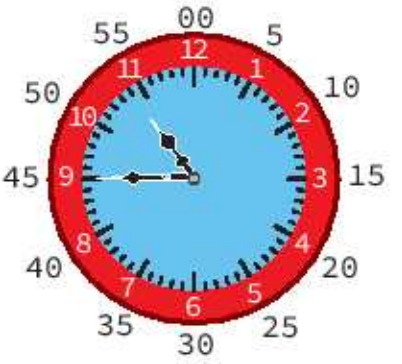
10 : 15

◆ At half past, the minute hand points to 6 on an analogue clock and a digital clock shows 30 minutes.



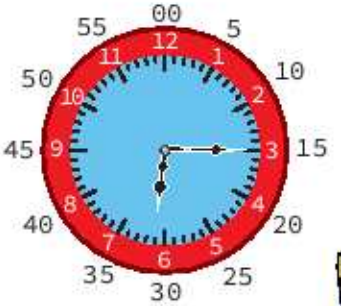
10 : 30

◆ At quarter to, the minute hand points to 9 on an analogue clock and a digital clock shows 45 minutes.

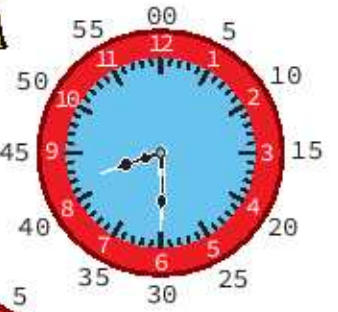


10 : 45

Match the time.



3 : 00



quarter past

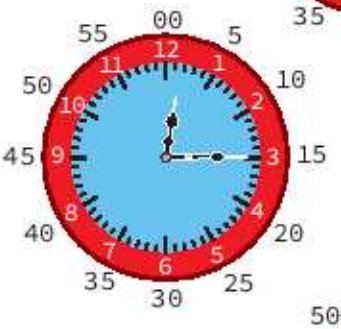
o'clock

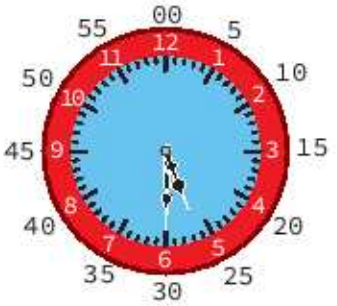
half past

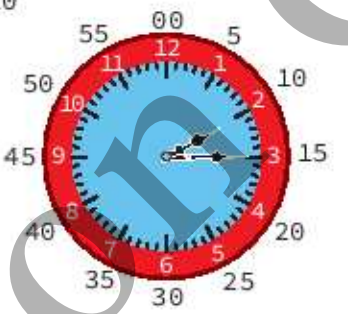
quarter to

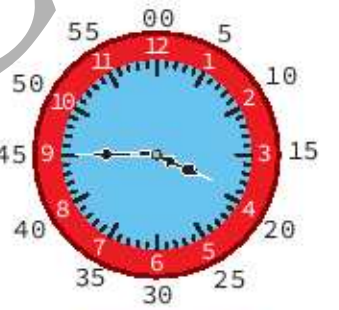
5 : 30

8 : 45







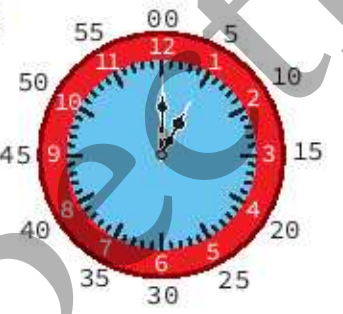


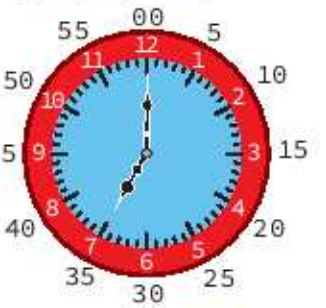
8 : 30

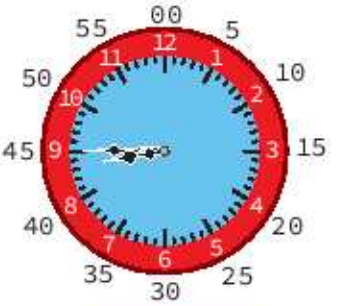
7 : 00

10 : 30

1 : 00



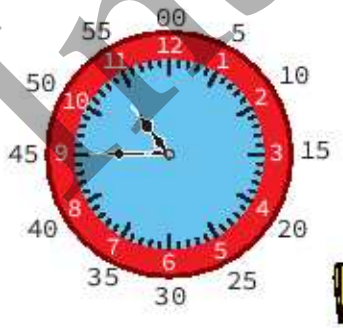


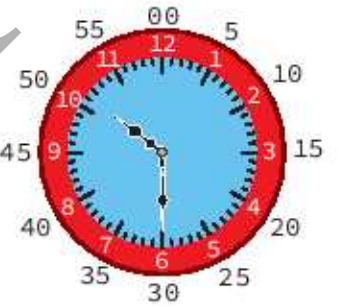


2 : 15

6 : 15

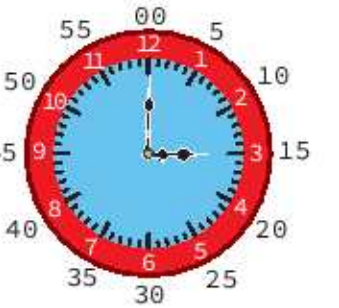
10 : 45





12 : 15

3 : 45



2.2. Cooking times

Remember

There are 60 minutes in an hour.

Solve the cooking time questions.

You will need: an analogue clock with movable hands, a digital clock or timer.

START	Put cake into the oven at 10:00. It takes 40 minutes. Take cake out at: 10:40.	Bread rolls take 40 minutes. Put in at ..... . Take out at 8:40.	Small cakes take 30 minutes. Put in at 3:30. Take out at ..... .
Casserole takes ..... . Put in at 5:45. Take out at 7:15.		Biscuits take 10 minutes. Put in at 11:55. Take out at	Chicken takes 2 hours. Put in at ..... . Take out at 1:30.
Scones take 20 minutes. Put in at 2:40. Take out at		Apple pie takes ..... . Put in at 4:20. Take out at 5:00.	Vegetable pie takes 55 minutes. Put in at ..... . Take out at 7:00.
Meringues take ..... . Put in at 4:50. Take out 7:20.		Oven chips take 25 minutes. Put in at ..... . Take out at 5:30.	Cheese straws take 10 minutes. Put in at 6:10. Take out at ..... .

Hint: count forward or back on an analogue or digital clock to find the missing times.

2.3. Rounding to the nearest 10 and 100

(a) Round these numbers to the nearest 10.

23	335	43	29	45
178	87	646	113	65
92	169	39	425	72
216	31	184	34	317
48	558	237	361	198

(b) Now round your new numbers to the nearest 100.

Round each length to the nearest 100 cm.

78 cm	145 cm	234 cm
319 cm	187 cm	264 cm

Which amounts did you round up?

Round each weight to the nearest 10 g.

37 g	49 g	21 g
75 g	84 g	56 g

Which amounts did you round down?

Round each number to the nearest 10.

84	121	68
248	43	103

Round each amount to the nearest 100 ml.

45 ml	82 ml	175 ml
121 ml	193 ml	64 ml

Look and learn

Round to the nearest:

To round to the nearest hundred, look at the tens digit and if it is

H	T	U
8	?	0

- < 5, round down ⇩
- = 5 or > 5, round up ⇧

H	T	U
8	3	0

830 to the nearest hundred is 800

H	T	U
	4	8

48 to the nearest ten, is 50.

Rounding numbers makes them easier to use.

CHAPTER 3

What learners will learn and reinforce

The activities in this chapter give learners practice in the following topics:

Topic	In this topic, learners will:
3.1. Equal and unequal	understand the concept of fraction.
3.2. Unit fractions	write the fraction for equally-divided parts of a shape.
3.3. Exploring fractions	write equivalent fractions.

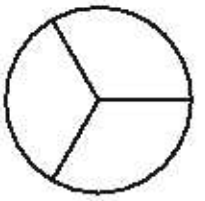
Word bank

1	equal	2	shaded	3	fraction	4	numerator	5	denominator
6	whole	7	half	8	third	9	quarter	10	equivalent fraction

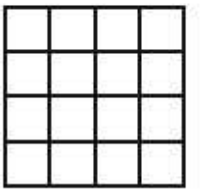
3.1. Equal and unequal

How many equal parts in each shape?

..... equal parts



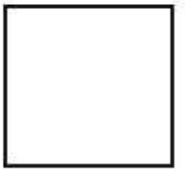
..... equal parts



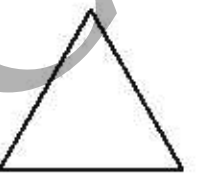
..... equal parts

Draw equal parts. Colour each part a different colour.

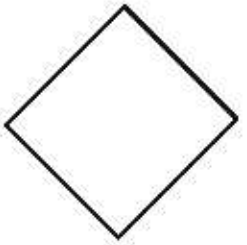
2 equal parts



4 equal parts



3 equal parts



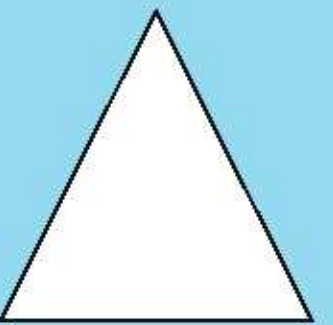
4 equal parts

3 equal parts

6 equal parts

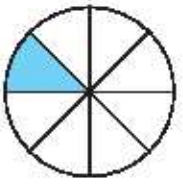
Problem Solving: Visual Thinking

Use pattern blocks to make this shape.
Make the shape the same size.
Trace to show the blocks you used.
How many equal parts did you make?



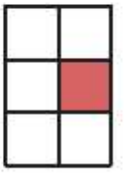
3.2. Unit fractions

Write the fraction for the shaded part.



$\frac{1}{8}$ 1 part shaded; 8 equal parts in all

$\frac{\quad}{\quad}$



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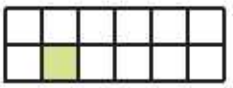

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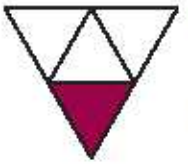

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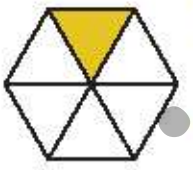
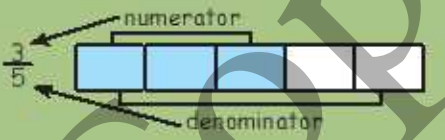


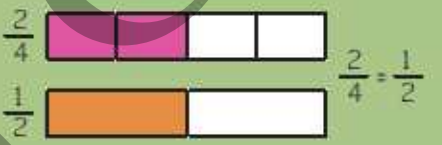
$\frac{\quad}{\quad}$

Look and learn

- **Numerator:** the top number of a fraction; it tells us how many parts we have.
- **Denominator:** the bottom number of a fraction; it tells us how many equal parts a whole has been divided into.



- **Equivalent fractions:** fractions that are the same size.



- **Reading fractions:** whole, half $\frac{1}{2}$, quarter $\frac{1}{4}$, three-quarters $\frac{3}{4}$, one-third $\frac{1}{3}$, one-eighth $\frac{1}{8}$, one-tenth $\frac{1}{10}$

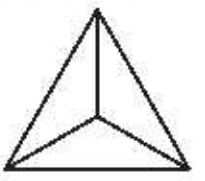
Shade some of the equal parts.

Write the fraction for parts that are shaded.

1) Shade 2 parts.

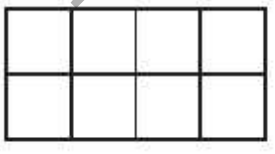
$\frac{2}{4}$

2) Shade 1 part.



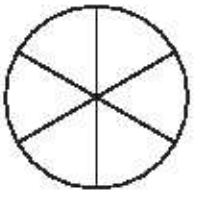
$\frac{\quad}{\quad}$

3) Shade 5 parts.



$\frac{\quad}{\quad}$

4) Shade 3 parts.



$\frac{\quad}{\quad}$

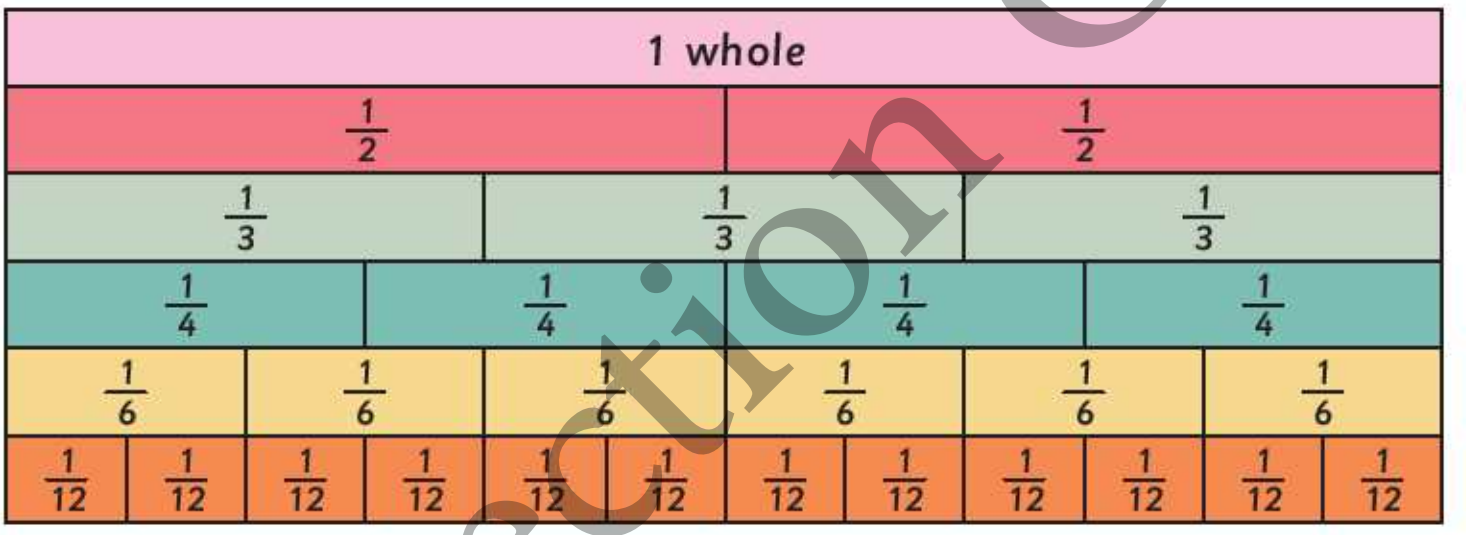
3.3. Exploring fractions

Use digits from 1 to 10 to make as many pairs of equivalent fractions as you can.

Try using number cards, for example:

$\frac{1}{2} = \frac{2}{4}$ $\frac{1}{2} = \frac{3}{6}$

Look at the fraction wall.



Use the fraction wall to help you complete these equivalent fractions.

(a) $\frac{1}{2} = \frac{?}{6}$ (b) $\frac{1}{2} = \frac{?}{12}$ (c) $\frac{1}{3} = \frac{?}{6}$

(d) $\frac{2}{3} = \frac{?}{12}$ (e) $\frac{3}{4} = \frac{?}{12}$ (f) $\frac{5}{6} = \frac{?}{12}$

1) Which is bigger $\frac{2}{3}$ or $\frac{5}{8}$?

2) Which is smaller, $\frac{6}{8}$ or $\frac{8}{10}$?

3) Express the following fractions in a different way:

(a) $\frac{1}{4} = ?$ (b) $\frac{3}{4} = ?$ (c) $\frac{1}{2} = ?$

Write the fraction for the candles that have been blown out.

CHAPTER 4

What learners will learn and reinforce

The activities in this chapter give learners practice in the following topics:

Topic	In this topic, learners will:
4.1. Explore joining equal groups	understand the concept of multiplication.
4.2. Explore making equal groups	understand the concept of division.
4.3. Double and half	what the double/ half of a given number is.
4.4. Building towers	practise multiplying and dividing numbers.

Word bank

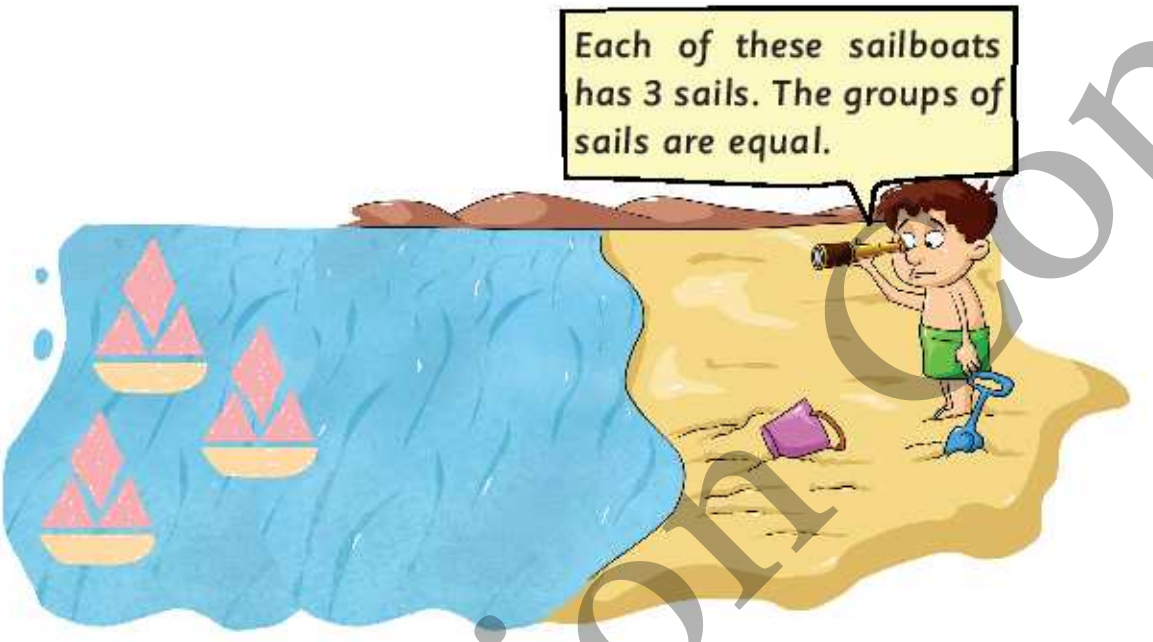
1	times	2	product	3	divided by	4	left over	5	remainder
6	double	7	half						

4.1. Explore joining equal groups

Sam is trying to count how many sails there are.

You can add to find out.

3 + 3 + 3 + 3 = 12



Use pattern blocks to make the sails.

Find how many sails there are in all.

	Draw the sails.	How many sails in all?
1 boat		3
2 boats		3 + 3 = ...
3 boats		3 + 3 + 3 = ...
4 boats		3 + 3 + 3 + 3 = ...

What patterns do you see in your answers?

Addition and multiplication

Find how many in all. You can use cubes.

1) How many wheels?

3 groups of 3

..... + ... + ... = ...

..... × ..... = ...

2) How many sails?

3 groups of 2

..... + ... + ... = ...

..... × ..... = ...

3) How many tennis balls?

4 groups of 3

..... + ... + ... + ... = ...

..... × ..... = ...

4) How many rocks?

3 groups of 6

..... + ... + ... = ...

..... × ..... = ...

Problem Solving: Visual Thinking

Can you multiply to show how many in all?

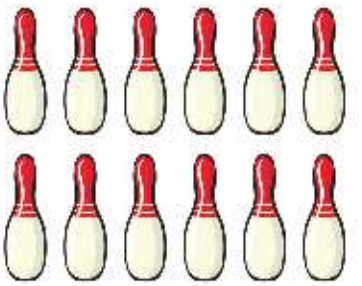
Say why or why not.

yes no

yes no

yes no

Explore building arrays



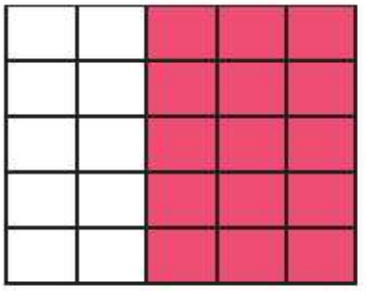
2 rows of 6 bowling pins

$2 \times 6 = 12$

There are 12 bowling pins in all.

Colour equal rows. Write how many. Find the product.

1) Show 5 rows of 3

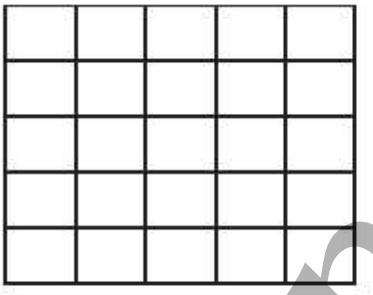


..... rows

..... in each row

$5 \times 3 =$ .....

2) Show 4 rows of 4

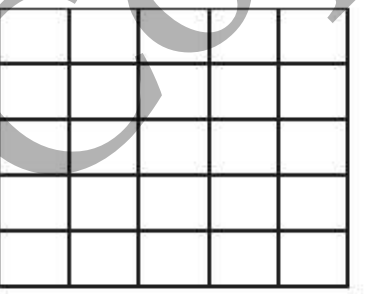


..... rows

..... in each row

$4 \times 4 =$ .....

3) Show 2 rows of 5



..... rows

..... in each row

$2 \times 5 =$ .....

4) Draw groups to show 3×4

How many in all? .....

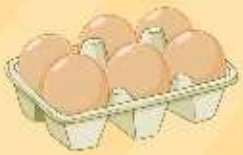
5) Draw groups to show 4×6

How many in all? .....

Use the multiplication table on page (38) to help you answer these problems:

1) There are two chocolate bars in a pack.
(a) How many chocolate bars are there in
(i) four packs?
(ii) six packs?
(iii) nine packs?
(iv) 11 packs?

2) Eggs come in boxes of six. How many eggs are there in seven boxes?

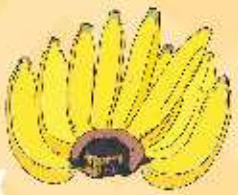


3) Stools have three legs. How many legs on nine stools?

4) There are six oranges in a bag. I buy five bags.
How many oranges have I got?

I give one bag to a friend.
How many oranges have I got now?

5) There are nine bananas in each bunch.
How many bananas are there in six bunches?

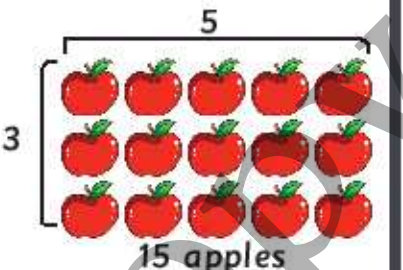


4.2. Explore making equal groups

Remember

- Multiplication is repeated addition. For example:

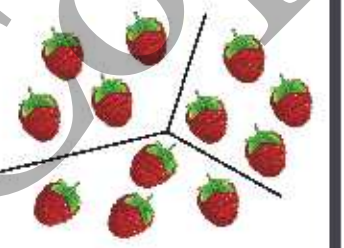
$5 \times 3 = 5 + 5 + 5 = 15$



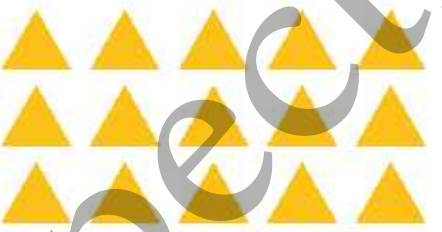
- Division is splitting into equal parts or groups.
  It is the result of fair sharing.

For example: 3 friends want to share 12 strawberries.
How do they divide the strawberries?
Answer: they should get 4 each.
The ÷ symbol means divide.

$12 \div 3 = 4$



Write the multiplication and division fact family for this array.



Write the multiplication and division fact family for this array.

Look and learn

Remainder:

what is left over when dividing by a particular number.

$15 \div 4 = 3$ r 3.

You can make 3 groups of 4 but do not have enough to make another group of 4, so the 3 is left over. We call this the remainder.

4.3. Double and half

Draw a grid like this one and write the answers in the matching squares.

What is half of 20?	What is double 4?	What is double 6?
What is double 14?	What is double 10?	What is half of 2?
What is half of 6?	What is half of 8?	What is double 8?
What is half of 12?	What is double 1?	What is half of 16?

There are three toy cars in a pack.

(a) How many cars are there in:

(i) two packs?

(ii) five packs?

(iii) eight packs?

(iv) 10 packs?

(b) I need 12 toy cars. How many packes should I buy?

The cake shop puts four cakes in each box.

(a) How many cakes are there in:

(i) two boxes?

(ii) five boxes?

(iii) seven boxes?

(iv) eight boxes?

(b) How many boxes of cakes do I need to give 24 people a cake each?

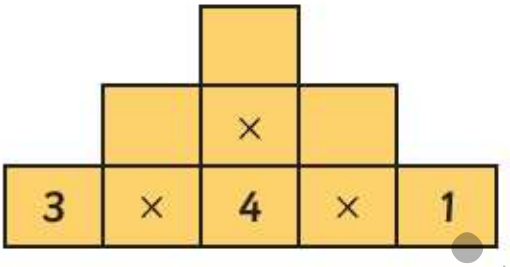
4.4. Building towers

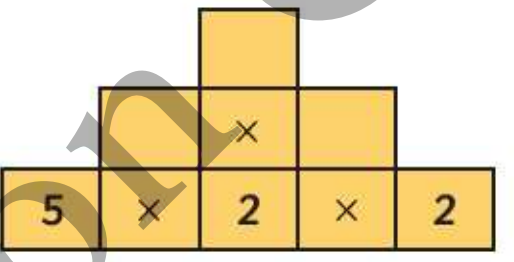
Remember

Multiplication and division are inverses of each other. Use your knowledge of one to calculate the other.

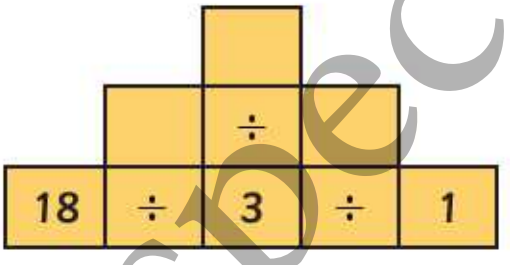
Fill in the missing numbers.

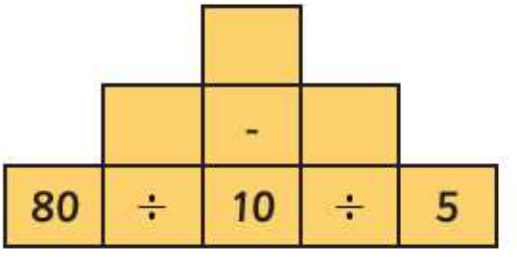
Multiply the two numbers on either side of the multiplication sign. Write the answer in the square above the multiplication sign.



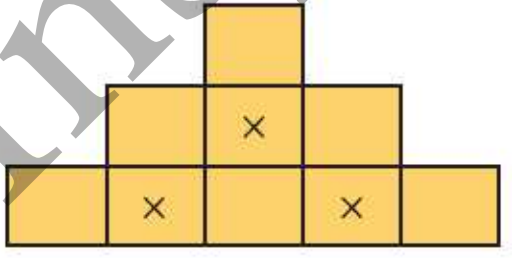


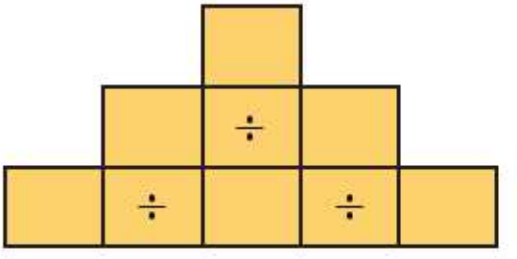
Divide the number before the division sign by the number after it. Write the answer in the square above the division sign.





Now make up some towers of your own.





Multiplication Table

×	1	2	3	4	5	6	7	8	9	10
1	1	2	3	4	5	6	7	8	9	10
2	2	4	6	8	10	12	14	16	18	20
3	3	6	9	12	15	18	21	24	27	30
4	4	8	12	16	20	24	28	32	36	40
5	5	10	15	20	25	30	35	40	45	50
6	6	12	18	24	30	36	42	48	54	60
7	7	14	21	28	35	42	49	56	63	70
8	8	16	24	32	40	48	56	64	72	80
9	9	18	27	36	45	54	63	72	81	90
10	10	20	30	40	50	60	70	80	90	100

CHAPTER

5

What learners will learn and reinforce

The activities in this chapter give learners practice in the following topics:

Topic	In this topic, learners will:
5.1. Tallying	use tally marks as a quick way of counting.
5.2. Honey, bees and butterflies	understand the concept of a bar chart.

Word bank

1	tally chart	2	bar chart	3	sort	4	group		

5.1. Tallying

Remember

Use tally marks to count things and keep records.

Throw a dice 10 times and record the numbers you throw.

Make a tally chart to record how many times each number on a dice is thrown.

Which number was thrown the most? How many times?

Number	Tally
1	
2	
3	
4	
5	
6	

Use the tally chart to answer the questions in this quiz.

The graph shows the number of books collected by each student.

(a) How many books does John have?

(b) How many books does Philip have?

(c) How many books do Kev nad Vikie have together?

(d) What is the total number of books?

	Books
John	𝍸 𝍸 𝍸 ||
Clare	||||
Vikie	𝍸 𝍸 |||
Kev	𝍸 𝍸 𝍸 𝍸
Philip	|||

Make a tally chart to show the information below.

What is your favourite hobby?

painting

dancing

football

reading

reading

reading

football

painting

football

reading

football

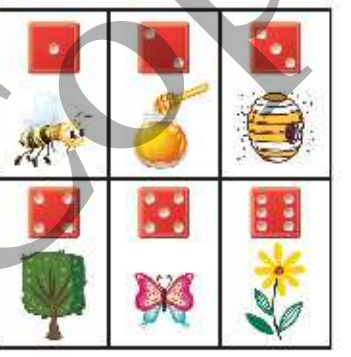
reading

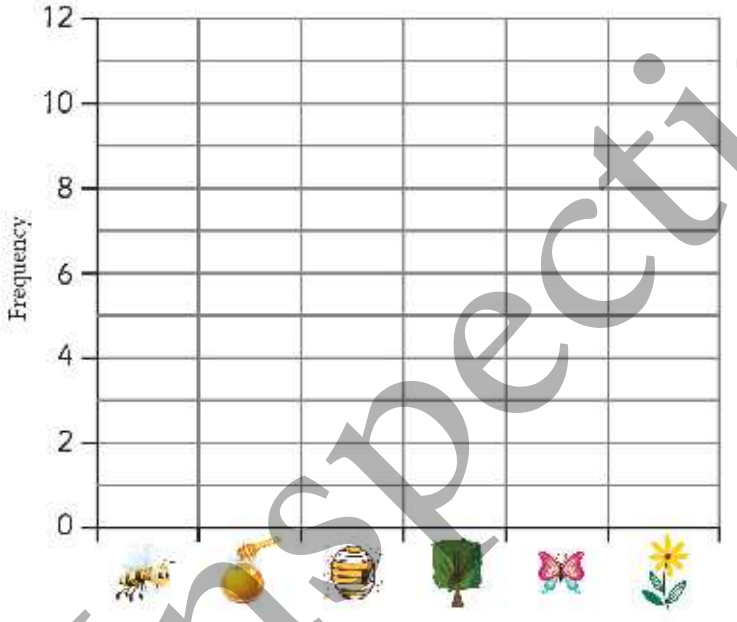
5.2. Honey, bees and butterflies

Remember

A bar chart shows data as bars of different heights. Frequency is the number of times what you are counting occurs.

Roll a dice. Use the dice key to find out which object you have rolled. Put a tally mark in the matching box. When you have rolled the dice 20 times, use your tally marks to complete a matching bar chart. Start from the bottom of the bar. Colour in the matching number of squares.





Bee	
Jar of honey	
Bee hive	
Tree	
Butterfly	
Flower	

Hint: check that your tally chart count matches your bar chart.

Complete the sentences.

There are ..... bees.

There are ..... jars of honey.

Compare your bar chart with a friend.

What is the same? What is different?

SPACE RACE TABLES

ONE

1 x 1 = 1
2 x 1 = 2
3 x 1 = 3
4 x 1 = 4
5 x 1 = 5
6 x 1 = 6
7 x 1 = 7
8 x 1 = 8
9 x 1 = 9
10 x 1 = 10

TWO

1 x 2 = 2
2 x 2 = 4
3 x 2 = 6
4 x 2 = 8
5 x 2 = 10
6 x 2 = 12
7 x 2 = 14
8 x 2 = 16
9 x 2 = 18
10 x 2 = 20

THREE

1 x 3 = 3
2 x 3 = 6
3 x 3 = 9
4 x 3 = 12
5 x 3 = 15
6 x 3 = 18
7 x 3 = 21
8 x 3 = 24
9 x 3 = 27
10 x 3 = 30

FOUR

1 x 4 = 4
2 x 4 = 8
3 x 4 = 12
4 x 4 = 16
5 x 4 = 20
6 x 4 = 24
7 x 4 = 28
8 x 4 = 32
9 x 4 = 36
10 x 4 = 40

FIVE

1 x 5 = 5
2 x 5 = 10
3 x 5 = 15
4 x 5 = 20
5 x 5 = 25
6 x 5 = 30
7 x 5 = 35
8 x 5 = 40
9 x 5 = 45
10 x 5 = 50

SIX

1 x 6 = 6
2 x 6 = 12
3 x 6 = 18
4 x 6 = 24
5 x 6 = 30
6 x 6 = 36
7 x 6 = 42
8 x 6 = 48
9 x 6 = 54
10 x 6 = 60

SEVEN

1 x 7 = 7
2 x 7 = 14
3 x 7 = 21
4 x 7 = 28
5 x 7 = 35
6 x 7 = 42
7 x 7 = 49
8 x 7 = 56
9 x 7 = 63
10 x 7 = 70

EIGHT

1 x 8 = 8
2 x 8 = 16
3 x 8 = 24
4 x 8 = 32
5 x 8 = 40
6 x 8 = 48
7 x 8 = 56
8 x 8 = 64
9 x 8 = 72
10 x 8 = 80

NINE

1 x 9 = 9
2 x 9 = 18
3 x 9 = 27
4 x 9 = 36
5 x 9 = 45
6 x 9 = 54
7 x 9 = 63
8 x 9 = 72
9 x 9 = 81
10 x 9 = 90

TEN

1 x 10 = 10
2 x 10 = 20
3 x 10 = 30
4 x 10 = 40
5 x 10 = 50
6 x 10 = 60
7 x 10 = 70
8 x 10 = 80
9 x 10 = 90
10 x 10 = 100