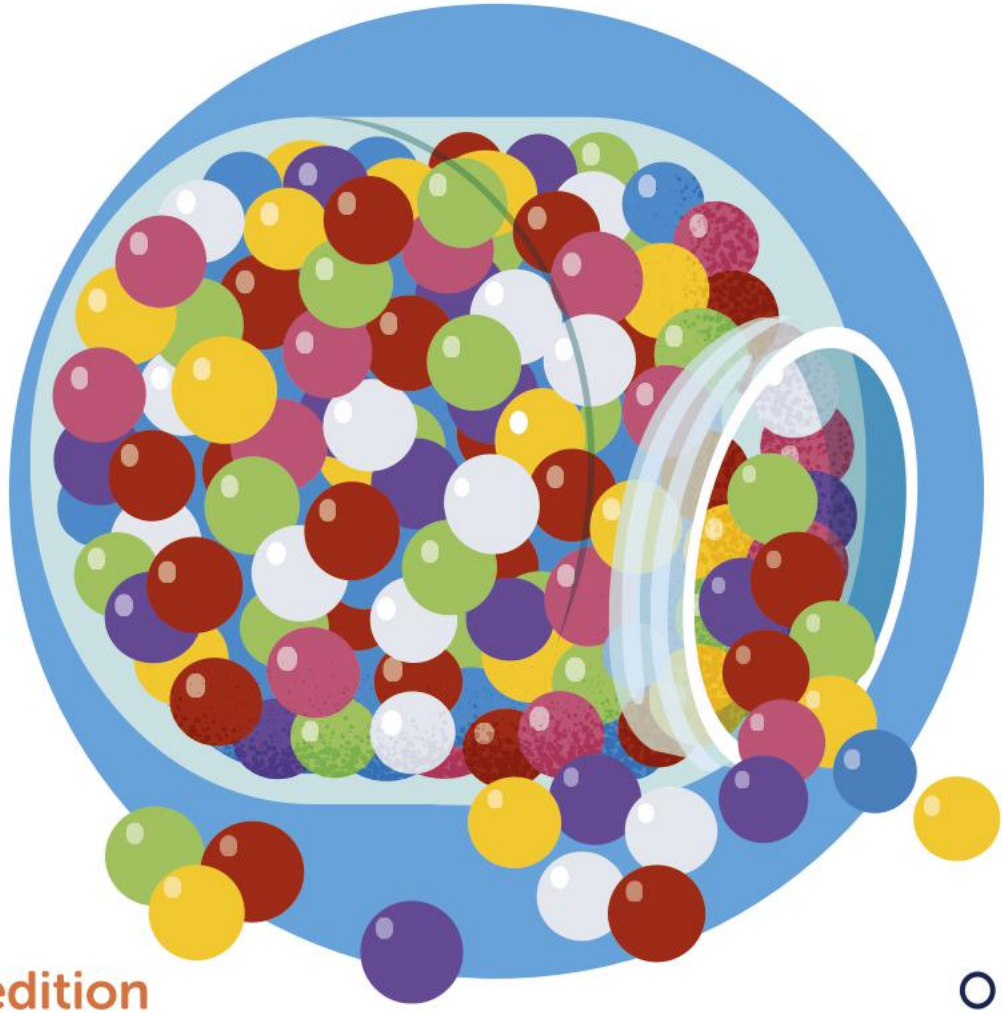
Oxford International Primary

3

Maths

Practice Book



Second edition

OXFORD

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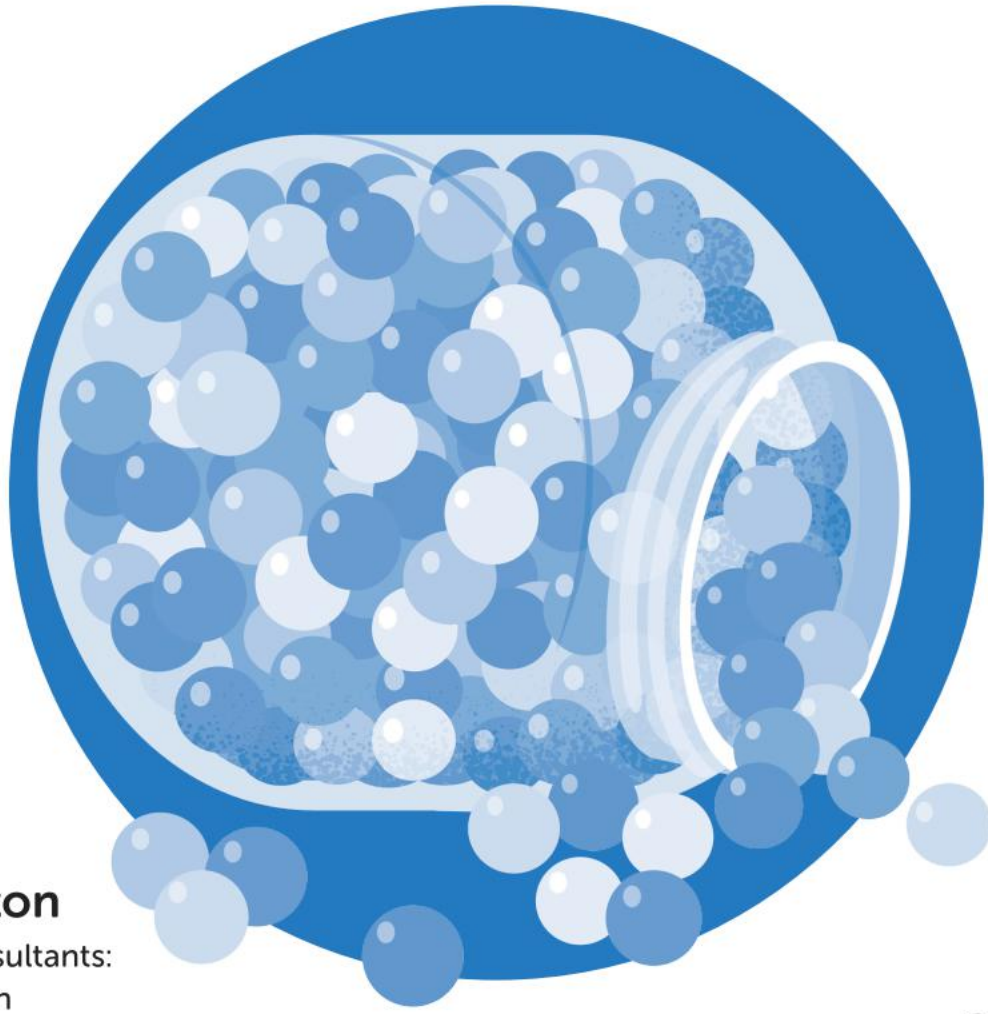

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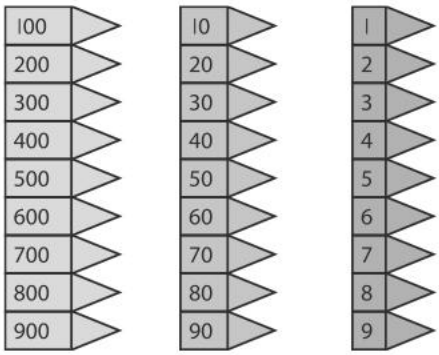
1 Number and place value

What students will learn

Students have learned to count up to 100 in Stages 1 and 2. This unit builds on their knowledge of place value up to 100 by teaching them to count up to and work with numbers up to 1000. The key is for students to realise that the place value of each digit in a number is 10 times more than the place value of the digit to its right. This will help students understand the effect of multiplying by 10 in later units. Students will also learn to estimate larger numbers and apply their new knowledge to solving problems.

Students should continue to use 100-squares and number lines to develop their mental images of the number system. Place-value cards such as those shown here will also help students to understand how they can partition (split) numbers up to 1000.



Learning objectives:

- read and write numbers up to 1000 and count from 0 in multiples of 4, 8, 50 and 100
- recognise hundreds, tens and ones in a 3-digit number
- estimate, compare and order numbers up to 1000
- solve number problems and practical problems.

Key words

number names zero to one thousand
digit
1-, 2-, 3-, 4-digit number
hundreds
tens
ones
more
less
1 more
1 less
10 more
10 less
100 more
100 less
bigger, biggest
larger, largest
smaller, smallest
greater than (>)
less than (<)
count on
count back
number line
multiple of 10
multiple of 100
round
round to the nearest 10
round to the nearest 100
estimate
group in tens
count in tens

Ways to help

- Prompt students to look out for numbers around them. Ask them what numbers they can see, and encourage them to say them aloud. You could ask, 'How many thousands?', 'How many hundreds?', 'How many ones?'.
- Ask students to estimate how many people there are in different situations, for example when attending events or when out shopping, or to estimate numbers of small objects in containers.

2 Addition and subtraction

What students will learn

Students need to develop robust and reliable mental images of the number system and so this unit continues to encourage students to use mental methods as their first resort when approaching problems. Developing a strong understanding of place value will support students as they learn the more formal methods of calculation covered in this unit.

Students will learn the column method for addition and subtraction. They will use strategies for solving missing-number problems, which they will develop in later years when they learn algebra. They will understand that addition and subtraction are 'inverse operations'. For example, if we know that 40 + 30 = 70, we also know that 70 – 40 = 30 and 70 – 30 = 40. Students will also learn how to estimate answers before calculating so they can judge whether their answers are reasonable.

Learning objectives:

- add and subtract numbers with up to three digits using mental methods and formal written methods
- solve problems, including missing number problems
- estimate the answer to a calculation and use inverse operations to check answers.

Key words

addition	minus	number story	3-digit number
add	subtraction fact	word problem	partition
addition fact	subtraction calculation	estimate	hundreds
addition calculation	difference	strategy	tens
total	how many more?	check	ones
altogether	calculation	inverse	base-10 equipment
sum	complements for 20	multiples of 10	number line
subtraction	complements for 200	multiples of 100	running total
subtract		2-digit number	

Ways to help

- Support students to use number lines and 100-squares to help them calculate. Focus on developing mental methods and noticing number patterns. 'Double counting' is a common mistake when adding using a number line. For example, when adding 8 + 6, some students may count '1' while still pointing at the 8, instead of counting '1' when moving their finger to the next number. If this happens, either model using the correct counting process on the number line or model the addition using real objects.
- When finding the difference between two numbers, do not say 'always take the smaller number from the larger'. This can lead to difficulties later, when students begin working with directed numbers (positive and negative numbers). Instead ask: 'How many more are in this group?' or 'How many fewer are in that group?' and ask them how they carried out the calculation.
- Always encourage students to estimate the answer before calculating. They can do this by rounding the numbers in the calculation to numbers that are easy to calculate mentally.
- At home, parents should ask students to explain the written methods they have been taught in school. Some of the methods may be different from the ones parents learned at school.

3 Multiplication and division

What students will learn

This unit develops students' knowledge of multiplication facts to include all the multiplication facts for 3, 4 and 8. They will understand that multiplication and division are 'inverse operations'. For example, if we know that $8 \times 3 = 24$, we also know that $24 \div 8 = 3$ and $24 \div 3 = 8$.

Students will be taught how to use this knowledge in multiplication and division problems. They will learn some written methods for multiplication and division.

Students will also be introduced to problems involving scaling. For example, they might be asked to adapt a recipe for 4 people to make enough for 8 people.

Learning objectives:

- recall the 3, 4 and 8 multiplication tables
- solve multiplication and division calculations, including for 2-digit numbers, using mental and written methods
- solve problems involving multiplication and division.

Key words

multiplication	divide into	double	equal groups
multiply by	division fact	halve	regroup
multiplication fact	divisible by	odd	partition, partitioning
multiple	divisibility rules	even	tens
factor	dividend	array	ones
product	quotient	row	pattern, number patterns
grid method	share, equal sharing	column	word problem
division	left over	fact family	
divide by	remainder	inverse	

Ways to help

- Encourage students to find arrays in real life. For example, a box of 12 eggs has 2 rows of 6. When out shopping, they may see fruit or vegetables arranged neatly in rows and arrays of boxes on shelves. They may notice rows and columns of cars in car parks. Talk about the 'fact family' for each array that they see. For example, the fact family for this box of eggs is:

  $2 \times 6 = 12$ $6 \times 2 = 12$

  $12 \div 2 = 6$ $12 \div 6 = 2$

- Challenge students to find their own ways to remember multiplication facts for 3, 4 and 8. For example, they could make up rhymes or songs to help them remember the facts.

4 Fractions

What students will learn

Students were introduced to halves and quarters in Stage 2. Now they will begin writing fractions using numerators and denominators. They will also be introduced to tenths and then decimal fractions, using place-value tables to develop their understanding.

Students will use fraction walls to help them recognise simple equivalent fractions. For example, they will discover that $\frac{1}{2}$ and $\frac{2}{4}$ are equivalent. They will begin to solve problems involving adding and subtracting fractions with the same denominator, for example: $\frac{1}{5} + \frac{2}{5} = \frac{3}{5}$.

Learning objectives:

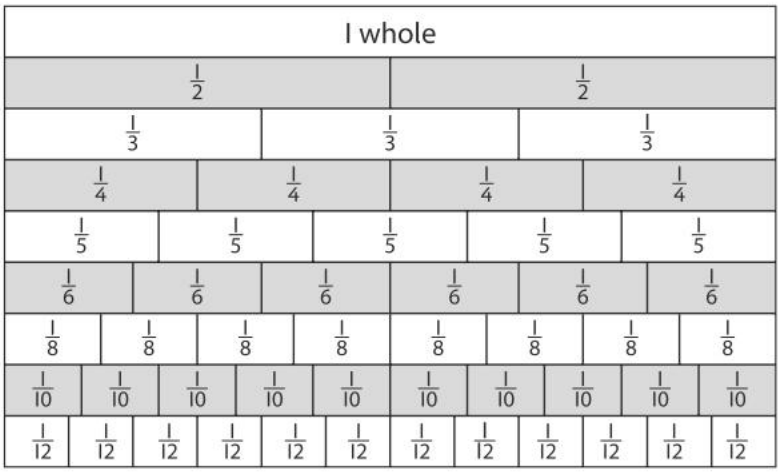
- recognise tenths; count up and down in tenths
- find fractions of amounts
- recognise equivalent fractions
- add and subtract fractions with the same denominator
- compare and order fractions
- solve problems with fractions.

Key words

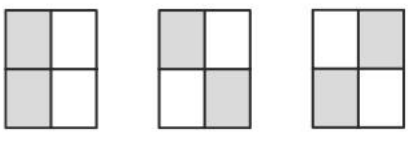
fraction	thirds	amount	equivalent
unit fraction	quarters	parts	same
non-unit fraction	fifths	add	greater than (>)
numerator	sixths	addition	less than (<)
denominator	eighths	subtract	smaller than
decimal	tenths	subtraction	order
decimal point	twelfths	total	fraction wall
halves	share	equal	number line

Ways to help

- Students often use fraction words such as 'half' and 'quarter' informally to describe objects and quantities that have been divided into uneven parts or groups. It is important to emphasise that when we divide a shape or a quantity into fractions, the sharing must be 'fair': fractions of a shape must all have the same area; fractional parts of a number must be equal.
- Keep a fraction wall on display. Students can use it when they are finding equivalent fractions, when they are adding and subtracting fractions with the same denominator and when they are comparing fractions with different denominators.



- Encourage students to represent the fractions in different ways. For example, the shading on all these shapes shows a half.



5 Length, mass and capacity

What students will learn

This unit introduces the idea that we use a range of 'standard units' for measuring things. When we are measuring, we make decisions about the units that are appropriate for that particular object.

The other key idea of this unit is that we can convert between standard units of measurement. These conversions are often based around factors of 100 and 1000. The prefixes used in units of measurement, such as *kilo-*, *milli-* and *centi-*, tell us the conversion factor. For example: 1 **kilo**gram is 1000 grams; there are 1000 **milli**litres in 1 litre; there are 100 **centi**metres in 1 metre.

Students will develop their skills in estimating and measuring length, mass and capacity. They will learn how to measure perimeter: the distance all the way around the edge of a shape.

Learning objectives:

- measure and compare lengths, mass and capacity
- measure the perimeter of simple 2D shapes.

Key words

length	metre (m)	kilogram (kg)
width	kilometre (km)	capacity
height	centimetre (cm)	empty
perimeter	millimetre (mm)	full
long, longer, longest	mass	litre (ℓ)
short, shorter, shortest	heavy, heavier, heaviest	millilitre (ml)
wide, wider, widest	light, lighter, lightest	scale
measure	gram (g)	estimate

Ways to help

- Help students to understand that a measurement stays the same even when we change the unit. So, for example, 1000 mm is the same as 1 m, even though the written measurement looks a lot larger.

  The best way to help students is to use two different forms for a measurement when measuring things around the home or classroom. For example, a line can be both 1 m 25 cm long and 125 cm. Ask students to carry out lots of practical measuring activities to help them discover these equivalences for themselves.
- Make sure you have tape measures, weighing scales and measuring jugs available for students to use. Involve students as often as possible when measuring in real-life contexts such as cooking or making things.

6 Money

What students will learn

This unit will build on students' knowledge from Stages 1 and 2, when they learned about the values of coins and notes in their national currency and also in dollars and pounds sterling. Students will solve problems involving adding and subtracting money, including giving change. They will carry out practical activities that are linked to realistic situations.

Learning objective:

- add and subtract amounts of money to give change, in practical contexts.

Key words

currency	dollars ($)	pence (p)
notes	cents (¢)	total
coins	pounds sterling (£)	change

Ways to help

There is a lot that can be done at home to help students develop an understanding of money.

- When out shopping, involve students in calculating the total cost of some of the items, what notes or coins you will use to pay for the shopping and what change you will receive.
- Encourage students to look at the prices of items in shops, so they develop an understanding of how much things cost and can work with realistic prices.
- If students receive pocket money or an allowance, help them to make their own decisions about spending and saving.

7 Time

What students will learn

This unit teaches students that time can mean both a 'time of day' and 'the time something takes'. They will continue to develop their skills in telling the time using different formats. For example, they might write a time as 'half past one in the morning', '1.30 a.m.' and '01:30'. They will solve problems involving the duration of events, such as calculating that the length of a film is 1 hour and 45 minutes.

Another key idea in this unit is that, although our number system is based on units of 10, we measure time using units of 12. We use 12-hour clock and 24-hour clock time. For example, 22:00 is the same as 10 o'clock in the afternoon, or 10 hours after noon (12). There are 60 seconds in a minute (5×12) and 24 hours in a day (2×12).

Learning objectives:

- estimate and read time to the nearest minute, including using Roman numerals, and 12-hour and 24-hour clocks
- record and compare time in seconds, minutes and hours
- compare how long things take
- know the number of seconds in a minute and the number of days in each month, year and leap year.

Key words

o'clock	digital	days of the week	tomorrow
half past	Roman numerals	months of the year	timetable
quarter to	second	morning	calendar
quarter past	minute	noon	duration
a.m.	hour	afternoon	how long before?
p.m.	day	evening	how long between?
12-hour clock	week	night	how long after?
24-hour clock	month	midnight	how long ago?
24-hour times	year	today	
analogue	nearest minute	yesterday	

Ways to help

- Provide a range of clocks with analogue and digital displays in the home or classroom. Make sure you refer to the time often: ask students to tell you what time it is; use both the 12-hour and the 24-hour clock; ask how long activities and events have taken.
- A possible difficulty for students may be that they are more accustomed to using digital times than to using analogue times. For example, they may read 12:35 as 'twelve thirty-five' rather than saying 'twenty-five to one'. Make sure you practise both ways of telling the time.

8 Geometry – properties of shapes

What students will learn

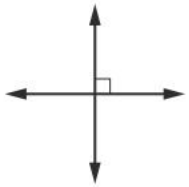
This unit reinforces the idea that shapes are defined by their properties. Similarly, shapes can be classified (sorted) in different ways depending on the properties that you choose. Sorting shapes according to their properties will allow students to identify the similarities and differences between shapes. They will begin to notice the links between 2-dimensional (2D) and 3-dimensional (3D) shapes and realise that images of 3D shapes are 2D representations. They will develop these skills by drawing and making shapes using modelling materials.

Students will continue to develop their skills of visualisation, which is a vital skill in geometry. In this unit students will be given the properties of shapes and asked to visualise these shapes.

This unit also introduces right angles and angles that are greater or less than a right angle. Students will learn that angles are dynamic by making objects turn. In this way, they can understand that a right angle is a quarter turn, two right angles are a half turn, and so on.

Finally, students will be introduced to the terms parallel and perpendicular.

parallel lines



perpendicular lines

Learning objectives:

- draw 2D shapes and make 3D shapes
- recognise angles in shapes or a description of a turn
- identify right angles and whether angles are greater than or less than a right angle
- identify horizontal and vertical lines and pairs of perpendicular and parallel lines.

Key words

2D shape	irregular	straight	reflective symmetry
polygon	3D shape	curved	line of symmetry
pentagon	side	angle	mirror line
hexagon	vertex, vertices	right angle	parallel
octagon	edge	set square	perpendicular
names of shapes	face	symmetry	horizontal
regular	surface	symmetrical	vertical

Ways to help

- Many students at this Stage still think of only regular representations of shapes. For example, when asked to draw a triangle or a pentagon, they may always draw an equilateral triangle or a regular pentagon. Help students to look for a wide range of regular and irregular shapes in their local environment. Ask them to name the shapes and describe their properties.
- Show students regular shapes in a range of different orientations to demonstrate that a shape's properties remain the same even if the shape has been turned. Do this by cutting out shapes and rotating them.
- Look for examples of parallel and perpendicular lines at home and in the local area.
- Encourage students to be creative: they can make patterns using 2D shapes and create 3D structures.

9 Geometry – position and direction

What students will learn

In Unit 8, students learned about right angles. In this unit, they continue to build on this understanding, with a focus on making right-angled turns. Students will use grids with labelled rows and columns to describe the position of objects. (This work will be developed into using coordinates in Stage 4.) Students will describe journeys between squares on grids, focusing on quarter, half and three-quarter turns.

Learning objectives:

- recognise that two right angles make a half turn, three make a three-quarter turn and four make a complete turn
- use angles to give directions
- describe the position of things.

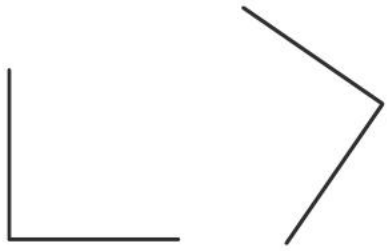
Key words

grid	up	backward	quarter turn
column	down	clockwise	half turn
row	left	anti-clockwise	three-quarter turn
across	right	right angle	whole turn
along	forward	turn	

Ways to help

- Students do not always recognise right angles if they are not in a common orientation. For example, they will probably recognise that the first angle is a right angle, but perhaps not the second.

  By seeing right angles in a range of orientations students will realise that it is the measure of turn that matters, not the orientation. For example, you can use a set square to show them that the corner of a book is a right angle. Then tilt the book a little and demonstrate that the angle of the corner has not changed.



- Use the key words listed above to discuss the positions and movement of things that students see around them every day.
- Play games that involve guessing where something is on a grid. You can make your own games or play games available on the Internet.

10 Statistics

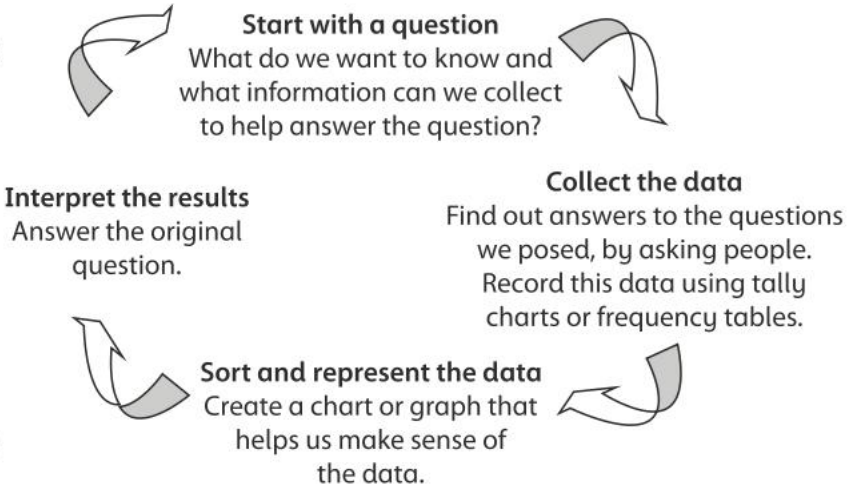
What students will learn

This unit develops students' understanding of the data-handling cycle, which was introduced in Stages 1 and 2.

Students will record data using tallies and frequency tables, and represent data using pictograms and bar charts. They will interpret these charts and diagrams and use them to answer questions.

Learning objectives:

- use and interpret bar charts, pictograms and tables
- solve one-step and two-step problems using information in bar charts, pictograms and tables
- use Venn or Carroll diagrams to sort data.



Key words

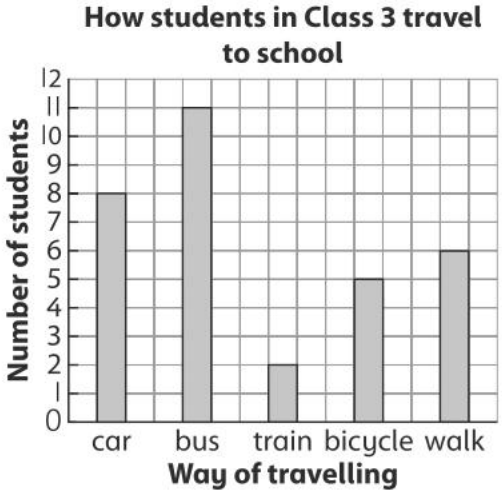
data	frequency table	labels	criteria
represent	pictogram	scale	sort
interpret	bar chart	key	Carroll diagram
tally, tallies	axis, axes	most/least popular	Venn diagram
tally chart	title	most/least common	

Ways to help

- Look out for examples of tables, graphs and charts in newspapers and magazines. Talk to students about what these diagrams mean. There are often different ways of interpreting the data and it is important to have these discussions.

How students in Class 3 travel to school

Way of travelling	Frequency
car	8
bus	11
train	2
bicycle	5
walk	6



- Ask students to carry out a survey at home. For example, they could count the number of cars of different colours they see out of the window, or types of toys in the toy box. Ask them to record what they see using tally marks and then add up to find the frequencies. Students could then compare their results in class.