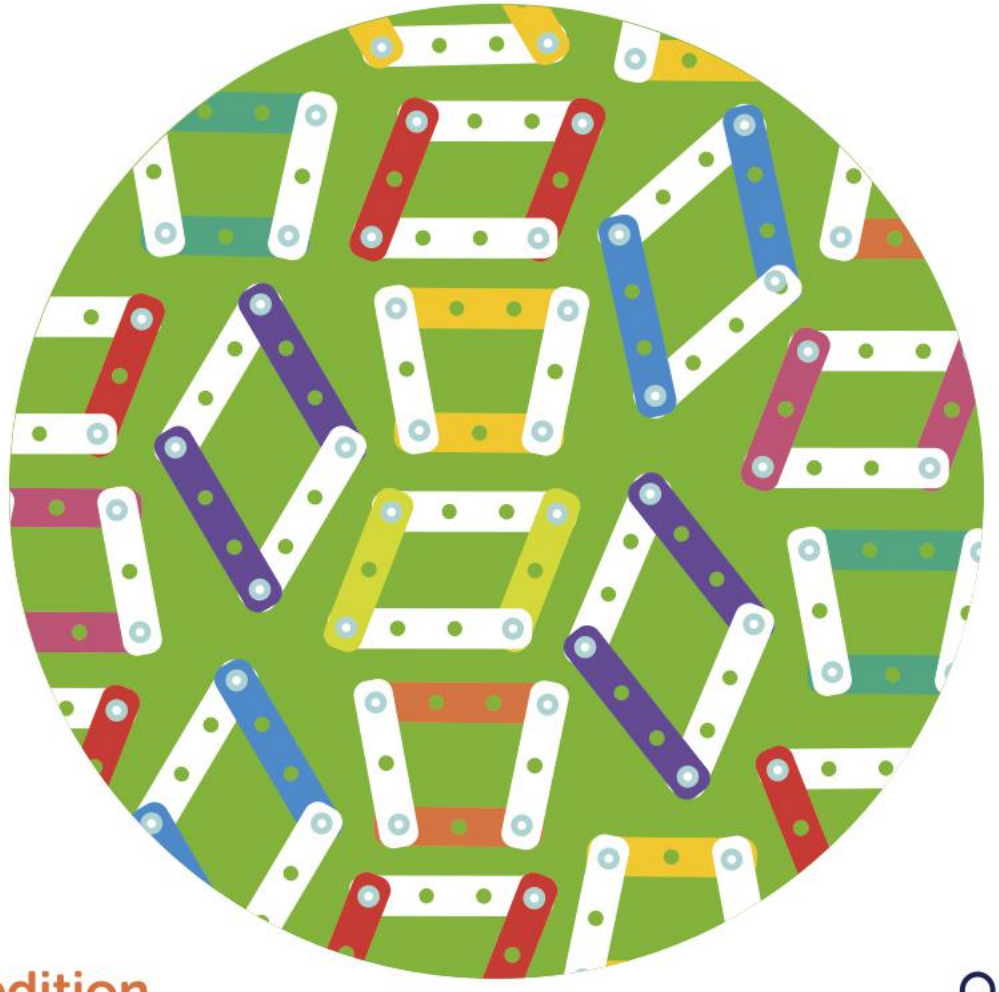
Oxford International Primary

4

Maths

Practice Book



Second edition

OXFORD

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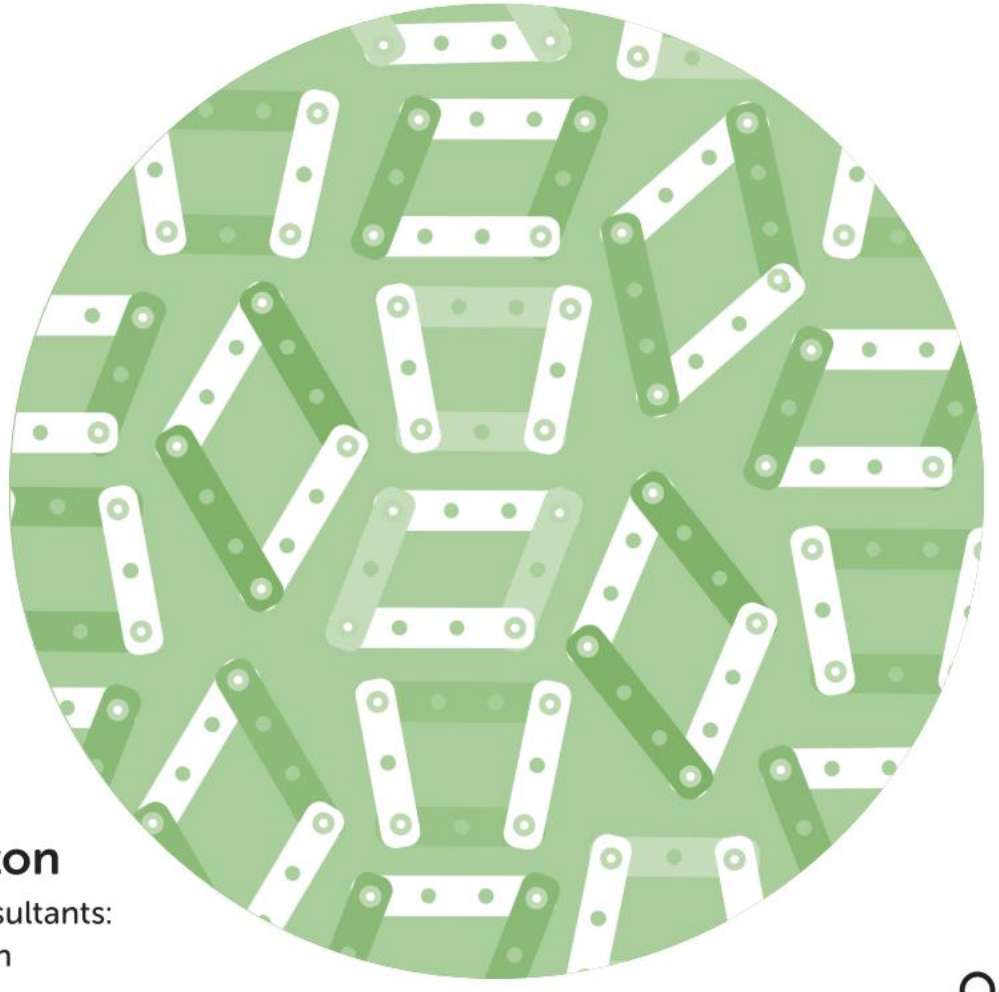

Tony Cotton

Language consultants:
John McMahon
Liz McMahon

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Contents

1 Number and place value

What students will learn

This unit extends students' understanding of place value in numbers up to 10 000 (ten thousand). They will learn that each time we move the digits in a number one place to the left, the value of the digit increases 10 times. An example is shown in this place-value grid.

	Ten thousands	Thousands	Hundreds	Tens	Ones
		2	4	5	7
× 10 =	2	4	5	7	0

Students will consolidate their knowledge of number properties by counting in multiples of 6, 7, 9, 25 and 100. They will be introduced to negative numbers by counting back through zero. They will continue to develop their skills of estimation and of rounding numbers.

Learning objectives:

- count in multiples of 6, 7, 9, 25 and 1000
- count back through zero to include negative numbers
- order and compare numbers beyond 1000
- estimate numbers using number lines
- round any number to the nearest 10, 100 or 1000.

Key words

digit	round	multiples of 10, 100, 1000
4-digit number	the nearest 10	negative number
thousands	the nearest 100	positive number
ten thousands	count on	thermometer
partition, partitioning	count back	temperature
value	number sequence	Roman numerals
place value	multiple	

Ways to help

- Look out for large numbers in everyday life, for example in newspapers and magazines. Say the numbers aloud with students, for example:
  - 14 305: 'fourteen thousand, three hundred and five'
  - 26 219: 'twenty-six thousand, two hundred and nineteen'.
- Use a thermometer to introduce negative numbers. Look at temperatures below freezing point. If temperatures in your country do not go below zero, ask students to research temperatures in countries that are colder than yours.

2 Addition and subtraction

What students will learn

This unit builds on students' developing skills in addition and subtraction. It encourages students to decide whether to try to calculate an answer mentally (in their heads) or whether they need to use a written method. They will learn to add and subtract numbers with up to four digits and will be introduced to written methods for more complicated calculations. Students will learn written methods gradually, starting with expanded methods and moving on to compact methods.

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

Students will learn ways to check their answers: by estimating the answer before carrying out a calculation to make sure their answer is reasonable; and by carrying out an inverse (opposite) calculation to check accuracy.

Students will also develop their skills in solving word problems involving addition and subtraction.

Learning objectives:

- add and subtract numbers with up to 4 digits
- estimate and use inverse operations to check answers to a calculation
- solve addition and subtraction problems.

Key words

add, addition	difference	near multiple of 10, 100	commutativity
plus	column method	near double	partition, partitioning
sum, total, altogether	column addition	bridging 10	regroup, regrouping
subtract, subtraction	column subtraction	bonds to 10 and 20	number line
minus, take away	multiple of 10, 100	commutative,	count on, count back

Ways to help

- The best way to help is to ask students to explain their methods to you when they are carrying out calculations.
- Encourage students to estimate the answer before they carry out each calculation. This is a very good habit for students to develop, as it helps them to judge whether the answer they arrive at is reasonable or not.
- At home, involve students when shopping or making things, as these types of activity offer lots of opportunities for solving number problems.

3 Multiplication and division

What students will learn

In this unit, students will become confident with multiplication facts up to 12 × 12. They will learn methods of multiplying and dividing 2- and 3-digit numbers by single-digit numbers. They will start with the 'grid method' before they move on to more compact methods.

Students will see division from two viewpoints: sharing and grouping. They already know that we can see multiplication as repeated addition, for example 5 × 6 is five groups of six things added together. Their understanding of division as the inverse (opposite) of the multiplication process will be reinforced.

×		4	0		2
7	2	8	0	1	4

			4	2	
×				7	
	2	9	4		
		1			

Students will develop their ability to carry out divisions that leave remainders. They will consider whether an answer needs to be rounded up or down, depending on the context.

Students will also be introduced to the new ideas of ratio and proportion.

Learning objectives:

- recall multiplication and division facts to 12 × 12
- multiply and divide mentally
- recognise and use factor pairs in mental calculations
- multiply 2- and 3-digit numbers using written methods
- solve multiplication problems.

Key words

digits	divisor	2-digit number	strategy
multiply, multiply by 0, multiply by 1	remainder	3-digit number	order
multiplication	round up/down	tens, ones	column method
multiple, factor, product	even/odd	units	inverse operation
divide, division	double	partition	ratio
	near double	recombine	proportion
	halve	array	scale

Ways to help

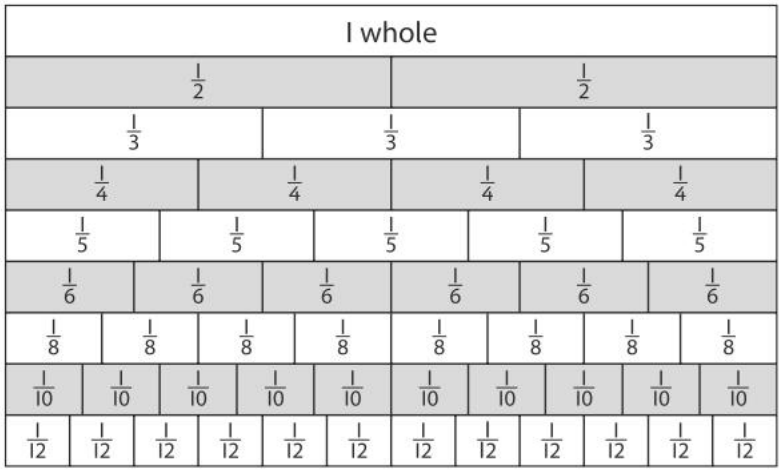
- As with addition and subtraction, a good way to help students is to ask them to explain the strategies they are using when they are solving multiplication and division problems.
- The ability to divide relies on knowing multiplication facts, so it is essential for students to continue practising these. Remind students that each multiplication fact is part of a fact family. Encourage them to make statements such as, 'If I know that 8 × 7 = 56, I also know that 7 × 8 = 56, 56 ÷ 7 = 8 and 56 ÷ 8 = 7.'
- It is helpful for students to carry out division calculations using concrete objects, either by sharing or by grouping objects. Students can use items such as counters, beads, coins or small toys.

4 Fractions and decimals

What students will learn

Students will develop their understanding of equivalent fractions. They will use equivalence to help them order fractions from smallest to largest. Fraction walls will continue to be useful visual aids.

Students will also explore equivalence between fractions and decimals. They will understand decimal numbers to two decimal places (hundredths) and will learn to round numbers to the nearest whole number or tenth.



Learning objectives:

- recognise families of equivalent fractions
- recall decimal equivalents of some fractions
- count on and back in hundredths
- add and subtract fractions
- understand the effect of dividing by 10 and 100
- round decimals to the nearest whole number
- solve problems involving fractions and decimals, including money problems.

Key words

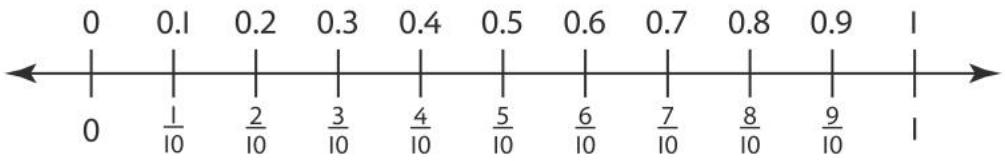
fraction	fraction pairs	tenths	round, rounding
unit fraction	equal	hundredths	nearest whole number
non-unit fraction	equivalent, equivalent fraction	decimal	dollars, cents
numerator	fraction wall	decimal fraction	centimetre (cm), metre (m)
denominator	one whole	decimal point	
fractional parts, equal parts	ones	decimal place	

Ways to help

- Students at this stage still need to see and make practical models of fractions. They can do this by folding paper and cutting shapes into equal parts.
- Talk about some common equivalent fractions and decimal numbers, including:

  $0.25 = \frac{1}{4}$ $0.5 = \frac{1}{2}$ $0.75 = \frac{3}{4}$.
- It is also helpful to use a number line divided into tenths to help students understand the equivalences between decimals and fractions:

  $0.1 = \frac{1}{10}$ $0.2 = \frac{2}{10}$ and so on.



- You can use money to look at decimals. For example, 1 cent is one hundredth or 0.01 of a dollar, and 10 cents is one tenth or 0.1 of a dollar.

5 Length, mass and capacity

What students will learn

This unit develops the measurement skills that students have learned in Stages 1–3. Students will become confident in measuring length, mass and capacity using measuring equipment such as tape measures, weighing scales and measuring jugs. They will practise measuring accurately and learn to understand the size of each unit of measurement. This will allow them to estimate measurements first and then measure to check their estimates.

They will convert between units of measure and be able to use decimal notation to record their measurements.

Learning objectives:

- estimate, compare and calculate different measures, including money
- convert between different units of measure.

$750\text{ml} = 0.75\ell = \frac{3}{4}\ell$

Key words

length, width, height, distance	mass	millilitre (ml)
kilometre (km)	kilogram (kg)	kilo-
metre (m)	gram (g)	milli-
centimetre (cm)	capacity	scale
millimetre (mm)	level	interval
	litre (ℓ)	

Ways to help

- The best way for students to learn how to measure is to physically measure objects. Take any opportunity you can to encourage them to measure length, mass and capacity. If you are making something that requires measuring, ask students to carry out the measurement for you. When cooking, ask students to measure the ingredients for you, using weighing scales and measuring jugs.
- Encourage students to develop the habit of estimating the length, mass or capacity before they measure. This will help them to develop a good sense of the size of the different units of measure.

6 Area and perimeter

What students will learn

In this unit students learn how to calculate perimeter (the distance around the edge of a shape) and area (the amount of space a shape covers) of rectilinear shapes (shapes made up of straight lines) and right angles. They will understand that area is measured in square units, such as square centimetres (cm^2) and square metres (m^2). At this stage they will find the perimeter by adding together the lengths of the sides of the shapes. They will find the area by counting the number of squares contained within the perimeter. For example:

Perimeter: 28 cm

Area: 34 cm^2

Students will also solve word problems involving area and perimeter.

Learning objective:

- measure and calculate the perimeter of a shape in centimetres and metres
- find the area of shapes by counting squares.

Key words

perimeter	metre	area
length, width	centimetre	square metres (m^2)
dimensions	millimetre	square centimetres (cm^2)

Ways to help

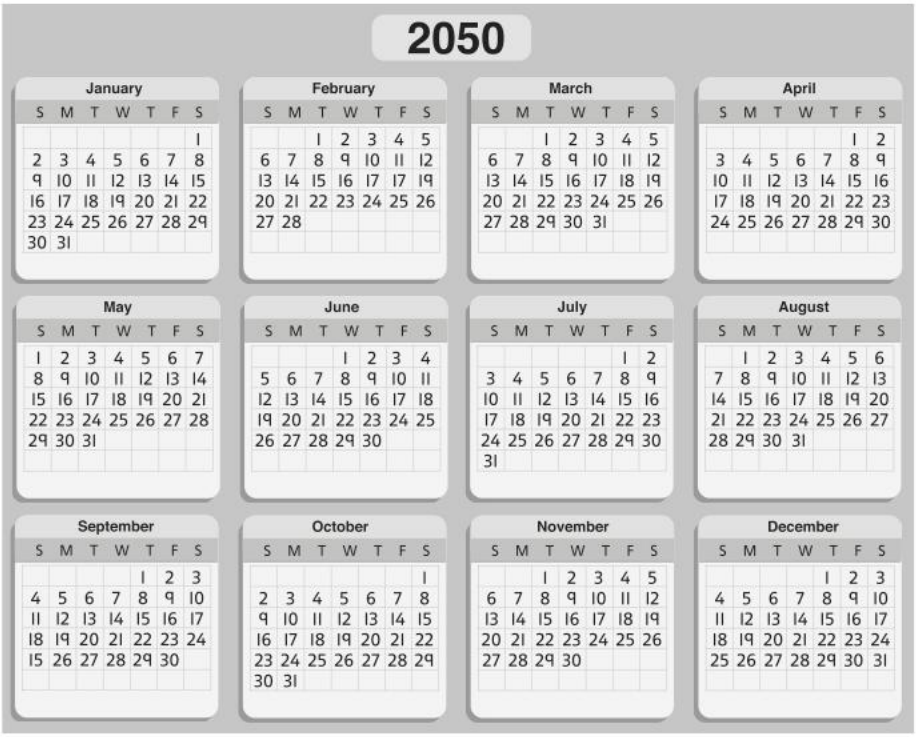
- Ask students to estimate and then calculate areas and perimeters of rooms in the school or at home. They could use their calculations to draw scale plans of rooms and include items such as rugs and large pieces of furniture, all drawn to scale.

7 Time

What students will learn

This unit develops students' skills in telling the time. They will learn to tell the time to the nearest minute using the 24-hour clock as well as a.m. and p.m. times (morning and afternoon/evening).

They will also learn how to read timetables and calendars and carry out calculations involving durations, such as the length of time between departure and arrival times on a timetable.



Learning objectives:

- read and write analogue and digital 12- and 24-hour clock times
- solve problems involving converting from hours to minutes' minutes to seconds' years to months, and weeks to days.

Key words

analogue clock	minute	decade	convert, converting between units
digital clock	hour	century	how long?
12-hour	day	millennium	time interval
24-hour	week	timetable	longest, shortest
a.m.	month	calendar	
p.m.	year	date	
second	leap year	unit of time	

Ways to help

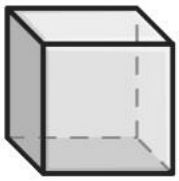
- It is helpful to have an analogue clock and a digital clock on the wall so that students become used to both ways of representing the time.
- We look at the time and use our skills in telling the time many times every day. Whenever you notice yourself glancing at the clock or looking at a calendar, schedule or timetable, ask students to help you. Pose questions based on time intervals, such as 'How long is it until …?' or 'How much longer …?'

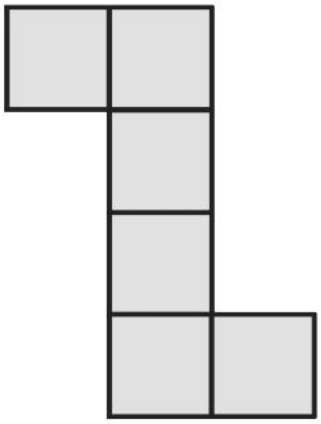
8 Geometry – properties of shapes

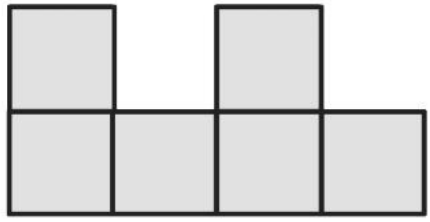
What students will learn

In this unit, students will continue to look at the properties of 2-dimensional (2D) and 3-dimensional (3D) shapes. They will learn to recognise a wider range of shapes. They will classify (sort) shapes according to their properties.

Students will also explore how nets are used to form 3D shapes. A net is a 2D shape that folds up to make a 3D shape. For example, these are both nets of a cube:







Students will develop their understanding of line symmetry. They will learn to recognise and design symmetrical patterns.

Finally, students will learn that angles are measured in degrees. They will learn to recognise, measure and draw right angles, angles that are smaller than 90° (acute angles) and angles that are larger than 90° (obtuse angles).

Learning objectives:

- compare and classify geometric shapes
- identify acute and obtuse angles and compare angles
- identify lines of symmetry.

Key words

2-dimensional (2D)	equilateral triangle	net	right
3-dimensional (3D)	right-angled triangle	symmetrical	acute
polygon	isosceles triangle	reflective symmetry	obtuse
sides	scalene triangle	line of symmetry	reflex
vertex/vertices	faces	mirror line	degrees (°)
regular	edges	angle	
irregular	cube	turn	

Ways to help

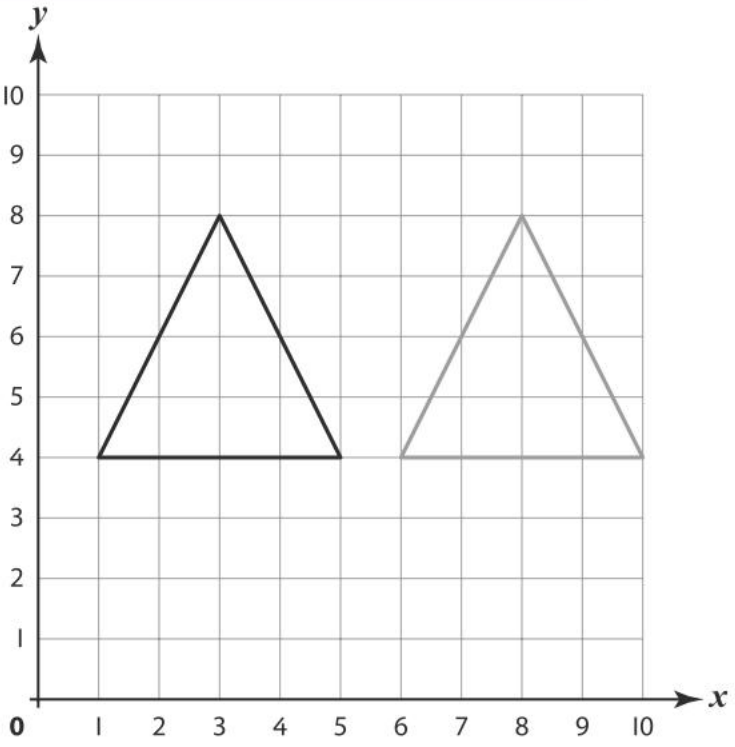
- Continue to point out and talk about all the shapes that you see around you with students. Allow students to practise saying the names and talking about the properties. Ask students questions such as: 'How many sides does it have? How many faces? What types of angles can you see? Are there any right angles?'
- Encourage students to look out for examples of symmetry in artwork and in patterns, at home, in the classroom and in the local environment, as well as in magazines and newspapers.

9 Geometry – position and direction

What students will learn

In this unit, students will learn the four main compass points: north (N), south (S), east (E) and west (W). They will also learn the four intercardinal points: north-east (NE), north-west (NW), south-east (SE) and south-west (SW). They will give directions using these compass points, as well as angles of turn in both clockwise and anti-clockwise directions.

Students will work with coordinate grids, using coordinates to locate points on the grid. They will use their knowledge of coordinates to describe movements of shapes on a grid. For example, this triangle has been translated (moved) 5 squares to the right.



Learning objectives:

- describe positions on a grid using coordinates
- describe movement using instructions such as up and down or left and right
- follow instructions to draw polygons.

Key words

north	south-west	anti-clockwise	intersection
south	forward	90 degrees (°)	translation, translate
east	backward	quarter turn	slide
west	up/down	half turn	left/right
north-east	*x*-axis	coordinate grid	
north-west	*y*-axis	coordinates	
south-east	clockwise	coordinate pair	

Ways to help

- Continue to use the language of position and direction with students. In particular, use the key words shown above to discuss the positions and movements of things that you see in your environment every day.
- It is helpful to ask students to give directions if you are going on a journey. Look at maps with students so they become familiar with using compass points. Introduce them to the convention that north is always at the top of a map.

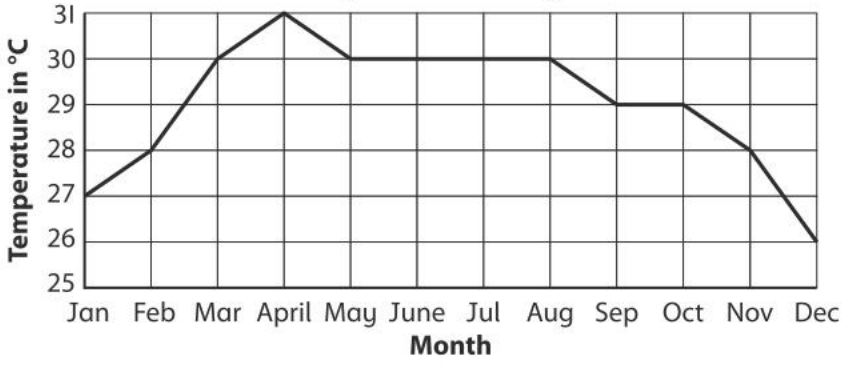
10 Statistics

What students will learn

This unit builds on students' understanding of data handling. At this stage, students need to think about good questions to ask in order to collect appropriate data for the topic that they are researching.

They will develop their ability to use bar charts to present discrete data and line graphs to present continuous data. They will learn how to decide on appropriate scales for their graphs. They will develop an understanding of how different scales can change the way the data looks.

A line graph to show the average monthly temperature in Bangkok



Students will also build on their skills in sorting data using Venn diagrams and Carroll diagrams.

Learning objectives:

- interpret and present data using bar charts and time graphs
- solve problems using data presented in bar charts, pictograms, tables and other graphs.

Key words

data	frequency table	scales	criterion/criteria
discrete data	bar chart	intervals	Venn diagram
continuous data	pictogram	axis, axes	Carroll diagram
survey	line graph	most/least popular	intersection
tally/tally chart	time graph	most/least common	union

Ways to help

- Look out for graphs and charts in newspapers, magazines and on the Internet. Discuss the graphs and charts with students and ask them to interpret the data presented.
- Encourage students to practise data-handling techniques when the family is making decisions at home. For example, they could carry out a survey of family members' preferred destinations for a day out or their choice of takeaway restaurant.