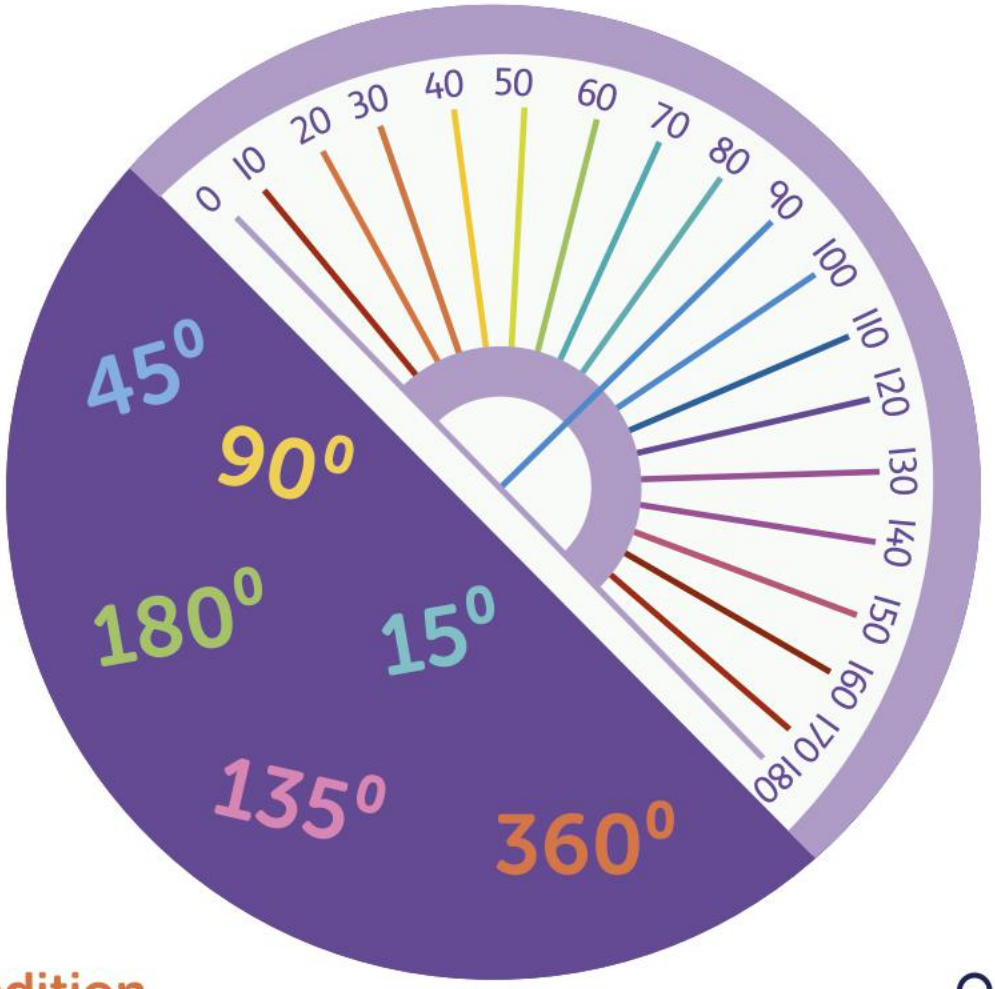
Oxford International Primary

5

Maths

Practice Book



Second edition

OXFORD

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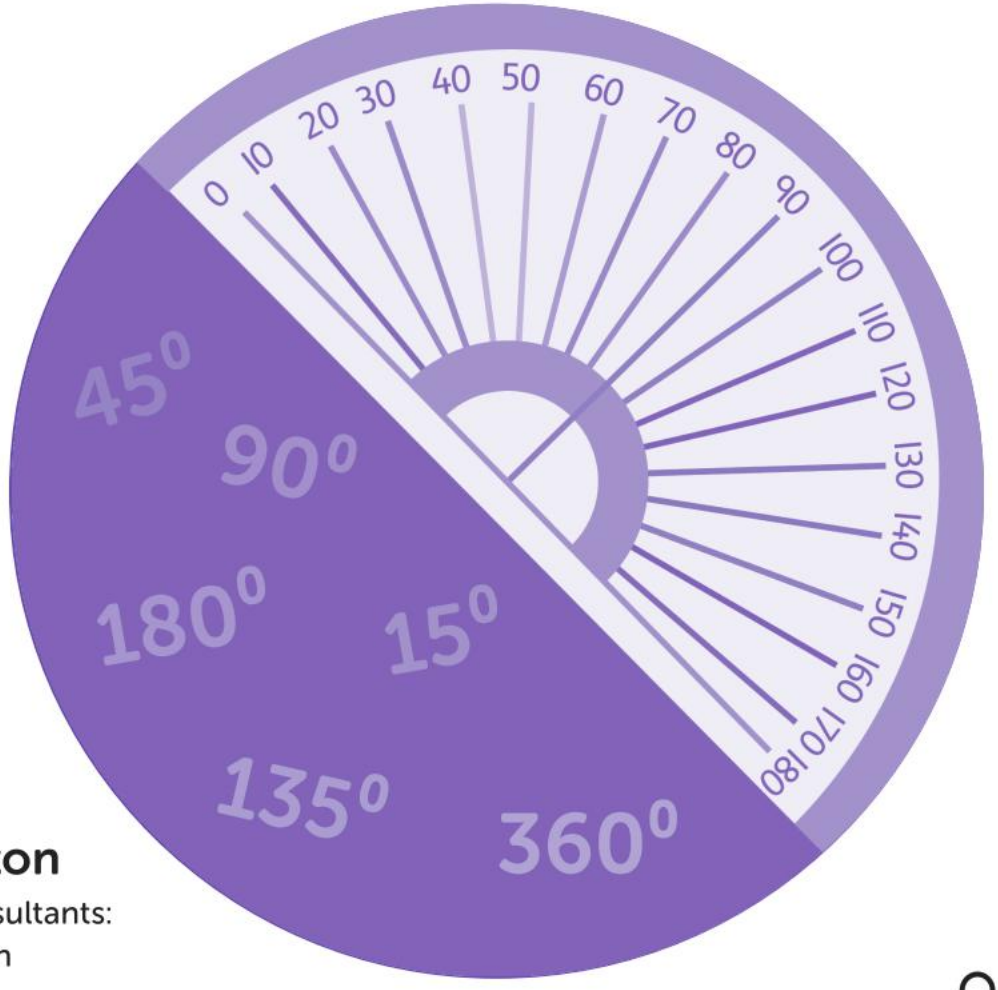

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1 Number and place value

What students will learn

This unit extends students' understanding of place value in whole numbers up to 100 000. In particular, the unit reinforces the understanding that when you move a digit one place to the left on a place-value grid, its value is multiplied by 10.

	Hundred thousands	Ten thousands	Thousands	Hundreds	Tens	Ones
		3	7	1	0	4
× 10	3	7	1	0	4	0

Students will continue to develop their rounding skills, focusing on rounding whole numbers to the nearest 10, 100 and 1000. They will explore general rules that apply when we add, subtract, multiply and divide odd and even numbers. Looking for general rules is one of the key mathematical skills that students need to develop.

Finally, students are introduced to Roman numerals, which are sometimes used in real-world applications of mathematics.

Learning objectives:

- count on and back in powers of 10 up to 1 000 000
- read, write, order and compare numbers up to 1 000 000 and determine the value of each digit
- round numbers
- use negative numbers
- use Roman numerals up to 1000
- solve number problems.

Key words

hundreds	greater than (>)	rule
thousands	less than (<)	pattern
ten thousands	positive number	odd/even
hundred thousands	negative number	generalisation
round, rounding	count on/back in tens	Roman numerals
nearest 10 000/1000/100/10	sequence	Hindu-Arabic numerals
order	number sequence	

Ways to help

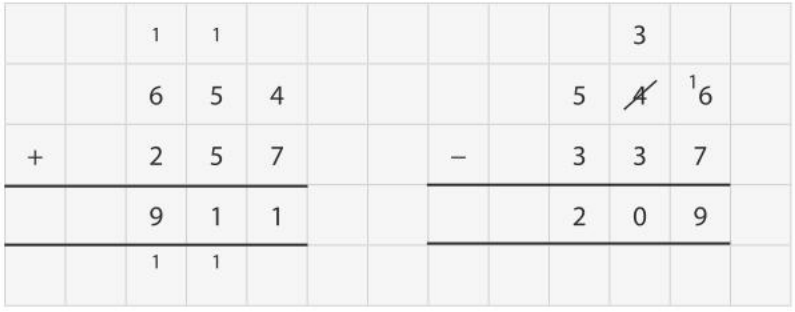
- Look out for large numbers in everyday life and in the local environment. Encourage students to say the numbers aloud. For example:
  - 214 305 is 'two hundred and fourteen thousand, three hundred and five'
  - 726 219 is 'seven hundred and twenty-six thousand, two hundred and nineteen'.
- Look out for Roman numerals, for example at the ends of films and some television programmes.
- When you encounter large numbers in the media, ask students to round these to the nearest 1000 or 100.

2 Addition and subtraction

What students will learn

This unit continues to develop students' strategies for calculating mentally when adding and subtracting. For example, students will make use of their knowledge of bonds to 10 and 100, near multiples and near doubles. They are encouraged to think critically about which strategies are the most appropriate for particular calculations. Many of the calculations relate to real-life problems.

Once mental calculation strategies have been reinforced, students move on to more complicated calculations using paper and pencil. They will develop their use of the column method for addition and subtraction, which they learned in Stage 3 and practised in Stage 4. By the end of the unit, students will be adding and subtracting with large numbers.



Learning objectives:

- add and subtract numbers mentally
- add and subtract whole numbers using written methods
- use rounding to check answers to calculations
- solve addition and subtraction multi-step problems.

Key words

partition, partitioning	calculation strategy	difference
mental methods	efficient strategy	estimate
mental strategies	compensating	adjust
written methods	near multiple	inverse operation
column method	total	word problem

Ways to help

- As in previous Stages, the best way to help is to ask students to explain their strategies to you. Talking about their methods is a great way for students to gain a better understanding of what they are doing and why. Also try to carry out the calculations yourself and talk about the strategies that you use. Students can then compare several strategies and decide which is the most efficient.
- Parents/carers: some of the methods that students are learning may not be the ones that you were taught at school, so ask students to explain how the methods work. This will have the benefit of deepening students' understanding.

3 Multiplication and division

What students will learn

This unit develops students' range of strategies for calculating mentally when multiplying and dividing. For example, students will make use of their knowledge of doubling and halving, and times tables facts, as well as factors and multiples.

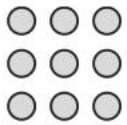
Students will strengthen their understanding of written methods for multiplication and division, including giving remainders as fractions. They will carry out multiplications and divisions using larger numbers than in previous stages.

Students will explore properties of numbers and general rules for multiplication and division by multiples of 10. They will learn about square numbers, cube numbers and prime numbers.

2^2

$= 2 \times 2$

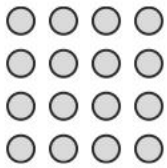
$= 4$



3^2

$= 3 \times 3$

$= 9$



4^2

$= 4 \times 4$

$= 16$

Learning objectives:

- multiply and divide mentally
- multiply and divide numbers using written methods
- find multiples and factors of numbers, including common factors
- find prime, square and cube numbers
- multiply and divide whole numbers and decimals by 10, 100 and 1000
- solve multiplication and division problems.

Key words

inverse operation	common factor	place-value grid	round up/down
multiplication fact	mental strategy	partitioning	prime number
division fact	written method	decimal point	prime factor
multiple	grid method	powers of 10	composite numbers
multiple of 10	column method	product	square numbers (^{2})
known fact	double	quotient	cube numbers (^{3})
factor	halve	divisor	proportion
common multiple	estimate	dividend	scaling problem

Ways to help

- Talk to students about the methods they are using to help them gain a better understanding. Carry out the calculations yourself and share the strategies that you used. Ask students to compare strategies and decide which is the most efficient for different calculations.
- Parents/carers: some of the methods that students are learning may not be the ones that you were taught at school, so ask students to explain how the methods work.
- Similarly, ask students to explain to you what square numbers, cube numbers and prime numbers are. Allow them to take the role of 'teacher'!

4 Fractions, decimals and percentages

What students will learn

In this unit, students will use their understanding of equivalence to order fractions. They will focus on halves, thirds, quarters, fifths, sixths, eighths, tenths, hundredths and thousandths. They will also learn to spot equivalences between fractions and decimals. They will round decimal numbers to the nearest tenth and the nearest whole number.

Students will go on to learn about percentages. By the end of the unit, students will be able to move confidently between fractions, decimals and percentages.

Students will also learn how to represent fractions that are greater than 1, using improper fractions and mixed numbers. For example, $\frac{11}{4}$ (an improper fraction) is the same as $2\frac{3}{4}$ (a mixed number).

At the end of the unit, students will solve problems using ratio and proportion.

Learning objectives:

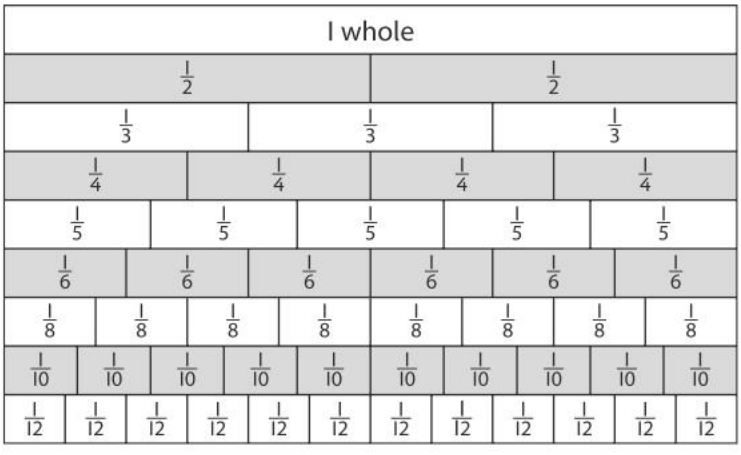
- identify, name and write equivalent fractions
- read, write, order and compare fractions, and decimals with up to three decimal places
- read and write decimal numbers as fractions
- recognise mixed numbers and improper fractions and convert between them
- add and subtract fractions
- multiply fractions by whole numbers, using diagrams
- recognise percentages.

Key words

fraction	bar model	decimal place	nearest whole number/tenth
improper fraction	whole	equivalent fractions	percentage
mixed number	tenths	decimal equivalent	out of a hundred
numerator	hundredths	multiplier	proportion
denominator	thousands	multiple	ratio
lowest common denominator	decimal fraction	rounding	

Ways to help

- At this stage in their learning, students still need to see fractions modelled practically as often as possible, for example by folding paper strips or cutting up cakes or pizzas.
- You could display a fraction wall like this one, to help students understand equivalent fractions.
- When you see decimal numbers in the media, ask students to round them to the nearest tenth or the nearest whole number.
- Parents/carers: look for ways of using ratio to solve everyday problems. For example, ask students to adapt a recipe for 2 people when cooking for 6 people.



5 Length, mass, capacity and volume

What students will learn

This unit continues to build students' measuring skills. Students will become more confident in using measuring equipment accurately to measure length, mass, capacity and volume. They will convert between units of measure and use decimal notation to record measurements. They will apply their estimating, rounding and ordering skills to the measurements they make.

They will learn how to use their knowledge of measurements to solve problems, many of which are based in everyday contexts.

Learning objectives:

- convert between different units of measure
- convert between metric and imperial units
- estimate volume and capacity
- solve measurement problems.

Key words

length, width, height	centimetre (cm)	estimate
distance	square centimetres (cm^2)	approximate
units of measure	cubic centimetres (cm^3)	mass
metric units	metre (m)	capacity
imperial units	kilometre (km)	volume
milli-	gram (g)	dimensions
centi-	kilogram (kg)	scale, scaling
kilo-	millilitre (ml)	convert, conversion
millimetre (mm)	litre (ℓ)	

Ways to help

- Use every opportunity to encourage students to measure length, mass and capacity. For example, cooking often involves measuring the mass and capacity of ingredients, so ask students to measure the ingredients for you.
- Always prompt students to estimate measurements first. In this way, students will begin to gain a good understanding of the size of different units of measure.

6 Area and perimeter

What students will learn

The perimeter is the distance all the way around the outline of a shape. The area is the amount of space that is enclosed by the perimeter. Students will learn how to record area using square centimetres (cm^2) and square metres (m^2).

In this unit, students will learn how to calculate the area and perimeter of a range of rectangles and composite rectilinear shapes. (Rectilinear describes a shape that is made up of straight lines that join at right angles. Composite describes a shape that is made up of two or more shapes joined together.)

This unit introduces the formula for calculating the area of a rectangle (area = length × width).

Learning objectives:

- measure and calculate the area and perimeter of rectilinear shapes
- compare the areas of two shapes.

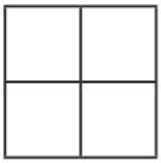
Key words

perimeter	estimate
area	formula
centimetre (cm)	scale
metre (m)	rectangle
square centimetres (cm^2)	rectilinear shape
square metres (m^2)	composite shape

Ways to help

- Ask students to measure the dimensions of rectangular objects in the home or classroom and to calculate the areas and perimeters of the rectangles.
- Sometimes students get confused between area and perimeter. You can help by looking at shapes and pointing out the perimeter and the area. For example, you could use square mats or cards that are all the same size to make different shapes. Then ask students to compare the areas and perimeters of these shapes. For example:
    - this shape has a perimeter of 10 cm and an area of 4 cm^2

    - this shape has a perimeter of 8 cm and an area of 4 cm^2.



7 Time

What students will learn

This unit continues to develop students' skills in telling the time to the nearest minute. They will also convert between units of time such as seconds, minutes, hours, days and weeks.

Students will develop their ability to read timetables and calendars with increasing accuracy. They will solve problems that involve calculating time intervals, including journey times and the number of days between dates.

Learning objectives:

- solve problems that involve converting between units of time.

Key words

analogue	months	convert
digital	year	number line
seconds	leap year	time interval
minutes	decade	duration
hours	century	quicker/slower
day	millennium	timeline
date	day of the month	difference
weeks	equivalent units	calendar

Ways to help

- We look at the time and use our skills in telling the time every day. Whenever you notice yourself glancing at the clock or using a timetable to look at television programmes or to plan a journey, ask students to do this task with you. It would be useful to have both an analogue clock and a digital clock on display so that students become used to both ways of telling the time.

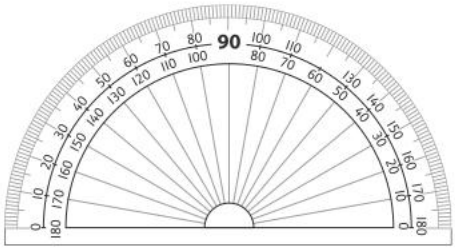
- Ask students to help you with time conversions. For example, ask students how many weeks it is until a certain event and then to convert this into the number of days. Students could then work out how many hours this is.

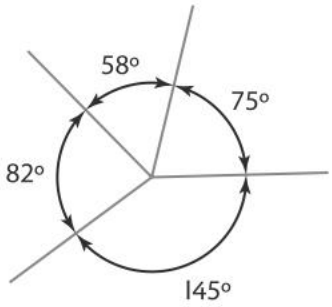
8 Geometry – properties of shapes

What students will learn

This unit continues to explore the properties of 2-dimensional (2D, flat) and 3-dimensional (3D, solid) shapes. Students will explore the properties of shapes. For 2D shapes, they will learn about the numbers of sides, types of angles and symmetry. For 3D shapes, they will look at the numbers of vertices, edges and faces.

Students will extend their understanding of reflective and rotational symmetry and of parallel and perpendicular lines. They will be taught how to use a protractor to measure angles.





Students will learn that the angles on a straight line total 180° and the angles at a point total 360°.

Learning objectives:

- identify 3D shapes from 2D representations
- distinguish between regular and irregular polygons
- recognise reflective and rotational symmetry
- estimate, draw and compare angles
- identify angles at a point and on a straight line.

Key words

2D shape, 3D shape	reflection	acute angle
vertex, vertices	reflective symmetry	right angle
side	order of rotational symmetry	obtuse angle
protractor	prism	angles at a point
equilateral triangle	pyramid	angles on a straight line
isosceles triangle	edge	estimate
scalene triangle	face	parallel
right-angled triangle	net	perpendicular
line of symmetry	angle	horizontal/vertical
mirror line	degrees	

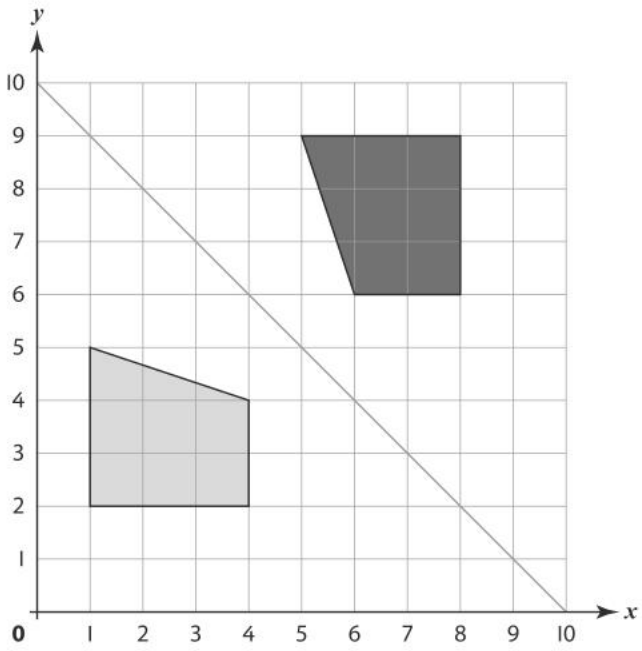
Ways to help

- Continue to encourage students to notice, name and talk about all the shapes around them. They will see lots of different shapes at home, in the classroom and around the local area. When you go on visits to new places, take photographs of the shapes that you see so that you can talk about the properties later.
- Prompt students to look for symmetry, particularly in nature. There are also lots of symmetrical patterns to be found in traditional art forms.

9 Geometry – position and direction

What students will learn

In this unit, students will develop their skills in using coordinate grids and become increasingly confident in understanding and writing coordinates. They will plot points on a grid to make shapes. They will carry out transformations of the shapes by reflecting and translating them.



Learning objectives:

- plot the coordinates of points and shapes on a grid
- identify, describe and draw shapes after reflections and translations.

Key words

axis, axes	*x*-coordinate	mirror line	up, down
x-axis, *y*-axis	*y*-coordinate	translate, translation	horizontal
coordinates	reflect, reflection	instruction	vertical
coordinate grid	vertex, vertices	position	
coordinate pairs	line of symmetry	right, left	

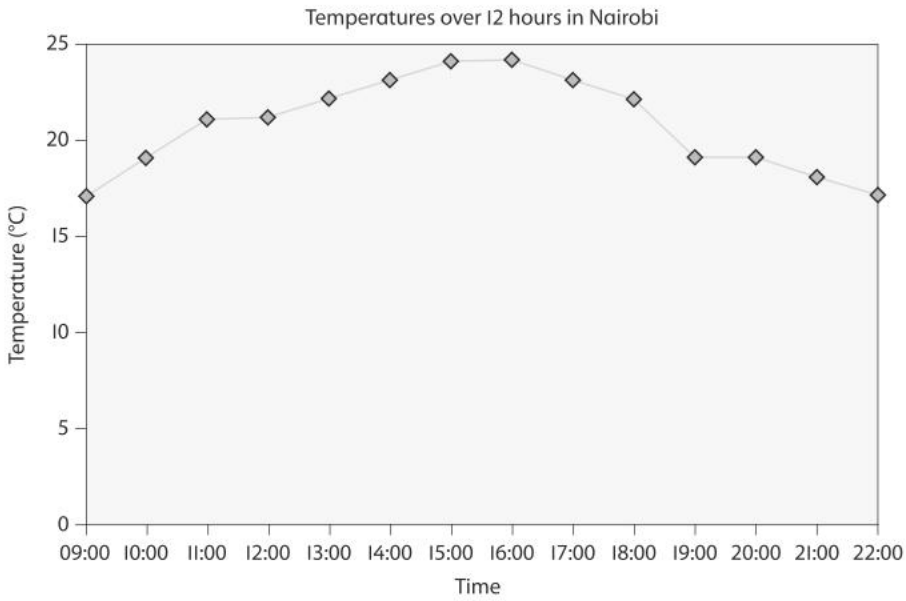
Ways to help

- Play games using coordinate grids. Here are some examples.
  - Carefully cut out a shape that fits on a coordinate grid so that each vertex (corner) is at the intersection of two grid lines. Place the shape on the grid and ask students to write the coordinates of the vertices. Then give students instructions for a transformation (reflection or translation) and ask them to write the new coordinates. For example: 'Reflect the shape across a vertical mirror line' or 'Translate the shape 4 squares to the right'.
  - Ask students to work with a partner. They draw a shape on a coordinate grid without letting their partner see and tell their partner the coordinates of the vertices. The partner plots the coordinates on their own grid and joins them to form a shape. The two students then compare grids to check that their shapes are identical.
  - Write a set of coordinates. Ask students to guess, without plotting the coordinates, what shape they will make by joining the points.

10 Statistics

What students will learn

This unit develops students' skills of handling and presenting data. They will start with the familiar bar charts and move on to plotting line graphs. They will learn the difference between discrete and continuous data and why we use line graphs to present continuous data. Continuous data can take any value and is measured across a specific time interval, for example the height of a plant measured each day for a month. Discrete data is countable, for example the number of cars parked in a car park each day of the week.



Students will have to work out the scales they need for each graph they draw. They will also answer more complex questions based on the data and the way it is presented.

Students will be taught how to use timetables to solve problems. These are related to the timetables that students see in their everyday lives.

Finally, they are introduced to the idea of probability or chance.

Learning objectives:

- read and interpret information in tables, including timetables
- solve problems using information presented in a line graph
- use the language of probability and carry out probability experiments.

Key words

data	tally chart	interval	likelihood
discrete data	frequency table	scale	chance
continuous data	bar chart	timetable	even chance
survey	line graph	time difference	event
questionnaire	time graph	time interval	frequency
tally, tally mark	axis, axes	probability	duration

Ways to help

- Look out for graphs, charts and other ways of presenting data on the television news or in newspapers and magazines. Talk to students about the graphs and charts and what they mean. Discuss whether the data is discrete or continuous.
- Use the language of probability when discussing everyday events and activities with students. For example: 'How likely do you think it is to rain today?', 'What are the chances of you being at school next week?' or 'What is the probability of the sun rising tomorrow?'