

## 2-year scheme of work

The following scheme of work provides suggestions for teaching Pupil Book 2.3 as part of a 2-year Key Stage 3 course.

Please note that you can recombine the test questions provided on Collins Connect to create new tests if your frequency of assessment differs from that below, or if you wish to combine content from different chapters in your own half-term tests.

This scheme of work is provided in editable Word and Excel format on the CD-ROM accompanying this Teacher Pack.

Chapter	Lesson	No. of hours	Learning objective	Comments/ suggestions
<b>Half-term / Term 1</b>				
1 Working with numbers	1.1 Multiplying and dividing negative numbers	1	<ul style="list-style-type: none"> <li>To carry out multiplications and divisions involving negative numbers</li> </ul>	Much of this material will be new to Year 8 pupils. Pupils can leave out questions 1 and 2 in Exercise 1A, which was covered in Year 7. If pupils are quick to grasp the concepts in this chapter they can move swiftly through the exercises, leaving out some of the questions.
	1.2 Factors and highest common factor (HCF)	1	<ul style="list-style-type: none"> <li>To understand and use highest common factors</li> </ul>	
	1.3 Multiples and lowest common multiple (LCM)		<ul style="list-style-type: none"> <li>To understand and use lowest common multiples</li> </ul>	
	1.4 Powers and roots	1	<ul style="list-style-type: none"> <li>To understand and use powers and roots</li> </ul>	
	1.5 Prime factors	1	<ul style="list-style-type: none"> <li>To find the prime numbers of an integer</li> </ul>	
	Challenge – Blackpool Tower	1		This challenge activity encourages pupils to think about a tourist attraction with different facilities and what is involved in running them. The topic could lead to class discussion about environmental issues such as electricity and water usage.
2 Geometry	2.1 Parallel lines	1	<ul style="list-style-type: none"> <li>To calculate angles in parallel lines</li> </ul>	Much of the material in the first three lessons of this chapter will be familiar to pupils. Use the activities and challenges at the end of each exercise to check pupils' understanding. If you feel that pupils' understanding is secure, move straight on to Lesson 2.4 and Lesson 2.5.
	2.2 The geometric properties of quadrilaterals	1	<ul style="list-style-type: none"> <li>To know the geometric properties of quadrilaterals</li> </ul>	
	2.3 Translations	1	<ul style="list-style-type: none"> <li>To understand how to translate a shape</li> </ul>	
	2.4 Enlargements	1	<ul style="list-style-type: none"> <li>To enlarge a 2D shape by a scale factor</li> </ul>	
	2.5 Constructions	1	<ul style="list-style-type: none"> <li>To construct the mid-point and the perpendicular bisector of a line</li> <li>To construct an angle bisector</li> <li>To construct a perpendicular to a line from or at a given point</li> <li>To construct a right-angled triangle</li> </ul>	
	Challenge – More constructions	1		This challenge gives pupils the opportunity to extend their learning to more complex constructions. They need to be able to reproduce a set of instructions that extend what they have already done during Lesson 2.5 and in Exercise 2E of the Pupil Book.
<i>Chapters 1–2 assessment on Collins Connect</i>				
3 Probability	3.1 Mutually exclusive outcomes and exhaustive outcomes	1	<ul style="list-style-type: none"> <li>To understand mutually exclusive and exhaustive outcomes</li> </ul>	Much of the material in this chapter will be new. If pupils are familiar with Lesson 3.1 from Year 7, they can move on to the activity question at the end of Exercise 3A.

	3.2 Using a sample space to calculate probabilities	1.5	<ul style="list-style-type: none"> <li>To use sample spaces to calculate probabilities</li> </ul>	
	3.3 Estimates of probability	1.5	<ul style="list-style-type: none"> <li>To use relative frequency to estimate probabilities</li> </ul>	
	Financial skills – Fun in the fairground	1		Pupils extend their understanding of probability to a common real-life application that may be new to them. Pupils also make a real-life link between probability and financial skills.
<b>Half-term</b>				
<b>Half-term / Term 2</b>				
4 Percentages	4.1 Calculating percentages	1	<ul style="list-style-type: none"> <li>To write one quantity as a percentage of another</li> </ul>	Although pupils have met percentages before, there are some important and quite challenging concepts in this chapter. The idea of percentages as a multiplier and the use of multiplicative reasoning is very important to pupils' confidence and fluency with percentages. Therefore, you may be able to leave out some of the earlier questions in each lesson, providing that pupils demonstrate confidence and fluency with calculating percentages.
	4.2 Calculating percentage increases and decreases	1	<ul style="list-style-type: none"> <li>To use a multiplier to calculate a percentage change</li> </ul>	
	4.3 Calculating a percentage change	1	<ul style="list-style-type: none"> <li>To work out a change in value as a percentage increase or decrease</li> </ul>	
	Challenge – Changes in population	1		
5 Congruent shapes	5.1 Congruent shapes	1	<ul style="list-style-type: none"> <li>To recognise congruent shapes</li> </ul>	Pupils will be unfamiliar with most of the concepts in this chapter. However if they can demonstrate that they are confident and fluent with these basic concepts, pupils can move on to the more challenging questions at the end of each exercise in the Pupil Book.
	5.2 Congruent triangles	1	<ul style="list-style-type: none"> <li>To know the conditions for recognising congruent triangles</li> </ul>	
	5.3 Using congruent triangles to solve problems	1	<ul style="list-style-type: none"> <li>To solve geometric problems using congruent triangles</li> </ul>	
	Problem solving – Using scale diagrams to work out distances	1		
<b>Chapters 3–5 assessment on Collins Connect</b>				
6 Surface area and volume of prisms	6.1 Metric units for area and volume	1	<ul style="list-style-type: none"> <li>To convert metric units for area and volume</li> </ul>	Pupils should be familiar with the concepts in Lesson 6.1. Check pupils' understanding with a couple of examples and if pupils are confident and fluent, move on to Lesson 6.2.
	6.2 Surface area of prisms	1	<ul style="list-style-type: none"> <li>To calculate the surface area of a prism</li> </ul>	
	6.3 Volume of prisms	1	<ul style="list-style-type: none"> <li>To calculate the volume of a prism</li> </ul>	
	Investigation – A cube investigation	2		In this investigation, pupils apply their understanding of area to a more complex problem. Pupils need to work methodically and be able to explain their solutions. This is a good transferable skills objective to share with pupils when doing this investigation. Ask pupils to share not only their solutions but also <i>how</i> they approached working on the problem.
7 Graphs	7.1 Graphs from linear equations	1	<ul style="list-style-type: none"> <li>To recognise and draw the graphs of more complex linear equations</li> </ul>	It is important to take time over the examples in this chapter. Sometimes, however, it is more worthwhile to work through one or two examples in-depth as a class, followed by picking out just one or two key examples for pupils.
	7.2 Gradient (steepness) of a straight line	1	<ul style="list-style-type: none"> <li>To work out the gradient in a graph from a linear equation</li> <li>To work out an equation of the form <math>y = mx + c</math> from the graph</li> </ul>	

	7.3 Graphs from quadratic equations	1	<ul style="list-style-type: none"> <li>To recognise and draw the graph from a simple quadratic equation</li> <li>To solve a quadratic equation from a graph</li> </ul>	
	7.4 Real-life graphs	1	<ul style="list-style-type: none"> <li>To draw graphs from real-life situations to illustrate the relationship between two variables</li> </ul>	
	Challenge – The M25	1		This challenge activity encourages pupils to think about the M25, one of Europe's busiest motorways.
<b>Holidays</b>				
<b>Half-term / Term 3</b>				
8 Number	8.1 Powers of 10	1	<ul style="list-style-type: none"> <li>To multiply and divide by negative powers of 10</li> </ul>	There are new ideas in all these lessons, which build on pupils' existing knowledge of rounding and the number system. Check pupils' understanding by doing some examples as a class; then ask pupils to focus on the PS and MR questions in the Pupil Book exercises, plus the investigations, activity and challenge at the end of the exercises
	8.2 Significant figures	1	<ul style="list-style-type: none"> <li>To round a specific number of significant figures</li> </ul>	
	8.3 Standard form with large numbers	1.5	<ul style="list-style-type: none"> <li>To write a large number in standard form</li> </ul>	
	8.4 Multiplying with numbers in standard form	1	<ul style="list-style-type: none"> <li>To multiply with numbers in standard form</li> </ul>	
	Challenge – Space – to see where no one has seen before	1.5		This activity is designed to combine the skills covered across this chapter to explore an interesting real-life problem in a slightly more abstract context.
Chapters 6–8 assessment on Collins Connect				
9 Interpreting data	9.1 Interpreting graphs and diagrams 9.2 Relative sized pie charts	1	<ul style="list-style-type: none"> <li>To interpret different charts seen in the media</li> <li>To draw pie charts relative to total frequency</li> </ul>	Much of the material in lessons of this chapter will be new to pupils. However, Lesson 9.3 and Lesson 9.4 could be combined. Make sure that pupils have a good grasp of correlation before moving on.
	9.3 Scatter graphs and correlation	1	<ul style="list-style-type: none"> <li>To read scatter graphs</li> <li>To understand correlation</li> </ul>	
	9.4 Creating scatter graphs	1	<ul style="list-style-type: none"> <li>To create scatter graphs and use a line of best fit</li> </ul>	
	Challenge – Football attendances	2		In order to be able to do this challenge activity, pupils will need to be able to read and interpret the table, draw pie charts relative to the data in the table, and draw on their knowledge of averages, means and scatter diagrams. Pupils are given the opportunity to practise these skills in what is most likely a familiar context.
10 Algebra	10.1 Algebraic notation 10.2 Like terms	1	<ul style="list-style-type: none"> <li>To simplify algebraic expressions involving the four basic operations</li> <li>To simplify algebraic expressions by combining like terms</li> </ul>	Pupils should have met the concepts in Lesson 10.1 and Lesson 10.2 before. Work through some examples to check pupils' understanding, then move on to Lesson 10.3.
	10.3 Expanding brackets	1	<ul style="list-style-type: none"> <li>To remove brackets from an expression</li> </ul>	
	10.4 Using algebraic expressions	1	<ul style="list-style-type: none"> <li>To manipulate algebraic expressions</li> <li>To identify algebraic expressions</li> </ul>	
	10.5 Using index notation	1	<ul style="list-style-type: none"> <li>To write algebraic expressions involving powers</li> </ul>	
	Mathematical reasoning – Writing in algebra	2		This activity develops confidence and fluency with algebraic notation. Pupils often struggle to decode everyday language into mathematics. This activity gives them the opportunity to practise this in a range of contexts.
11 Shape and ratio	11.1 Ratio of lengths, areas and volumes	1	<ul style="list-style-type: none"> <li>To use ratio to compare lengths, areas and volumes of 2D and 3D shapes</li> </ul>	Pupils will have met some of the basic concepts in this chapter. If they can demonstrate that they are confident and fluent with these basic concepts, pupils can move on to the more challenging questions at the end of each exercise in the Pupil Book.
	11.2 Fractional enlargement	1.5	<ul style="list-style-type: none"> <li>To enlarge a 2D shape by a fractional scale factor</li> </ul>	
	11.3 Map scales	1	<ul style="list-style-type: none"> <li>To understand how to use map scales</li> </ul>	

	Activity – Map reading	2		This activity consolidates topics previously covered on extracting data, area and ratio.
<i>Chapters 9–11 assessment on Collins Connect</i>				
<b>Half-term</b>				
<b>Half-term / Term 4</b>				
12 Fractions and decimals	12.1 Adding and subtracting fractions	1	<ul style="list-style-type: none"> <li>To add and subtract fractions and mixed numbers</li> </ul>	Pupils should be familiar with how to use all four operations with fractions. However, these operations are important concepts and pupils often get them confused. Check pupils' confidence while working through the examples in Lessons 12.1 to 12.3. If pupils are confident, concentrate on the challenge questions in these lessons. Then move on to Lesson 12.4 and Lesson 12.5.
	12.2 Multiplying fractions and integers	1	<ul style="list-style-type: none"> <li>To multiply a fraction or a mixed number and an integer</li> </ul>	
	12.3 Dividing with integers and fractions	1	<ul style="list-style-type: none"> <li>To divide a fraction or a mixed number by an integer</li> <li>To divide an integer or a mixed number by a fraction</li> </ul>	
	12.4 Multiplication with large and small numbers	1	<ul style="list-style-type: none"> <li>To multiply combinations of large and small numbers mentally</li> </ul>	
	12.5 Division with large and small numbers	1	<ul style="list-style-type: none"> <li>To divide combinations of large or small numbers mentally</li> </ul>	
	Challenge – Guesstimates	1		This activity gives pupils the opportunity to practise their mental strategies in some real-life contexts. It also encourages pupils to make links to the use of estimation as well as the need to make assumptions when tackling real-life problems.
13 Proportion	13.1 Direct proportion	1	<ul style="list-style-type: none"> <li>To understand the meaning of direct proportion</li> <li>To find missing values in problems involving proportion</li> </ul>	Much of this material in this chapter will be unfamiliar to pupils. Make sure that each concept is fully understood by all pupils before moving on to the MR and PS questions in the exercises.
	13.2 Graphs and direct proportion	1	<ul style="list-style-type: none"> <li>To represent direct proportion graphically and algebraically</li> </ul>	
	13.3 Inverse proportion	1	<ul style="list-style-type: none"> <li>To understand what inverse proportion is</li> <li>To use graphical and algebraic representations of inverse proportion</li> </ul>	
	13.4 Comparing direct proportion and inverse proportion	1	<ul style="list-style-type: none"> <li>To recognise direct and inverse proportion and work out missing values</li> </ul>	
		Challenge – Planning a trip	1	
<i>Chapters 12–13 assessment on Collins Connect</i>				
14 Circles	14.1 The circumference of a circle	1	<ul style="list-style-type: none"> <li>To know the definition of a circle and the names of its parts</li> <li>To work out a relationship between the circumference and diameter of a circle</li> </ul>	Pupils may be familiar with the contents of Lesson 14.1. Check understanding with a couple of examples, and if pupils are confident and fluent move straight on to Lesson 14.3 and Lesson 14.4.
	14.2 Formula for the circumference of a circle	1	<ul style="list-style-type: none"> <li>To calculate the circumference of a circle</li> </ul>	
	14.3 Formula for the area of a circle	1	<ul style="list-style-type: none"> <li>To calculate the area of a circle</li> </ul>	

	Financial skills – Athletics stadium	2		This activity is designed to give pupils the opportunity to apply their knowledge to a multi-step real-life problem. The context is common, but the activity is presented in a slightly more complex way than pupils may be used to.
15 Equations and formulae	15.1 Equations with brackets 15.2 Equations with the variable on both sides	1	<ul style="list-style-type: none"> <li>To solve equations involving brackets</li> <li>To solve equations where the answers are fractions or negative numbers</li> <li>To solve equations with the variable on both sides</li> </ul>	Much of this chapter will be new material. However, pupils who are familiar with multiplying out brackets and solving simple equations can either complete Exercise 15A in the Pupil Book quickly, or move straight on to Exercise 15B.
	15.3 More complex equations	1	<ul style="list-style-type: none"> <li>To solve equations with brackets and fractional coefficients</li> <li>To solve equations involving squares</li> </ul>	
	15.4 Rearranging formulae	1	<ul style="list-style-type: none"> <li>To change the subject of a simple formula</li> <li>To change the subject of a formula involving squares</li> </ul>	
	Mathematical reasoning – Using graphs to solve equations	1		In this activity, pupils will use mathematical reasoning to make links between equations and formulae and their graphical representations. Comparing graphical and algebraic representations enables pupils to check their ability to solve equations. Tell pupils that the ability to use different representations to check their understanding is a valuable skill.
16 Comparing data	16.1 Grouped frequency tables 16.2 Drawing frequency diagrams	1	<ul style="list-style-type: none"> <li>To create a grouped frequency table from raw data</li> <li>To interpret frequency diagrams</li> <li>To draw a frequency diagram from a grouped frequency table</li> </ul>	Use one or two examples to check pupils' understanding from Lesson 16.1 and Lesson 16.2. If pupils are fluent and confident with the concepts, move straight to Lessons 16.3 and 16.4.
	16.3 Comparing sets of data 16.4 Misleading charts	1	<ul style="list-style-type: none"> <li>To be able to compare data from two sources</li> <li>To recognise when a statistical chart may be misleading</li> </ul>	
	Problem solving – Why do we use so many devices to watch TV?	1		This activity is designed to combine all the lessons in this chapter by taking pupils through the steps of tabulating and displaying data for a familiar real-life problem. All the data is given but pupils will need to read and think carefully about the way the data is displayed so that they can make valid comparisons.
<i>Chapters 14–16 assessment on Collins Connect</i>				
<i>End of year assessment on Collins Connect</i>				
<b>Holidays</b>				
<b>Half-term / Term 5</b>				
Work continues with Pupil Book 3.3				
<b>Half-term</b>				
<b>Half-term / Term 6</b>				
Work continues with Pupil Book 3.3				