

## 3-year scheme of work

The following scheme of work provides a suggestion for how Pupil Book 3.2 can be taught over the course of one year, as part of a 3-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 Percentages	1.1 Simple interest	1	<ul style="list-style-type: none"> <li>To understand what simple interest is</li> <li>To solve problems involving simple interest</li> </ul>	Pupils often struggle when they start using percentages greater than 100. Using real-life example will help them overcome this. Start with percentages that pupils are already comfortable working with.
	1.2 Percentage increases and decreases	1	<ul style="list-style-type: none"> <li>To calculate the result of a percentage increase or decrease</li> <li>To choose the most appropriate method to calculate a percentage change</li> </ul>	Pupils need a good understanding of 100% as a whole before tackling percentage increases and decreases successfully. The concept of using percentage as an operator is an important step to ensure confidence and fluency, so make sure you take time over it.
	1.3 Calculating the original value.	2	<ul style="list-style-type: none"> <li>Given the result of a percentage, to calculate the original value</li> </ul>	This lesson looks at inverse operations to calculate the percentage change or to calculate an initial value. This is another concept with which pupils will need to be fluent, to ensure confidence in applying their understanding of percentages to real-life problems
	1.4 Using percentages	1	<ul style="list-style-type: none"> <li>To choose the correct calculation to work out a percentage</li> </ul>	Pupils often meet the different types of questions over a period of time, so they never have the opportunity to identify the type of question and make independent decisions about which method to use. Give pupils lots of opportunity to check their understanding by making choices and decisions over the approaches they use in a range of increasingly complex and unfamiliar situations.
	Challenge – Exponential growth	2		This challenge gives pupils the opportunity to extend their learning by making links to other areas of mathematics including the work in Chapter 5 (Applications of graphs).
2 Equations and formulae	2.1 Multiplying out brackets	1	<ul style="list-style-type: none"> <li>To multiply out brackets</li> </ul>	This chapter builds on previously learned algebraic techniques and moves on to more advanced methods of algebraic manipulation. These include: expanding brackets with negative coefficients, factorising algebraic expressions, solving linear equations involving fractions and rearranging formulae.
	2.2 Factorising algebraic expressions	1	<ul style="list-style-type: none"> <li>To factorise expressions</li> </ul>	
	2.3 Equations with brackets	1	<ul style="list-style-type: none"> <li>To solve equations with one or more sets of brackets</li> </ul>	
	2.4 Equations with fractions	1	<ul style="list-style-type: none"> <li>To solve equations involving fractions</li> </ul>	
	2.5 Rearranging formulae	1	<ul style="list-style-type: none"> <li>To change the subject of a formula</li> </ul>	
	Investigation – Body mass index	1		This investigation will help to embed the concepts and skills learned in this chapter.
<i>Chapters 1–2 assessment on Collins Connect</i>				
3 Polygons	3.1 Angles in polygons	1	<ul style="list-style-type: none"> <li>To work out the sum of the interior angles of a polygon</li> <li>To work out exterior angles of polygons</li> </ul>	This chapter introduces the sums of the interior and exterior angles of polygons. It also includes more complex constructions. Pupils try to learn justifications such as those in Lesson 3.1 and Lesson 3.3 by

	3.2 Constructions	1	<ul style="list-style-type: none"> <li>To make accurate geometric constructions</li> </ul>	memory instead of understanding the logic. Discuss this with pupils so that they are clear on this. Give pupils the opportunity to identify the steps in the process and to use similar logic in different contexts.
	3.3 Angles in regular polygons	1	<ul style="list-style-type: none"> <li>To work out the exterior angles of a regular polygon</li> <li>To work out the interior angles of a regular polygon</li> </ul>	
	3.4 Regular polygons and tessellations	1	<ul style="list-style-type: none"> <li>To work out which regular polygons tessellate</li> </ul>	
	Activity – Garden design	1		For this activity, pupils will need to apply their knowledge of angles in polygons and more complex multi-step constructions.
<b>Half-term / Term 2</b>				
4 Using data	4.1 Scatter graphs and correlation	1	<ul style="list-style-type: none"> <li>To infer a correlation from two related scatter graphs</li> </ul>	This chapter picks up the ideas from previous years in statistics. It develops ways of illustrating distributions and how we can use data to explore possibilities as well as to compare them. This chapter concludes with pupils conducting their own investigations, using the ideas from the first part of the chapter.
	4.2 Time-series graphs	1	<ul style="list-style-type: none"> <li>To use and interpret a variety of time-series graphs</li> </ul>	
	4.3 Two-way tables	1	<ul style="list-style-type: none"> <li>To interpret a variety of two-way tables</li> </ul>	
	4.4 Comparing two or more sets of data	1	<ul style="list-style-type: none"> <li>To compare two sets of data from statistical tables and diagrams</li> </ul>	In order to make comparisons between graphs, pupils need to be able to understand what the graph represents, what the axes mean and how to read data from the graph.
	4.5 Statistical investigations	1	<ul style="list-style-type: none"> <li>To plan a statistical investigation</li> </ul>	This challenge does not intend to make any judgement values. Instead, this activity has been devised to allow pupils to find what the statistics may suggest; in other words, that economic growth can affect the amount of deforestation.
	Challenge – Rainforest deforestation	1		
5 Applications of graphs	5.1 Step graphs	1	<ul style="list-style-type: none"> <li>To interpret step graphs</li> </ul>	Graphs are common in everyday life but it is important that pupils understand what different graphs can and cannot tell them.
	5.2 Time graphs	2	<ul style="list-style-type: none"> <li>To interpret and draw time graphs</li> </ul>	
	5.3 Exponential growth graphs	2	<ul style="list-style-type: none"> <li>To interpret and draw exponential growth graphs</li> </ul>	
	Problem solving – Mobile phone tariffs	2		This activity uses the context of mobile phones, a topic that will be very familiar to pupils. However, pupils may not have thought of using graphs to make the best decisions about which tariff to buy.
<b>Chapters 3–5 assessment on Collins Connect</b>				
6 Pythagoras' theorem	6.1 Introducing Pythagoras' theorem	2	<ul style="list-style-type: none"> <li>To understand Pythagoras' theorem</li> </ul>	This chapter teaches pupils about Pythagoras' theorem as well as giving them the opportunity to apply it to more complex and real-life situations.
	6.2 Calculating the length of the hypotenuse	1	<ul style="list-style-type: none"> <li>To calculate the length of the hypotenuse in a right-angled triangle</li> </ul>	
	6.3 Calculating the length of a shorter side	2	<ul style="list-style-type: none"> <li>To calculate the length of a shorter side in a right-angled triangle</li> <li>To show that a triangle is right-angled</li> </ul>	
	6.4 Using Pythagoras' theorem to solve problems	1	<ul style="list-style-type: none"> <li>To use Pythagoras' theorem to solve problems</li> </ul>	
	Activity – Practical Pythagoras	1		This practical activity will help to deepen pupils' understanding of Pythagoras' theorem.
<b>Half-term / Term 3</b>				
7 Fractions	7.1 Adding and subtracting fractions	1	<ul style="list-style-type: none"> <li>To add or subtract any two mixed numbers confidently</li> </ul>	This chapter builds on the Year 8 work on fractions. Pupils often get taught rules without fully understanding them and often

				confuse rules for adding and subtracting fractions with those for multiplying and dividing fractions. Take time to build understanding, not just teaching the process.
	7.2 Multiplying fractions	1	<ul style="list-style-type: none"> <li>To multiply two fractions</li> </ul>	
	7.3 Multiplying mixed numbers	1	<ul style="list-style-type: none"> <li>To multiply one mixed number by another</li> </ul>	
	7.4 Dividing fractions and mixed numbers	1	<ul style="list-style-type: none"> <li>To divide one fraction or mixed number by another</li> </ul>	
	Investigation – Fractions from one to six	1		In this investigation pupils are required to apply their understanding of fractions to a more complex problem. Pupils need to work methodically and be able to explain their solutions.
8 Algebra	8.1 More about brackets	1	<ul style="list-style-type: none"> <li>To expand a term with a variable or constant outside brackets</li> </ul>	This chapter recalls previous work on algebra and revisits expansion of brackets and collection of like terms.
	8.2 Factorising expressions containing powers	2	<ul style="list-style-type: none"> <li>To take out a variable as a factor</li> </ul>	
	8.3 Expanding the product of two brackets	2	<ul style="list-style-type: none"> <li>To multiply out two brackets</li> </ul>	
	Challenge – Graphs from expressions	1		This challenge activity requires pupils to apply their learning from this chapter in a less familiar practical context.
<b>Chapters 6–8 assessment on Collins Connect</b>				
9 Decimal numbers	9.1 Powers of 10	1	<ul style="list-style-type: none"> <li>To understand and work with both positive and negative powers of ten</li> </ul>	The ability to understand place value is very important for being able to use numbers effectively when doing calculations in real life. The work in this chapter builds on pupils' existing knowledge. If necessary, check earlier objectives involving an understanding of place value.
	9.2 Standard form	1	<ul style="list-style-type: none"> <li>To understand and work with standard form, using both positive and negative powers of ten</li> </ul>	
	9.3 Rounding appropriately	1	<ul style="list-style-type: none"> <li>To round numbers, where necessary, to an appropriate or suitable degree of accuracy</li> </ul>	
	9.4 Mental calculations	1	<ul style="list-style-type: none"> <li>To learn and understand some routines that can help in mental arithmetic</li> </ul>	
	9.5 Solving problems	1	<ul style="list-style-type: none"> <li>To solve real-life problems involving multiplication or division</li> </ul>	Pupils often struggle to decode word problems to identify the mathematics they need to use. Provide plenty of opportunity for pupils to discuss word problems to identify the mathematics required independently.
	Mathematical reasoning – Paper	2		All the information is provided but it is quite complex. Pupils will need to read the questions very carefully to decide which information they need and what mathematical skills to use in each case.
<b>Half-term / Term 4</b>				
10 Prisms and cylinders	10.1 Metric units for area and volume	1	<ul style="list-style-type: none"> <li>To convert from one metric unit to another</li> </ul>	Pupils often get confused when converting between different units for area and volume, and simply multiply or divide by the length conversion factor. Make sure that pupils know the difference when converting between area and volume.
	10.2 Volume of a prism	1	<ul style="list-style-type: none"> <li>To calculate the volume of a prism</li> </ul>	
	10.3 Surface area of a prism	1	<ul style="list-style-type: none"> <li>To calculate the surface area of a prism</li> </ul>	Some pupils are confused by the difference between working out volume and surface area.
	10.4 Volume of a cylinder	1	<ul style="list-style-type: none"> <li>To calculate the volume of a cylinder</li> </ul>	
	10.5 Surface area of a cylinder	2	<ul style="list-style-type: none"> <li>To calculate the curved surface area of a cylinder</li> <li>To calculate the total surface area of a cylinder</li> </ul>	
	Problem solving – Packaging cartons of fruit juice	2		This problem-solving activity will help pupils to make their learning relevant, by applying it to a real-life situation.
<b>Chapters 9–10 assessment on Collins Connect</b>				

11 Solving equations graphically	11.1 Graphs from equations in the form $ay \pm bx = c$	1	<ul style="list-style-type: none"> <li>To draw any linear graph from any linear equation</li> <li>To solve a linear equation from a graph</li> </ul>	This chapter provides examples of the fact that many equations can arise from real-life situations, and it builds on straight-line graphs and quadratics with more complex examples. Pupils are introduced to the idea that while many equations that are used to model real life are difficult to solve by algebraic methods, they are more easily solved by drawing a graph.
	11.2 Graphs from quadratic equations	1	<ul style="list-style-type: none"> <li>To draw graphs from quadratic equations</li> </ul>	
	11.3 Solving quadratic equations by drawing graphs	2	<ul style="list-style-type: none"> <li>To solve a quadratic equation by drawing a graph</li> </ul>	
	11.4 Solving simultaneous equations by graphs	2	<ul style="list-style-type: none"> <li>To solve a pair of simultaneous equations</li> </ul>	
	Challenge – Linear programming	2		Pupils often ask why they do mathematics with which they are not familiar. Linear programming is a good example of how mathematics can be used for unexpected and exciting ways that are extremely valuable in a modern society.
<b>Half-term / Term 5</b>				
12 Compound units	12.1 Speed	2	<ul style="list-style-type: none"> <li>To understand and use measures of speed</li> </ul>	This chapter teaches pupils how to calculate with different measures. Pupils are introduced to the relationship between speed, distance and time, followed by the relationship between mass, density and volume.
	12.2 More about proportion	2	<ul style="list-style-type: none"> <li>To understand and use density and other compound units</li> </ul>	
	12.3 Unit costs	2	<ul style="list-style-type: none"> <li>To understand and use unit pricing</li> </ul>	
	Challenge – Population density	1		This challenge activity requires pupils to apply their learning from this chapter in a less familiar practical context.
13 Right-angled triangles	13.1 Introducing trigonometric ratios	2	<ul style="list-style-type: none"> <li>To understand what trigonometric ratios are</li> </ul>	This chapter introduces these important properties of right-angled triangles and demonstrates to pupils how they can use these properties in real-life situations. Take your time with the introduction, making links with proportional reasoning, otherwise pupils will struggle to retain what they have learnt in this lesson.
	13.2 How to find trigonometric ratios of angles	1	<ul style="list-style-type: none"> <li>To understand what the trigonometric ratios sine, cosine and tangent are</li> </ul>	
	13.3 Using trigonometric ratios to find angles	1	<ul style="list-style-type: none"> <li>To find the angle identified from a trigonometric ratio</li> </ul>	
	13.4 Using trigonometric ratios to find lengths	1	<ul style="list-style-type: none"> <li>To find an unknown length of a right-angled triangle given one side and another angle</li> </ul>	
	Investigation – Barnes Wallis and the bouncing bomb	2		This investigation is an interesting application of the learning in this unit. Pupils may be familiar with the idea from films but will probably be surprised at its use here. This is a good opportunity to demonstrate links to other subjects, in this case history.
<i>Chapters 11–13 assessment on Collins Connect</i>				
14 Revision and GCSE preparation	<ul style="list-style-type: none"> <li>Practice</li> <li>Revision</li> <li>GCSE-type questions</li> </ul>	6	<p>This chapter is going to:</p> <ul style="list-style-type: none"> <li>Help pupils practise and revise topics covered in their current course</li> <li>Get pupils started on their GCSE course</li> </ul>	<p>The exercises in this chapter of the Pupil Book cover the following mathematical strands:</p> <ul style="list-style-type: none"> <li>Algebra</li> <li>Geometry and measures</li> <li>Statistics</li> <li>Number</li> </ul> <p>The material will provide excellent practice so that pupils become mathematically fluent. Encourage pupils to work through this whole chapter before their End of Year 9 tests.</p>
<i>Chapter 14 assessment on Collins Connect</i>				
<i>End of year assessment on Collins Connect</i>				

## 2-year scheme of work

The following scheme of work provides suggestions for teaching Pupil Book 3.2 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 Percentages	1.1 Simple interest	1	<ul style="list-style-type: none"> <li>To understand what simple interest is</li> <li>To solve problems involving simple interest</li> </ul>	Although pupils have met percentages before there are some important and quite challenging concepts in this chapter. The ideas of percentages as a multiplier and the use of multiplicative reasoning are very important to pupils' confidence and fluency when working with percentages. Therefore, while you may be able to leave out some of the earlier questions in each exercise, be careful not leave out too much or move on too fast.
	1.2 Percentage increases and decreases	1	<ul style="list-style-type: none"> <li>To calculate the result of a percentage increase or decrease</li> <li>To choose the most appropriate method to calculate a percentage change</li> </ul>	
	1.3 Calculating the original value		<ul style="list-style-type: none"> <li>Given the result of a percentage change, to calculate the original value</li> </ul>	
	1.4 Using percentages	1	<ul style="list-style-type: none"> <li>To choose the correct calculation to work out a percentage</li> </ul>	
	Challenge – Exponential growth	1		This challenge gives pupils the opportunity to extend their learning by making links to other areas of mathematics including the work in Chapter 5 (Applications of graphs).
2 Equations and formulae	2.1 Multiplying out brackets	1	<ul style="list-style-type: none"> <li>To multiply out brackets</li> </ul>	Much of this chapter will be unfamiliar to pupils. However, some pupils may be familiar with expanding brackets. Check that all pupils can expand brackets with negative coefficients fluently before moving on to the rest of the chapter. If pupils grasp the concepts quickly they can move on to the more challenging questions that are towards the end of each exercise in the Pupil Book.
	2.2 Factorising algebraic expressions	1	<ul style="list-style-type: none"> <li>To factorise expressions</li> </ul>	
	2.3 Equations with brackets	1	<ul style="list-style-type: none"> <li>To solve equations with one or more sets of brackets</li> </ul>	
	2.4 Equations with fractions	1	<ul style="list-style-type: none"> <li>To solve equations involving fractions</li> </ul>	
	2.5 Rearranging formulae	1	<ul style="list-style-type: none"> <li>To change the subject of a formula</li> </ul>	
	Investigation – Body mass index	1		This investigation will help to embed the concepts and skills learned in this chapter.
<i>Chapters 1–2 assessment on Collins Connect</i>				
3 Polygons	3.1 Angles in polygons	1	<ul style="list-style-type: none"> <li>To work out the sum of the interior angles of a polygon</li> <li>To work out exterior angles of polygons</li> </ul>	The material in this chapter is mainly new material. However, you could use one or two examples as a class discussion and then focus on the PS and MR questions in each exercise of the Pupil Book plus the activities at the end of each lesson. In this way, you could combine Lesson 1.1 and Lesson 1.2.
	3.2 Constructions		<ul style="list-style-type: none"> <li>To make accurate geometric constructions</li> </ul>	
	3.3 Angles in regular polygons	1	<ul style="list-style-type: none"> <li>To work out the exterior angles of a regular polygon</li> <li>To work out the interior angles of a regular polygon</li> </ul>	
	3.4 Regular polygons and tessellations	1	<ul style="list-style-type: none"> <li>To work out which regular polygons tessellate</li> </ul>	

	Activity – Garden design	1		This activity is designed to give the class the opportunity to apply what they have learnt to a familiar real-life context. Pupils will need to apply their knowledge of angles in polygons, as well as to more complex multi-step constructions.
<b>Holidays</b>				
<b>Half-term / Term 2</b>				
4 Using data	4.1 Scatter graphs and correlation	1	<ul style="list-style-type: none"> <li>To infer a correlation from two related scatter graphs</li> </ul>	Much of the material in the lessons of this chapter will be new to pupils. Lesson 4.3 and Lesson 4.4 could, however, be combined. Make certain that pupils have a good grasp of correlation and time series before moving on.
	4.2 Time-series graphs	1	<ul style="list-style-type: none"> <li>To use and interpret a variety of time-series graphs</li> </ul>	
	4.3 Two-way tables 4.4 Comparing two or more sets of data	1	<ul style="list-style-type: none"> <li>To interpret a variety of two-way tables</li> <li>To compare two sets of data from statistical tables and diagrams</li> </ul>	
	4.5 Statistical investigations	1	<ul style="list-style-type: none"> <li>To plan a statistical investigation</li> </ul>	
	Challenge – Rainforest deforestation	1		
5 Applications of graphs	5.1 Step graphs	1	<ul style="list-style-type: none"> <li>To interpret step graphs</li> </ul>	This chapter is mainly new material, so work through each lesson thoroughly.
	5.2 Time graphs	1	<ul style="list-style-type: none"> <li>To interpret and draw time graphs</li> </ul>	
	5.3 Exponential growth graphs	1	<ul style="list-style-type: none"> <li>To interpret and draw exponential growth graphs</li> </ul>	
	Problem solving – Mobile phone tariffs	1		This activity uses the context of mobile phones, a topic that will be very familiar to pupil. However, pupils may not have thought of using graphs to make the best decisions about which tariff to buy.
<b>Chapters 3–5 assessment on Collins Connect</b>				
6 Pythagoras' theorem	6.1 Introducing Pythagoras' theorem	1	<ul style="list-style-type: none"> <li>To understand Pythagoras' theorem</li> </ul>	This whole chapter will be new to pupils. However, it is possible to combine Lesson 6.2 and Lesson 6.3. More able pupils could then move on rapidly to Lesson 6.4 if they fully grasp the concepts and methods taught in this chapter.
	6.2 Calculating the length of the hypotenuse 6.3 Calculating the length of a shorter side	2	<ul style="list-style-type: none"> <li>To calculate the length of the hypotenuse in a right-angled triangle</li> <li>To calculate the length of a shorter side in a right-angled triangle</li> <li>To show that a triangle is right-angled</li> </ul>	
	6.4 Using Pythagoras' theorem to solve problems	1	<ul style="list-style-type: none"> <li>To use Pythagoras' theorem to solve problems</li> </ul>	
	Activity – Practical Pythagoras	1		
	7 Fractions	7.1 Adding and subtracting fractions	1	<ul style="list-style-type: none"> <li>To add or subtract any two mixed numbers confidently</li> </ul>
7.2 Multiplying fractions		1	<ul style="list-style-type: none"> <li>To multiply two fractions</li> </ul>	
7.3 Multiplying mixed numbers 7.4 Dividing fractions and mixed numbers		1	<ul style="list-style-type: none"> <li>To multiply one mixed number by another</li> <li>To divide one fraction or mixed number by another</li> </ul>	
Investigation – Fractions from one to six		1		In this investigation, pupils are required to apply their understanding of fractions to a more complex problem. Pupils need to work methodically and be able to explain their solutions.
<b>Holidays</b>				
<b>Half-term / Term 3</b>				

8 Algebra	8.1 More about brackets	1	<ul style="list-style-type: none"> <li>To expand a term with a variable or constant outside brackets</li> </ul>	All the work in this chapter will be new to pupils. However, you could fast-track those pupils who grasp the material quickly to the more challenging questions at the end of each exercise in the Pupil Book.
	8.2 Factorising expressions containing powers	1	<ul style="list-style-type: none"> <li>To take out a variable as a factor</li> </ul>	
	8.3 Expanding the product of two brackets	1	<ul style="list-style-type: none"> <li>To multiply out two brackets</li> </ul>	
	Challenge – Graphs from expressions	1		This challenge activity requires pupils to apply their learning from this chapter in a less familiar practical context.
<i>Chapters 6–8 assessment on Collins Connect</i>				
9 Decimal numbers	9.1 Powers of 10	1	<ul style="list-style-type: none"> <li>To understand and work with both positive and negative powers of ten</li> <li>To understand and work with standard form, using both positive and negative powers of ten</li> </ul>	The content of Lesson 9.1 should be familiar to pupils. Check understanding then move on to Lesson 9.2 on standard form. You could combine Lessons 9.3 and 9.4 by working through the examples and asking pupils to answer the MR and PS questions in Exercise 9C and 9D and/or the activity and investigation at the end of each exercise, respectively. Then move on to Lesson 9.5.
	9.2 Standard form			
	9.3 Rounding appropriately	1	<ul style="list-style-type: none"> <li>To round numbers, where necessary, to an appropriate or suitable degree of accuracy</li> <li>To learn and understand some routines that can help in mental arithmetic</li> </ul>	
	9.4 Mental calculations			
	9.5 Solving problems	1	<ul style="list-style-type: none"> <li>To solve real-life problems involving multiplication or division</li> </ul>	
	Mathematical reasoning – Paper	1		
10 Prisms and cylinders	10.1 Metric units for area and volume	1	<ul style="list-style-type: none"> <li>To convert from one metric unit to another</li> </ul>	The material in this chapter will be new to pupils. However, you could combine Lessons 10.2 and 10.3 and Lessons 10.4 and 10.5 while teaching.
	10.2 Volume of a prism	1	<ul style="list-style-type: none"> <li>To calculate the volume of a prism</li> <li>To calculate the surface area of a prism</li> </ul>	
	10.3 Surface area of a prism			
	10.4 Volume of a cylinder	2	<ul style="list-style-type: none"> <li>To calculate the volume of a cylinder</li> <li>To calculate the curved surface area of a cylinder</li> <li>To calculate the total surface area of a cylinder</li> </ul>	
	10.5 Surface area of a cylinder			
Problem solving – Packaging cartons of fruit juice	1		This problem-solving activity will help pupils to make their learning relevant, by applying it to a real-life situation.	
<i>Chapters 9–10 assessment on Collins Connect</i>				
11 Solving equations graphically	11.1 Graphs from equations in the form $ay \pm bx = c$	1	<ul style="list-style-type: none"> <li>To draw any linear graph from any linear equation</li> <li>To solve a linear equation from a graph</li> <li>To draw graphs from quadratic equations</li> </ul>	The material in this chapter is complex and is likely to be new to many pupils. If pupils are confident and fluent with linear graphs and rearranging equations you could move straight on to Lesson 11.2. First, however, check pupils' understanding by giving them some examples.
	11.2 Graphs from quadratic equations			
	11.3 Solving quadratic equations by drawing graphs	1	<ul style="list-style-type: none"> <li>To solve a quadratic equation by drawing a graph</li> </ul>	
11.4 Solving simultaneous equations by graphs	1	<ul style="list-style-type: none"> <li>To solve a pair of simultaneous equations</li> </ul>		

	Challenge – Linear programming	2		Pupils often ask why they do mathematics with which they are not familiar. Linear programming is a good example of how mathematics can be used for unexpected and exciting ways that are extremely valuable in a modern society.
<b>Holidays</b>				
<b>Half-term / Term 4</b>				
12 Compound units	12.1 Speed 12.2 More about proportion	2	<ul style="list-style-type: none"> <li>To understand and use measures of speed</li> <li>To understand and use density and other compound units</li> </ul>	All the material in this chapter will be new to pupils. However, you could combine Lesson 12.1 and Lesson 12.2 to make it one lesson.
	12.3 Unit costs	1	<ul style="list-style-type: none"> <li>To understand and use unit pricing</li> </ul>	
	Challenge – Population density	1		This challenge activity requires pupils to apply their learning from this chapter in a less familiar practical context.
13 Right-angled triangles	13.1 Introducing trigonometric ratios	2	<ul style="list-style-type: none"> <li>To understand what trigonometric ratios are</li> </ul>	This chapter is new material and in many cases quite complex. Choose examples carefully to support or challenge pupils.
	13.2 How to find trigonometric ratios of angles	1	<ul style="list-style-type: none"> <li>To understand what the trigonometric ratios sine, cosine and tangent are</li> </ul>	
	13.3 Using trigonometric ratios to find angles	1	<ul style="list-style-type: none"> <li>To find the angle identified from a trigonometric ratio</li> </ul>	
	13.4 Using trigonometric ratios to find lengths	1	<ul style="list-style-type: none"> <li>To find an unknown length of a right-angled triangle given one side and another angle</li> </ul>	
	Investigation – Barnes Wallis and the bouncing bomb	1		This investigation is an interesting application of the learning in this unit. Pupils may be familiar with the idea from films but will probably be surprised at its use here. This is a good opportunity to demonstrate links to other subjects, in this case history.
<i>Chapters 11–13 assessment on Collins Connect</i>				
14 Revision and GCSE preparation	<ul style="list-style-type: none"> <li>Practice</li> <li>Revision</li> <li>GCSE-type questions</li> </ul>	4	<p>This chapter is going to:</p> <ul style="list-style-type: none"> <li>Help pupils practise and revise topics covered in their current course</li> <li>Get pupils started on their GCSE course</li> </ul>	<p>The exercises in this chapter of the Pupil Book cover the following mathematical strands:</p> <ul style="list-style-type: none"> <li>Algebra</li> <li>Geometry and measures</li> <li>Statistics</li> <li>Number</li> </ul> <p>The material will provide excellent practice so that pupils become mathematically fluent. Encourage pupils to work through this whole chapter before their End of Year 9 tests.</p>
<i>Chapters 14 assessment on Collins Connect</i>				
<i>End of year assessment on Collins Connect</i>				

# Notes

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