

Mathematics

Scheme of Work

Year 7

Key Maths

Key :

7/1 – Key Maths 7¹ Pupil Book

7/1 – Key Maths 7² Pupil Book

7HY – Key Maths 7 Pupil Book – Help Yourself Section

8/1 – Key Maths 8¹ Pupil Book

8/1 – Key Maths 8² Pupil Book

8/1 – Key Maths 8³ Pupil Book

9/1 – Key Maths 9¹ Pupil Book

9/1 – Key Maths 9² Pupil Book

9/1 – Key Maths 9³ Pupil Book

YEAR 7: AUTUMN TERM

Teaching objectives for the oral and mental activities

Read and write whole numbers in figures and words.
Multiply and divide whole numbers by 10, 100, 1000.
Count on and back in steps of 0.1, 0.2, 0.25, $\frac{1}{2}$, $\frac{1}{4}$...
Round whole numbers to the nearest 10 or 100.
Order, add and subtract positive and negative numbers in context.
Recognise multiples and use simple tests of divisibility.
Know pairs of factors of numbers to 100.
Know or derive quickly prime numbers less than 30.
Know or derive quickly squares to at least 12×12 and the corresponding roots.
Convert between fractions, decimals and percentages.
Find simple fractions of quantities.
Know addition and subtraction facts to 20 and whole number complements of 100.
Find two decimals (one decimal place) with a sum of 1.
Add and subtract several small numbers or several multiples of 10, e.g. $50 - 40 + 80 - 100$.
Add and subtract pairs of numbers, e.g. 76 ± 38 , 760 ± 380 .
Find doubles and halves of numbers, e.g. 670, 5.6.
Recall multiplication facts to 10×10 and derive associated division facts.
Multiply and divide a two-digit number by a one-digit number.
Visualise, describe and sketch 2-D shapes in different orientations.
Estimate and order acute and obtuse angles.
Use metric units (length, mass, capacity) and units of time for calculations.
Use metric units for estimation (length, mass, capacity).
Convert between m, cm and mm, km and m, kg and g, litres and ml.
Know rough metric equivalents of common imperial units.
Apply mental skills to solve simple problems.

Teaching objectives for the main activities

	SUPPORT	CORE	EXTENSION
Algebra 1 (6 hours) Sequences and functions	Recognise and extend number sequences formed by counting from any number in steps of constant size, extending beyond zero when counting back. ▶ 7/1 – 3:1 ▶ 7/1 – 3:5	Generate and describe simple integer sequences. ▶ 7/1 – 3:1, 3:2, 3:5, 3:6 ▶ 7/2 – 3:1, 3:2, 3:6, 3:7	
		Generate terms of a simple sequence, given a rule (e.g. finding a term from the previous term, finding a term given its position in the sequence). ▶ 7/1 – 3:1 ▶ 7/2 – 3:1	
		Generate sequences from practical contexts and describe the general term in simple cases. ▶ 7/1 – 9:4, 9:5, 9:6, 9:8 ▶ 7/2 – 9:4, 9:5, 9:6, 9:8	
		Express simple functions in words, then using symbols; represent them in mappings. ▶ 7/1 – 9:1, 9:2, 9:3 ▶ 7/2 – 9:1, 9:2, 9:3	
Formulae and identities		Use letter symbols to represent unknown numbers or variables. ▶ 7/1 – 9:7, 9:12, 9:13 ▶ 7/2 – 9:7, 9:12, 9:13, 9:14, 9:15	
Solving problems		Suggest extensions to problems by asking 'What if...?'; begin to generalise and to understand the significance of a counter-example. ▶ 7/1 – Throughout ▶ 7/2 – Throughout	

	SUPPORT	CORE	EXTENSION
Number 1 (6 hours) Place value	Read and write whole numbers in figures and words. ▶ 7/1 – 6:1, 6:2 ▶ 7/2 – 6:1, 6:2 Use decimal notation for tenths and hundredths; know what each digit represents in numbers with up to two decimal places.	Understand and use decimal notation and place value; multiply and divide integers and decimals by 10, 100, 1000, and explain the effect. ▶ 7/1 – 6:3, 6:4, 6:5, 6:6 ▶ 7/2 – 6:3, 6:4, 6:5, 6:6, 6:7 ▶ 7HY	
		Compare and order decimals in different contexts; know that when comparing measurements they must be in the same units. ▶ 7/1 – 6:7, 12:3 ▶ 7/2 – 6:8, 12:3	
Integers	Calculate a temperature rise and fall across °C. ▶ 7/1 – 11:1, 11:2	Understand negative numbers as positions on a number line; order, add and subtract positive and negative integers in context. ▶ 7/1 – 11:1, 11:2, 11:3 ▶ 7/2 – 11:1, 11:2, 11:3	Add, subtract, multiply and divide integers. ▶ 8/2 – Chapter 6, section 2 ▶ 8/3 – Chapter 6, section 2
Calculations	Know squares to at least 10 x 10. ▶ 7/1 – 3:5	Consolidate the rapid recall of number facts, including positive integer complements to 100 and multiplication facts to 10 x 10, and quickly derive associated division facts. ▶ 7/1 – 4:4, 4:5, 4:6 ▶ 7/2 – 4:7, 4:8, 4:9	
	Use informal pencil and paper methods to support, record or explain additions and subtractions. ▶ 7HY	Make and justify estimates and approximations of calculations. ▶ 7/1 – 4:7 ▶ 7/2 – 4:10 ▶ 7/1 – 6:9 ▶ 7/2 – 6:10	
Calculator methods	Develop calculator skills and use a calculator effectively. ▶ 7/1 – 4:8, 4:9, 4:10, 4:11 ▶ 7/1 – Calculator Help Sheet ▶ 7/2 – Calculator Help Sheet	Enter numbers and interpret the display in different contexts (decimals, money). ▶ 7/1 – 4:8, 4:9, 4:10, 4:11 ▶ 7/2 – 4:11, 4:12	
Solving problems		Solve word problems and investigate in a range of contexts: number; compare and evaluate solutions e.g. ▶ 7/1 – 4:3 ▶ 7/2 – 4:6 and throughout	

	SUPPORT	CORE	EXTENSION
Shape, space and measures 1 (4 hours)	Identify different nets for an open cube. ▶ 7/1 – 7:6 ▶ 7/2 – 7:6	Use 2-D representations to visualise 3-D shapes and deduce some of their properties. ▶ 7/1 – 7:1, 7:2, 7:3, 7:4 ▶ 7/2 – 7:1, 7:2, 7:3, 7:4, 7:5	
Mensuration	Measure and draw lines to the nearest millimetre. ▶ 7/1 – 12:2, 12:4 ▶ 7/1 – 12:8 ▶ 7/2 – 12:8	Use names and abbreviations of units of measurement to measure, estimate, calculate and solve problems in everyday contexts involving length, area. ▶ 7/1 – 12:1, 12:2, 14:1, 14:2 ▶ 7/2 – 12:1, 12:2, 14:1, 14:2	Make simple scale drawings. ▶ 7/2 – 12:5
	Understand that area is measured in square centimetres (cm ²). ▶ 7/1 – 14:1, 14:2 ▶ 7/2 – 14:1, 14:2 Understand, measure and calculate perimeters of rectangles and regular polygons. ▶ 7/1 – 14:8, 14:9 ▶ 7/2 – 14:8	Know and use the formula for the area of a rectangle; calculate the perimeter and area of shapes made from rectangles. ▶ 7/1 – 14:3, 14:5, 14:6, 14:7, 14:8, 14:9, 14:13, 14:14 ▶ 7/2 – 14:3, 14:5, 14:6, 14:7, 14:8, 14:9, 14:13, 14:14	Deduce and use formulae for the area of a triangle, parallelogram and trapezium. ▶ 7/1 – 14:10, 14:11, 14:12 ▶ 7/2 – 14:10, 14:11, 14:12
Solving problems		Solve word problems and investigate in a range of contexts: length, perimeter and area. ▶ 7/1 – Throughout, e.g. 14:4 ▶ 7/2 – Throughout, e.g. 14:4	

	SUPPORT	CORE	EXTENSION
Number 2 (6 hours) Fractions, decimals, percentages	Change an improper fraction to a mixed number; recognise when two simple fractions are equivalent, including relating hundredths to tenths. ▶ 7/1 – 15:5, 15:7 ▶ 7/2 – 15:4 Use decimal notation for tenths and hundredths.	Use fraction notation to describe parts of shapes and to express a smaller whole number as a fraction of a larger one; simplify fractions by cancelling all common factors and identify equivalent fractions; convert terminating decimals to fractions e.g. $0.23 = \frac{23}{100}$; use a diagram to compare two or more simple fractions. ▶ 7/1 – 15:1, 15:2, 15:5, 15:6, 15:12 ▶ 7/2 – 15:1, 15:2, 15:5, 15:6, 15:13	Know that a recurring decimal is a fraction; use division to convert a fraction to a decimal; order fractions by converting them to decimals. ▶ 7/2 – 15:13
		Begin to add and subtract simple fractions and those with common denominators; calculate simple fractions of quantities and measurements (whole-number answers); multiply a fraction by an integer. ▶ 7/1 – 15:3, 15:7, 15:8, 15:9 ▶ 7/2 – 15:3, 15:7, 15:8	Calculate fractions of quantities and measurements (fraction answers); multiply and divide an integer by a fraction. ▶ 7/2 – 15:4, 15:9, 15:10
		Understand percentage as the 'number of parts per 100'; recognise the equivalence of percentages, fractions and decimals; calculate simple percentages. ▶ 7/1 – 15:10, 15:11 ▶ 7/2 – 15:11, 15:12	Find the outcome of a given percentage increase or decrease. ▶ 8/2 – 9:6 ▶ 8/3 – 9:5
Calculations		Consolidate and extend mental methods of calculation to include decimals, fractions and percentages, accompanied where appropriate by suitable jottings; solve simple word problems mentally. ▶ 7/1 – Chapter 15 ▶ 7/2 – Chapter 15	Recall fraction to decimal conversions. ▶ 7:2 – 15:13
		Check a result by considering whether it is of the right order of magnitude and by working the problem backwards. ▶ 7/1 – Throughout ▶ 7/2 – Throughout	
Solving problems		Break a complex calculation into simpler steps, choosing and using appropriate and efficient operations, methods and resources, including ICT. ▶ 7/1 – Throughout ▶ 7/2 – Throughout	
		Present and interpret solutions in the context of the original problem; explain and justify methods and conclusions, orally and in writing. ▶ 7/1 – Throughout ▶ 7/2 – Throughout	

	SUPPORT	CORE	EXTENSION
Handling data 1 (6 hours) Handling data		Calculate statistics for small sets of discrete data: -find the mode, median and range and the modal class for grouped data; -calculate the mean, including from a simple frequency table, using a calculator for a larger number of items. ▶ 7/1 – 16:1, 16:2, 16:3, 16:4, 16:5, 16:6 ▶ 7/2 – 16:1, 16:2, 16:3, 16:4, 16:5, 16:6 ▶ 9/2 – Chapter 4 (modal class) ▶ 9/3 – Chapter 4 (modal class)	Recognise when it is appropriate to use the range, mean, median and mode; calculate a mean using an assumed mean. ▶ 7/2 – 16:5
	Solve a problem by representing, extracting and interpreting data in tables, graphs, charts and diagrams, for example: -line graphs; -frequency tables and bar charts. ▶ 7/1 – 1:1, 1:3 ▶ 7:2 – 1:1, 1:3	Interpret diagrams and graphs (including pie charts), and draw conclusions based on the shape of graphs and simple statistics for a single distribution. ▶ 7/1 – 1:1, 1:3 ▶ 7/2 – 1:1, 1:3	
Probability		Use vocabulary and ideas of probability, drawing on experience. ▶ 7/1 – 8:1 ▶ 7/2 – 8:1	
		Understand and use the probability scale from 0 to 1; find and justify probabilities based on equally likely outcomes in simple contexts; identify all the possible mutually exclusive outcomes of a single event. ▶ 7/1 – 8:2 ▶ 7/2 – 8:1, 8:2	Know that if the probability of an event occurring is p , then the probability of it not occurring is $1 - p$; find and record all possible mutually exclusive outcomes for two successive events in a systematic way, using diagrams and tables. ▶ 8/2 – Chapter 8, sections 2, 3 and 4 ▶ 8/3 – Chapter 8, sections 2, 3 and 4
		Collect data from a simple experiment and record in a frequency table; estimate probabilities based on this data. ▶ 7/1 – Chapter 8, section 3 ▶ 7/2 – Chapter 8, section 3	

	SUPPORT	CORE	EXTENSION
Algebra 2 (5 hours) Equations, formulae and identities		Use letter symbols to represent unknown numbers or variables; know the meanings of the words term, expression and equation. ▶ 7/1 – 9:1, 9:2 ▶ 7/2 – 9:1, 9:2	Begin to distinguish the different roles played by letter symbols in equations, formulae and functions; know the meanings of the words formula and function. ▶ 7/2 – 9:3
	Understand and use the relationships between the four operations, and the principles (not the names) of the arithmetic laws. Use brackets. ▶ 7:1 – 4:12, 4:13 ▶ 7:2 – 4:13, 4:14, 4:16, 4:17	Understand that algebraic operations follow the same conventions and order as arithmetic operations. ▶ 7/1 – Chapter 13 ▶ 7/2 – Chapter 13	Know that algebraic operations follow the same conventions and order as arithmetic operations; use index notation for small positive integer powers. ▶ 7/2 – 4:15
		Simplify linear algebraic expressions by collecting like terms; begin to multiply a single term over a bracket (integer coefficients). ▶ 7/1 – 9:10, 9:11 ▶ 7/2 – 9:10, 9:11	
		Use simple formulae from mathematics and other subjects, substitute positive integers into simple linear expressions and formulae and, in simple cases, derive a formula. ▶ 7/1 – 9:12, 9:13 ▶ 7/2 – 9:12, 9:13, 9:14, 9:15	
Solving problems		Identify the necessary information to solve a problem; represent problems mathematically, making correct use of symbols, words, diagrams and tables. ▶ 7/1 – Throughout ▶ 7/2 – Throughout	

	SUPPORT	CORE	EXTENSION
Shape, space and measures 2 (3 hours) Geometrical reasoning: lines, angles and shapes	Recognise positions. ▶ 7/1 – 1:5 ▶ 7/2 – 1:5	Use correctly the vocabulary, notation and labelling conventions for lines, angles and shapes. ▶ 7/1 – 5:1, 5:2, 5:3, 5:4, 5:6, 10:1, 10:2 ▶ 7/2 – 5:1, 5:2, 5:3, 5:4, 5:6, 10:1, 10:2	
		Identify parallel and perpendicular lines; know the sum of angles at a point, on a straight line and in a triangle and recognise vertically opposite angles. ▶ 7/1 – 10:5, 10:6, 10:8, 10:9, 10:11, 10:12 ▶ 7/2 – 10:5, 10:6, 10:8, 10:9, 10:11, 10:12	
	Recognise properties of rectangles. Classify triangles (isosceles, equilateral, scalene), using criteria such as equal sides, equal angles, lines of symmetry. ▶ 7/1 – 2:1, 5:1, 5:2 ▶ 7/2 – 2:1, 5:1	Begin to identify and use angle, side and symmetry properties of triangles and quadrilaterals. ▶ 7/1 – 5:5, 5:8, 5:9, 10:13 ▶ 7/2 – 5:5, 5:8, 5:9, 10:13	Classify quadrilaterals by their geometric properties. ▶ 7/2 – 5:2
Coordinates	Read and plot coordinates in the first quadrant. ▶ 7/1 – 1:5 ▶ 7/2 – 1:5	Use conventions and notation for 2-D coordinates in all four quadrants; find coordinates of points determined by geometric information. ▶ 7/1 – 11:4 ▶ 7/2 – 11:4	
Mensuration		Use angle measure; distinguish between and estimate the size of acute, obtuse and reflex angles. ▶ 7/1 – 10:2, 10:3 ▶ 7/2 – 10:2, 10:3	

YEAR 7: SPRING TERM

Teaching objectives for the oral and mental activities

Read and write whole numbers in figures and words.
Find doubles and halves of numbers, e.g. 6500, 0.76, $\frac{3}{4}$.
Multiply and divide decimals by 10, 100, 1000.
Recall multiplication and division facts to 10×10 . Count on and back in steps of 0.4, 0.75, $\frac{3}{4}$...
Derive answers to calculations, e.g. 60×80 , 0.4×9 .
Order decimals in different contexts.
Multiply and divide a two-digit number by a one-digit number.
Round decimals to the nearest whole number.
Order, add and subtract integers.
Visualise, describe and sketch 2-D shapes.
Recognise multiples and use tests of divisibility.
Estimate and order acute and obtuse angles.
Know pairs of factors of numbers to 100.
Know or derive quickly prime numbers less than 30.
Use metric units (length and area) and units of time for calculations.
Know or derive quickly squares to at least 12×12 and the corresponding roots.
Convert between m, cm and mm, km and m.
Find simple equivalent fractions.
Calculate perimeter and area of rectangles.
Discuss and interpret graphs.
Find two decimals with a sum of 1 or 0.1 (two decimal places).
Add several small numbers and find their mean.
Know whole-number complements of 50 and 100.
Apply mental skills to solve simple problems.
Add and subtract pairs of numbers, e.g. 7.6 ± 3.8 , 760 ± 380 .

Teaching objectives for the main activities

	SUPPORT	CORE	EXTENSION
Handling data 2 (5 hours) Handling data	Solve a problem by representing, extracting and interpreting data in tables, graphs, charts and diagrams. ▶ 7/1 – 1:1, 1:3 ▶ 7:2 – 1:1, 1:3	Given a problem that can be addressed by statistical methods, suggest possible answers. ▶ 7/1 – 1:2 ▶ 7/2 – 1:2	
		Decide which data would be relevant to an enquiry and possible sources. ▶ 7/1 – 1:2 ▶ 7/2 – 1:2	Decide the degree of accuracy needed for the data. Discuss as appropriate: length in cm to nearest cm or mm; mass in g to nearest g, etc.
		Plan how to collect and organise small sets of data; design a data collection sheet or questionnaire to use in a simple survey; construct frequency tables for discrete data, grouped where appropriate in equal class intervals. ▶ 7/1 – 1:2 ▶ 7/2 – 1:2 ▶ 8/1 – 13:4, 13:5 ▶ 8/2 – 13:5, 13:6 ▶ 8/3 – 13:5, 13:6	Plan how to collect the data, including sample size; construct frequency tables with given equal class intervals for sets of continuous data. ▶ 8/2 – 13:7 ▶ 8/3 – 13:7
		Collect small sets of data from surveys and experiments, as planned. ▶ 7/1 – 1:2 ▶ 7/2 – 1:2 ▶ 8/1 – Chapter 3, section 3 ▶ 8/2 – Chapter 3, section 3 ▶ 8/3 – Chapter 3, section 3	
		Construct, on paper and using ICT, graphs and diagrams to represent data, including: -bar-line graphs; -frequency diagrams for grouped discrete data; use ICT to generate pie charts. ▶ 7/1 – 1:4 ▶ 7/2 – 1:4	Construct on paper and using ICT: -pie charts for categorical data;- simple line graphs for time series. ▶ 8/1 – Chapter 3, section 2 ▶ 8/2 – Chapter 3, section 2 ▶ 8/3 – Chapter 3, section 2
	Solve problems by representing data in a bar chart and line graph. ▶ 7/1 – 1:1 ▶ 7/2 – 1:1	Interpret diagrams and graphs (including pie charts), and draw simple conclusions based on the shape of graphs. ▶ 7/1 – 1:3, 16:7 ▶ 7/2 – 1:3, 16:8	
Solving problems		Solve word problems and investigate in a range of contexts: handling data. ▶ 7/1 – 16:8 ▶ 7/2 – 16:9	

	SUPPORT	CORE	EXTENSION
Number and measures 3 (8 hours) Place value		Round positive whole numbers to the nearest 10, 100 or 1000 and decimals to the nearest whole number or one decimal place. ► 7/1 – 4:1, 4:2, 4:3, 6:12, 6:13 ► 7/2 – 4:1, 4:2, 4:3, 4:4, 6:13	Round positive numbers to any given power of 10; round decimals to the nearest whole number or to one or two decimal places. ► 9/2 – Chapter 5, section 1 ► 9/3 – Chapter 5, section 1
Calculations		Understand addition, subtraction, multiplication and division as they apply to whole numbers and decimals; know how to use the laws of arithmetic and inverse operations. ► 7/1 – 6:9, 6:10, 6:11 ► 7/2 – 6:10, 6:11, 6:12 ► 7HY	
		Know and use the order of operations, including brackets. ► 7/1 – 4:12, 4:13, 4:14 ► 7/2 – 4:13, 4:14, 4:15, 4:16	
		Know multiplication facts up to 10 x 10. ► 7/1 – 4:4 ► 7/2 – 4:7	
		Consolidate and extend mental methods of calculation to include decimals, fractions and percentages, accompanied where appropriate by suitable jottings; solve simple word problems mentally.	
		Make and justify estimates and approximations of calculations. ► 7/1 – 4:7, 4:8, 4:9, 4:10, 4:11 ► 7/2 – 4:7, 4:8, 4:9, 4:10, 4:11	
	Extend written methods to: -HTU x U and U.t ÷ U; -HTU x U; -HTU ÷ U. ► 7HY ► 7/1 – 4:3 ► 7/2 – 4:6	Multiply and divide three-digit by two-digit whole numbers; extend to multiplying and dividing decimals with one or two places by single-digit whole numbers. ► 7/1 – 6:10, 6:11 ► 7/2 – 6:11, 6:12 ► 7HY	
		Check a result by considering whether it is of the right order of magnitude and by working the problem backwards. ► 7/1 – Throughout ► 7/2 – Throughout	
Calculator methods	Develop calculator skills and use a calculator effectively. ► 7/1 – 4:8, 4:9, 4:10, 4:11 ► 7/1 – Calculator Help Sheet ► 7/2 – Calculator Help Sheet	Carry out calculations with more than one step using brackets and the memory; use the square root and sign change keys. ► 7/1 – 11:2 ► 7/2 – 4:17, 11:2	

	SUPPORT	CORE	EXTENSION
Measures	Use, read and write standard metric units of length, mass and capacity. ▶ 7/1 – 12:2 ▶ 7/2 – 12:2 Suggest suitable units and measuring equipment to estimate or measure length, mass or capacity. ▶ 7/1 – 12:2 ▶ 7/2 – 12:2	Use names and abbreviations of units of measurement to measure, estimate, calculate and solve problems in everyday contexts involving length, area, mass, capacity and time; convert one metric unit to another (e.g. grams to kilograms); read and interpret scales on a range of measuring instruments. ▶ 7/1 – 12:1, 12:2, 12:3, 12:4, 12:6, 12:8, 14:1, 14:2 ▶ 7/2 – 12:1, 12:2, 12:3, 12:4, 12:6, 12:8, 14:1, 14:2	Know rough metric equivalents of imperial measures in daily use. ▶ 7/1 – 12:7 ▶ 7/2 – 12:7
Solving problems	Use all four operations to solve word problems, including time.	Break a complex calculation into simpler steps, choosing and using appropriate and efficient operations, methods and resources, including ICT. ▶ 7/1 – Throughout ▶ 7/2 – Throughout	
		Present and interpret solutions in the context of the original problem; explain and justify methods and conclusions, orally and in writing. ▶ 7/1 – Throughout ▶ 7/2 – Throughout	Give solutions to an appropriate degree of accuracy in the context of the problem. ▶ 7/1 – Throughout ▶ 7/2 – Throughout

	SUPPORT	CORE	EXTENSION
Algebra 3 (6 hours) Integers, powers and roots	Recognise multiples up to 10×10 ; know and apply simple tests of divisibility. ▶ 7/1 – 4:4 ▶ 7/2 – 4:7 ▶ 7/1 – 3:3 ▶ 7/2 – 3:3	Recognise and use multiples, factors (divisors), common factor and primes (less than 100); use simple tests of divisibility. ▶ 7/1 – 3:1, 3:2, 3:3, 3:4 ▶ 7/2 – 3:1, 3:2, 3:3, 3:4, 3:5	Find the prime factor decomposition of a number. ▶ 7/2 – 3:5
		Recognise the first few triangular numbers, squares of numbers to at least 12×12 , and the corresponding roots. ▶ 7/1 – 3:5, 3:6 ▶ 7/2 – 3:6, 3:7	
Calculator methods		Use a calculator to square numbers. ▶ 7/1 – 4:14 ▶ 7/2 – 4:15	Use the function keys for sign change, powers and roots. ▶ 7/2 – 4:15 ▶ 8/2 – 6:5 ▶ 8/3 – 6:4
Sequences, functions and graphs	Recognise and extend number sequences. ▶ 7/1 – 3:1	Generate terms of a simple sequence, given a rule (e.g. finding a term from the previous term, finding a term given its position in the sequence). ▶ 7/1 – 3:1 ▶ 7/2 – 3:1	
		Generate sequences from practical contexts and describe the general term in simple cases ▶ 7/1 – 9:4, 9:5, 9:6, 9:8 ▶ 7/2 – 9:4, 9:5, 9:6, 9:8	
		Express simple functions in words, then using symbols; represent them in mappings. ▶ 7/1 – 9:3 ▶ 7/2 – 9:3	
	Read and plot coordinates in the first quadrant. ▶ 7/1 – 1:5 ▶ 7/2 – 1:5 Represent and interpret data in a graph (e.g. for a multiplication table). ▶ 7/1 – 11:1	Generate coordinate pairs that satisfy a simple linear rule; plot the graphs of simple linear functions, where y is given explicitly in terms of x , on paper and using ICT; recognise straight-line graphs parallel to the x -axis or y -axis. ▶ 7/1 – 11:5, 11:6 ▶ 7/2 – 11:5, 11:6	
Solving problems	Solve mathematical problems, explaining patterns and relationships. ▶ 7/1 – Throughout ▶ 7/2 – Throughout	Solve word problems and investigate in a range of contexts: number and algebra. ▶ 7/1 – Throughout ▶ 7/2 – Throughout	Solve more complex problems by breaking them into smaller steps. ▶ 7/1 – Throughout ▶ 7/2 – Throughout
		Identify the necessary information to solve a problem; represent problems mathematically, making correct use of symbols, words, diagrams, tables and graphs. ▶ 7/1 – Throughout ▶ 7/2 – Throughout	Represent problems and interpret solutions in algebraic or graphical form, using correct notation. ▶ 7/1 – Throughout ▶ 7/2 – Throughout

	SUPPORT	CORE	EXTENSION
Shape, space and measures 3 (5 hours) Geometrical reasoning: lines, angles and shapes	Recognise reflection symmetry. ▶ 7/1 – 2:1, 2:2 ▶ 7/2 – 2:1, 2:2 ▶ 7/1 – 2:3 ▶ 7/2 – 2:3 ▶ 8/1 – 5:4, 5:5 Calculate angles on a straight line. ▶ 7/1 – 10:5 ▶ 7/2 – 10:5 Calculate angles in a triangle or around a point. ▶ 7/1 – 10:6, 10:11 ▶ 7/2 – 10:6, 10:11	Begin to identify and use angle, side and symmetry properties of triangles and quadrilaterals; solve geometrical problems involving these properties, using step-by-step deduction and explaining reasoning with diagrams and text. ▶ 7/1 – 5:5, 5:8, 5:9, 10:13 ▶ 7/2 – 5:5, 5:8, 5:9, 10:13	Solve geometrical problems using side and angle properties of equilateral, isosceles and right-angled triangles and special quadrilaterals. ▶ 7/1 – 10:12 ▶ 7/2 – 10:12
		Use 2-D representations to visualise 3-D shapes and deduce some of their properties. ▶ 7/1 – 7:1, 7:2, 7:3, 7:4 ▶ 7/2 – 7:1, 7:2, 7:3, 7:4, 7:5	
Construction	Use a protractor to measure and draw acute and obtuse angles to the nearest degree. ▶ 7/1 – 10:4 ▶ 7/2 – 10:4	Use a ruler and protractor to: -measure and draw lines to nearest millimetre and angles, including reflex angles, to the nearest degree; -construct a triangle given two sides and the included angle (SAS) or two angles and the included side (ASA); explore these constructions using ICT. ▶ 7/1 – 10:7, 10:13, 12:4, 12:5 ▶ 7/2 – 10:7, 10:13, 12:4, 12:5	Use straight edge and compasses to construct: -the mid-point and perpendicular bisector of a line segment; -the bisector of an angle; construct a triangle given three sides (SSS). ▶ 9/2 – 15:5, 15:7 ▶ 9/3 – 12:5, 12:7

	SUPPORT	CORE	EXTENSION
Number 4 (5 hours) Fractions, decimals, percentages, ratio and proportion	<p>Relate fractions to division.</p> <ul style="list-style-type: none"> ▶ 7/1 – 15:1, 15:2 ▶ 7/2 – 15:1, 15:2 Find simple fractions of whole-number quantities. ▶ 7/1 – 15:3 ▶ 7/2 – 15:3 Find simple percentages of whole-number quantities. ▶ 7/1 – 15:10 ▶ 7/2 – 15:11 	<p>Recognise the equivalence of percentages, fractions and decimals; calculate simple percentages and use percentages to compare simple proportions.</p> <ul style="list-style-type: none"> ▶ 7/1 – 15:11, 15:12 ▶ 7/2 – 15:11, 15:12 	<p>Express one given number as a percentage of another; use the equivalence of fractions, decimals and percentages to compare proportions.</p> <ul style="list-style-type: none"> ▶ 7/2 – 15:12, 15:13 ▶ 8/2 – 9:8 ▶ 8/3 – 9:7
		<p>Understand the relationship between ratio and proportion; use direct proportion in simple contexts; use ratio notation, reduce a ratio to its simplest form and divide a quantity into two parts in a given ratio; solve simple problems about ratio and proportion using informal strategies.</p> <ul style="list-style-type: none"> ▶ 8/2 – Chapter 11, sections 2 & 3 ▶ 8/3 – Chapter 11, sections 2 & 3 	<p>Divide a quantity into two or more parts in a given ratio; use the unitary method to solve simple word problems involving ratio and direct proportion.</p> <ul style="list-style-type: none"> ▶ 8/2 – Chapter 11, section 3 ▶ 8/3 – Chapter 11, section 3
Calculations		<p>Check a result by considering whether it is of the right order of magnitude and by working the problem backwards.</p> <ul style="list-style-type: none"> ▶ 7/1 – Throughout ▶ 7/2 – Throughout 	

	SUPPORT	CORE	EXTENSION
Algebra 4 (4 hours) Equations, formulae and identities		Use letter symbols to represent unknown numbers or variables; know the meanings of the words term, expression and equation. ▶ 7/1 – 9:1, 9:2 ▶ 7/2 – 9:1, 9:2	Begin to distinguish between the different roles played by letter symbols in equations, formulae and functions; know the meanings of the words formula and function. ▶ 7/2 – 9:3
	Understand and use the relationships between the four operations, and the principles (not the names) of the arithmetic laws. Use brackets. ▶ 7/1 – 4:13	Understand that algebraic operations follow the same conventions and order as arithmetic operations. ▶ 7/1 – Chapter 13 ▶ 7/2 – Chapter 13	
		Simplify linear algebraic expressions by collecting like terms; begin to multiply a single term over a bracket (integer coefficients). ▶ 7/1 – 9:10, 9:11 ▶ 7/2 – 9:10, 9:11	
		Construct and solve simple linear equations with integer coefficients (unknown on one side only) using an appropriate method (e.g. inverse operations). ▶ 7/1 – 13:4, 13:5, 13:6, 13:7, 13:8 ▶ 7/2 – 13:4, 13:5, 13:6, 13:7, 13:8, 13:9, 13:10, 13:11	

YEAR 7: SUMMER TERM

Teaching objectives for the oral and mental activities

Multiply and divide decimals by 10, 100, 1000 and small multiples of 10.
Use factors to multiply and divide mentally, e.g. 35×12 , 144×36 , 3.2×30 .
Round numbers, including to one or two decimal places.
Derive answers to calculations, e.g. 0.4×9 , 0.7×0.9 .
Order decimals and simple fractions in different contexts.
Multiply and divide a two-digit number by a one-digit number.
Recognise multiples and use tests of divisibility.
Use approximations to estimate the answers to calculations, e.g. $39 \div 2.8$.
Know pairs of factors of numbers to 100.
Know or derive quickly prime numbers less than 30.
Solve equations such as $100 = x + 37$.
Know or derive squares to at least 12×12 , multiples of 10, 0.1 to 0.9 and corresponding square roots.
Visualise and describe 2-D and 3-D shapes.
Convert between fractions, decimals and percentages.
Estimate and order acute, obtuse and reflex angles.
Find fractions and percentages of quantities.
Use metric units (length, mass, capacity) and units of time for calculations.
Know complements of 0.1, 1, 10, 50, 100.
Convert between m, cm and mm, km and m, kg and g, litres and ml.
Add and subtract pairs of numbers, e.g. $0.65 + 3.8$, $765 + 47$.
Convert between metric and common imperial units.
Use jottings to support addition and subtraction of whole numbers and decimals. Find doubles and halves of decimals and fractions.
Discuss and interpret graphs.
Recall multiplication and division facts to 10×10 .
Use doubling and halving to calculate, e.g. 6×4.5 , 1.38×50 .
Apply mental skills to solve simple problems.

Teaching objectives for the main activities

	SUPPORT	CORE	EXTENSION
Shape, space and measures 4 (6 hours) Transformations		Understand and use the language and notation associated with reflections, translations and rotations. ▶ ER – Chapter 2 (not translations) ▶ 8/2 – Chapter 5 ▶ 8/3 – Chapter 5	
	Recognise reflection symmetry. ▶ 7/1 – 2:1, 2:2 ▶ 7/2 – 2:1, 2:2 ▶ 7/1 – 2:3 ▶ 7/2 – 2:3 ▶ 8/1 – 5:4, 5:5	Recognise and visualise the transformation and symmetry of a 2-D shape: -reflection in given mirror lines, and line symmetry; -rotation about a given point, and rotation symmetry; -translation; explore these transformations and symmetries using ICT. ▶ 7/1 – 2:1, 2:2, 2:3, 2:4, 2:5, 2:6, 2:7 ▶ 7/2 – 2:1, 2:2, 2:3, 2:4, 2:5, 2:6, 2:7	Transform 2-D shapes by simple combinations of rotations, reflections and translations, on paper and using ICT; identify all the symmetries of 2-D shapes. ▶ 9/3 – Chapter 15, section 2
			Understand and use the language and notation associated with enlargement; enlarge 2-D shapes, given a centre of enlargement and a positive whole-number scale factor. ▶ 8/2 – Chapter 5, section 4 ▶ 8/3 – Chapter 5, section 4
Solving problems		Solve word problems and investigate in a range of contexts: shape and space. ▶ 7/1 – Throughout ▶ 7/2 – Throughout	
		Suggest extensions to problems by asking 'What if...?'; begin to generalise and to understand the significance of a counter-example. ▶ 7/1 – Throughout ▶ 7/2 – Throughout	

	SUPPORT	CORE	EXTENSION
Handling data 3 (8 hours) Handling data		Decide which data would be relevant to an enquiry and possible sources. ▶ 7/1 – 1:2 ▶ 7/2 – 1:2	
		Plan how to collect and organise small sets of data; design a data collection sheet or questionnaire to use in a simple survey; construct frequency tables for discrete data, grouped where appropriate in equal class intervals. ▶ 7/1 – 1:2 ▶ 7/2 – 1:2	
	Find the mode and range of a set of data. ▶ 7/1 – 16:3, 16:5 ▶ 7/2 – 16:3, 16:6 Begin to find the median and the mean of a set of data. ▶ 7/1 – 16:1, 16:2, 16:4 ▶ 7/2 – 16:1, 16:2, 16:4	Calculate statistics for small sets of discrete data: -find the mode, median and range and the modal class for grouped data; -calculate the mean, including from a simple frequency table, using a calculator for a larger number of items. ▶ 7/1 – 16:1, 16:2, 16:3, 16:4, 16:5, 16:6 ▶ 7/2 – 16:1, 16:2, 16:3, 16:4, 16:5, 16:6 ▶ 9/2 – Chapter 4 (modal class) ▶ 9/3 – Chapter 4 (modal class)	Recognise when it is appropriate to use the range, mean, median and mode and, for grouped data, the modal class; calculate a mean using an assumed mean. ▶ 9/2 – Chapter 4 ▶ 9/3 – Chapter 4
		Construct, on paper and using ICT, graphs and diagrams to represent data, including: -bar-line graphs; -frequency diagrams for grouped discrete data; use ICT to generate pie charts. ▶ 7/1 – 1:4 ▶ 7/2 – 1:4	Construct on paper and using ICT: -pie charts for categorical data;- simple line graphs for time series. ▶ 8/1 – Chapter 3, section 2 ▶ 8/2 – Chapter 3, section 2 ▶ 8/3 – Chapter 3, section 2
	Solve a problem by representing, extracting and interpreting data in tables, graphs and charts. ▶ 7/1 – 1:1, 1:3 ▶ 7/2 – 1:1, 1:3	Interpret diagrams and graphs (including pie charts), and draw conclusions based on the shape of graphs and simple statistics for a single distribution. ▶ 7/1 – 1:3, 16:7 ▶ 7/2 – 1:3, 16:8	
		Compare two simple distributions using the range and one of the mode, median or mean. ▶ 7/1 – 16:5 ▶ 7/2 – 16:6	
		Write a short report of a statistical enquiry and illustrate with appropriate diagrams, graphs and charts, using ICT as appropriate; justify the choice of what is presented. ▶ 7/1 – 16:6 ▶ 7/2 – 16:7	

	SUPPORT	CORE	EXTENSION
Probability		Understand and use the probability scale from 0 to 1; find and justify probabilities based on equally likely outcomes in simple contexts; identify all the possible mutually exclusive outcomes of a single event. ► 7/1 – 8:1, 8:2, 8:3, 8:4 ► 7/2 – 8:1, 8:2, 8:3, 8:4	Know that if the probability of an event occurring is p , then the probability of it not occurring is $1 - p$; find and record all possible mutually exclusive outcomes for two successive events in a systematic way, using diagrams and tables. ► 8/2 – Chapter 8, sections 2, 3 and 4 ► 8/3 – Chapter 8, sections 2, 3 and 4
		Collect data from a simple experiment and record in a frequency table; estimate probabilities based on this data. ► 7/1 – Chapter 8, section 3 ► 7/2 – Chapter 8, section 3	
		Compare experimental and theoretical probabilities in simple contexts. ► 7/1 – 8:6 ► 7/2 – 8:6	

	SUPPORT	CORE	EXTENSION
Number 5 (8 hours) Place value	Recognise multiples up to 10×10 ; know simple tests of divisibility. ▶ 7/1 – 4:4 ▶ 7/2 – 4:7 ▶ 7/1 – 3:3 ▶ 7/2 – 3:3	Recognise and use multiples, factors (divisors), common factor, highest common factor and lowest common multiple in simple cases, and primes (less than 100); use simple tests of divisibility. ▶ 7/1 – 3:1, 3:2, 3:3, 3:4 ▶ 7/2 – 3:1, 3:2, 3:3, 3:4	Find the prime factor decomposition of a number. ▶ 7/2 – 3:5
Calculations		Consolidate the rapid recall of number facts, including positive integer complements to 100 and multiplication facts to 10×10 , and quickly derive associated division facts. ▶ 7/1 – 4:4, 4:5, 4:6, 7:1 ▶ 7/2 – 4:7, 4:8, 4:9	
		Consolidate and extend mental methods to include decimals, fractions and percentages, accompanied where appropriate by suitable jottings; solve simple word problems mentally. ▶ 7/1 – Chapter 15 ▶ 7/2 – Chapter 15	Extend mental calculations to squares and square roots, cubes and cube roots. ▶ 8/3 – 2:1, 2:2, 2:3, 2:4
		Make and justify estimates and approximations of calculations. ▶ 7/1 – 4:7 ▶ 7/2 – 4:10	
	Approximate first and use informal pencil and paper methods to EXTENSION addition and subtraction. ▶ 7HY	Use standard column procedures to add and subtract whole numbers and decimals with up to two places. ▶ 7/1 – 6:9 ▶ 7/2 – 6:10	
	Extend written methods to: -ThHTU \times U and U.t \div U; -HTU \times TU; -HTU \div TU. ▶ 7HY ▶ 7/1 – 4:3 ▶ 7/2 – 4:6	Multiply and divide three-digit by two-digit whole numbers; extend to multiplying and dividing decimals with one or two places by single-digit whole numbers. ▶ 7/1 – 6:10, 6:11 ▶ 7/2 – 6:11, 6:2	
		Check a result by considering whether it is of the right order of magnitude and by working the problem backwards. ▶ 7/1 – Throughout ▶ 7/2 – Throughout	

	SUPPORT	CORE	EXTENSION
Calculator methods		Carry out calculations with more than one step using brackets and the memory; use the square root and sign change keys. ▶ 7/1 – 11:2 ▶ 7/2 – 4:17, 11:12	
		Interpret the display of a calculator in different contexts (decimals, percentages). ▶ 7/1 – Throughout e.g. Chapter 4 ▶ 7/2 – Throughout e.g. Chapter 4	
Fractions and percentages		Calculate simple fractions of quantities and measurements (whole-number answers); multiply a fraction by an integer. ▶ 7/1 – 15:3, 15:4 ▶ 7/2 – 15:3, 15:4, 15:9	Calculate fractions of quantities and measurements (fraction answers); multiply and divide an integer by a fraction. ▶ 7/2 – 15:4, 15:9, 15:10
		Recognise the equivalence of percentages, fractions and decimals; calculate simple percentages and use percentages to compare simple proportions. ▶ 7/1 – 15:10, 15:11 ▶ 7/2 – 15:11, 15:12	
Solving problems		Break a complex calculation into simpler steps, choosing and using appropriate and efficient operations, methods and resources, including ICT. ▶ 7/1 – Throughout ▶ 7/2 – Throughout	

	SUPPORT	CORE	EXTENSION
Algebra 5 (8 hours) Equations, formulae and identities		Construct and solve simple linear equations with integer coefficients (unknown on one side only) using an appropriate method (e.g. inverse operations). ▶ 7/1 – 13:4, 13:5, 13:6, 13:7, 13:8 ▶ 7/2 – 13:5, 13:6, 13:7, 13:8, 13:9, 13:10, 13:11	
	Understand and use the relationships between the four operations, and the principles (not the names) of the arithmetic laws. Use brackets. ▶ 7:1 – 4:12, 4:13 ▶ 7:2 – 4:13, 4:14, 4:16, 4:17	Use simple formulae from mathematics and other subjects, substitute positive integers in simple linear expressions and formulae and, in simple cases, derive a formula. ▶ 7/1 – 9:12, 9:13 ▶ 7/2 – 9:14, 9:15	
Sequences, functions and graphs		Generate sequences from practical contexts and describe the general term in simple cases. ▶ 7/1 – 9:4, 9:5, 9:6, 9:8 ▶ 7/2 – 9:4, 9:5, 9:6, 9:8	
		Express simple functions (in words, then) using symbols; represent them in mappings. ▶ 7/1 – 9:3 ▶ 7/2 – 9:3	
	Read and plot coordinates in all four quadrants. ▶ 7/1 – 11.4 ▶ 7/2 – 11.4	Generate coordinate pairs that satisfy a simple linear rule; plot the graphs of simple linear functions, where y is given explicitly in terms of x, on paper and using ICT; recognise straight-line graphs parallel to the x-axis or y-axis. ▶ 7/1 – 11:5, 11:6 ▶ 7/2 – 11:5, 11:6	
		Begin to plot and interpret the graphs of simple linear functions arising from real-life situations. ▶ 8/1 – Chapter 1, sections 1 and 2 ▶ 8/2 – Chapter 1, sections 1, 2 and 4 ▶ 8/3 – Chapter 1, sections 1, 2 and 4	
Solving problems		Suggest extensions to problems by asking 'What if...?'; begin to generalise and to understand the significance of a counter-example. ▶ 7/1 – Throughout ▶ 7/2 – Throughout	

	SUPPORT	CORE	EXTENSION
Shape, space and measures 5 (6 hours) Geometrical reasoning: lines, angles and shapes	Recognise reflection symmetry. ▶ 7/1 – 2:1, 2:2 ▶ 7/2 – 2:1, 2:2 ▶ 7/1 – 2:3 ▶ 7/2 – 2:3 ▶ 8/1 – 5:4, 5:5 Calculate angles on a straight line, in a triangle, or around a point. ▶ 7/1 – 10:5, 10:6, 10:11 ▶ 7/2 – 10:5, 10:6, 10:11	Begin to identify and use angle, side and symmetry properties of triangles and quadrilaterals; solve geometrical problems involving these properties, using step-by-step deduction and explaining reasoning with diagrams and text. ▶ 7/1 – 5:5, 5:8, 5:9, 10:13 ▶ 7/2 – 5:5, 5:8, 5:9, 10:13	Solve geometrical problems using side and angle properties of equilateral, isosceles and right-angled triangles and special quadrilaterals. ▶ 7/1 – 10:12 ▶ 7/2 – 10:12 Classify quadrilaterals by their geometric properties. ▶ 7/2 – 5:2
Construction	Use a protractor to measure and draw acute and obtuse angles to the nearest degree. ▶ 7/1 – 10:4 ▶ 7/2 – 10:4	Use a ruler and protractor to: -construct a triangle given two sides and the included angle (SAS) or two angles and the included side (ASA); explore these constructions using ICT. ▶ 7/1 – 10:13 ▶ 7/2 – 10:13	Use straight edge and compasses to construct: -the mid-point and perpendicular bisector of a line segment; -the bisector of an angle; construct a triangle given three sides (SSS). ▶ 9/2 – 15:5, 15:7 ▶ 9/3 – 12:5, 12:7
	Visualise 3-D shapes from 2-D drawings and identify different nets for a closed cube. ▶ 7/1 – 7:1, 7:4, 7:5, 7:6 ▶ 7/2 – 7:1, 7:4, 7:5, 7:6	Use a ruler and protractor to construct simple nets of 3-D shapes, e.g. cuboid, regular tetrahedron, square-based pyramid, triangular prism. ▶ 7/1 – 7:7, 7:8 ▶ 7/2 – 7:7, 7:8	