

Term	Half term	Unit	Topic	KS3 Ref	KS3 Objective Statement(s)
		1 Whole numbers and decimals (Number)	Powers of 10	N1	Understand and use place value for decimals, measures and integers of any size.
			Rounding	N13	Round numbers and measures to an appropriate degree of accuracy [for example, to a number of decimal places or significant figures].
			Order of operations	N5	Use conventional notation for the priority of operations, including brackets, powers, roots and reciprocals.
			Multiples, factors, divisibility and prime numbers	N3	Use the concepts and vocabulary of prime numbers, factors (or divisors), multiples, common factors, common multiples, highest common factor, lowest common multiple, prime factorisation, including using product notation and the unique factorisation property.
			Prime factors, the HCF and the LCM	N3 P3	Use the concepts and vocabulary of prime numbers, factors (or divisors), multiples, common factors, common multiples, highest common factor, lowest common multiple, prime factorisation, including using product notation and the unique factorisation property. Enumerate sets and unions/intersections of sets systematically, using tables, grids and Venn diagrams.
			Ordering decimals	N2 N1	Order positive and negative integers, decimals and fractions; use the number line as a model for ordering of the real numbers; use the symbols =, ≠, <, >, ≤, ≥ . Understand and use place value for decimals, measures and integers of any size.
		2 Measurement	Metric measures	R1	Change freely between related standard units [for example time, length, area, volume/capacity, mass].
			Imperial measures	R1	Change freely between related standard units [for example time, length, area, volume/capacity, mass].
			Area	G1	Derive and apply formulae to calculate and solve problems involving: perimeter and area of triangles, parallelograms, trapezia, volume of cuboids (including cubes) and other prisms (including cylinders).

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2 Measures and area (Geometry and measures)	Area of a triangle	G1	Derive and apply formulae to calculate and solve problems involving: perimeter and area of triangles, parallelograms, trapezia, volume of cuboids (including cubes) and other prisms (including cylinders).
	Area of a parallelogram	G1	Derive and apply formulae to calculate and solve problems involving: perimeter and area of triangles, parallelograms, trapezia, volume of cuboids (including cubes) and other prisms (including cylinders).
	Circumference of a circle	G2	Calculate and solve problems involving: perimeters of 2-D shapes (including circles), areas of circles and composite shapes.
3 Expressions and formulae (Algebra)	Simplifying expressions.	A4	Simplify and manipulate algebraic expressions to maintain equivalence by: <ul style="list-style-type: none"> • collecting like terms • multiplying a single term over a bracket • taking out common factors • expanding products of 2 or more binomials
	Using brackets	A4	Simplify and manipulate algebraic expressions to maintain equivalence by: <ul style="list-style-type: none"> • collecting like terms • multiplying a single term over a bracket • taking out common factors • expanding products of 2 or more binomials
	Formulae	A2 A5 N6	Substitute numerical values into formulae and expressions, including scientific formulae. Understand and use standard mathematical formulae; rearrange formulae to change the subject. Recognise and use relationships between operations including inverse operations.

Autumn term

		A6 A1	<p>Model situations or procedures by translating them into algebraic expressions or formulae and by using graphs.</p> <p>Use and interpret algebraic notation, including:</p> <ul style="list-style-type: none"> • ab in place of $a \times b$ • $3y$ in place of $y + y + y$ and $3 \times y$ • a^2 in place of $a \times a$, a^3 in place of $a \times a \times a$; a^2b in place of $a \times a \times b$ • a/b in place of $a \div b$ • coefficients written as fractions rather than as decimals • brackets
	Adding and subtracting fractions 1	N4	Use the 4 operations, including formal written methods, applied to integers, decimals, proper and improper fractions, and mixed numbers, all both positive and negative.
	Adding and subtracting fractions 2	N4	Use the 4 operations, including formal written methods, applied to integers, decimals, proper and improper fractions, and mixed numbers, all both positive and negative.
	Fraction of a quantity	N11	Interpret fractions and percentages as operators.
	Multiplying and dividing fractions	N4	Use the 4 operations, including formal written methods, applied to integers, decimals, proper and improper fractions, and mixed numbers, all both positive and negative.
	Fractions and decimals	N9 DF5	<p>Work interchangeably with terminating decimals and their corresponding fractions (such as 3.5 and $7/2$ or 0.375 and $3/8$).</p> <p>Move freely between different numerical, algebraic, graphical and diagrammatic representations [for example, equivalent fractions, fractions and decimals, and equations and graphs]</p>

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4 Fractions, decimals and percentages (Number)	Percentage of a quantity	N10	Define percentage as 'number of parts per hundred', interpret percentages and percentage changes as a fraction or a decimal, interpret these multiplicatively, express 1 quantity as a percentage of another, compare 2 quantities using percentages, and work with percentages greater than 100%.
	Percentage problems	N10 R8	Define percentage as 'number of parts per hundred', interpret percentages and percentage changes as a fraction or a decimal, interpret these multiplicatively, express 1 quantity as a percentage of another, compare 2 quantities using percentages, and work with percentages greater than 100%. Solve problems involving percentage change, including: percentage increase, decrease and original value problems and simple interest in financial mathematics
	Repeated percentage change	N10 R8	Define percentage as 'number of parts per hundred', interpret percentages and percentage changes as a fraction or a decimal, interpret these multiplicatively, express 1 quantity as a percentage of another, compare 2 quantities using percentages, and work with percentages greater than 100%. Solve problems involving percentage change, including: percentage increase, decrease and original value problems and simple interest in financial mathematics
Assessment			
	Angles and lines	G10	Apply the properties of angles at a point, angles at a point on a straight line, vertically opposite angles.
		G11	Understand and use the relationship between parallel lines and alternate and corresponding angles.

5 Angles and 2D shapes (Geometry and measures)	Angles in a triangle	G6 G7	Use the standard conventions for labelling the sides and angles of triangle ABC, and know and use the criteria for congruence of triangles. Derive and illustrate properties of triangles, quadrilaterals, circles, and other plane figures [for example, equal lengths and angles] using appropriate language and technologies.
	Properties of triangles	G7	Derive and illustrate properties of triangles, quadrilaterals, circles, and other plane figures [for example, equal lengths and angles] using appropriate language and technologies.
	Angles in a quadrilateral	G12 G3	Derive and use the sum of angles in a triangle and use it to deduce the angle sum in any polygon, and to derive properties of regular polygons. Draw and measure line segments and angles in geometric figures, including interpreting scale drawings.
	Properties of quadrilaterals	G5	Describe, sketch and draw using conventional terms and notations: points, lines, parallel lines, perpendicular lines, right angles, regular polygons, and other polygons that are reflectively and rotationally symmetric.
	Horizontal and vertical lines	A8 A10	Work with coordinates in all 4 quadrants. Interpret mathematical relationships both algebraically and graphically.
	Tables of values	A6 RM1	Model situations or procedures by translating them into algebraic expressions or formulae and by using graphs. Extend their understanding of the number system; make connections between number relationships, and their algebraic and graphical representations.
	Drawing straight line graphs	A8 A9	Work with coordinates in all 4 quadrants. Recognise, sketch and produce graphs of linear and quadratic functions of 1 variable with appropriate scaling, using equations in x and y and the Cartesian plane.

	6 Graphs (Algebra)	Problems solving using straight line graphs	A9 A12	Recognise, sketch and produce graphs of linear and quadratic functions of 1 variable with appropriate scaling, using equations in x and y and the Cartesian plane. Use linear and quadratic graphs to estimate values of y for given values of x and vice versa and to find approximate solutions of simultaneous linear equations.
		Straight line rules	A10 A11	Interpret mathematical relationships both algebraically and graphically. Reduce a given linear equation in two variables to the standard form $y = mx + c$; calculate and interpret gradients and intercepts of graphs of such linear equations numerically, graphically and algebraically
		Interpreting real-life graphs	A13	Find approximate solutions to contextual problems from given graphs of a variety of functions, including piece-wise linear, exponential and reciprocal graphs.
		Time-series graphs	S2	Construct and interpret appropriate tables, charts, and diagrams, including frequency tables, bar charts, pie charts, and pictograms for categorical data, and vertical line (or bar) charts for ungrouped and grouped numerical data.
	7 Calculations	Addition and subtraction	N4	Use the 4 operations, including formal written methods, applied to integers, decimals, proper and improper fractions, and mixed numbers, all both positive and negative.
		Mental multiplication and division	N4	Use the 4 operations, including formal written methods, applied to integers, decimals, proper and improper fractions, and mixed numbers, all both positive and negative.
		Written multiplication	N4 N14	Use the 4 operations, including formal written methods, applied to integers, decimals, proper and improper fractions, and mixed numbers, all both positive and negative. Use approximation through rounding to estimate answers and calculate possible resulting errors expressed using inequality notation $a < x \leq b$.

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(Number)	Written division	N4	Use the 4 operations, including formal written methods, applied to integers, decimals, proper and improper fractions, and mixed numbers, all both positive and negative.
	Estimating and approximating	N13 N14	Round numbers and measures to an appropriate degree of accuracy [for example, to a number of decimal places or significant figures]. Use approximation through rounding to estimate answers and calculate possible resulting errors expressed using inequality notation $a < x \leq b$.
	Using a calculator	N15 DF2	Use a calculator and other technologies to calculate results accurately and then interpret them appropriately. Select and use appropriate calculation strategies to solve increasingly complex problems.
	Designing a survey	DF7	Use language and properties precisely to analyse numbers, algebraic expressions, 2-D and 3-D shapes, probability and statistics.
	Collecting data	RM7	Develop their mathematical knowledge, in part through solving problems and evaluating the outcomes, including multi-step problems.
	Frequency tables	S2	Construct and interpret appropriate tables, charts, and diagrams, including frequency tables, bar charts, pie charts, and pictograms for categorical data, and vertical line (or bar) charts for ungrouped and grouped numerical data.
	Bar charts	S2	Construct and interpret appropriate tables, charts, and diagrams, including frequency tables, bar charts, pie charts, and pictograms for categorical data, and vertical line (or bar) charts for ungrouped and grouped numerical data.
	Pie charts	S2	Construct and interpret appropriate tables, charts, and diagrams, including frequency tables, bar charts, pie charts, and pictograms for categorical data, and vertical line (or bar) charts for ungrouped and grouped numerical data.

Spring term

8 Statistics (Statistics and probability)	Calculating averages	S1	Describe, interpret and compare observed distributions of a single variable through: appropriate graphical representation involving discrete, continuous and grouped data; and appropriate measures of central tendency (mean, mode, median) and spread (range, consideration of outliers).
	Scatter graphs	S3	Describe simple mathematical relationships between 2 variables (bivariate data) in observational and experimental contexts and illustrate using scatter graphs.
	Stem-and-leaf diagrams	S1	Describe, interpret and compare observed distributions of a single variable through: appropriate graphical representation involving discrete, continuous and grouped data; and appropriate measures of central tendency (mean, mode, median) and spread (range, consideration of outliers).
	Frequency diagrams	S1	Describe, interpret and compare observed distributions of a single variable through: appropriate graphical representation involving discrete, continuous and grouped data; and appropriate measures of central tendency (mean, mode, median) and spread (range, consideration of outliers).
	Writing a statistical report	S1 RM7	Describe, interpret and compare observed distributions of a single variable through: appropriate graphical representation involving discrete, continuous and grouped data; and appropriate measures of central tendency (mean, mode, median) and spread (range, consideration of outliers). Explore what can and cannot be inferred in statistical and probabilistic settings, and begin to express their arguments formally.
Assessment			
	Reflection and rotation symmetry	G8	Identify properties of, and describe the results of, translations, rotations and reflections applied to given figures.

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9 Transformations and symmetry (Geometry and measures)	Reflection	G8	Identify properties of, and describe the results of, translations, rotations and reflections applied to given figures.
	Translation	G8	Identify properties of, and describe the results of, translations, rotations and reflections applied to given figures.
	Rotation	G8	Identify properties of, and describe the results of, translations, rotations and reflections applied to given figures.
	Enlargement	G9	Identify and construct congruent triangles, and construct similar shapes by enlargement, with and without coordinate grids.
	Enlargement through a centre	G9	Identify and construct congruent triangles, and construct similar shapes by enlargement, with and without coordinate grids.
	Scale drawings	R2	Use scale factors, scale diagrams and maps.
10 Equations (Algebra)	Equality and inequality	A3	Understand and use the concepts and vocabulary of expressions, equations, inequalities, terms and factors.
	Solving equations	A7	Use algebraic methods to solve linear equations in 1 variable (including all forms that require rearrangement).
		DF3	Use algebra to generalise the structure of arithmetic, including to formulate mathematical relationships.
		DF4	Substitute values in expressions, rearrange and simplify expressions, and solve equations.
Balancing equations 1	A7	Use algebraic methods to solve linear equations in 1 variable (including all forms that require rearrangement).	
	DF4	Substitute values in expressions, rearrange and simplify expressions, and solve equations.	
Balancing equations 2	A7	Use algebraic methods to solve linear equations in 1 variable (including all forms that require rearrangement).	
	DF4	Substitute values in expressions, rearrange and simplify expressions, and solve equations.	

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12 Construction (Geometry and measures)	Perpendicular bisectors	G4	Derive and use the standard ruler and compass constructions (perpendicular bisector of a line segment, constructing a perpendicular to a given line from/at a given point, bisecting a given angle); recognise and use the perpendicular distance from a point to a line as the shortest distance to the line.
	Angle bisectors	G4	Derive and use the standard ruler and compass constructions (perpendicular bisector of a line segment, constructing a perpendicular to a given line from/at a given point, bisecting a given angle); recognise and use the perpendicular distance from a point to a line as the shortest distance to the line.
	Constructing triangles	G3	Draw and measure line segments and angles in geometric figures, including interpreting scale drawings.
	Bearings		
Case study	Garden design	RM5	Begin to reason deductively in geometry, number and algebra, including using geometrical constructions.
Assessment			
13 Sequences (Algebra)	Term-to-term rules	A14 A15	Generate terms of a sequence from either a term-to-term or a position to-term rule. Recognise arithmetic sequences and find the n th term.
	Position-to-term rules	A15	Recognise arithmetic sequences and find the n th term.
	The n th term formula	A15	Recognise arithmetic sequences and find the n th term.
	Recursive sequences	A14	Generate terms of a sequence from either a term-to-term or a position to-term rule.
	Three-dimensional shapes	G15 DF7	Use the properties of faces, surfaces, edges and vertices of cubes, cuboids, prisms, cylinders, pyramids, cones and spheres to solve problems in 3-D. Use language and properties precisely to analyse numbers, algebraic expressions, 2-D and 3-D shapes, probability and statistics.
	Nets	G15	Use the properties of faces, surfaces, edges and vertices of cubes, cuboids, prisms, cylinders, pyramids, cones and spheres to solve problems in 3-D.

Summer term

14 3D shapes (Geometry and measures)	Plans and elevations		
	Volume of a cuboid	G1	Derive and apply formulae to calculate and solve problems involving: perimeter and area of triangles, parallelograms, trapezia, volume of cuboids (including cubes) and other prisms (including cylinders).
	Shapes made from cuboids	G1 G2	Derive and apply formulae to calculate and solve problems involving: perimeter and area of triangles, parallelograms, trapezia, volume of cuboids (including cubes) and other prisms (including cylinders). Calculate and solve problems involving: perimeters of 2-D shapes (including circles), areas of circles and composite shapes.
	Surface area of a cuboid	G1	Derive and apply formulae to calculate and solve problems involving: perimeter and area of triangles, parallelograms, trapezia, volume of cuboids (including cubes) and other prisms (including cylinders).
Case study	Golden rectangle	RM4 RM5 SP3	Make and test conjectures about patterns and relationships; look for proofs or counter-examples. Begin to reason deductively in geometry, number and algebra, including using geometrical constructions. Begin to model situations mathematically and express the results using a range of formal mathematical representations.
	Ratio	R4	Use ratio notation, including reduction to simplest form.
	Dividing in a given ratio	R5	Divide a given quantity into 2 parts in a given part:part or part:whole ratio; express the division of a quantity into 2 parts as a ratio.
	Ratio and proportion	RM2	Extend and formalise their knowledge of ratio and proportion in working with measures and geometry, and in formulating proportional relations algebraically.

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15 Ratio and proportion (Ratio and proportion)	Percentages and proportion	N10	Define percentage as 'number of parts per hundred', interpret percentages and percentage changes as a fraction or a decimal, interpret these multiplicatively, express 1 quantity as a percentage of another, compare 2 quantities using percentages, and work with percentages greater than 100%
	Proportional reasoning	S3	Describe simple mathematical relationships between 2 variables (bivariate data) in observational and experimental contexts and illustrate using scatter graphs.
	Living on a budget	SP2 SP4	Develop their use of formal mathematical knowledge to interpret and solve problems, including in financial mathematics. Select appropriate concepts, methods and techniques to apply to unfamiliar and non-routine problems.
16 Probability (Statistics and probability)	Probability	P1	Record, describe and analyse the frequency of outcomes of simple probability experiments involving randomness, fairness, equally and unequally likely outcomes, using appropriate language and the 0-1 probability scale.
	Mutually exclusive events	P2	Understand that the probabilities of all possible outcomes sum to 1.
	Theoretical probability	P4	Generate theoretical sample spaces for single and combined events with equally likely, mutually exclusive outcomes and use these to calculate theoretical probabilities.
	Counting outcomes	P4	Generate theoretical sample spaces for single and combined events with equally likely, mutually exclusive outcomes and use these to calculate theoretical probabilities.
	Two events	P4	Generate theoretical sample spaces for single and combined events with equally likely, mutually exclusive outcomes and use these to calculate theoretical probabilities.

