KS3 Progress – Delta Mapping

This document matches iLowerSecondary objectives against the UK Maths course – KS3 Progress Delta. You can be confident that by following the teaching planning provided by this proven Pearson UK resource your students will cover all of the required objectives of iLowerSecondary by the end of Year 9.

Contact your local Pearson representative in order to purchase the textbooks and digital planning resources for this course.

Year 7

Term	Activities	iLowerSecondary objectives covered
Autumn Term 1 1. Analysing and displaying data (11 hours teaching)	Use two-way tables; Interpret and draw dual bar charts and compound bar charts; Choose the most appropriate average for a set of data; Find the mode, median, mean and range for a set of data; Compare sets of data using averages and the range; Group discrete and continuous data; Draw and interpret grouped frequency diagrams; Interpret and draw line graphs; Recognise when a graph is misleading; Draw and interpret pie charts; Graph paper and draw scatter graphs; Describe the correlation between two sets of data; Draw a line of best fit and use it to estimate values.	**N7.1C** Compare and order positive and negative numbers and write statements using inequality signs, > and <, in context. **S7.1F** Analyse and present data using spreadsheets in a computer software program. **S8.2B** Design, read and interpret two-way tables. **S8.2H** Solve problems by drawing or interpreting graphs, charts and tables. **S7.2F** Decide how best to represent the data. **S8.1B** Choose the most appropriate average to use. **S7.1A** Find the mode of a set of data presented in a list, table or bar chart. **S7.1B** Find the median and range of a set of data presented in a list. **S7.1C** Calculate and interpret the mean of a set of data presented in a list. **S7.1D** Find the modal class of grouped data.

		S7.1E Compare sets of data using their ranges and averages. **S7.1G** Solve problems involving mean, median, mode and range. **S7.2G** Solve problems by interpreting or drawing graphs, charts and tables. **S8.1C** Compare two sets of data using statistics or the shape of the graph. **S8.1D** Solve problems involving comparing data. **S7.2D** Represent data in grouped tally charts or frequency tables; draw bar charts for grouped data. **S8.2A** Design, read and interpret tables for grouped data. **S7.2C** Identify discrete and continuous data. **S7.2E** Read and interpret information from tally charts, frequency tables, bar charts, bar-line charts, compound bar charts, line graphs and pie charts. **S7.2A** Represent data in tally charts, frequency tables, bar charts, bar-line charts and pie charts. **S7.2B** Interpret simple tables and bar charts for grouped data. **S8.2G** Explain why a graph or chart is misleading. **S8.2C** Draw and interpret pie charts to represent data. **S8.2E** Draw and interpret scatter graphs (including correlation). **S8.2F** Draw a line of best fit by eye on a scatter graph. **S9.2A** Draw and use a line of best fit on a scatter graph, to predict data values.

Autumn Term 1 2. Number Skills (11 hours teaching)	Understand the difference between multiples, factors and primes; Find all the factor pairs of any whole number; Find the HCF and LCM of two numbers; Add, subtract, multiply and divide positive and negative numbers; Use mental and written strategies for multiplication; Divide a 3-digit integer by a single or 2-digit integer; Use index notation for squares and square roots; Calculate with squares and square roots. Carry out calculations involving squares, cubes, square roots and cube roots; Use factorising to work out square roots and cube roots; Solve word problems using square roots and cube roots; Estimate answers to complex calculations; Carry out calculations involving brackets.	**N7.1A** Recognise the place value of each digit in numbers beyond 1 000 000 (one million) to 1 000 000 000 (one billion). **N7.1D** Identify factors of any integer; identify common factors and the highest common factor of two integers. **N7.1E** Identify multiples of any integer; identify common multiples and the lowest common multiple of two integers. **N7.1F** Use rules for divisibility by 2, 3, 4, 5, 9, 10. **N7.1G** Recognise prime numbers. **N7.1B** Add and subtract positive and negative numbers. **N8.1A** Add, subtract, multiply and divide positive and negative numbers. **N8.1C** Use index notation. **N7.1H** Know square numbers up to and including 144 and related square roots; calculate other squares and square roots. **N7.1I** Know cube numbers up to and including 125 and related cube roots; calculate other cubes and cube roots. **N7.1J** Use index notation up to and including powers of 3. **N7.4A** Use estimates to check answers. **N7.4B** Use priority of operations for calculations involving the four operations. **N7.4C** Use a calculator for the four operations and interpret the answer in different contexts. **N8.1B** Use BIDMAS and calculate combinations of powers,

		roots and brackets.
Autumn Term 2 3. Equations, functions and formulae (11 hours teaching)	Simplify expressions by collecting like terms; Construct expressions using four operations; Substitute into formulae; Derive formulae from a description; Expand expressions involving brackets; Substitute into expressions involving powers; Factorise an algebraic expression.	**A7.1A** Use letters to represent unknown values. **A7.1C** Simplify simple linear algebraic expressions by collecting like terms. **A7.1D** Simplify simple linear algebraic expressions involving multiplication and division. **A7.1B** Write simple expressions using correct algebraic notation and the four operations. **A7.1F** Substitute positive integers into simple formulae written in words. **A7.1G** Substitute integers into formulae written in letters. **A7.1H** Write simple formulae using letters. **A9.1B** Write expressions and formulae involving more than one variable. **A7.1E** Expand brackets by multiplying a single positive number term over a bracket. **A8.1C** Expand and simplify expressions involving brackets by multiplying a negative number term, or terms involving letters and numbers, over a bracket. **A8.1E** Substitute values into expressions and formulae involving powers or brackets. **A9.1A** Substitute values into expressions and formulae involving powers, roots and brackets. **A8.1D** Factorise expressions.
Autumn Term 2 4. Fractions (11 hours teaching)	Compare and simplify fractions; Write one number as a fraction of another; Work out simple fractions of amounts; Write an improper fraction as a mixed number; Add and subtract fractions; Work with	**N7.2D** Round decimals to make estimates and approximations of calculations. **N7.2I** Understand and use equivalent fractions and write fractions in their simplest form.

	equivalent fractions, decimals and percentages; Use division to write a fraction as a decimal; Work out fractions of amounts; Divide an integer and a fraction by a fraction; Multiply a fraction by a fraction; Add and subtract mixed numbers; Multiply and divide a mixed number; Enter time as a mixed number into a calculator.	**N7.2N** Write one number as a fraction of another. **N7.2L** Multiply fractions by whole numbers. **N7.2K** Change an improper (vulgar) fraction to a mixed number. **N7.2M** Add a mixed number and a fraction where one denominator is a multiple of the other; subtract a fraction from a mixed number where one denominator is a multiple of the other. **N8.3C** Use the equivalence of fractions, decimals and percentages to solve problems that involve comparing proportions. **N8.2H** Convert fractions to decimals by dividing the numerator by the denominator. **N8.2G** Multiply integers by a fraction and multiply fractions by a fraction. **N8.2J** Write the reciprocal of a number or a fraction. **N8.2K** Divide integers by a fraction and divide fractions by a fraction. **N8.2F** Add and subtract fractions with any size of denominator. **N8.2L** Use the four operations with mixed numbers. **N8.2M** Solve problems involving decimals and fractions.
<u>Spring Term 1</u> 5. Angles and shapes (9 hours teaching)	Work out unknown angles when two or more lines meet or cross at a point; Work out unknown angles involving parallel lines; Describe the line and rotational symmetry of triangles; Describe the line and rotational symmetry of quadrilaterals; Understand how to prove that a result is true; Use	**G7.2C** Know and use the rules for the sum of angles on a straight line and angles around a point. **G7.2D** Identify vertically opposite angles and know that they are equal. **G7.2E** Solve problems involving angles. **G8.2E** Identify alternate angles and know that they are equal.

	properties of a triangle to work out unknown angles; Use the properties of isosceles and equilateral triangles to solve problems; Describe the properties of quadrilaterals; Solve problems involving quadrilaterals; Work out the interior and exterior angles of a polygon.	**G8.2F** Identify corresponding angles and know that they are equal. **G8.2G** Solve simple problems using properties of angles in parallel and intersecting lines and polygons, giving reasons. **G7.4A** Recognise and describe rotational symmetry. **G7.4B** Identify and describe all the symmetries of common 2D shapes (reflection and rotational). **G7.3A** Describe, name and compare equilateral, scalene, isosceles and right-angled triangles. **G7.3B** Describe, name and compare quadrilaterals (square, rectangle, rhombus, parallelogram, kite and trapezium). **G7.3C** Know and use the sum of angles in a triangle and sum of angles in a quadrilateral. **G7.3D** Calculate exterior angles of triangles and quadrilaterals **G7.3F** Solve angle problems involving triangles and quadrilaterals. **G8.2A** Identify and use properties of quadrilaterals, including their angle, sides, diagonals and symmetry. **G8.2B** Calculate the sum of the interior and exterior angles of an irregular or regular polygon. **G8.2C** Calculate the interior and exterior angles of an irregular or regular polygon. **G8.2D** Solve geometric problems using side and angle properties of quadrilaterals and other polygons.

Spring Term 1 6. Decimals (11 hours teaching)	Write decimals in ascending and descending order; Round to decimal places; Add and subtract decimals; Multiply a decimal by an integer; Use place value to multiply decimals; Divide a decimal by a whole number; Divide a number by a decimal; Convert between fractions decimals and percentages; Compare different proportions using percentages; Calculate percentages with and without a calculator; Calculate percentage increases and decreases; Work backwards to solve a percentage problem.	**N7.2A** Recognise the place value of each digit in a number with three decimal places. **N7.2B** Write decimals with up to three decimal places in order of size and write statements using inequality signs < or >. **N7.2C** Round decimals to one decimal place. **N8.2A** Round numbers to two or three decimal places. **N7.2F** Add and subtract decimals up to and including three decimal places. **N7.2E** Multiply decimals mentally. **N7.2G** Multiply and divide decimals by single-digit whole numbers **N8.2B** Multiply and divide any number by 0·1, 0·01 and 0·001. **N8.2C** Multiply decimals using a written method. **N7.2H** Solve problems involving decimals. **N8.2D** Divide by decimals. **N7.2J** Compare and order simple decimals, fractions and percentages. **N7.3A** Convert percentages to decimals, and decimals to percentages. **N7.3B** Convert fractions whose denominator is a factor of 10 and fractions whose denominator is a factor of 100. **N7.3C** Write one number as a fraction of another (where the denominator is a factor of 100) and then as a percentage. **N8.3C** Use the equivalence of fractions, decimals and percentages to solve problems that involve comparing proportions.

		N8.3A Find equivalent fractions, decimals and percentages, including mixed numbers and percentages over 100%. **N7.5G** Use percentages to describe and compare proportions. **N7.3D** Mentally calculate percentages of an amount. **N8.3B** Calculate percentages of amounts. **N8.3E** Work out a percentage increase or decrease.
Spring Term 2 7. Equations (9 hours teaching)	Write and solve simple equations; Solve problems using equations; Write and solve two-step equations; Write and solve equations that have brackets; Write and solve equations with letters on both sides; Solve equations that include x^2 and x^3; Use trial and improvement to find solutions to one decimal place.	**A7.1I** Solve missing-number problems and problems involving formulae. **A8.2A** Find pairs of numbers that satisfy a linear equation with two unknowns. **A8.2B** Solve 1-step linear equations with integer coefficients, with one unknown, with the unknown on either side of the equation. **A8.2C** Solve 2-step linear equations (including those with one set of brackets) with integer coefficients, with one unknown, with the unknown on either side of the equation. **A8.2D** Solve problems by writing and solving linear equations.

<u>Summer Term 1</u> 8. Multiplicative reasoning (11 hours teaching)	Convert between metric and imperial units; Use metric units; Write a ratio in its simplest form; Simplify a ratio expressed in fractions or decimals; Share a quantity in two or more parts in a given ratio; Understand the relationship between ratio and proportion; Solve simple word problems involving ratio and direct proportion; Solve simple word problems involving ratio and inverse proportion; Solve problems involving ratio and proportion using the unitary method; Write ratios in the form 1:n; Solve best-buy problems.	**N7.5B** Write and interpret ratios written in ratio notation. **N7.5C** Reduce a ratio to its simplest form. **N8.5A** Simplify and use ratios involving decimals. **N7.5D** Solve word problems that involve dividing a quantity into two parts in a given ratio. **N7.5E** Solve word problems where given a ratio and one quantity and have to find the other quantity. **N8.5B** Divide a quantity into three parts in a given ratio. **N7.5H** Understand and use the relationship between ratio and proportion. **N7.5F** Use fractions to describe and compare proportions. **N7.5G** Use percentages to describe and compare proportions. **N8.5D** Solve simple word problems using ratio and proportion. **N9.4A** Calculate an unknown quantity from quantities that vary in direct proportion. **N9.4C** Solve word problems using ratio and/or proportion. **N7.5A** Solve simple problems involving direct proportion in a range of contexts. **N8.5C** Write and compare unit ratios (1:n or n:1).
<u>Summer Term 1</u> 9. Perimeter, area and volume (11 hours teaching)	Calculate the area of triangles; Calculate the area of parallelograms; Calculate the area of trapeziums; Calculate the perimeter of shapes made from rectangles and triangles; Calculate the area of shapes made from rectangles and triangles; Identify nets of different 3D shapes; Know the	**G7.2A** Describe and name acute, obtuse and reflex angles. **G7.1D** Calculate the areas of squares and rectangles and shapes made from rectangles. **G8.1A** Derive, know and use the formula for the area of a triangle.

	properties of 3D shapes; Calculate the surface area of a cube; Calculate the surface area of a cuboid; Calculate the volume of a cube; Calculate the volume of a cuboid; Convert between different units of volume: cm^3, ml and litres; Convert between metric measures for area and volume.	**G8.1C** Derive, know and use the formula for the area of a parallelogram. **G8.1D** Know and use the formula for the area of a trapezium. **G7.1C** Work out the perimeters of regular and irregular polygons, when not all lengths are given, including compound shapes. **G8.1B** Calculate the area of compound shapes made from rectangles and triangles. **G7.1E** Solve perimeter and area problems. **G8.1F** Sketch nets of 3D solids. **G7.4C** Identify reflection symmetry in common 3D solids. **G8.1H** Calculate the surface area of cubes and cuboids. **G8.1E** Calculate the volume of cubes and cuboids and 3D solids made from cuboids. **G8.1I** Solve problems involving area, surface area and volume. **G7.1A** Convert between metric units of measure of length, mass and capacity, up to and including three decimal places. **G7.1B** Solve problems in everyday contexts involving measures and conversions. **G8.1J** Convert between metric units of measure of area, volume and capacity. **G8.1K** Solve problems in everyday contexts involving measures.

<u>Summer Term 2</u> 10. Sequences and graphs (10 hours teaching)	Work out the terms of an arithmetic sequence using the term-to-term rule; Work out a given term in a simple arithmetic sequence; Work out and use expressions for the *n*th term in an arithmetic sequence; Generate sequences and predict how they will continue; Recognise geometric sequences and work out the term-to-term rule; Use positive and negative coordinates; Work out the midpoint of a line segment; Draw straight-line graphs; Recognise straight-line graphs parallel to the axes; Recognise graphs of $y = x$ and $y = -x$.	**N7.1C** Compare and order positive and negative numbers and write statements using inequality signs, > and <, in context. **A7.2A** Describe simple pattern or number sequences. **A7.2B** Find or generate terms of a sequence using a term-to-term rule. **A7.2C** Recognise different types of sequence. **A7.2D** Generate terms of a sequence using a simple position-to-term rule given in words. **A7.2E** Use linear expressions to describe the *n*th term of simple sequences. **A7.2F** Solve problems involving sequences. **A9.4B** Find the *n*th term of an arithmetic sequence. **A9.4C** Recognise and continue more complex geometric sequences. **A7.3E** Solve problems involving coordinates and straight lines. **A7.3D** Find the midpoint of a line segment, given the coordinates of the end points. **A7.3B** Plot straight-line graphs using a table of values. **A7.3C** Draw graphs to represent relationships. **A7.3A** Recognise, name and plot graphs parallel to the axes and the graphs of $y = x$ and $y = -x$.

Year 8

Term	Activities	iLowerSecondary objectives covered
Autumn Term 1 1. Factors and powers (9 hours teaching)	Write the prime factor decomposition of a number; Use prime factor decomposition to find the HCF or LCM or two numbers; Work out the laws of indices for positive powers; Show that any number to the power of zero is 1; Use the laws of indices for multiplying and dividing; Use and understand powers of 10; Use the prefixes associated with powers of 10; Understand the effect of multiplying and dividing by any integer power of 10; Calculate with powers; Round to a number of significant figures.	**N8.1D** Write a number as the product of its prime factors. **N8.1E** Find the highest common factor (HCF) and lowest common multiple (LCM). **N9.1C** Understand negative and 0 indices. **N9.1D** Use powers of 10 and their prefixes. **N9.1A** Round numbers to a given number of significant figures. **N9.1B** Solve problems where answers are required to a specified number of significant figures.
Autumn Term 1 2. Working with powers (10 hours teaching)	Simplify expressions involving powers and brackets; Understand the meaning of an identity; Use the index laws in algebraic calculations and expressions; Simplify expressions with powers; Write and simplify expressions involving brackets and powers; Factorise an algebraic expression; Substitute integers into expressions; Construct and solve equations.	**N8.4B** Work out calculations involving the four operations with integers, fractions and decimals, and also including powers, roots and brackets. **N8.4C** Solve problems involving the four operations with integers, fractions, decimals, powers, roots and brackets. **N8.4A** Use estimates to check answers. **A8.1A** Use index notation for algebraic powers.. **A8.1B** Simplify simple algebraic expressions involving powers, using the index laws. **A8.1D** Factorise expressions. **A8.1E** Substitute values into expressions and formulae involving powers or brackets. **A8.1F** Solve problems involving formulae.

		A9.1J Solve problems involving formulae and expressions. **A9.2A** Construct and solve equations with the unknown on both sides. **A9.2B** Construct and solve equations with the unknown on both sides and including brackets and fractions.
Autumn Term 2 3. 2D shapes and 3D solids (12 hours teaching)	Use 2D representations of 3D solids; Sketch nets of 3D solids; Calculate the surface area of prisms; Calculate the volume of right prisms; Name the different parts of a circle; Calculate the circumference of a circle; Calculate the area of a circle; Calculate the radius or diameter of a circle when you know the circumference; Calculate the radius or diameter of a circle when you know the area; Calculate the volume and surface area of a cylinder; Use Pythagoras' theorem in right-angled triangles.	**G8.1G** Draw and interpret 2D representations of 3D solids. **G8.1F** Sketch nets of 3D solids. **G9.1G** Identify a right prism. **G9.1H** Calculate the volume and surface area of a right prism and a cylinder. **G9.1D** Use appropriate apparatus (including compasses) to identify and draw the diameter and radius of a circle; identify the circumference, arc and sector of a circle. **G9.1E** Calculate the circumference of a circle. **G9.1F** Calculate the area of a circle. **G9.1I** Solve problems involving circles or prisms. **G9.5A** Identify and name the hypotenuse of a right-angled triangle. **G9.5B** Know and use Pythagoras' theorem.

Autumn Term 2 4. Real-life graphs (10 hours teaching)	Recognise when values are in direct proportion; Plot graphs and read values to solve problems; Interpret graphs from different sources; Understand financial graphs; Draw and interpret distance–time graphs; Use distance–time graphs to solve problems; Interpret graphs that are curved; Interpret real-life graphs; Understand when graphs are misleading.	**A8.3E** Identify a directly proportional relationship from a graph. **A8.3A** Draw, use and interpret conversion graphs. **A8.3B** Draw, use and interpret distance–time graphs. **A9.5A** Recognise, draw and interpret graphs showing constant rates of change. **A8.3C** Draw and interpret line graphs for real-life contexts. **A8.3D** Draw and interpret non-linear graphs for real-life contexts. **A8.3H** Solve problems by sketching, drawing and interpreting real-life graphs. **S8.2D** Draw and interpret stem and leaf diagrams.
Spring Term 1 5. Transformations (11 hours teaching)	Describe and carry out translations; Describe and carry out reflections; Describe and carry out rotations; Enlarge a shape; Describe an enlargement; Enlarge a shape using negative scale factors; Enlarge a shape using fractional scale factors; Transform 2D shapes using a combination of reflection, rotation, enlargement and translation; Identify planes of reflection symmetry in 3D solids; Find the perimeter and area of 2D shapes after enlargement; Find the volume of 3D solids after enlargements.	**G7.5A** Translate 2D shapes. **G9.2D** Understand and use column vectors in translations. **G7.5B** Recognise and carry out reflections in a mirror line. **G7.5C** Reflect a shape on a coordinate grid; describe a reflection on a coordinate grid. **G7.5D** Recognise and draw rotations about a centre of rotation. **G7.5E** Rotate a shape on a coordinate grid; describe a rotation on a coordinate grid. **G7.5H** Enlarge shapes using positive-integer scale factors (without a centre of enlargement). **G7.5I** Work out the scale factor given an object and its image. **G9.2A** Work out the scale factor of an enlargement. **G9.2C** Describe an enlargement on a coordinate grid.

		G9.2B Enlarge shapes using positive, negative and fractional scale factors, about a centre of enlargement. **G7.5F** Transform 2D shapes by combinations of rotations, reflections and translations. **G7.4C** Identify reflection symmetry in common 3D solids.
<u>Spring Term 1</u> 6. Fractions, decimals and percentages (10 hours teaching)	Recognise fractional equivalents to important recurring decimals; Recognise which denominators of simple fractions produce recurring decimals; Change a recurring decimal into a fraction; Calculate percentages; Work out an original quantity before a percentage increase or decrease; Calculate percentage change; Calculate the effect of repeated percentage changes.	**N8.4B** Work out calculations involving the four operations with integers, fractions and decimals, and also including powers, roots and brackets. **N8.4A** Use estimates to check answers. **N8.2E** Recognise recurring and terminating decimals. **N8.2I** Convert recurring decimals to a fraction using an algebraic method. **N8.3B** Calculate percentages of amounts. **N8.3D** Write a quantity as a percentage of another, where the quantities are measured in different units. **N8.3F** Calculate the original amount after a percentage increase or decrease. **N9.2A** Use inverse operations to work out the original amount after a percentage increase or decrease. **N9.2B** Calculate percentage change. **N8.3G** Calculate simple interest. **N8.3H** Calculate compound interest. **N9.2C** Solve problems involving percentage increase, decrease and change.

Spring Term 2 7. Constructions and loci (11 hours teaching)	Draw triangles accurately using a ruler and protractor; Draw diagrams to scale; Draw accurate nets of 3D solids; Construct triangles using a ruler and compasses. Construct nets of 3D solids using a ruler and compasses; Bisect a line using a ruler and compasses; Construct perpendicular lines using a ruler and compasses; Bisect angles using a ruler and compasses; Draw accurate diagrams to solve problems; Draw a locus; Use loci to solve problems.	**G7.2B** Use a protractor to measure and draw angles; estimate the size of angles. **G7.3E** Use a ruler and protractor to draw triangles accurately, including simple scale drawings. **G9.3B** Construct accurate circles, triangles and quadrilaterals using compasses, ruler and protractor. **G9.3A** Construct perpendicular bisectors and angle bisectors.
Summer Term 1 8. Probability (11 hours teaching)	Calculate and compare probabilities; Decide if a game is fair; Identify mutually exclusive outcomes and events; Find the probabilities of mutually exclusive outcomes and events; Find the probability of an event not happening; Calculate the relative frequency of a value; Use relative frequency to make estimates; Use relative frequency to estimate the probability of an event; Use estimated probability to calculate expected frequencies; Carry out a probability experiment; Estimate probability using data from an experiment; Work out the expected results when an experiment is repeated; List all the possible outcomes of one or two events in sample space diagrams or Venn diagrams; Calculate probabilities of repeated events; Use tree diagrams to find the probabilities of two or more events.	**S7.3A** Use and interpret a probability scale with words. **S7.3B** Use and interpret the probability scale from 0 to 1 or 0% to 100%. **S7.3C** Identify outcomes and equally likely outcomes. **S9.3C** Identify mutually exclusive events. **S7.3D** Calculate probabilities of single and mutually exclusive events. **S7.3E** Calculate the probability of an event not happening. **S7.3F** Solve problems involving probability. **S9.3D** Compare probabilities. **S8.3A** Record data from a simple probability experiment. **S8.3B** Estimate probability based on experimental or collected data. **S8.3C** Use experimental probability to model and predict future outcomes. **S8.3D** Solve problems using experimental probability.

		S9.3E Compare experimental and theoretical probabilities. **S9.3A** Present the possible outcomes of single events, or two successive events (including in lists, tables, Venn diagrams and sample space diagrams). **S9.3B** Calculate probabilities from possible outcomes presented in different ways. **S9.3F** Calculate the probability of two independent events. **S9.3G** Use tree diagrams to calculate the probability of independent events. **S9.3H** Solve problems involving probability.
Summer Term 1 9. Scale drawings and measures (10 hours teaching)	Use scales in maps and plans; Use and interpret maps; Measure and use bearings; Draw diagrams to scale using bearings; Draw diagrams to scale; Use and interpret scale drawings; Identify congruent and similar shapes; Use congruence to solve problems in triangles and quadrilaterals; Use similarity to solve problems in 2D shapes.	**G9.1A** Use and interpret scales on maps and diagrams. **G9.1B** Describe, use and interpret 3-figure bearings. **G9.1C** Solve problems involving 3-figure bearings and/or scale drawings. **G7.5G** Identify congruent shapes. **G9.4A** Use congruent shapes to solve problems about triangles and quadrilaterals. **G9.4B** Identify two shapes that are mathematically similar. **G9.4C** Solve problems involving similar triangles.

<u>Summer Term 2</u> 10. Graphs (12 hours teaching)	Plot straight-line graphs; Find the y-intercept of a straight-line graph; Find the gradient of a straight-line graph; Plot graphs using the gradient and *y*-intercept; Use $y = mx + c$; Find the equation of a straight-line graph; Identify parallel and perpendicular lines; Find the inverse of a linear function; Plot and use non-linear graphs.	**A9.5D** Draw graphs with equations of the form $y = mx + c$ and $ax + by = c$. **A8.3F** Work out the gradient of a linear graph. **A8.3G** Write the equation of a straight-line graph in the form $y = mx + c$. **A9.5B** Recognise that equations of the form y = mx + c are straight-line graphs and state their gradient (m) and intercept (0, c). **A9.5C** Compare linear graphs using their equations, including parallel graphs. **A8.3D** Draw and interpret non-linear graphs for real-life contexts.

Year 9

Term	Activities	iLowerSecondary objectives covered
Autumn Term 1 1. Powers and roots (11 hours teaching)	Find the reciprocal of a number; Work with reciprocals; Use negative indices; Work out powers of fractions; Write numbers using standard form; Order numbers written in standard form; Calculate with numbers written in standard form; Calculate with fractional indices; Use surds; Understand the difference between rational and irrational numbers.	**N9.1C** Understand negative and 0 indices. **A9.1F** Use index notation and index laws for positive and negative integer powers, including zero. **N9.3A** Write large and small numbers using standard form. **N9.3B** Enter and read standard-form numbers on a calculator. **N9.3C** Order numbers written in standard form. **N9.3D** Add, subtract, multiply and divide numbers in standard form and be able to solve problems involving standard form calculations.
Autumn Term 1 2. Quadratics (10 hours teaching)	Generate sequences using quadratic expressions; Find an expression for the *n*th term of a quadratic sequence; Multiply pairs of brackets; Square a linear expression; Use quadratic identities; Factorise quadratic expressions into two brackets; Solve quadratic equations by factorising.	**A9.4A** Use the *n*th term to generate a linear or quadratic sequence. **A9.4D** Solve problems involving sequences. **A9.1G** Expand the product of two linear expressions (where both expressions have x coefficient 1). **A9.1I** Distinguish between expressions, identities and equations **A9.1H** Factorise quadratic expressions of the form $x^2 + bx + c$ (where the squared term has coefficient 1). **A9.1E** Expand and factorise expressions involving powers. **A9.2C** Solve equations involving an x^2 term and a number.

		A9.2D Solve quadratic equations of the form $x^2 + bx + c = 0$, by factorising (where the squared term has coefficient 1). **A9.1K** Recognise and factorise the difference of two squares.
Autumn Term 2 3. Inequalities, equations and formulae (11 hours teaching)	Solve linear equations and represent the solution on a number line; Multiply both sides of an inequality by a negative number; Use index laws with zero and negative powers; Explain the difference between equations, formulae and functions; Construct and solve complex equations; Change the subject of a formula; Change algebraic fractions to equivalent fractions; Solve problems with fractions in formulae.	**A9.3A** Solve linear inequalities in one unknown. **A9.3B** Understand and use symbols relating to inequality. **A9.3C** Represent solutions to linear inequalities on a number line. **A9.1F** Use index notation and index laws for positive and negative integer powers, including zero. **A9.1I** Distinguish between expressions, identities and equations. **A9.2A** Construct and solve equations with the unknown on both sides. **A9.2B** Construct and solve equations with the unknown on both sides and including brackets and fractions. **A9.1C** Substitute values into a formula and find the value of a variable that is not the subject. **A9.1D** Change the subject of a simple formula, involving any of the four operations, powers or roots.

Autumn Term 2 4. Collecting and analysing data (12 hours teaching)	Identify sources of primary and secondary data; Choose a suitable sample size; Understand how to reduce bias in sampling and questionnaires; Identify a random sample; Draw and interpret stem and leaf diagrams; Construct and interpret frequency polygons; Use frequency polygons to compare data; Estimate the mean and range from a grouped frequency table; Draw conclusions from tables and charts; Interpret statistics; Draw and interpret box plots; Compare data using box plots; Draw cumulative frequency graphs for grouped data; Interpret cumulative frequency graphs; Construct and interpret histograms.	**S9.1A** Identify sources of primary and secondary data. **S9.1B** Choose a suitable sample size and what data to collect. **S9.1C** Identify factors that might affect data collection and plan to reduce bias. **S9.2B** Draw and interpret frequency polygons. **S8.1C** Compare two sets of data using statistics or the shape of the graph. **S8.1A** Calculate the mean from a frequency table (ungrouped data). **S9.1F** Estimate the range from a grouped frequency table. **S9.1G** Calculate an estimate of the mean from a grouped frequency table. **S8.1D** Solve problems involving comparing data. **S9.2C** Solve problems by drawing or interpreting graphs, charts and tables. **S9.1I** Solve problems by collecting and analysing data. **S9.1D** Analyse and write questions for a questionnaire. **S9.1E** Design and use data collection sheets and tables. **S9.1H** Identify and suggest reasons for outliers in data. **S9.1J** Know and use correct set language and notation.
Spring Term 1 5. Multiplicative reasoning (10 hours teaching)	Recognise data sets that are in proportion; Set up equations that show direct proportion; Use algebra to solve problems involving proportion; Use algebra to solve problems involving different types of proportion; Work out the length of an arc; Work out the area of a sector; Solve problems involving arcs and sectors.	**N9.4B** Identify a proportional relationship between sets of data. **A9.2E** Write equations to represent direct proportion. **N9.4A** Calculate an unknown quantity from quantities that vary in direct proportion. **N9.4C** Solve word problems using ratio and/or proportion.

Spring Term 1 6. Non-linear graphs (10 hours teaching)	Understand and draw graphs of quadratic functions; Identify quadratic graphs and their features; Solve problems using quadratic graphs; Use quadratic graphs to solve equations; Understand and draw graphs of cubic functions; Identify cubic graphs and their features; Identify and draw graphs of reciprocal functions; Solve problems using reciprocal graphs.	**A9.5F** Draw graphs of quadratic functions. **A9.5G** Solve problems by sketching, drawing and interpreting real-life linear and quadratic graphs.
Spring Term 2 7. Accuracy and measures (9 hours teaching)	Solve problems involving rates of change; Convert units with compound measures; Calculate density and pressure; Solve problems involving compound measures; Understand the effects of rounding; Find upper and lower bounds; Calculate the lower and upper bound of areas and volumes; Calculate the lower and upper bounds of compound measures; Use upper and lower bounds to solve complex problems.	**N9.1E** Find upper and lower bounds for discrete data. **G9.1J** Solve problems using compound measures and rates.
Summer Term 1 8. Graphical solutions (11 hours teaching)	Solve a pair of simultaneous equations; Rearrange equations of graphs to find the gradient and the *y*-intercept; Find the equation of the line between two points; Solve more complex simultaneous equations; Solve simultaneous equations by drawing graphs; Solve inequalities by graphing straight lines; Solve inequalities that involve quadratic graphs.	**A9.2F** Solve a pair of simultaneous linear equations. **A9.2G** Solve problems involving simultaneous linear equations or direct proportion. **A9.5B** Recognise that equations of the form y = mx + c are straight line graphs and state their gradient m and intercept (0, c). **A9.5E** Solve a pair of linear simultaneous equations by drawing graphs.

Summer Term 1 9. Trigonometry (12 hours teaching)	Use conventions for naming sides of a right-angled triangle; Work out the tangent of any angle; Use the tangent ratio to work out an unknown side of a right-angled triangle; Work out the sine of any angle; Use the sine ratio to work out an unknown side of a right-angled triangle; Work out the cosine of any angle; Use the cosine ratio to work out an unknown side in a right-angled triangle; Use the trigonometric ratios to work out an unknown angle in a right-angled triangle; Use trigonometry to solve problems involving missing lengths and angles; Plot and sketch graphs of the trigonometric functions; Use the trigonometric ratios with any angle from 0 to 360°.	**G9.5C** Know, understand and use sine, cosine and tangent of acute angles to calculate lengths in a right-angled triangle. **G9.5D** Solve problems involving right-angled triangles. **G9.5E** Use trigonometry to calculate lengths and angles in a right-angled triangle.
Summer Term 2 10. Mathematical reasoning (9 hours teaching)	Explain, show and justify a mathematical solution; Draw graphs to solve mathematical problems; Identify the difference between giving an example and proving a theory; Understand how to use mathematical proof; Present a logical argument using algebra.	**A8.3H** Solve problems by sketching, drawing and interpreting real-life graphs. **A9.5G** Solve problems by sketching, drawing and interpreting real-life linear and quadratic graphs. **S8.2H** Solve problems by drawing or interpreting graphs, charts and tables. **A9.1J** Solve problems involving formulae and expressions.