

# Curriculum Map 2020-21

- Interleaving opportunities? <https://www.kangaroomaths.co.uk/kennys-pouch-plan-secondary/>

Subject \_\_\_\_\_

		Term 1	Term 2	Term 3	Term 4	Term 5	Term 6
Stage 6	<b>Assessment task(s)/title(s)</b>	Numbers & the Number System, Checking, Approximating & Estimating, Calculating	Calculating: Division, Visualising & Constructing, Investigating Properties of Shapes	Algebraic Proficiency: Using Formulae, Exploring Fractions, Decimals & %, Proportional Reasoning	Pattern Sniffing, Measuring Space, Investigating Angles	Calculating Fractions, Decimals & %, Solving Equations & Inequalities, Calculating Space	Mathematical Movement, Presentation of Data, Measuring Data
	<b>Key knowledge</b>	<ul style="list-style-type: none"> <li>• Understand and use decimals with up to three decimal places</li> <li>• Work with numbers up to ten million</li> <li>• Explore the use of negative numbers</li> <li>• Develop understanding of factors and multiples</li> <li>• Investigate prime numbers</li> <li>• Explore ways of approximating numbers</li> <li>• Explore ways of checking answers</li> <li>• Develop mental calculation skills</li> <li>• Extend written methods of multiplication</li> <li>• Know and use the order of operations</li> <li>• Solve problems involving addition, subtraction and multiplication</li> </ul>	<ul style="list-style-type: none"> <li>• Develop written methods of short division for numbers up to four-digits divided by a one-digit number</li> <li>• Deal with remainders when carrying out division</li> <li>• Solve problems involving the four operations</li> <li>• Construct 2D shapes</li> <li>• Investigate 3D shapes</li> <li>• Explore nets of 3D shapes</li> <li>• Investigate properties of 2D shapes</li> <li>• Investigate angles in polygons</li> <li>• Understand and use the vocabulary of circles</li> </ul>	<ul style="list-style-type: none"> <li>• Use simple formulae written in words</li> <li>• Create simple formulae written in words</li> <li>• Work with formulae written algebraically</li> <li>• Explore the equivalence between fractions</li> <li>• Use the equivalence between fractions</li> <li>• Explore the equivalence between fractions, decimals and percentages</li> <li>• Solve problems involving scaling</li> <li>• Explore enlargement</li> <li>• Solve problems involving sharing and grouping</li> </ul>	<ul style="list-style-type: none"> <li>• Explore number sequences</li> <li>• Solve problems involving measurement</li> <li>• Develop knowledge of angles</li> <li>• Apply angle facts to deduce unknown angles</li> </ul>	<ul style="list-style-type: none"> <li>• Calculate with fractions</li> <li>• Calculate with decimals</li> <li>• Calculate with percentages</li> <li>• Solve missing number problems</li> <li>• Understand and use algebra</li> <li>• Explore area</li> <li>• Investigate volume</li> <li>• Solve problems involving area and volume</li> </ul>	<ul style="list-style-type: none"> <li>• Understand and use Cartesian coordinates</li> <li>• Use transformations to move shapes</li> <li>• Construct and interpret pie charts</li> <li>• Solve problems involving graphs and charts</li> <li>• Understand and use the mean</li> </ul>
	<b>Vocabulary instruction</b>	Place value Digit Negative number (Common) multiple	Commutative Divide, Division, Divisible Divisor, Dividend, Quotient, Remainder	Formula, Formulae Expression Variable Substitute	Pattern Sequence Linear Term	Mixed number Equivalent fraction Simplify, cancel Lowest terms	2-D Grid Axis, axes, x-axis, y-axis Origin

	<p>(Common) factor</p> <p>Divisible</p> <p>Prime number, Composite number</p> <p>Approximate (noun and verb)</p> <p>Round</p> <p>Decimal place</p> <p>Check</p> <p>Solution</p> <p>Answer</p> <p>Estimate (noun and verb)</p> <p>Order of magnitude</p> <p>Accurate</p> <p>Accuracy</p> <p>Addition</p> <p>Subtraction</p> <p>Sum, Total</p> <p>Difference, Minus, Less</p> <p>Column addition</p> <p>Column subtraction</p> <p>Operation</p> <p>Multiply, Multiplication, Times, Product</p> <p>Commutative</p> <p>Factor</p> <p>Short multiplication</p> <p>Long multiplication</p> <p>Estimate</p>	<p>Factor</p> <p>Short division</p> <p>Long division</p> <p>Remainder</p> <p>Operation</p> <p>Estimate</p> <p>Protractor</p> <p>Measure</p> <p>Nearest</p> <p>Construct</p> <p>Sketch</p> <p>Cube, Cuboid, Cylinder, Pyramid, Prism</p> <p>Net</p> <p>Edge, Face, Vertex (Vertices)</p> <p>Visualise</p> <p>Quadrilateral, Square, Rectangle, Parallelogram, (Isosceles) Trapezium, Kite, Rhombus, Delta, Arrowhead</p> <p>Triangle, Scalene, Right-angled, Isosceles, Equilateral</p> <p>Polygon, Regular, Irregular</p> <p>Pentagon, Hexagon, Octagon, Decagon, Dodecagon</p> <p>Circle, Radius, Diameter, Circumference, Centre</p> <p>Parallel</p> <p>Diagonal</p> <p>Angle</p>	<p>Symbol</p> <p>Mile</p> <p>Kilometre</p> <p>Metric</p> <p>Imperial</p> <p>Fraction</p> <p>Improper fraction, Proper fraction, Vulgar fraction,</p> <p>Top-heavy fraction</p> <p>Percentage</p> <p>Decimal</p> <p>Proportion</p> <p>Simplify</p> <p>Equivalent</p> <p>Lowest terms</p> <p>Proportion</p> <p>Ratio</p> <p>Quantity</p> <p>Integer</p> <p>Similar (shapes)</p> <p>Enlargement</p> <p>Scale factor</p> <p>Group</p> <p>Share</p> <p>Multiples</p>	<p>Ascending</p> <p>Descending</p> <p>Length, distance</p> <p>Mass, weight</p> <p>Volume</p> <p>Capacity</p> <p>Metre, centimetre, millimetre</p> <p>Tonne, kilogram, gram, milligram</p> <p>Litre, millilitre</p> <p>Hour, minute, second</p> <p>Inch, foot, yard</p> <p>Pound, ounce</p> <p>Pint, gallon</p> <p>Angle</p> <p>Degrees</p> <p>Right angle</p> <p>Acute angle</p> <p>Obtuse angle</p> <p>Reflex angle</p> <p>Protractor</p> <p>Vertically opposite</p>	<p>Proper fraction, improper fraction, top-heavy fraction, vulgar fraction</p> <p>Numerator, denominator</p> <p>Percent, percentage</p> <p>Algebra, algebraic, algebraically</p> <p>Symbol</p> <p>Expression</p> <p>Variable</p> <p>Substitute</p> <p>Equation</p> <p>Unknown</p> <p>Enumerate</p> <p>Perimeter, area, volume, capacity</p> <p>Square, rectangle, parallelogram, triangle</p> <p>Composite rectilinear</p> <p>Polygon</p> <p>Cube, cuboid</p> <p>Millimetre, Centimetre, Metre, Kilometre</p> <p>Square millimetre, square centimetre, square metre, square kilometre</p> <p>Cubic centimetre, centimetre cube</p> <p>Formula, formulae</p> <p>Convert</p> <p>Length, breadth, depth, height, width</p>	<p>Quadrant (Cartesian) coordinates</p> <p>Point</p> <p>Translation</p> <p>Reflection</p> <p>Transformation</p> <p>Object, Image</p> <p>Congruent, congruence</p> <p>Data</p> <p>Scale</p> <p>Axis, axes</p> <p>Graph</p> <p>Frequency</p> <p>Time graph, Time series</p> <p>Line graph</p> <p>Pie chart</p> <p>Sector</p> <p>Angle</p> <p>Protractor</p> <p>Degrees</p> <p>Maximum, minimum</p> <p>Average</p> <p>Mean</p> <p>Measure</p> <p>Data</p> <p>Statistic</p> <p>Statistics</p> <p>Approximate</p> <p>Round</p>	
	<p><b>Subject-specific strand(s)</b></p>	<ul style="list-style-type: none"> <li>identify the value of each digit in numbers given to three decimal places and multiply and divide numbers by 10, 100 and 1000 giving answers up to three decimal places</li> <li>read, write, order and compare numbers up to 10 000 000 and determine the value of each digit</li> <li>use negative numbers in context, and calculate intervals across zero</li> </ul>	<ul style="list-style-type: none"> <li>divide numbers up to 4 digits by a two-digit whole number using the formal written method of long division; interpret remainders as whole number remainders, fractions, or by rounding, as appropriate for the context</li> <li>divide numbers up to 4 digits by a two-digit number using the formal written method of short</li> </ul>	<ul style="list-style-type: none"> <li>use simple formulae</li> <li>convert between miles and kilometres</li> <li>use common factors to simplify fractions; use common multiples to express fractions in the same denomination</li> <li>compare and order fractions, including fractions &gt; 1</li> <li>associate a fraction with division and calculate decimal fraction equivalents [for example, 0.375]</li> </ul>	<ul style="list-style-type: none"> <li>generate and describe linear number sequences</li> <li>use, read, write and convert between standard units, converting measurements of length, mass, volume and time from a smaller unit of measure to a larger unit, and vice versa, using decimal notation to up to three decimal places</li> </ul>	<ul style="list-style-type: none"> <li>add and subtract fractions with different denominators and mixed numbers, using the concept of equivalent fractions</li> <li>multiply simple pairs of proper fractions, writing the answer in its simplest form [for example, <math>\frac{1}{4} \times \frac{1}{2} = \frac{1}{8}</math>]</li> <li>divide proper fractions by whole numbers [for example, <math>\frac{1}{3} \div 2 = \frac{1}{6}</math>]</li> </ul>	<ul style="list-style-type: none"> <li>describe positions on the full coordinate grid (all four quadrants)</li> <li>draw and translate simple shapes on the coordinate plane, and reflect them in the axes</li> <li>interpret and construct pie charts and line graphs and use these to solve problems</li> <li>calculate and interpret the mean as an average</li> </ul>

		<ul style="list-style-type: none"> <li>• identify common factors, common multiples and prime numbers</li> <li>• solve problems which require answers to be rounded to specified degrees of accuracy</li> <li>• use estimation to check answers to calculations and determine, in the context of a problem, an appropriate degree of accuracy</li> <li>• round any whole number to a required degree of accuracy</li> <li>• perform mental calculations, including with mixed operations and large numbers</li> <li>• solve addition and subtraction multi-step problems in contexts, deciding which operations and methods to use and why</li> <li>• multiply multi-digit numbers up to 4 digits by a two-digit whole number using the formal written method of long multiplication</li> <li>• solve problems involving addition, subtraction and multiplication</li> <li>• use their knowledge of the order of operations to carry out calculations</li> </ul>	<p>division where appropriate, interpreting remainders according to the context</p> <ul style="list-style-type: none"> <li>• use written division methods in cases where the answer has up to two decimal places</li> <li>• solve problems involving division</li> <li>• use their knowledge of the order of operations to carry out calculations involving the four operations</li> <li>• draw 2-D shapes using given dimensions and angles</li> <li>• recognise, describe and build simple 3-D shapes, including making nets</li> <li>• compare and classify geometric shapes based on their properties and sizes and find unknown angles in any triangles, quadrilaterals, and regular polygons</li> <li>• illustrate and name parts of circles, including radius, diameter and circumference and know that the diameter is twice the radius</li> </ul>	<p>for a simple fraction [for example, <math>\frac{3}{8}</math>]</p> <ul style="list-style-type: none"> <li>• recall and use equivalences between simple fractions, decimals and percentages, including in different contexts</li> <li>• solve problems involving the relative sizes of two quantities where missing values can be found by using integer multiplication and division facts</li> <li>• solve problems involving similar shapes where the scale factor is known or can be found</li> <li>• solve problems involving unequal sharing and grouping using knowledge of fractions and multiples</li> </ul>	<ul style="list-style-type: none"> <li>• recognise angles where they meet at a point, are on a straight line, or are vertically opposite, and find missing angles</li> </ul>	<ul style="list-style-type: none"> <li>• multiply one-digit numbers with up to two decimal places by whole numbers</li> <li>• solve problems involving the calculation of percentages [for example, of measures, and such as 15% of 360] and the use of percentages for comparison</li> <li>• enumerate possibilities of combinations of two variables</li> <li>• express missing number problems algebraically</li> <li>• find pairs of numbers that satisfy an equation with two unknowns</li> <li>• recognise that shapes with the same areas can have different perimeters and vice versa</li> <li>• calculate the area of parallelograms and triangles</li> <li>• calculate, estimate and compare volume of cubes and cuboids using standard units, including cubic centimetres (<math>\text{cm}^3</math>) and cubic metres (<math>\text{m}^3</math>), and extending to other units [for example, <math>\text{mm}^3</math> and <math>\text{km}^3</math>]</li> <li>• recognise when it is possible to use formulae for area and volume of shape</li> <li>• solve problems involving the calculation and conversion of units of measure, using</li> </ul>	
--	--	---	--	---	--	--	--

						decimal notation up to three decimal places where appropriate	
Stage 7	<b>Assessment task(s)/title(s)</b>	Numbers and the Number System; Calculating	Checking, Approximating & Estimating, Counting & Computing, Visualising & Constructing, Investigating Properties of Shapes	Algebraic Proficiency: Tinkering, Exploring FDP, Proportional Reasoning, Pattern Sniffing	Measuring Space, Investigating Angles, Calculating Fractions, Decimals & %	Solving Equations & Inequalities, Calculating Space	Mathematical Movement, Presentation of Data, Measuring Data
	<b>Key knowledge</b>	<ul style="list-style-type: none"> <li>Solve problems using common factors and highest common factors</li> <li>Exploring prime numbers</li> <li>Solve problems using common multiples and lowest common multiples</li> <li>Explore powers and roots</li> <li>Exploring place value</li> <li>Exploring written methods of calculation</li> <li>Calculating with decimals</li> </ul> <p>Know and apply the correct order of operations</p>	<ul style="list-style-type: none"> <li>Explore ways of approximating numbers</li> <li>Explore ways of checking answers</li> <li>Comparing numbers</li> <li>Ordering integers and decimals</li> <li>Ordering fractions</li> <li>Ordering integers, decimals and fractions (including mixed numbers)</li> <li>Using comparison symbols in algebraic contexts</li> <li>Interpret geometrical conventions and notation</li> <li>Apply geometrical conventions and notation</li> <li>Investigate the properties of 3D shapes</li> <li>Explore quadrilaterals</li> <li>Explore triangles</li> </ul>	<ul style="list-style-type: none"> <li>Understand the vocabulary and notation of algebra</li> <li>Manipulate algebraic expressions</li> <li>Explore functions</li> <li>Evaluate algebraic statements</li> <li>Understand and use top-heavy fractions</li> <li>Understand the meaning of 'percentage'</li> <li>Explore links between fractions and percentages</li> <li>Understand and use ratio notation</li> <li>Solve problems that involve dividing in a ratio</li> <li>Investigate number patterns</li> <li>Explore number sequences</li> <li>Explore sequences</li> </ul>	<ul style="list-style-type: none"> <li>Measure accurately</li> <li>Convert between measures</li> <li>Solve problems involving measurement</li> <li>Investigate angles</li> <li>Calculate with fractions</li> <li>Calculate with percentages</li> </ul>	<ul style="list-style-type: none"> <li>Explore way of solving equations</li> <li>Solve two-step equations</li> <li>Solve three-step equations</li> <li>Develop knowledge of area</li> <li>Investigate surface area</li> <li>Explore volume</li> </ul>	<ul style="list-style-type: none"> <li>Explore lines on the coordinate grid</li> <li>Use transformations to move shapes</li> <li>Describe transformations</li> <li>Explore types of data</li> <li>Construct and interpret graphs</li> <li>Select appropriate graphs and charts</li> <li>Investigate averages</li> <li>Explore ways of summarising data</li> <li>Analyse and compare sets of data</li> </ul>
	<b>Vocabulary instruction</b>	((Lowest) common) multiple and LCM ((Highest) common) factor and HCF Power (Square and cube) root	Approximate (noun and verb) Round Decimal place Check Solution Answer	Algebra Expression, Term, Formula (formulae), Equation, Function, Variable Mapping diagram, Input, Output	Length, distance Mass, weight Volume Capacity Metre, centimetre, millimetre	Algebra, algebraic, algebraically Unknown Equation Operation Solve Solution	(Cartesian) coordinates Axis, axes, x-axis, y-axis Origin Quadrant Translation, Reflection, Rotation Transformation

	<p>Triangular number, Square number, Cube number, Prime number          Linear sequence, Arithmetic sequence          Improper fraction          Top-heavy fraction          Mixed number          Operation          Inverse          Long multiplication          Short division          Long division          Remainder</p>	<p>Estimate (noun and verb)          Order of magnitude          Accurate, Accuracy          Significant figure          Cancel          Inverse          Operation          Positive number          Negative number          Integer          Numerator          Denominator          Edge, Face, Vertex (Vertices)          Plane          Parallel          Perpendicular          Regular polygon          Rotational symmetry          Face, Edge, Vertex (Vertices)          Cube, Cuboid, Prism, Cylinder, Pyramid, Cone, Sphere          Quadrilateral          Square, Rectangle, Parallelogram, (Isosceles)          Trapezium, Kite, Rhombus          Delta, Arrowhead          Diagonal          Perpendicular          Parallel          Triangle          Scalene, Right-angled, Isosceles, Equilateral</p>	<p>Represent          Substitute          Evaluate          Like terms          Simplify / Collect          Fraction          Improper fraction          Proper fraction          Vulgar fraction          Top-heavy fraction          Percentage          Proportion          Ratio          Proportion          Compare, comparison          Part          Simplify          Common factor          Cancel          Lowest terms          Unit          Pattern          Sequence          Linear          Term          Term-to-term rule          Ascending          Descending</p>	<p>Tonne, kilogram, gram, milligram          Litre, millilitre          Hour, minute, second          Inch, foot, yard          Pound, ounce          Pint, gallon          Line segment          Angle          Degrees          Right angle          Acute angle          Obtuse angle          Reflex angle          Protractor          Vertically opposite          Geometry, geometrical          Mixed number          Equivalent fraction          Simplify, cancel, lowest terms          Proper fraction, improper fraction, top-heavy fraction, vulgar fraction          Percent, percentage          Multiplier          Increase, decrease</p>	<p>Brackets          Symbol          Substitute          Perimeter, area, volume, capacity, surface area          Square, rectangle, parallelogram, triangle, trapezium (trapezia)          Polygon          Cube, cuboid          Square millimetre, square centimetre, square metre, square kilometre          Cubic centimetre, centimetre cube          Formula, formulae          Length, breadth, depth, height, width</p>	<p>Object, Image          Congruent, congruence          Mirror line          Vector          Centre of rotation          Data, Categorical data, Discrete data          Pictogram, Symbol, Key          Frequency          Table, Frequency table          Tally          Bar chart          Time graph, Time series          Bar-line graph, Vertical line chart          Scale, Graph          Axis, axes          Line graph          Pie chart          Sector          Angle          Maximum, minimum          Average          Spread          Consistency          Mean          Median          Mode          Range          Measure          Data          Statistic          Statistics          Approximate          Round</p>	
	<p><b>Subject-specific strand(s)</b></p>	<ul style="list-style-type: none"> <li>use the concepts and vocabulary of prime numbers, factors (divisors), multiples, common factors, common multiples, highest common factor and lowest common multiple</li> <li>use positive integer powers and associated real roots (square, cube and higher), recognise powers of 2, 3, 4, 5</li> <li>recognise and use sequences of triangular,</li> </ul>	<ul style="list-style-type: none"> <li>round numbers and measures to an appropriate degree of accuracy (e.g. to a specified number of decimal places or significant figures)</li> <li>estimate answers; check calculations using approximation and estimation, including answers obtained using technology</li> <li>recognise and use relationships between</li> </ul>	<ul style="list-style-type: none"> <li>understand and use the concepts and vocabulary of expressions, equations, formulae and terms</li> <li>use and interpret algebraic notation, including: <math>ab</math> in place of <math>a \times b</math>, <math>3y</math> in place of <math>y + y + y</math> and <math>3 \times y</math>, <math>a^2</math> in place of <math>a \times a</math>, <math>a^3</math> in place of <math>a \times a \times a</math>, <math>a/b</math> in place of <math>a \div b</math>, brackets</li> </ul>	<ul style="list-style-type: none"> <li>use standard units of measure and related concepts (length, area, volume/capacity, mass, time, money, etc.)</li> <li>use standard units of mass, length, time, money and other measures (including standard compound measures) using decimal quantities where appropriate</li> <li>change freely between related standard units</li> </ul>	<ul style="list-style-type: none"> <li>recognise and use relationships between operations, including inverse operations (e.g. cancellation to simplify calculations and expressions)</li> <li>solve linear equations in one unknown algebraically</li> <li>use standard units of measure and related concepts (length, area, volume/capacity)</li> </ul>	<ul style="list-style-type: none"> <li>work with coordinates in all four quadrants</li> <li><i>understand and use lines parallel to the axes, <math>y = x</math> and <math>y = -x</math></i></li> <li>solve geometrical problems on coordinate axes</li> <li>identify, describe and construct congruent shapes including on coordinate axes, by considering</li> </ul>

		<p>square and cube numbers, simple arithmetic progressions</p> <ul style="list-style-type: none"> <li>understand and use place value (e.g. when working with very large or very small numbers, and when calculating with decimals)</li> <li>apply the four operations, including formal written methods, to integers and decimals</li> <li>use conventional notation for priority of operations, including brackets</li> <li>recognise and use relationships between operations, including inverse operations (e.g. cancellation to simplify calculations and expressions)</li> </ul>	<p>operations, including inverse operations (e.g. cancellation to simplify calculations and expressions)</p> <ul style="list-style-type: none"> <li>order positive and negative integers, decimals and fractions</li> <li>use the symbols =, ≠, &lt;, &gt;, ≤, ≥</li> <li>use conventional terms and notations: points, lines, vertices, edges, planes, parallel lines, perpendicular lines, right angles, polygons, regular polygons and polygons with reflection and/or rotation symmetries</li> <li>use the standard conventions for labelling and referring to the sides and angles of triangles</li> <li>draw diagrams from written description</li> <li>identify properties of the faces, surfaces, edges and vertices of: cubes, cuboids, prisms, cylinders, pyramids, cones and spheres</li> <li>derive and apply the properties and definitions of: special types of quadrilaterals, including square, rectangle, parallelogram, trapezium, kite and rhombus; and triangles and other plane figures using appropriate language</li> </ul>	<ul style="list-style-type: none"> <li>simplify and manipulate algebraic expressions by collecting like terms and multiplying a single term over a bracket</li> <li>where appropriate, interpret simple expressions as functions with inputs and outputs</li> <li>substitute numerical values into formulae and expressions</li> <li>use conventional notation for priority of operations, including brackets</li> <li>express one quantity as a fraction of another, where the fraction is less than 1 or greater than 1</li> <li>define percentage as 'number of parts per hundred'</li> <li>express one quantity as a percentage of another</li> <li>use ratio notation, including reduction to simplest form</li> <li>divide a given quantity into two parts in a given part:part or part:whole ratio</li> <li>generate terms of a sequence from a term-to-term rule</li> </ul>	<p>(e.g. time, length, area, volume/capacity, mass) in numerical contexts</p> <ul style="list-style-type: none"> <li>measure line segments and angles in geometric figures</li> <li>apply the properties of angles at a point, angles at a point on a straight line, vertically opposite angles</li> <li>apply the four operations, including formal written methods, to simple fractions (proper and improper), and mixed numbers</li> <li>interpret percentages and percentage changes as a fraction or a decimal, and interpret these multiplicatively</li> <li>compare two quantities using percentages</li> <li>solve problems involving percentage change, including percentage increase/decrease</li> </ul>	<ul style="list-style-type: none"> <li>calculate perimeters of 2D shapes</li> <li>know and apply formulae to calculate area of triangles, parallelograms, trapezia</li> <li>calculate surface area of cuboids</li> <li>know and apply formulae to calculate volume of cuboids</li> <li>understand and use standard mathematical formulae</li> </ul>	<p>rotation, reflection and translation</p> <ul style="list-style-type: none"> <li>describe translations as 2D vectors</li> <li>interpret, analyse and compare the distributions of data sets from univariate empirical distributions through appropriate measures of central tendency (median, mean and mode) and spread (range)</li> </ul>
Stage 8	Assessment task(s)/title(s)	Numbers & The Number System, Calculating,	Understanding Risk 1, Algebraic Proficiency: Tinkering	Exploring Fractions, Decimals & %, Pattern Sniffing,	Investigating Angles, Calculating Fractions, Decimals & %, Calculating	Calculating Space, Algebraic Proficiency: Visualising,	Presentation of Data, Measuring Data

		Visualising & Constructing		Proportional Reasoning	Solving Equations & Inequalities	Understanding Risk 2	
<b>Key knowledge</b>	<ul style="list-style-type: none"> <li>Identify and use the prime factorisation of a number</li> <li>Understand and use standard form</li> <li>Calculate with negative numbers</li> <li>Apply the correct order of operations</li> <li>apply the four operations, including formal written methods, to integers, decimals and simple fractions (proper and improper), and mixed numbers – all both positive and negative</li> <li>use conventional notation for priority of operations, including brackets, powers, roots and reciprocals</li> <li>Explore enlargement of 2D shapes</li> <li>Use and interpret scale drawings</li> <li>Use and interpret bearings</li> <li>Explore ways of representing 3D shapes</li> </ul>	<ul style="list-style-type: none"> <li>Understand the meaning of probability</li> <li>Explore experiments and outcomes</li> <li>Develop understanding of probability</li> <li>Understand the concept of a factor</li> <li>Understand the notation of algebra</li> <li>Manipulate algebraic expressions</li> <li>Evaluate algebraic statements</li> </ul>	<ul style="list-style-type: none"> <li>Explore links between fractions, decimals and percentages</li> <li>Explore sequences</li> <li>Develop knowledge of angles</li> <li>Explore the uses of ratio</li> <li>Investigate the connection between ratio and proportion</li> <li>Solve problems involving proportional reasoning</li> <li>Solve problems involving compound units</li> </ul>	<ul style="list-style-type: none"> <li>Explore geometrical situations involving parallel lines</li> <li>Calculate with fractions</li> <li>Calculate with percentages</li> <li>Solve linear equations with the unknown on one side</li> <li>Solve linear equations with the unknown on both sides</li> <li>Explore connections between graphs and equations</li> </ul>	<ul style="list-style-type: none"> <li>Investigate circles</li> <li>Discover pi</li> <li>Solve problems involving circles</li> <li>Explore prisms and cylinders</li> <li>lot and interpret linear graphs</li> <li>Plot and quadratic graphs</li> <li>Model real situations using linear graphs</li> <li>Explore experiments and outcomes</li> <li>Develop understanding of probability</li> <li>Use probability to make predictions</li> </ul>	<ul style="list-style-type: none"> <li>Explore types of data</li> <li>Construct and interpret graphs</li> <li>Select appropriate graphs and charts</li> </ul>	
<b>Vocabulary instruction</b>	Prime Prime factor Prime factorisation Product Venn diagram Highest common factor Lowest common multiple Standard form Significant figure Negative number Directed number Improper fraction Top-heavy fraction Mixed number Operation Inverse Long multiplication Short division Power	Probability, Theoretical probability Event Outcome Impossible, Unlikely, Evens chance, Likely, Certain Equally likely Mutually exclusive Exhaustive Possibility space Experiment Product Variable Term Coefficient Common factor Factorise Power	Fraction Mixed number Top-heavy fraction Percentage Decimal Proportion Terminating Recurring Simplify, Cancel Sequence Linear Term Difference Term-to-term rule Position-to-term rule Ascending Descending Ratio Proportion	Degrees Right angle, acute angle, obtuse angle, reflex angle Vertically opposite Geometry, geometrical Parallel Alternate angles, corresponding angles Interior angle, exterior angle Regular polygon Proper fraction, improper fraction, mixed number Simplify, cancel, lowest terms Percent, percentage Percentage change Original amount Multiplier	Circle Centre Radius, diameter, chord, circumference Pi (Right) prism Cross-section Cylinder Polygon, polygonal Solid Plot Equation (of a graph) Function Formula Linear Coordinate plane Gradient y-intercept Substitute	Data Categorical data, Discrete data Continuous data, Grouped data Table, Frequency table Frequency Histogram Scale, Graph Axis, axes Scatter graph (scatter diagram, scattergram, scatter plot) Bivariate data (Linear) Correlation Positive correlation, Negative correlation	

		Indices Roots Similar, Similarity Enlarge, enlargement Scaling Scale factor Centre of enlargement Object Image Scale drawing Bearing Plan, Elevation	Indices Formula, Formulae Subject Change the subject	Proportional Multiplier Speed Unitary method Units Compound unit	(Simple) interest Exact Algebra, algebraic, algebraically Unknown Equation Operation Solve Solution Brackets Symbol Substitute Graph Point of intersection	Quadratic Piece-wise linear Model Kinematic, Speed, Distance Outcome Event Experiment, Combined experiment Frequency tree Enumerate Set Venn diagram Possibility space, sample space Equally likely outcomes Theoretical probability Random Bias, Fairness Relative frequency	
	<b>Subject-specific strand(s)</b>	<ul style="list-style-type: none"> <li>use the concepts and vocabulary of prime numbers, highest common factor, lowest common multiple, prime factorisation, including using product notation and the unique factorisation theorem</li> <li>round numbers and measures to an appropriate degree of accuracy (e.g. to a specified number of decimal places or significant figures)</li> <li>interpret standard form <math>A \times 10^n</math>, where <math>1 \leq A &lt; 10</math> and <math>n</math> is an integer</li> <li>apply the four operations, including formal written methods, to integers, decimals and simple fractions (proper and improper), and mixed numbers – all both positive and negative</li> <li>use conventional notation for priority of operations, including</li> </ul>	<ul style="list-style-type: none"> <li>relate relative expected frequencies to theoretical probability, using appropriate language and the 0 - 1 probability scale</li> <li>record describe and analyse the frequency of outcomes of probability experiments using tables</li> <li>construct theoretical possibility spaces for single experiments with equally likely outcomes and use these to calculate theoretical probabilities</li> <li>apply the property that the probabilities of an exhaustive set of outcomes sum to one</li> <li>use and interpret algebraic notation, including: <math>a^2b</math> in place of <math>a \times a \times b</math>, coefficients written as fractions rather than as decimals</li> </ul>	<ul style="list-style-type: none"> <li>work interchangeably with terminating decimals and their corresponding fractions (such as 3.5 and <math>7/2</math> or 0.375 or <math>3/8</math>)</li> <li>generate terms of a sequence from either a term-to-term or a position-to-term rule</li> <li>deduce expressions to calculate the <math>n</math>th term of linear sequences</li> <li>express the division of a quantity into two parts as a ratio; apply ratio to real contexts and problems (such as those involving conversion, comparison, scaling, mixing, concentrations)</li> <li>identify and work with fractions in ratio problems</li> </ul>	<ul style="list-style-type: none"> <li>understand and use alternate and corresponding angles on parallel lines</li> <li>derive and use the sum of angles in a triangle (e.g. to deduce and use the angle sum in any polygon, and to derive properties of regular polygons)</li> <li>interpret fractions and percentages as operators</li> <li>work with percentages greater than 100%</li> <li>solve problems involving percentage change, including original value problems, and simple interest including in financial mathematics</li> <li>calculate exactly with fractions</li> <li>solve linear equations with the unknown on both sides of the equation</li> <li>find approximate solutions to linear</li> </ul>	<ul style="list-style-type: none"> <li>compare lengths, areas and volumes using ratio notation</li> <li>calculate perimeters of 2D shapes, including circles</li> <li>identify and apply circle definitions and properties, including: centre, radius, chord, diameter, circumference</li> <li>know the formulae: circumference of a circle = <math>2\pi r = \pi d</math>, area of a circle = <math>\pi r^2</math></li> <li>calculate areas of circles and composite shapes</li> <li>know and apply formulae to calculate volume of right prisms (including cylinders)</li> <li>plot graphs of equations that correspond to straight-line graphs in the coordinate plane</li> <li>identify and interpret gradients and intercepts of linear functions graphically</li> </ul>	<ul style="list-style-type: none"> <li>interpret, analyse and compare the distributions of data sets from univariate empirical distributions through appropriate graphical representation involving discrete, continuous and grouped data</li> <li>use and interpret scatter graphs of bivariate data</li> <li>recognise correlation</li> </ul>



		<p>brackets, powers, roots and reciprocals</p> <ul style="list-style-type: none"> <li>• measure line segments and angles in geometric figures, including interpreting maps and scale drawings and use of bearings</li> <li>• identify, describe and construct similar shapes, including on coordinate axes, by considering enlargement</li> <li>• interpret plans and elevations of 3D shapes</li> <li>• use scale factors, scale diagrams and maps</li> </ul>	<ul style="list-style-type: none"> <li>• understand and use the concepts and vocabulary of factors</li> <li>• simplify and manipulate algebraic expressions by taking out common factors and simplifying expressions involving sums, products and powers, including the laws of indices</li> <li>• substitute numerical values into scientific formulae</li> <li>• rearrange formulae to change the subject</li> </ul>	<ul style="list-style-type: none"> <li>• understand and use proportion as equality of ratios</li> <li>• express a multiplicative relationship between two quantities as a ratio or a fraction</li> <li>• use compound units (such as speed, rates of pay, unit pricing)</li> <li>• change freely between compound units (e.g. speed, rates of pay, prices) in numerical contexts</li> <li>• relate ratios to fractions and to linear functions</li> </ul>	<p>equations using a graph</p>	<ul style="list-style-type: none"> <li>• recognise, sketch and interpret graphs of linear functions and simple quadratic functions</li> <li>• plot and interpret graphs and graphs of non-standard (<i>piece-wise linear</i>) functions in real contexts, to find approximate solutions to problems such as simple kinematic problems involving distance and speed</li> <li>• apply systematic listing strategies</li> <li>• record describe and analyse the frequency of outcomes of probability experiments using frequency trees</li> <li>• enumerate sets and combinations of sets systematically, using tables, grids and Venn diagrams</li> <li>• construct theoretical possibility spaces for combined experiments with equally likely outcomes and use these to calculate theoretical probabilities</li> <li>• apply ideas of randomness, fairness and equally likely events to calculate expected outcomes of multiple future experiments</li> </ul>	
Stage 9	<b>Assessment task(s)/title(s)</b>	Calculating, Visualising & Constructing	Algebraic Proficiency: Tinkering, Proportional Reasoning	Presentation of Data, Pattern Sniffing, Conjecturing	Calculating Space, Solving Equations & Inequalities 1	Understanding Risk, Algebraic Proficiency: Visualising	Solving Equations & Inequalities 2, Pattern Sniffing: Stage 10, analysing

							Statistics – Stage 10
<b>Key knowledge</b>	<ul style="list-style-type: none"> <li>Calculate with powers and roots</li> <li>Explore the use of standard form</li> <li>Explore the effects of rounding</li> <li>Know standard mathematical constructions</li> <li>Apply standard mathematical constructions</li> <li>Explore ways of representing 3D shapes</li> </ul>	<ul style="list-style-type: none"> <li>Understand equations and identities</li> <li>Manipulate algebraic expressions</li> <li>Construct algebraic statements</li> <li>Solve problems involving different types of proportion</li> <li>Investigate ways of representing proportion</li> <li>Understand and solve problems involving congruence</li> <li>Understand and solve problems involving similarity</li> <li>Know and use compound units in a range of situations</li> </ul>	<ul style="list-style-type: none"> <li>Construct and interpret graphs of time series</li> <li>Interpret a range of charts and graphs</li> <li>Interpret scatter diagrams</li> <li>Explore correlation</li> <li>Investigate Fibonacci numbers</li> <li>Investigate Fibonacci type sequences</li> <li>Explore quadratic sequences</li> <li>Explore the congruence of triangles</li> <li>Investigate geometrical situations</li> <li>Form conjectures</li> <li>Create a mathematical proof</li> </ul>	<ul style="list-style-type: none"> <li>Solve problems involving arcs and sectors</li> <li>Solve problems involving prisms</li> <li>Investigate right-angled triangles</li> <li>Solve problems involving Pythagoras' theorem</li> <li>Explore the meaning of an inequality</li> <li>Solve linear inequalities</li> </ul>	<ul style="list-style-type: none"> <li>Understand and use tree diagrams</li> <li>Develop understanding of probability in situations involving combined events</li> <li>Use probability to make predictions</li> <li>Investigate features of straight line graphs</li> <li>Explore graphs of quadratic functions</li> <li>Explore graphs of other standard non-linear functions</li> <li>Create and use graphs of non-standard functions</li> <li>Solve kinematic problems</li> </ul>	<ul style="list-style-type: none"> <li>Solve simultaneous equations</li> <li>Use graphs to solve equations</li> <li>Solve problems involving simultaneous equations</li> <li>Explore quadratic sequences</li> <li>Investigate geometric progressions</li> <li>Construct and interpret cumulative frequency graphs</li> <li>Construct and interpret box plots</li> <li>Analyse distributions of data sets</li> </ul>	
<b>Vocabulary instruction</b>	Power Root Index, Indices Standard form Inequality Truncate Round Minimum, Maximum Interval Decimal place Significant figure Compasses Arc Line segment Perpendicular Bisect Perpendicular bisector Locus, Loci Plan Elevation	Inequality Identity Equivalent Equation Formula, Formulae Expression Expand Linear Quadratic Direct proportion Inverse proportion Multiplier Linear Congruent, Congruence Similar, Similarity Compound unit Density, Population density Pressure	Categorical data, Discrete data Continuous data, Grouped data Axis, axes Time series Compound bar chart Scatter graph (scatter diagram, scattergram, scatter plot) Bivariate data (Linear) Correlation Positive correlation, Negative correlation Line of best fit Interpolate Extrapolate Trend Term Term-to-term rule Position-to-term rule nth term Generate Linear Quadratic First (second) difference Fibonacci number	Circle, Pi Radius, diameter, chord, circumference, arc, tangent, sector, segment (Right) prism, cylinder Cross-section Hypotenuse Pythagoras' theorem (Linear) inequality Unknown Manipulate Solve Solution set Integer	Outcome, equally likely outcomes Event, independent event, dependent event Tree diagrams Theoretical probability Experimental probability Random Bias, unbiased, fair Relative frequency Enumerate Set Function, equation Quadratic, cubic, reciprocal Gradient, y-intercept, x-intercept, root Sketch, plot Kinematic Speed, distance, time Acceleration, deceleration Linear, non-linear Parabola, Asymptote Rate of change	Equation Simultaneous equation Variable Manipulate Eliminate Solve Derive Interpret Term nth term Generate Quadratic First (second) difference Geometric Progression Categorical data, Discrete data Continuous data, Grouped data Axis, axes Population Sample Cumulative frequency Box plot, box-and-whisker diagram Central tendency Mean, median, mode	

				Fibonacci sequence Congruent, congruence Similar (shapes), similarity Hypotenuse Conjecture Derive Prove, proof Counterexample			Spread, dispersion, consistency Range, Interquartile range Skewness
	<b>Subject-specific strand(s)</b>	<ul style="list-style-type: none"> <li>calculate with roots, and with integer indices</li> <li>calculate with standard form <math>A \times 10^n</math>, where <math>1 \leq A &lt; 10</math> and <math>n</math> is an integer</li> <li>use inequality notation to specify simple error intervals due to truncation or rounding</li> <li>apply and interpret limits of accuracy</li> <li>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)</li> <li>use these to construct given figures and solve loci problems; know that the perpendicular distance from a point to a line is the shortest distance to the line</li> <li>construct plans and elevations of 3D shapes</li> </ul>	<ul style="list-style-type: none"> <li>understand and use the concepts and vocabulary of identities</li> <li>know the difference between an equation and an identity</li> <li>simplify and manipulate algebraic expressions by expanding products of two binomials and factorising quadratic expressions of the form <math>x^2 + bx + c</math></li> <li>argue mathematically to show algebraic expressions are equivalent, and use algebra to support and construct arguments</li> <li>translate simple situations or procedures into algebraic expressions or formulae</li> <li>solve problems involving direct and inverse proportion including graphical and algebraic representations</li> <li>apply the concepts of congruence and similarity, including the relationships between lengths in similar figures</li> <li>change freely between compound units (e.g. density, pressure) in numerical and algebraic contexts</li> </ul>	<ul style="list-style-type: none"> <li>interpret and construct tables, charts and diagrams, including tables and line graphs for time series data and know their appropriate use</li> <li>draw estimated lines of best fit; make predictions</li> <li>know correlation does not indicate causation; interpolate and extrapolate apparent trends whilst knowing the dangers of so doing</li> <li>recognise and use Fibonacci type sequences, quadratic sequences</li> <li>use the basic congruence criteria for triangles (SSS, SAS, ASA, RHS)</li> <li>apply angle facts, triangle congruence, similarity and properties of quadrilaterals to conjecture and derive results about angles and sides, including Pythagoras' Theorem and the fact that the base angles of an isosceles triangle are equal, and use known results to obtain simple proofs</li> </ul>	<ul style="list-style-type: none"> <li>identify and apply circle definitions and properties, including: tangent, arc, sector and segment</li> <li>calculate arc lengths, angles and areas of sectors of circles</li> <li>calculate surface area of right prisms (including cylinders)</li> <li>calculate exactly with multiples of <math>\pi</math></li> <li>know the formulae for: Pythagoras' theorem, <math>a^2 + b^2 = c^2</math>, and apply it to find lengths in right-angled triangles in two dimensional figures</li> <li>understand and use the concepts and vocabulary of inequalities</li> <li>solve linear inequalities in one variable</li> <li>represent the solution set to an inequality on a number line</li> </ul>	<ul style="list-style-type: none"> <li>calculate the probability of independent and dependent combined events, including using tree diagrams and other representations, and know the underlying assumptions</li> <li>enumerate sets and combinations of sets systematically, using tree diagrams</li> <li>understand that empirical unbiased samples tend towards theoretical probability distributions, with increasing sample size</li> <li>identify and interpret gradients and intercepts of linear functions algebraically</li> <li>use the form <math>y = mx + c</math> to identify parallel lines</li> <li>find the equation of the line through two given points, or through one point with a given gradient</li> <li>interpret the gradient of a straight line graph as a rate of change</li> <li>recognise, sketch and interpret graphs of quadratic functions</li> <li>recognise, sketch and interpret graphs of simple cubic</li> </ul>	<ul style="list-style-type: none"> <li>solve, in simple cases, two linear simultaneous equations in two variables algebraically</li> <li>derive an equation (or two simultaneous equations), solve the equation(s) and interpret the solution</li> <li>find approximate solutions to simultaneous equations using a graph</li> <li>deduce expressions to calculate the <math>n</math>th term of quadratic sequences</li> <li>recognise and use simple geometric progressions (<math>r^n</math> where <math>n</math> is an integer, and <math>r</math> is a rational number <math>&gt; 0</math>)</li> <li>infer properties of populations or distributions from a sample, whilst knowing the limitations of sampling</li> <li>construct and interpret diagrams for grouped discrete data and continuous data, i.e. cumulative frequency graphs, and know their appropriate use</li> </ul>

			<ul style="list-style-type: none"> <li>use compound units such as density and pressure</li> </ul>			<p>functions and the reciprocal function <math>y = 1/x</math> with <math>x \neq 0</math></p> <ul style="list-style-type: none"> <li>plot and interpret graphs (including reciprocal graphs) and graphs of non-standard functions in real contexts, to find approximate solutions to problems such as simple kinematic problems involving distance, speed and acceleration</li> </ul>	<ul style="list-style-type: none"> <li>interpret, analyse and compare the distributions of data sets from univariate empirical distributions through appropriate graphical representation involving discrete, continuous and grouped data, including box plots</li> <li>interpret, analyse and compare the distributions of data sets from univariate empirical distributions through appropriate measures of central tendency including quartiles and inter-quartile range</li> </ul>
Stage 10	<b>Assessment task(s)/title(s)</b>	Investigating Properties of Shapes, Calculating, Solving Equations & Inequalities 1	Mathematical Movement 1, Algebraic Proficiency: Tinkering	Proportional Reasoning, Analysing Statistics	Pattern Sniffing, Solving Equations & Inequalities 2, Calculating Space,	Conjecturing	Algebraic Proficiency: Visualising 1, Exploring Fractions, Decimals & Percentages
	<b>Key knowledge</b>	<ul style="list-style-type: none"> <li>Investigate similar triangles</li> <li>Explore trigonometry in right-angled triangles</li> <li>Set up and solve trigonometric equations</li> <li>Use trigonometry to solve practical problems</li> <li>Estimate with powers and roots</li> <li>Calculate with powers and roots</li> <li>Explore the impact of rounding</li> <li>Find approximate solutions to complex equations</li> </ul>	<ul style="list-style-type: none"> <li>Explore enlargement of 2D shapes</li> <li>Investigate the transformation of 2D shapes</li> <li>Manipulate algebraic fractions</li> <li>Manipulate algebraic expressions</li> </ul>	<ul style="list-style-type: none"> <li>Explore differences between direct and inverse proportion</li> <li>Investigate ways of representing proportion in situation</li> <li>Solve problems involving proportion</li> <li>Construct and interpret cumulative frequency graphs</li> <li>Construct and interpret box plots</li> <li>Analyse distributions of data sets</li> </ul>	<ul style="list-style-type: none"> <li>Explore quadratic sequences</li> <li>Investigate geometric progressions</li> <li>Understand and use set notation</li> <li>Solve inequalities</li> <li>Represent inequalities on a graph</li> <li>Calculate surface areas of solids</li> <li>Calculate volumes of solids</li> <li>Solve problems involving enlargement and 3D shapes</li> </ul>	<ul style="list-style-type: none"> <li>Investigate geometric patterns using circles</li> <li>Explore circle theorems</li> <li>Make and prove conjectures</li> </ul>	

		<ul style="list-style-type: none"> <li>Solve simultaneous equations</li> <li>Solve problems involving simultaneous equations</li> </ul>					
<b>Vocabulary instruction</b>	<p>Similar</p> <p>Opposite</p> <p>Adjacent</p> <p>Hypotenuse</p> <p>Trigonometry</p> <p>Function</p> <p>Ratio</p> <p>Sine</p> <p>Cosine</p> <p>Tangent</p> <p>Angle of elevation, angle of depression</p> <p>Power, Root</p> <p>Index, Indices</p> <p>Standard form</p> <p>Inequality</p> <p>Truncate, Round</p> <p>Minimum bound, Maximum bound</p> <p>Interval</p> <p>Decimal place, Significant figure</p> <p>Surd</p> <p>Limit</p> <p>Unknown</p> <p>Solve</p> <p>Solution set</p> <p>Interval</p> <p>Decimal search</p> <p>Iteration</p> <p>Simultaneous equations</p> <p>Substitution</p> <p>Elimination</p>	<p>Perpendicular bisector</p> <p>Scale Factor</p> <p>Similar</p> <p>Congruent</p> <p>Invariance</p> <p>Transformation</p> <p>Rotation</p> <p>Reflection</p> <p>Translation</p> <p>Enlargement</p> <p>Equivalent</p> <p>Equation</p> <p>Expression</p> <p>Expand</p> <p>Linear</p> <p>Quadratic</p> <p>Algebraic Fraction</p> <p>Difference of two squares</p> <p>Binomial</p> <p>Factorise</p>	<p>Direct proportion</p> <p>Inverse proportion</p> <p>Multiplier</p> <p>Categorical data, Discrete data</p> <p>Continuous data, Grouped data</p> <p>Axis, axes</p> <p>Population</p> <p>Sample</p> <p>Cumulative frequency</p> <p>Box plot, box-and-whisker diagram</p> <p>Central tendency</p> <p>Mean, median, mode</p> <p>Spread, dispersion, consistency</p> <p>Range, Interquartile range</p> <p>Skewness</p>	<p>Term</p> <p>nth term</p> <p>Generate</p> <p>Quadratic</p> <p>First (second) difference</p> <p>Geometric Progression (Linear) inequality</p> <p>Variable</p> <p>Manipulate</p> <p>Solve</p> <p>Solution set</p> <p>Integer</p> <p>Set notation</p> <p>Region</p> <p>(Composite) solid</p> <p>Sphere, Pyramid, Cone</p> <p>Perpendicular (height), (slant height)</p> <p>Surface area</p> <p>Volume</p> <p>Congruent, congruence</p> <p>Similarity, similar shapes, similar figures</p> <p>Enlarge, enlargement</p> <p>Scale factor</p>	<p>Radius, radii</p> <p>Tangent</p> <p>Chord</p> <p>Theorem</p> <p>Conjecture</p>	<p>Derive</p> <p>Prove, proof</p> <p>Counterexample</p> <p>Function, equation</p> <p>Linear, non-linear</p> <p>Quadratic, cubic, reciprocal, exponential</p> <p>Parabola, Asymptote</p> <p>Gradient, y-intercept, x-intercept, root</p> <p>Rate of change</p> <p>Sketch, plot</p> <p>Kinematic</p> <p>Speed, distance, time</p> <p>Acceleration, deceleration</p> <p>Fraction</p> <p>Mixed number</p> <p>Top-heavy fraction</p> <p>Percentage change, percentage increase, percentage increase</p> <p>Compound interest, Simple interest</p> <p>Terminating decimal, Recurring decimal (Exponential) growth, decay</p>	
<b>Subject-specific strand(s)</b>	<ul style="list-style-type: none"> <li>"• make links to similarity (including trigonometric ratios) and scale factors</li> <li>• know the exact values of <math>\sin\theta</math> and <math>\cos\theta</math> for <math>\theta = 0^\circ, 30^\circ, 45^\circ, 60^\circ</math> and <math>90^\circ</math>; know the exact value of <math>\tan\theta</math> for <math>\theta = 0^\circ, 30^\circ, 45^\circ</math> and <math>60^\circ</math></li> <li>• know the trigonometric ratios, <math>\sin\theta = \frac{\text{opposite}}{\text{hypotenuse}}</math>,</li> </ul>	<ul style="list-style-type: none"> <li>"• identify, describe and construct similar shapes, including on coordinate axes, by considering enlargement (including fractional scale factors)</li> <li>• make links between similarity and scale factors</li> <li>• describe the changes and invariance achieved</li> </ul>	<ul style="list-style-type: none"> <li>"• interpret equations that describe direct and inverse proportion</li> <li>• recognise and interpret graphs that illustrate direct and inverse proportion</li> <li>• understand that X is inversely proportional to Y is equivalent to X is proportional to <math>1/Y</math></li> <li>• infer properties of populations or</li> </ul>	<ul style="list-style-type: none"> <li>"• deduce expressions to calculate the nth term of quadratic sequences</li> <li>• recognise and use simple geometric progressions (<math>r^n</math> where n is an integer, and r is a rational number <math>&gt; 0</math>)</li> <li>• solve linear inequalities in two variables</li> </ul>	<ul style="list-style-type: none"> <li>"• apply the concepts of congruence and similarity, including the relationships between length, areas and volumes in similar figures</li> <li>• apply and prove the standard circle theorems concerning angles, radii, tangents and chords, and use</li> </ul>	<ul style="list-style-type: none"> <li>"• plot and interpret graphs (including exponential graphs) and graphs of non-standard functions in real contexts, to find approximate solutions to problems such as simple kinematic problems involving distance,</li> </ul>	

		<p><math>\cos\theta =</math> adjacent/hypotenuse,  <math>\tan\theta =</math> opposite/adjacent</p> <ul style="list-style-type: none"> <li>• apply it to find angles and lengths in right-angled triangles in two dimensional figures</li> <li>• estimate powers and roots of any given positive number</li> <li>• calculate with roots, and with integer and fractional indices</li> <li>• calculate exactly with surds</li> <li>• apply and interpret limits of accuracy, including upper and lower bounds</li> <li>• find approximate solutions to equations numerically using iteration</li> <li>• solve two linear simultaneous equations in two variables algebraically</li> </ul>	<p>by combinations of rotations, reflections and translations</p> <ul style="list-style-type: none"> <li>• simplify and manipulate algebraic expressions involving algebraic fractions</li> <li>• manipulate algebraic expressions by expanding products of more than two binomials</li> <li>• simplify and manipulate algebraic expressions (including those involving surds) by expanding products of two binomials and factorising quadratic expressions of the form <math>x^2 + bx + c</math>, including the difference of two squares</li> <li>• manipulate algebraic expressions by factorising quadratic expressions of the form <math>ax^2 + bx + c</math></li> </ul>	<p>distributions from a sample, whilst knowing the limitations of sampling</p> <ul style="list-style-type: none"> <li>• construct and interpret diagrams for grouped discrete data and continuous data, i.e. cumulative frequency graphs, and know their appropriate use</li> <li>• interpret, analyse and compare the distributions of data sets from univariate empirical distributions through appropriate graphical representation involving discrete, continuous and grouped data, including box plots</li> <li>• interpret, analyse and compare the distributions of data sets from univariate empirical distributions through appropriate measures of central tendency including quartiles and inter-quartile range</li> </ul>	<ul style="list-style-type: none"> <li>• represent the solution set to an inequality using set notation and on a graph</li> <li>• calculate surface area and volume of spheres, pyramids, cones and composite solids</li> </ul>	<p>them to prove related results</p>	<p>speed and acceleration</p> <ul style="list-style-type: none"> <li>• calculate or estimate gradients of graphs and areas under graphs (including quadratic and other non-linear graphs), and interpret results in cases such as distance-time graphs, velocity-time graphs and graphs in financial contexts</li> <li>• interpret the gradient at a point on a curve as the instantaneous rate of change</li> <li>• identify and interpret roots, intercepts, turning points of quadratic functions graphically</li> <li>• change recurring decimals into their corresponding fractions and vice versa</li> <li>• set up, solve and interpret the answers in growth and decay problems, including compound interest</li> </ul>
Stage 10 Lite	<b>Assessment task(s)/title(s)</b>	Calculating, Exploring FDP, Solving Equations & Inequalities 1, Mathematical Movement 1	Algebraic Proficiency: Tinkering, Proportional Reasoning	Analysing Statistics, Pattern Sniffing, Calculating Space, Investigating	GAP ANALYSIS	GAP ANALYSIS	

				Properties of Shape			
<b>Key knowledge</b>	<ul style="list-style-type: none"> <li>Calculate with powers and roots</li> <li>Solve problems involving repeated percentage change</li> <li>Solve problems involving exponential growth and decay</li> <li>Solve simultaneous equations</li> <li>Solve problems involving simultaneous equations</li> <li>Explore enlargement of 2D shapes</li> <li>Investigate the transformation of 2D shapes</li> </ul>	<ul style="list-style-type: none"> <li>Manipulate algebraic expressions</li> <li>Change the subject of a formula</li> <li>Explore differences between direct and inverse proportion</li> <li>Investigate ways of representing proportion in situation</li> <li>Solve problems involving proportion</li> </ul>	<ul style="list-style-type: none"> <li>Analyse distributions of data sets</li> <li>Investigate geometric progressions</li> <li>Calculate surface areas of solids</li> <li>Calculate volumes of solids</li> <li>Investigate similar triangles</li> <li>Explore trigonometry in right-angled triangles</li> <li>Set up and solve trigonometric equations</li> <li>Use trigonometry to solve practical problems</li> </ul>				
<b>Vocabulary instruction</b>	Power, Root Index, Indices Standard form Fraction Mixed number Top-heavy fraction Percentage change, percentage increase, percentage increase Compound interest, Simple interest (Exponential) growth, decay Unknown Solve Simultaneous equations Substitution Elimination Congruent, congruence Similarity, similar shapes, similar figures Enlarge, enlargement Scale factor Transformation Rotation Reflection Translation	Equivalent Equation Expression Expand Linear Quadratic Difference of two squares Binomial Factorise Direct proportion Inverse proportion Multiplier	Categorical data, Discrete data Continuous data, Grouped data Axis, axes Population Sample Central tendency Mean, median, mode Spread, dispersion, consistency Term nth term Generate First (second) difference Geometric Progression (Composite) solid Sphere, Pyramid, Cone Perpendicular (height), (slant height) Surface area Volume Similar Opposite Adjacent Hypotenuse Trigonometry Function				

				Ratio Sine Cosine Tangent Angle of elevation, angle of depression	
	<b>Subject-specific strand(s)</b>	<ul style="list-style-type: none"> <li>• calculate with roots, and with integer indices</li> <li>• solve two linear simultaneous equations in two variables algebraically</li> <li>• identify, describe and construct similar shapes, including on coordinate axes, by considering enlargement (including fractional scale factors)</li> <li>• make links <i>between</i> similarity and scale factors</li> <li>• apply the concepts of congruence and similarity, including the relationships between length in similar figures</li> </ul>	<ul style="list-style-type: none"> <li>• simplify and manipulate algebraic expressions by factorising quadratic expressions of the form <math>x^2 + bx + c</math>, including the difference of two squares</li> <li>• interpret equations that describe direct and inverse proportion</li> <li>• recognise and interpret graphs that illustrate direct and inverse proportion</li> <li>• understand that X is inversely proportional to Y is equivalent to X is proportional to <math>1/Y</math></li> </ul>	<ul style="list-style-type: none"> <li>• infer properties of populations or distributions from a sample, whilst knowing the limitations of sampling</li> <li>• set up, solve and interpret the answers in growth and decay problems, including compound interest</li> <li>• recognise and use simple geometric progressions (<math>r^n</math> where n is an integer, and r is a rational number <math>&gt; 0</math>)</li> <li>• calculate surface area and volume of spheres, pyramids, cones and composite solids</li> <li>• identify and interpret roots, intercepts, turning points of quadratic functions graphically</li> <li>• make links to similarity (including trigonometric ratios) and scale factors</li> <li>• know the exact values of <math>\sin\theta</math> and <math>\cos\theta</math> for <math>\theta = 0^\circ, 30^\circ, 45^\circ, 60^\circ</math> and <math>90^\circ</math>; know the exact value of <math>\tan\theta</math> for <math>\theta = 0^\circ, 30^\circ, 45^\circ</math> and <math>60^\circ</math></li> <li>• know the trigonometric ratios, <math>\sin\theta = \frac{\text{opposite}}{\text{hypotenuse}}</math>, <math>\cos\theta = \frac{\text{adjacent}}{\text{hypotenuse}}</math>,</li> </ul>	



				$\tan\theta = \frac{\text{opposite}}{\text{adjacent}}$ <ul style="list-style-type: none"> <li>apply it to find angles and lengths in right-angled triangles in two dimensional figures</li> </ul>				
Stage 11	<b>Assessment task(s)/title(s)</b>	Investigating Properties of Shapes, Calculating, Solving Equations & Inequalities 1, Mathematical Movement 1	Algebraic Proficiency: Tinkering, Proportional Reasoning, Analysing Statistics, Pattern Sniffing	Solving Equations & Inequalities 2, Algebraic Proficiency: Visualising 1, Algebraic Proficiency: Visualising 2, Mathematical Movement 2			GAP ANALYSIS	GAP ANALYSIS
	<b>Key knowledge</b>	<ul style="list-style-type: none"> <li>Explore three-dimensional shapes</li> <li>Apply Pythagoras' theorem in three dimensions</li> <li>Apply trigonometry in three dimensions</li> <li>Know and use the sine rule</li> <li>Know and use the cosine rule</li> <li>Manipulate expressions by simplifying surds</li> <li>Solve quadratic equations</li> <li>Solve practical problems involving quadratic equations</li> <li>Understand and use iterative processes</li> <li>Explore enlargement of 2D shapes</li> <li></li> </ul>	<ul style="list-style-type: none"> <li>Solve quadratic equations</li> <li>Solve practical problems involving quadratic equations</li> <li>Understand and use iterative processes</li> <li>Explore enlargement of 2D shapes</li> <li>Solve problems involving functions</li> <li>Explore differences between direct and inverse proportion</li> <li>Solve problems involving proportion</li> <li>Construct and interpret histograms</li> <li>Analyse distributions of data sets</li> <li>Solve problems involving histograms</li> <li>investigate geometric progressions</li> </ul>	<ul style="list-style-type: none"> <li>Solve inequalities</li> <li>Solve simultaneous equations</li> <li>Explore graphs of exponential functions</li> <li>Explore graphs of trigonometric functions</li> <li>Investigate the connections between graphs of functions and their translations</li> <li>Manipulate quadratic functions</li> <li>Solve problems involving graphs of quadratic functions</li> <li>Explore rates of change</li> <li>Use vectors to create geometric arguments and proofs</li> </ul>				
	<b>Vocabulary instruction</b>	Diagonal (Face Diagonal, Space Diagonal) Plane	(Quadratic) equation Factorise Rearrange Complete the square	Surd Unknown (Quadratic) inequality Variable				

		<p>Opposite, Adjacent, Hypotenuse  Trigonometry  Sine, Cosine, Tangent  Angle of elevation, angle of depression  Power, Root  Index, Indices  Surd  Simplify  Rationalise  (Quadratic) equation  Factorise  Rearrange  Complete the square  Unknown  Manipulate  Maximum, minimum  Parabola  Recurrence relation  Interval bisection  Scale Factor  Similar  Transformation  Enlargement</p>	<p>Unknown  Manipulate  Maximum, minimum  Parabola  Recurrence relation  Interval bisection  Scale Factor  Similar  Transformation  Enlargement  Mapping  Function  Inverse function  Composite function  Direct proportion  Inverse proportion  Multiplier  Continuous data,  Grouped data  Table, Frequency table  Frequency  Frequency density  Histogram  Scale, Graph  Axis, axes  Term  nth term  First (second) difference  Geometric Progression</p>	<p>Manipulate  Solve  Solution set  Simultaneous equations  Substitution  Elimination  Exponential  Function, equation  Linear, non-linear  Quadratic, cubic, reciprocal, exponential  Parabola  Asymptote  Maximum, minimum, period  Gradient, y-intercept, x-intercept, root  Sketch, plot  Arguments  Function  Complete the square  Deduce  Root  Turning point, minimum, maximum  Rate of change  Chord  Tangent  Average rate of change  Instantaneous rate of change  Vector  Scalar  Constant  Magnitude  Collinear</p>	
	<p><b>Subject-specific strand(s)</b></p>	<ul style="list-style-type: none"> <li>know the formulae for Pythagoras' theorem, <math>a^2 + b^2 = c^2</math>, and apply it to find lengths in three dimensional figures</li> <li>know the trigonometric ratios, <math>\sin\theta = \frac{\text{opposite}}{\text{hypotenuse}}</math>, <math>\cos\theta = \frac{\text{adjacent}}{\text{hypotenuse}}</math>, <math>\tan\theta = \frac{\text{opposite}}{\text{adjacent}}</math> and apply them to find angles and</li> </ul>	<ul style="list-style-type: none"> <li>solve quadratic equations by completing the square and by using the quadratic formula</li> <li>deduce turning points of quadratic functions by completing the square</li> <li>deduce roots of quadratic functions algebraically</li> <li>work with general iterative processes</li> <li>identify, describe and construct similar shapes, including on</li> </ul>	<ul style="list-style-type: none"> <li>solve quadratic inequalities in one variable</li> <li>solve two simultaneous equations in two variables where one is quadratic algebraically</li> <li>recognise, sketch and interpret graphs of exponential functions <math>y = k^x</math> for positive values of k, and the trigonometric functions (with arguments in degrees) <math>y = \sin x</math>, <math>y = \cos x</math> and</li> </ul>	

		<p>lengths in three dimensional figures</p> <ul style="list-style-type: none"> <li>• know and apply the sine rule, <math>a/\sin A = b/\sin B = c/\sin C</math>, and the cosine rule, <math>a^2 = b^2 + c^2 - 2bc \cos A</math>, to find unknown lengths and angles</li> <li>• know and apply area <math>= \frac{1}{2}ab \sin C</math> to calculate the area, sides or angles of any triangle</li> <li>• simplify surd expressions involving squares (e.g. <math>\sqrt{12} = \sqrt{4 \times 3} = \sqrt{4} \times \sqrt{3} = 2\sqrt{3}</math>) and rationalise denominators</li> <li>• solve quadratic equations by completing the square and by using the quadratic formula</li> <li>• deduce turning points of quadratic functions by completing the square</li> <li>• deduce roots of quadratic functions algebraically</li> <li>• work with general iterative processes</li> <li>• identify, describe and construct similar shapes, including on coordinate axes, by considering enlargement (including negative scale factors)</li> </ul>	<p>coordinate axes, by considering enlargement (including negative scale factors)</p> <ul style="list-style-type: none"> <li>• interpret the succession of two functions as a 'composite function'</li> <li>• interpret the reverse process as the 'inverse function'</li> <li>• construct equations that describe direct and inverse proportion</li> <li>• construct and interpret diagrams for grouped discrete data and continuous data, i.e. histograms with equal and unequal class intervals and know their appropriate use</li> <li>• recognise and use simple geometric progressions (<math>r^n</math> where <math>n</math> is an integer, and <math>r</math> is a rational number <math>&gt; 0</math> or a surd) and other sequences</li> </ul>	<p><math>y = \tan x</math> for angles of any size</p> <ul style="list-style-type: none"> <li>• sketch translations and reflections of a given function</li> <li>• apply the concepts of average and instantaneous rate of change (gradients of chords and tangents) in numerical, algebraic and graphical contexts)</li> <li>• use vectors to construct geometric arguments and proofs</li> </ul>	
--	--	--	--	---	--