

FLIGHTPATH

MATHS

	Year 9	Year 9	Year 9	Year 9	Year 9	Year 9	Year 9	
	1	2	3	4	5	6	8	
Number	<p>Round decimals to whole numbers and decimal places</p> <p>Multiply and divide decimals by 10, 100, 1000</p> <p>Multiply and divide whole numbers</p> <p>+ and - decimals with up to two places</p> <p>Extend written methods to e.g. 36×27</p> <p>Know and use the simple order of operations</p> <p>Recognise and use factors, multiples and prime numbers.</p> <p>Find the factor pairs for any whole number and identify common multiples</p> <p>Recall know facts for fraction to decimal conversions</p> <p>Convert terminating decimals to fractions, e.g. $0.23 = 23/100$</p> <p>Compare decimals in different contexts</p> <p>Calculate simple percentages</p> <p>Know square numbers up to 10×10</p> <p>Find roots of square numbers up to 100</p> <p>Approximate before carrying out an addition or subtraction</p>	<p>Round numbers to decimals</p> <p>Use symbols $\times, \div, <, >$</p> <p>Multiply and divide 3 digit by 2 digit numbers</p> <p>Use 4 rules with positive integers</p> <p>Use +, - with negative integers</p> <p>Multiply decimals by a whole number</p> <p>+ and - decimals with up to two decimal places</p> <p>Begin to + and - simple fractions and those with simple common denominators</p> <p>Simplify fractions</p> <p>Calculate simple fractions of an amount</p> <p>Extend strategies to find any percentage, e.g. finding 10%, 5%, 1% and 2.5%</p> <p>Order fractions, decimals and percentages</p> <p>Convert any terminating decimal to a fraction</p> <p>Calculate fractions of quantities and measurements</p> <p>Use the equivalence of fractions, decimals and percentages to compare proportions (i.e. compare a fraction and a percentage)</p> <p>Find factors, multiples, primes and identify common factors and multiples</p> <p>Make estimates and approximations of calculations</p> <p>Use a calculator for simple calculations e.g. $(1.4 + 2.8)/(10 - 3)$</p>	<p>Multiply and divide decimals by whole numbers</p> <p>Be able to add + or multiply by 0.1 and 0.01</p> <p>Add and subtract negative integers from positive and negative numbers</p> <p>Add and subtract simple fractions with different denominators including mixed number fractions</p> <p>Multiply a fraction by an integer</p> <p>Estimate answers to calculations involving 2 or more operations and BIDMAS</p> <p>Find factors, multiples and primes and find the HCF and LCM of two or more numbers</p> <p>Use division to convert a fraction to a decimal</p> <p>Convert any terminating decimal to a fraction</p> <p>Calculate fractions of quantities and measurements</p> <p>Use the equivalence of fractions, decimals and percentages to compare proportions (i.e. compare a fraction and a percentage)</p> <p>Estimate mental calculations to squares, square roots and cubes, cube roots</p> <p>Find roots of non-square numbers using square root key and estimate square roots of non-square numbers less than 100</p>	<p>Multiply and divide two decimals</p> <p>Divide an integer by a fraction</p> <p>Add, subtract, multiply and divide fractions (proper and improper), and all FDP conversions</p> <p>Order fractions by converting them to decimals or otherwise</p> <p>Write numbers as product of primes</p> <p>Recognise and use relationships between operations, including inverse operations</p> <p>Calculate average speed, distance, time</p> <p>Recall the square numbers up to 12×12</p> <p>Simplify expressions containing powers</p> <p>Establish index laws for positive powers for x and \div</p> <p>Use an extended range of calculator functions</p>	<p>Find the reciprocal of simple numbers and fractions</p> <p>Use BIDMAS including powers and brackets as part of a fraction</p> <p>Round to an appropriate degree of accuracy (d.p. or sig fig)</p> <p>Start to use standard form</p> <p>Find the prime factors of a number in index form</p> <p>Find HCF and LCM using Prime Factors</p> <p>Add and subtract fractions including mixed numbers</p> <p>Use the square, cube and power keys on a calculator</p> <p>Estimate answers to calculations by rounding numbers to 1 s.f.</p> <p>Be able to use 4 operations on directed numbers</p> <p>Start to work with some simple surds</p> <p>Start to use percentage increase and decrease</p>	<p>Multiply and divide simple fractions (mixed) - positive and negative</p> <p>Convert recurring decimals to fractions and have some understanding of the proof</p> <p>Calculate with roots (surds - exact values)</p> <p>Start to develop an understanding of lower and upper bounds</p> <p>Convert between large and small numbers into standard form and vice-versa</p> <p>Order numbers written in standard index form</p> <p>Add subtract multiply and divide numbers in standard form</p> <p>Confidently recall the laws of indices to multiply and divide numbers written in index notation, including negative power answers and understand that these answers are smaller than 1</p>	<p>4 rules for numbers in standard form</p> <p>Understand a recurring decimal to fraction proof</p> <p>Find the value of calculations using indices including fractional and negative indices</p> <p>Understand that the inverse operation of raising a positive number to a power n is raising the result of this operation to the power $1/n$</p> <p>Simplify surd expressions involving squares (e.g. $\sqrt{12} = \sqrt{4 \times 3} = 2\sqrt{3}$)</p> <p>Use fractions, surds and pi in exact calculations, without a calculator</p>	
Algebra	<p>Use letters for unknowns and write an expression</p> <p>Collect like terms together</p> <p>Use basic substitution</p> <p>Use a simple function machine</p> <p>Plot coordinates in the positive quadrant</p> <p>Find the next term in a sequence given the rule</p> <p>Describe simple sequences</p>	<p>Collect simple like terms</p> <p>Substitute positive integers into simple expressions</p> <p>Find the inputs and outputs of function machines expressed in words</p> <p>Begin to construct expressions from worded descriptions, using addition and subtraction e.g. add 7 to (answer $n \times 7$)</p> <p>Solve simple one-step equations</p> <p>Plot co-ordinates in all four quadrants</p> <p>Use function machines to generate coordinates</p> <p>Start to use simple notation and symbols correctly</p> <p>Substitute integers into algebra equations and formulae</p> <p>Find outputs of more complex functions and inputs using inverse operations</p> <p>Read and identify x and y coordinates in all four quadrants</p> <p>Draw label and scale axes</p> <p>Plot and draw graphs of $y = a \times x + b$, $y = x$ and $y = -x$</p> <p>Draw straight-line graphs for real-life situations, read values from the real life graphs</p>	<p>Multiply together two simple algebraic expressions</p> <p>Simplify algebraic expressions by collecting like terms</p> <p>Start to solve simple two-step equations</p> <p>Form simple expressions from worded descriptions</p> <p>Explain the difference between a simple term or a bracket</p> <p>Begin to multiply together two simple algebraic expressions</p> <p>Substitute integers into algebra equations and formulae</p> <p>Find outputs of more complex functions and inputs using inverse operations</p> <p>Read and identify x and y coordinates in all four quadrants</p> <p>Draw label and scale axes</p> <p>Plot and draw graphs of $y = a \times x + b$, $y = x$ and $y = -x$</p> <p>Draw straight-line graphs for real-life situations, read values from the real life graphs</p>	<p>Solve two-step linear equations</p> <p>Form expressions using all 4 operations</p> <p>Start to construct equations by linking expressions to given information</p> <p>Substitute positive and negative integers into simple formulae</p> <p>Draw and use graphs to solve distance-time problems.</p> <p>Find the coordinates of points identified by geometrical information in 2D (all four quadrants) for simple shapes e.g. Use rectangles</p> <p>Plot and draw graphs of straight lines using a table of values in the first quadrant</p> <p>Draw and recognise lines parallel to axes, plus $y = x$ and $y = -x$</p> <p>Generate terms of a linear sequence</p> <p>Begin to use linear expressions to describe the nth term of a simple sequence</p> <p>Draw the next term in a pattern sequence</p> <p>Recognise simple sequences including Fibonacci-type sequences</p>	<p>Solve equations with brackets and fractions where the unknown appears on either side or on both sides of the equation.</p> <p>Expand and simplify brackets</p> <p>+ and - simple algebraic fractions</p> <p>Substitute positive and negative integers into expressions involving powers</p> <p>Expand and simplify more complex brackets</p> <p>Factorise an expression with more than 1 factor</p> <p>Rearrange simple equations</p> <p>Plot the graphs of linear functions</p> <p>Find the gradient of a line and identify parallel lines from their equations</p> <p>Draw and recognise a quadratic graph</p> <p>Calculate the midpoint of a line segment</p> <p>Argue mathematically that algebraic expressions are equivalent e.g. $2(x + 3) - 4(x - 2) = 6x - 1$</p> <p>Find and use the nth term of an arithmetic sequence</p> <p>Simplify simple expressions involving index notation</p> <p>Factorise an expression e.g. $6a - 9b = 3(2a - 3b)$</p> <p>Change the subject of a formula in the sequence</p>	<p>Solve equations which include brackets, negatives, fractions and those with a negative solution</p> <p>Identify the subject of a formula where the subject is on both sides</p> <p>Expand double brackets (a + b)(c + d)</p> <p>Plot lines & quadratic graphs from a table of values</p> <p>Identify the gradient from an equation and write down the equation of a line parallel to it</p> <p>Factorise the area of a simple geometric figure</p> <p>Identify the line of symmetry of a quadratic graph</p> <p>Intercept, intercept and turning points</p> <p>Use knowledge of cubic, exponential and reciprocal graphs</p> <p>Factorise an expression with more than 1 factor</p> <p>Rearrange simple equations</p> <p>Plot the graphs of linear functions</p> <p>Find the gradient of a line and identify parallel lines from their equations</p> <p>Draw and recognise a quadratic graph</p> <p>Calculate the midpoint of a line segment</p> <p>Argue mathematically that algebraic expressions are equivalent e.g. $2(x + 3) - 4(x - 2) = 6x - 1$</p> <p>Find and use the nth term of an arithmetic sequence</p> <p>Simplify simple expressions involving index notation</p> <p>Factorise an expression e.g. $6a - 9b = 3(2a - 3b)$</p> <p>Change the subject of a formula in the sequence</p>	<p>Confidently write their equations which involve brackets, negatives, fractions and those with a negative solution</p> <p>Identify the subject of a formula where the subject is on both sides</p> <p>Solve quadratic equations by factoringising</p> <p>Solve quadratic equations by completing the square. Deduce the turning point and sketch the corresponding graph</p> <p>Solve simple quadratic equations by using the quadratic formula</p> <p>Simplify and manipulate algebraic expressions involving surds and algebraic fractions</p> <p>Find the equation of the line through two given points</p> <p>Solve quadratic inequalities in one variable, by factoringising and sketching the graph to identify values</p> <p>Plot and recognise graphs of linear, quadratic, cubic and reciprocal functions</p> <p>Plot graphs of the exponential functions $y = ab^x$</p> <p>Begin to recognise, sketch and interpret graphs of trigonometric functions</p> <p>Intercept coordinates for trigonometric graphs</p> <p>Find the gradient of the radius that meets the circle at a given point</p> <p>Find the equation of a tangent to a circle at a given point</p> <p>Estimate the gradient of a quadratic or non-linear graph at a given point by sketching the tangent and finding its gradient</p> <p>Estimate and use the nth term of an arithmetic sequence</p> <p>Set up and solve a pair of simultaneous equations to represent a real life situation</p> <p>Use algebra to support and contextualise equations, and begin to use algebra to support proofs</p>	
Probability and Statistics	<p>Use a tally chart</p> <p>Find the mode, median and range of a small set of data.</p> <p>Draw a simple bar chart</p> <p>Start to understand and apply the probability scale</p> <p>Sort using Venn diagrams</p>	<p>Use a probability scale with words.</p> <p>Use a probability scale from 0 to 1</p> <p>Represent data in a table</p> <p>Draw and interpret line graphs, pictograms and bar charts</p> <p>Find the mode median mean and range for a small set of data</p> <p>Compare two simple distributions using the range and the mode</p> <p>Find the mode and range from a bar chart</p> <p>Interpret simple pie charts using simple fraction sections</p> <p>Start to solve simple problems using sets and Venn diagrams</p>	<p>Use the vocabulary of probability and understand and use probability notations</p> <p>Identify all mutually exclusive outcomes of a set of outcomes sum to 1</p> <p>Estimate the number of times an event will occur, given the probability and the number of trials</p> <p>Compare experimental and theoretical probabilities</p> <p>Find the probability of an event happening using relative frequency</p> <p>Record outcomes of events in tables and grids</p> <p>Write probabilities in words, fractions, decimals and percentages</p> <p>Interpret pie charts and line graphs taking into account different sized samples</p> <p>Construct simple line graphs for time series</p> <p>Solve questions involving simple sets by drawing Venn diagrams</p>	<p>Calculate the probability of mutually exclusive events.</p> <p>Draw and complete a probability tree diagram based on given information (no more than 3 branches per event)</p> <p>Use the 'and' and 'or' rule to find probabilities of events</p> <p>Construct cumulative frequency tables and draw the corresponding curve</p> <p>Draw box plots and find the median, quartiles, range and interquartile range.</p> <p>Do simple questions with moving averages</p>	<p>Record outcomes of events in a Venn diagram</p> <p>Draw and complete a probability tree diagram based on given information (no more than 3 branches per event)</p> <p>Use the 'and' and 'or' rule to find probabilities of events</p> <p>Construct cumulative frequency tables and draw the corresponding curve</p> <p>Draw a scatter graph, recognise and interpret correlation and draw and use a line of best fit to make predictions</p> <p>Plan a statistical survey</p> <p>Understand different types of data collection</p>	<p>Use Venn diagrams to solve problems</p> <p>Draw and complete a probability tree diagram based on given information (no more than 3 branches per event)</p> <p>Use the 'and' and 'or' rule to find probabilities of events</p> <p>Construct cumulative frequency tables and draw the corresponding curve</p> <p>Draw box plots and find the median, quartiles, range and interquartile range.</p> <p>Do simple questions with moving averages</p>	<p>Understand conditional probabilities and decide if two events are independent</p> <p>Use tree diagrams to calculate the probability of two independent events</p> <p>Draw a cumulative frequency graph and use it to estimate frequency greater/less than a given value</p> <p>Compare the measures of spread between a pair of box plots/C graphs</p> <p>Find the median, quartiles and interquartile range for large data sets with grouped data</p> <p>Compare the mean, median, mode and range as appropriate of two distributions</p> <p>Select and justify a sampling method to investigate a population, including random and stratified sampling</p> <p>Start to understand how to construct a histogram</p>	
Geometry	<p>Start to know the properties of simple shapes</p> <p>Measure a line and read from simple scales to 1 d.p.</p> <p>Use a protractor to measure acute angles</p> <p>Understand the meaning of parallel and perpendicular lines</p> <p>Find the perimeter of a simple shape by calculation</p> <p>Recognise and draw lines of symmetry for simple shapes</p> <p>Know how many degrees are in a right angle</p>	<p>Measure lines to the nearest millimetre</p> <p>Use a protractor to measure acute angles</p> <p>Tessellate shapes</p> <p>Know the sum of angles round a point, on a straight line and in a triangle</p> <p>Draw parallel lines and identify parallel lines on a diagram</p> <p>Calculate the perimeter of a square/rectangle</p> <p>Identify and name common solids: cube, cuboid, cylinder, prism, pyramid, sphere and cone</p> <p>Know the terms face, edge and vertex</p> <p>Understand that area is measured in cm^2</p> <p>Choose suitable metric units to estimate length and area.</p> <p>Begin to construct triangles given ASA</p> <p>Recognise reflection symmetry and visualise the reflection in a mirror line of a 2-D shape</p> <p>Translate a shape on a square/coordinate grid</p> <p>Understand and use the language associated with rotations</p>	<p>Estimate the size of angles and distinguish between acute, obtuse and reflex angles</p> <p>Use a protractor to measure and draw acute, obtuse and reflex angles</p> <p>Tessellate combinations of shapes</p> <p>Use correct notation for labelling angles</p> <p>Identify perpendicular lines</p> <p>Identify simple properties of triangles and some quadrilaterals</p> <p>Measure shapes to find perimeters and areas</p> <p>Calculate perimeter of compound shapes</p> <p>Use the formulae for the area of a rectangle, square, parallelogram and triangle</p> <p>Draw and use properties of cuboids</p> <p>Use nets to calculate the surface area of simple cuboids</p> <p>Find the volume of a simple cuboid</p> <p>Estimate real life measures to suitable degrees of accuracy</p> <p>Use units of measurement to estimate and solve problems in everyday contexts</p> <p>Construct triangles given SAS</p> <p>Recognise rotational symmetry of 2-D shapes</p> <p>Rotate a shape about a given point</p>	<p>Use a protractor to draw and measure angles</p> <p>Recognise parallel and perpendicular lines in all diagrams</p> <p>Recognise and find vertically opposite angles</p> <p>Find missing angles around a point and in a triangles and quadrilaterals</p> <p>Calculate perimeter and area of compound shapes made from triangles, rectangles and other shapes</p> <p>Calculate the surface area of simple cubes and cuboids</p> <p>Construct simple nets of 3D shapes</p> <p>Begin to use plans and elevations</p> <p>Solve simple problems involving units of measurement in the context of length and area</p> <p>Identify regular and irregular polygons</p> <p>Recognise and visualise the rotational symmetry of a 2-D shape</p> <p>Draw or complete diagrams with a given number of lines of symmetry or rotational symmetry</p> <p>Identify co-ordinates of points determined by geometric information</p>	<p>Find missing angles in triangles and quadrilaterals and give reasons for your answers</p> <p>Identify alternate, opposite and corresponding angles on parallel lines and their values.</p> <p>Use a formula to calculate the area of squares, rectangles, triangles, trapezia and parallelograms</p> <p>Calculate areas of compound shapes</p> <p>Know the formulae for the volume of a cube and cuboid</p> <p>Identify simple nets of 3D shapes - regular polyhedra</p> <p>Construct the perpendicular bisector of a line segment</p> <p>Perform and describe a rotation, reflection, translation and simple enlargement.</p> <p>Solve harder problems using properties of angles, of parallel and intersecting lines, and of triangles and other polygons - by looking at several shapes together</p> <p>Use plans and elevations</p> <p>Have a basic understanding of loci and start to construct simple scale drawings to solve problems</p> <p>Start to have an understanding of bearings</p>	<p>Solve problems involving bearings</p> <p>Recall the sum of the exterior angles of any polygon</p> <p>Calculate the interior angles of regular polygons</p> <p>Know the names of parts of a circle</p> <p>Know and use formulae for the circumference and area of a circle</p> <p>Calculate surface area and volume of shapes made from cuboids</p> <p>Calculate the volume and surface area of right prisms and cylinders</p> <p>Use the information given to determine whether triangles are congruent, or similar</p> <p>Identify more complex nets of 3D shapes</p> <p>Draw plans and elevations of 3-D shapes</p> <p>Perform and describe a rotation, reflection, translation and enlargement (including the centre of enlargement and fractional scale factors)</p> <p>Enlarge 2-D shapes, given a centre of enlargement and a positive whole number scale factor</p> <p>Use Pythagoras' Theorem on simple problems</p>	<p>Use the sum of the interior angles of an n-sided polygon to find missing angles in problems</p> <p>Find the size of an interior angle, exterior angle or the number of sides of a regular polygon</p> <p>Find the surface area of simple prisms</p> <p>Calculate the lengths and areas given the volumes in right prisms and cylinders</p> <p>Use similarity to solve problems in 2D shapes</p> <p>Use the formulae for length of arcs in a circle.</p> <p>Use the formulae for area of sectors in a circle.</p> <p>Perform and describe combinations of rotations, reflections and translations</p> <p>Use ruler and compasses to construct bisectors, triangles and angles of $60, 90, 30, 45$</p> <p>Use loci to solve problems</p> <p>Use and apply Pythagoras' theorem to solve problems</p> <p>Use Pythagoras' Theorem to justify if a triangle is right-angled given its three lengths</p> <p>Use the sine, cosine and tangent ratios to find the lengths of unknown sides in a right-angled triangle.</p> <p>Use vector notation for translations</p>	
Ratio, proportion and rates of change	<p>Work with basic ratio Start to solving simple problems involving proportion</p> <p>Draw simple scale diagrams using integer scale factor</p>	<p>Convert fractions to percentages</p> <p>Work with simple ratios (e.g. 3 kilograms to 3000 grams)</p> <p>Convert lengths from simple scale drawings to real life</p> <p>Solve simple direct proportion questions</p>	<p>Convert a larger whole number metric unit to a smaller unit (e.g. 3 kilograms to 3000 grams)</p> <p>Start to use scale drawings with decimals</p> <p>Express one number as a fraction of another</p> <p>Use percentages to compare simple proportions</p> <p>Ratio notation</p> <p>Reduce a ratio to its simplest form</p>	<p>Convert between simple metric units.</p> <p>Express the division of a quantity into a number of parts as a ratio and simplify (including 3 part)</p> <p>Recall basic equivalent fractions, decimals and percentages</p> <p>Express one number as a percentage of another</p> <p>Identify regular and irregular polygons</p> <p>Use the unitary method to solve simple word problems involving ratio and direct proportion</p> <p>Use a ratio to find one quantity when the other is known</p> <p>Use strategies for finding equivalent fractions, decimals and percentages</p> <p>Find percentage increase and decrease</p>	<p>Solve a ratio problem in context</p> <p>Divide a given quantity into a ratio</p> <p>Write a ratio as a fraction</p> <p>Recognise graphs showing constant rates of change, Begin to solve problems involving the unitary method, e.g. If 40 is 80%, find 1% by dividing by 60 and then 100% by multiplying by 100.</p> <p>Compare two quantities using percentages, including a range of calculations and contexts</p> <p>Use percentages in real-life situations</p> <p>Use and interpret maps, using map scales (1 : 25 000)</p>	<p>Interpret and write ratios to describe a situation</p> <p>Compare proportions using percentages</p> <p>Use algebraic methods to solve problems involving variables in direct proportion</p> <p>Set up simple equations for quantities in direct proportion</p>	<p>Write a ratio as a linear function</p> <p>Use graphs to calculate measures including unit price, average speed, distance, time.</p> <p>Use percentages in real-life situations: compound interest, depreciation, percentage profit and loss</p> <p>Calculate repeated proportional change</p> <p>Find the original amount given the final amount after a percentage change (reverse percentages)</p> <p>Identify the scale factor of an enlargement as the ratio of the lengths of any two corresponding line segments</p> <p>Enlarge 2-D shapes and recognise the similarity of resulting shapes and understand the implications of enlargement for perimeter</p>	<p>Solve problems involving inverse proportion using graphs</p> <p>Use velocity-time graphs to calculate acceleration</p> <p>Solve problems involving inverse proportionality, including problems where y is inversely proportional to the square of x</p> <p>Calculate unknown quantity from direct or inverse proportion</p> <p>Set up and use equations to solve word and other problems involving direct or inverse proportion</p> <p>Calculate the new area or volume of a shape after enlargement</p>