FLIGHTPATH MATHS

Year 7	Year 7	Year 7	Year 7	Year 7	Year 7	Year 7	Year 7
1	2	3	4	5	6	7	8
Number	Read & write whole numbers in figures & words Add three or more multiples of 10 Round positive whole numbers to the nearest 10 Give one or more numbers positioned between two others Recall addition & subtraction facts for each number up to 20 Find pairs of whole numbers with a sum of 100 Use doubling and halving Know by heart multiplication facts up to 10 × 10 Know factors of numbers up to 30 Use standard column procedures to add and subtract whole numbers Apply simple tests of divisibility (2, 9, 10, 5) Recognise multiples up to 10 × 10 Know square numbers, 1 × 1 to 5 × 5 and 10 x 10 Use diagrams to compare two or more simple fractions Order positive integers Use fraction notation, including simple mixed numbers and vocabulary such as numerator & denominator	Understand that halving is the reverse of doubling × and ÷ integers by 10 and 100 and explain the result Round positive whole numbers to the nearest 10, 100 or 1000 Understand + and - as they apply to whole numbers Multiply a two-digit number by a single digit number Apply simple tests of divisibility Recognise squares to at least 12 X 12 Know factors of numbers up to 60 Be able to order positive and negative numbers Be able to use > or < correctly between two positive numbers Know what each digit represents in numbers with up to two decimal places and put digits in the correct place in a calculation Work with decimals, money and temperature Read x and y coordinate in the first quadrant Add, subtract multiply and divide integers Illustrate simple fractions by shading (focus on ¼, ½, ¾) Start to use simple fractions and percentages	Round decimals to whole numbers and decimal places Multiply and divide decimals by 10, 100, 1000 Multiply and divide whole numbers + and - decimals with up to two places Extend written methods to e.g. 36 × 27 Know and use the simple order of operations Recognise and use factors, multiples and prime numbers. Find the factor pairs for any whole number and identify common multiples Recall known facts for fraction to decimal conversions Convert terminating decimals to fractions, e.g. 0.23 = 23/100 Compare decimals in different contexts Calculate simple percentages Know square numbers up to 10 × 10 Find roots of square numbers up to 100 Approximate before carrying out an addition or subtraction	Round numbers to decimals Use symbols = , ≠, <, > Multiply and divide 3 digit by 2 digit numbers Use 4 rules with positive integers Use + , - with negative integers Multiply decimals by a whole number + and - decimals with up to two decimal places Begin to add and subtract simple fractions and those with simple common denominators Simplify fractions Calculate simple fractions of an amount Extend strategies to find any percentage, e.g. finding 10%, 5%, 1% and 2.5% Order fractions, decimals and percentages Use order of operations, including brackets and powers Find factors, multiples, primes and identify common factors and multiples Make estimates and approximations of calculations Use a calculator for simple calculations e.g. (1.4 + 2.8)/(10 – 3) Recognise the first few triangular numbers	Multiply and divide decimals by whole numbers Be able to x and ÷ any number by 0.1 and 0.01 Add and subtract negative integers from positive and negative numbers Add and subtract simple fractions with different denominators including mixed number fractions Multiply a fraction by an integer Estimate answers to calculations involving 2 or more operations and BIDMAS Find factors, multiples and primes and find the of HCF and LCM of two or more numbers Use division to convert a fraction to a decimal Convert any terminating decimal to a fraction Calculate fractions of quantities and measurements Use the equivalence of fractions, decimals and percentages to compare proportions (i.e. compare a fraction and a percentage) Extend mental calculations to squares, square roots and cubes, cube roots Find roots of non-square numbers using square root key and estimate square roots of non-square numbers less than 100	Identify the upper and lower bounds of a measurement Multiply and divide two decimals Divide an integer by a fraction Add, subtract, multiply and divide fractions (proper and improper) and all FDP conversions Order fractions by converting them to decimals or otherwise Be able to use 4 operations on directed numbers Write numbers as product of primes Recognise and use relationships between operations, including inverse operations Recall the squares of numbers up to 13 x 13 Simplify expressions containing powers Use an extended range of calculator functions	Find the reciprocal of simple numbers and fractions Use BIDMAS including powers and brackets as part of a fraction Round to an appropriate degree of accuracy (d p or sig fig) Find the prime factors of a number in index form Find HCF and LCM using Prime Factors Add and subtract fractions including mixed numbers Use the square, cube and power keys on a calculator Estimate answers to calculations by rounding numbers to 1 s.f.
Algebra	Identify patterns involving shapes and put missing value in a simple sequence involving 2 to 5 and 10 times tables Start to use symbols for unknowns Start to use basic substitution Start to use simple function machines Start to construct simple one-step equations	Use letters for unknowns and write an expression Collect single terms together Use basic substitution Use a simple function machine Plot coordinates in the positive quadrant Find the next term in a sequence given the rule Describe simple sequences	Collect simple like terms Substitute positive integers into simple expressions Find the inputs and outputs of function machines expressed in words Use a function machine to create an expression Begin to construct expressions from worded descriptions, using addition and subtraction e.g. add 7 to a number (answer n+7) Solve simple one-step equations Plot co-ordinates in all four quadrants Use function machines to generate coordinates Start to use simple notation and symbols correctly including exclusive inequalities Describe and generate sequences given in words (e.g. add 3, multiply by 6, subtract 4) Generate and describe simple integer sequences – square and triangle numbers	Multiply together two simple algebraic expressions Simplify algebraic expressions by collecting like terms Start to solve simple two-step equations Form simple expressions from worded descriptions Begin to multiply a single term over a bracket Explain the difference between equations and formulae Substitute integers into algebra equations and formulae Find outputs of more complex functions and inputs using inverse operations Read and identify x and y coordinates in all four quadrants Draw label and scale axes Plot and draw graphs of y = a, x = a, y = x and y = -x Draw straight-line graphs for real-life situations and read values from the real life graphs	Solve two-step linear equations Form expressions using all 4 operations Start to construct equations by linking expressions to given information Substitute positive and negative integers into simple formulae Draw and use graphs to solve distance-time problems. Find the coordinates of points identified by geometrical information in 2D (all four quadrants) for simple shapes e.g. squares and rectangles Plot and draw graphs of straight lines using a table of values in the first quadrant Draw and recognise lines parallel to axes, plus y = x and y = -x Generate terms of a linear sequence Begin to use linear expressions to describe the nth term of a simple sequence Draw the next term in a pattern sequence Recognise simple sequences including triangular, square, cube numbers and Fibonacci-type sequences	Solve equations with brackets where the unknown appears on either side or on both sides of the equation. Expand and simplify brackets Simplify simple algebraic fractions Construct and solve simple equations Substitute integers into more complex formulae including squares and cubes Begin to consider the features of graphs of simple linear functions (intercepts and gradients) Use gradients to interpret how one variable changes in relation to another Draw and interpret distance-time graphs and velocity-time graphs Sketch and interpret real-life graphs (water flowing into vessels) Plot the graphs of simple linear functions in the form y = mx + c in four quadrants Recognise that equations of the form y = mx + c correspond to straight-line graphs Begin to use formal algebra to describe the nth term in an arithmetic sequence. Find a specific term in the sequence	Solve equations which include brackets, negatives, fractions and those with a negative solution Use trial and improvement to find solutions to 1or2 decimal places Derive a simple formula Substitute positive and negative integers into expressions involving powers Expand and simplify more complex brackets Factorise an expression with more than 1 factor Rearrange simple equations Plot the graphs of linear functions Find the gradient of a line and identify parallel lines from their equations Draw and recognise a quadratic graph Calculate the midpoint of a line segment Argue mathematically to show algebraic expressions are equivalent e.g. 2x(x + 3) - 4(3x - x2) = 6x(x - 1) Find and use the nth term of an arithmetic sequence Simplify simple expressions involving index notation Factorise an expression e.g. 6a + 8b = 2(3a + 4b) Change the subject of a formula in one and two step
Probability and Statistics	Find the median and range of a small set of data that is in order Recognise Pie charts, bar charts and pictograms Interpret a simple bar chart Begin to understand the probability scale Use Venn diagrams for simple sorting	Use a tally chart Find the mode, median and range of a small set of data. Draw a simple bar chart Draw and interpret a pictogram Start to understand and apply the probability scale Sort using Venn diagrams	Use a probability scale with words. Mark probabilities on the probability scale Represent data in a table Draw and interpret line graphs, pictograms and bar charts Find the mode median mean and range for a small set of data Compare two simple distributions using the range and the mode Find the mode and range from a bar chart Interpret simple pie charts using simple fraction sections Start to solve simple problems using sets and Venn diagrams	Use the vocabulary of probability and understand and use the probability scale from 0 to 1 Understand that the probabilities of a set of outcomes sum to 1 Identify all mutually exclusive outcomes of an event Understand and use relative frequency Extract data and interpret frequency tables Design & use data collection sheets for grouped, data Group data in equal class intervals Choose a suitable graph to represent data Confidently draw and interpret simple diagrams and charts including, line graphs, pictograms and dual bar charts Use information provided to complete a two-way table Find the mode and total frequency from a pie chart Calculate the mean, mode, median and range of a set of data Compare two simple distributions using the range, median and mean Solve questions using sets and Venn diagrams	Know that if the probability of an event is p, the probability of it not occurring is 1-p Estimate the number of times an event will occur, given the probability and the number of trials Compare experimental and theoretical probabilities Find the probability of an event happening using relative frequency Record outcomes of events in tables and grids Write probabilities in words, fractions, decimals and percentages Interpret pie charts and line graphs taking into account different sized samples Construct simple line graphs for time series Solve questions involving simple sets by drawing Venn diagrams	Calculate the probability of mutually exclusive events. Record outcomes of probability experiments in tables and use and draw sample space diagrams Identify which graphs are the most useful in the context of the problem Use two-way tables Calculate the mean and range from a frequency table Calculate mean, median, mode and range from a list Understand and use sets and Venn diagrams, including 3 way Venn diagrams Draw and interpret pie charts Interpret composite bar charts	Record outcomes of events in a Venn diagram Find a missing probability from a list or table Draw a stem and leaf diagram and find the median, mode and range Understand problems with comparing two pie charts Recognise the advantages and disadvantages between measures of average Draw a scatter graph, recognise and interpret correlation and draw and use a line of best fit to make predictions
Geometry	Alge bra	Recognise vertical and horizontal lines Identify simple shapes from the given picture list Measure a line to integer values Find the perimeter of a simple shape by counting Begin to recognise symmetry in simple shapes Recognise 2D shapes and 3D solids Recognise if a simple shape tessellates	Start to know the properties of simple shapes Measure a line and read from simple scales to 1 dp Use a protractor to measure acute angles (multiples of 10) Understand the meaning of parallel and perpendicular lines Find the perimeter and area of shapes by counting Recognise and draw lines of symmetry for simple shapes Know how many degrees are in a right angle	Measure lines to the nearest millimetre Use a protractor to measure acute angles Tessellate shapes Know the sum of angles round a point, on a straight line and in a triangle Draw parallel lines and identify parallel lines on a diagram Find the perimeter of a square/rectangle by counting Identify and name common solids: cube, cuboid, cylinder, prism, pyramid, sphere and cone Know the terms face, edge and vertex Understand that area is measured in cm2 Choose suitable metric units to estimate length and area. Begin to construct triangles given ASA Recognise reflection symmetry and visualise the reflection in a mirror line of a 2-D shape Translate a shape on a square/coordinate grid Understand and use the language associated with rotations	Estimate the size of angles and distinguish between acute, obtuse and reflex angles Use a protractor to measure and draw acute, obtuse and reflex angles to the nearest degree Tessellate combinations of shapes Use correct notation for labelling angles Identify perpendicular lines Identify simple properties of triangles and some quadrilaterals Measure shapes to find perimeters and areas Calculate perimeter of compound shapes Use the formula for the area of a rectangle, square, parallelogram and triangle Know and use properties of cuboids Use nets to calculate the surface area of simple cuboids Find the volume of a simple cuboid Identify different nets of a cuboid Estimate real life measures to a suitable degree of accuracy Use units of measurement to estimate and solve problems in everyday contexts Construct triangles given SAS Recognise and visualise the symmetry of a 2-D shape: line symmetry Draw 3D shapes on isometric paper Rotate a shape about a given point	Use a protractor to draw and measure angles Recognise parallel and perpendicular lines in all diagrams Recognise and find vertically opposite angles Find missing angles around a point and in a triangles and quadrilaterals Calculate perimeter and area of compound shapes made from triangles, rectangles and other shapes Calculate the surface area of simple cubes and cuboids Construct simple nets of 3D shapes Begin to use plans and elevations Solve simple problems involving units of measurement in the context of length and area Identify regular and irregular polygons Recognise and visualise the rotational symmetry of a 2-D shape Draw or complete diagrams with a given number of lines of symmetry or rotational symmetry Identify co-ordinates of points determined by geometric information	Find missing angles in triangles and quadrilaterals and give reasons for your answers Identify alternate, opposite and corresponding angles on parallel lines and their values. Use a formula to calculate the area of squares, rectangles, triangles, trapezia and parallelograms Calculate areas of compound shapes Know the formulae for the volume of a cube and cuboid Identify simple nets of 3D shapes – regular polyhedra construct the perpendicular bisector of a line segment Perform and describe a rotation, reflection, translation and simple enlargement. Solve harder problems using properties of angles, of parallel and intersecting lines, and of triangles and other polygons - by looking at several shapes together Use plans and elevations Have a basic understanding of loci and start to construct simple scale drawings to solve problems	Solve problems involving bearings Recall the sum of the exterior angles of any polygon Calculate the interior angles of regular polygons Know the names of parts of a circle Know and use formulae for the circumference and area of a circle Calculate surface area and volume of shapes made from cuboids Calculate the volume and surface area of right prisms and cylinders Use the information given to determine whether triangles are congruent, or similar Construct triangles and bisectors of lines and angles Identify more complex nets of 3D shapes Draw plans and elevations of 3-D shapes Perform and describe a rotation, reflection, translation and enlargement (including the centre of enlargement and fractional scale factors) Enlarge 2-D shapes, given a centre of enlargement and a positive whole number scale factor
Ratio, proportion and rates of change	Begin to understand simple ratio Start to understand scales used for scale drawing	Work with basic ratio Solving simple problems involving proportion Draw simple scale diagrams using an integer scale factor	Convert fractions to percentages Begin to simplify ratios Convert lengths from simple scale drawings to real life Solve simple direct proportion questions	Convert a larger whole number metric unit to a smaller unit (e.g. 3 kilograms to 3000 grams) Start to use scale drawings with decimals Express one number as a fraction of another Use percentages to compare simple proportions Use ratio notation Reduce a ratio to its simplest form	Convert between simple metric units. Simplify a ratio (including three part ratios) Express the division of a quantity into a number of parts as a ratio Recall basic equivalent fractions, decimals and percentages Express one number as a percentage of another Find a percentage of a quantity using a multiplier Use the unitary method to solve simple word problems involving ratio and direct proportion Use a ratio to find one quantity when the other is known Use strategies for finding equivalent fractions, decimals and percentages Find percentage increase and decrease Use a multiplier to increase or decrease by a percentage	Write ratios in the form 1: m or m: 1 Solve a ratio problem in context Divide a given quantity into a ratio Write a ratio as a fraction Convert between metric area and volume measures Set up equations to show direct proportion Recognise graphs showing constant rates of change, Begin to solve problems involving the unitary method, e.g. if £40 is 60%, find 1% by dividing by 60 and then 100% by multiplying by 100. Compare two quantities using percentages, including a range of calculations and contexts Use percentages in real-life situations Use and interpret maps, using map scales (1 : 25 000)	Interpret and write ratios to describe a situation Compare proportions using percentages Use algebraic methods to solve problems involving variables in direct proportion Start to recognise expressions of the form y α x Set up equations to show direct proportion