Longcroft School departmental curriculum overview
MATHEMATICS

Key subject skills

Assessment Objective 1	Assessment Objective 2	Assessment Objective 3
Use and apply standard techniques Students should be able to: • accurately recall facts, terminology and definitions • use and interpret notation correctly • accurately carry out routine procedures or set tasks requiring multi-step solutions.	Reason, interpret and communicate mathematically Students should be able to: • make deductions, inferences and draw conclusions from mathematical information • construct chains of reasoning to achieve a given result • interpret and communicate information accurately • present arguments and proofs • assess the validity of an argument and critically evaluate a given way of presenting information.	Solve problems within mathematics and in other contexts Students should be able to: • translate problems in mathematical or non-mathematical contexts into a process or a series of mathematical processes • make and use connections between different parts of mathematics • interpret results in the context of the given problem • evaluate methods used and results obtained • evaluate solutions to identify how they may have been affected by assumptions made.

Building on prior learning - *What can students do by the end of KS2?*

Number – addition, subtraction, multiplication and division	Number – fractions (including decimals and percentages)	Ratio and proportion	Algebra	Measurement	Geometry	Statistics
Multiply multi-digit numbers up to 4 digits by a two-digit whole number using the formal written method of long multiplication Divide numbers up to 4 digits by a two-digit whole number using the formal written method of long division, and interpret remainders as whole number remainders, fractions, or by rounding, as	Use common factors to simplify fractions; use common multiples to express fractions in the same denomination Compare and order fractions, including fractions > 1 Add and subtract fractions with different denominators and mixed numbers, using the concept of equivalent fractions	Solve problems involving the relative sizes of two quantities where missing values can be found by using integer multiplication and division facts Solve problems involving the calculation of percentages and the use of percentages for comparison Solve problems involving similar shapes where the	Use simple formulae Generate and describe linear number sequences Express missing number problems algebraically Find pairs of numbers that satisfy an equation with two unknowns Enumerate possibilities of combinations of two variables	Solve problems involving the calculation and conversion of units of measure, using decimal notation up to three decimal places where appropriate 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	Draw 2-D shapes using given dimensions and angles Recognise, describe and build simple 3-D shapes, including making nets Compare and classify geometric shapes based on their properties and sizes and find unknown angles in any triangles, quadrilaterals, and regular polygons	Interpret and construct pie charts and line graphs and use these to solve problems Calculate and interpret the mean as an average.

appropriate for the context Divide numbers up to 4 digits by a two-digit number using the formal written method of short division where appropriate, interpreting remainders according to the context Perform mental calculations, including with mixed operations and large numbers Identify common factors, common multiples and prime numbers Use their knowledge of the order of operations to carry out calculations involving the four operations Solve addition and subtraction multi-step problems in contexts, deciding which operations and methods to use and why Solve problems involving addition, subtraction, multiplication and division Use estimation to check answers to calculations and determine, in the context of a problem, an appropriate degree of accuracy.	Multiply simple pairs of proper fractions, writing the answer in its simplest form Divide proper fractions by whole numbers Associate a fraction with division and calculate decimal fraction equivalents for a simple fraction 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 Multiply one-digit numbers with up to two decimal places by whole numbers Use written division methods in cases where the answer has up to two decimal places Solve problems which require answers to be rounded to specified degrees of accuracy Recall and use equivalences between simple fractions, decimals and percentages, including in different contexts.	scale factor is known or can be found Solve problems involving unequal sharing and grouping using knowledge of fractions and multiples.		decimal notation to up to three decimal places Convert between miles and kilometres Recognise that shapes with the same areas can have different perimeters and vice versa Recognise when it is possible to use formulae for area and volume of shapes Calculate the area of parallelograms and triangles Calculate, estimate and compare volume of cubes and cuboids using standard units, including cubic centimetres (cm^3) and cubic metres (m^3), and extending to other units.	Illustrate and name parts of circles, including radius, diameter and circumference and know that the diameter is twice the radius Recognise angles where they meet at a point, are on a straight line, or are vertically opposite, and find missing angles. describe positions on the full coordinate grid (all four quadrants) Draw and translate simple shapes on the coordinate plane, and reflect them in the axes.	

Longcroft School departmental curriculum overview
MATHEMATICS

What are the skills gaps?

- Divide numbers up to 4 digits by a two-digit whole number using the formal written method of long division, and interpret remainders as whole number remainders, fractions
- Add and subtract fractions with different denominators and mixed numbers, using the concept of equivalent fractions
- Solve problems involving unequal sharing and grouping using knowledge of fractions and multiples.
- 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
- Construct pie charts

Progression Map

Longcroft School departmental curriculum overview

MATHEMATICS

Strand	Year 6	Year 7	Year 8	Year 9	Year 10	Year 11	Year 12	Year 13
Number - addition, subtraction, multiplication and division	Multiply multi-digit numbers up to 4 digits by a two-digit whole number using the formal written method of long multiplication	Use the 4 operations, including formal written methods, applied to integers, decimals, proper and improper fractions, and mixed numbers.		Ordering decimals. Rounding numbers and measures to an appropriate degree of accuracy	Calculate with and interpret standard form A x 10^n, where 1 <A<10 and n is an integer.	Converting between normal numbers and standard form.		
	Divide numbers up to 4 digits by a two-digit number using the formal written method of long and short division where appropriate, interpreting remainders according to the context	Use four operations with directed numbers	Calculations with money		Apply and interpret limits of accuracy . Change freely between related standard units. Use compound units such as speed, rates of pay, unit pricing, density and pressure.	Plotting and interpreting graphs in real contexts to find approximate solutions to problems such as simple kinematic problems		
		Explore powers, prime factorisation, Highest Common Factor (HCF) and Lowest Common Multiple (LCM)	Write numbers of any size in standard form	Use positive integer powers and associated real roots. Recognise powers of 2, 3, 4, 5. Estimate powers and roots of any given positive number	Calculate exactly with surds. Simplify surd expressions involving squares	Calculating with roots and with integer indices . Calculating with fractional indices	Understand and use the laws of indices for all rational exponents. Use and manipulate surds, including rationalising the denominator	
	Perform mental calculations, including with mixed operations and large numbers	Compare and order numbers						
	Identify common factors, common multiples and prime numbers	Use the concepts and vocabulary of prime numbers, factors (or divisors), multiples, common factors, common multiples, HCF, LCM, prime factorisation, including using product notation and the unique factorisation property		Fraction arithmetic including exact values	Change recurring decimals into their corresponding fractions and vice versa	Using inequality notation to specify simple error intervals		
	Use knowledge of the order of operations to carry out calculations involving the four operations	Understand fractions as division			Ratios and Fractions	Proving equivalence		
	Solve addition and subtraction multi-step problems in contexts.	Appreciate the infinite nature of the sets of integers, real and rational numbers						

Longcroft School departmental curriculum overview

MATHEMATICS

Strand	Year 6	Year 7	Year 8	Year 9	Year 10	Year 11	Year 12	Year 13
Number – fractions decimals and percentages	Use common factors to simplify fractions; use common multiples to express fractions in the same denomination	Represent any fraction as a diagram or on a number line	Find the product of a pair of fractions	Define percentage as 'number of parts per hundred'	Expressing one quantity as a fraction of another			
	Compare and order fractions, including fractions > 1	Identify and use simple equivalent fractions		Compare two quantities using percentages	Expressing a multiplicative relationship between two quantities as a ratio or a fraction			
	Add and subtract fractions with different denominators and mixed numbers, using the concept of equivalent fractions	Add and subtract fractions mixed numbers	Multiply and divide fractions and mixed numbers	Express one quantity as a percentage of another	Finding percentages and percentage changes			
	Multiply simple pairs of proper fractions, writing the answer in its simplest form	Represent tenths and hundreths on number lines and in diagrams. Interchange between fractional and decimal number lines	We will be able to multiply a fraction by an integer					
	Divide proper fractions by whole numbers	Convert between fractions and decimals - tenths and hundreths, fifths and quarters, eigths and thousandths	Divide an integer by a fraction/ a fraction by a unit fraction	Interpret percentages and percentage changes as a fraction or decimal and interpret these multiplicatively	Finding percentages and percentage changes multiplicatively using decimals			
	Associate a fraction with division and calculate decimal fraction equivalents	Convert fluently between fractions, decimals and percentages			Converting between fractions, decimals and percentages			
	Multiply one-digit numbers with up to two decimal places by whole numbers	Multiply and divide by powers 10.	Interpret and compare numbers in standard form A x 10^n, where n is a positive or negative integer or 0					
	Solve problems which require answers to be rounded to specified degrees of accuracy	Round numbers and measures to an appropriate degree of accuracy.	Understand and use the reciprocal					

Longcroft School departmental curriculum overview

MATHEMATICS

Strand	Year 6	Year 7	Year 8	Year 9	Year 10	Year 11	Year 12	Year 13
Number – fractions decimals and percentages	Use common factors to simplify fractions; use common multiples to express fractions in the same denomination	Represent any fraction as a diagram or on a number line	Find the product of a pair of fractions	Define percentage as 'number of parts per hundred'	Expressing one quantity as a fraction of another			
	Recall and use equivalences between simple fractions, decimals and percentages, including in different contexts.	Order positive and negative integers, decimals and fractions; use the number line as a model for ordering of the real numbers; use the symbols =, ≠, <, >, ≤, ≥						
	Identify the value of each digit in numbers given to three decimal places and multiply and divide numbers by 10, 100 and 1000.	Understand and use place value for decimals, measures and integers of any size	Write numbers of any size in standard form	Use positive integer powers and associated real roots (square, cube and higher). Estimate powers and roots of any given positive number.	Calculate exactly with surds. Simplify surd expressions involving squares	Calculating with roots and with integer indices . Calculating with fractional indices	Understand and use the laws of indices for all rational exponents, Use and manipulate surds, including rationalising the denominator	
Algebra	Use Simple Formulae	Use function Machines, form and solve one abnd two step equations	Solve inequalities, form and solve equations with brackets	Form and solve equations and inequalities with unknowns on both sides	Solving two linear simultaneous equations algebraically by elimination. Solving two linear simultaneous equations graphically or algebraically by substitution	Using inequality notation to specify simple error intervals	Work with quadratic functions and their graphs; the discriminant of a quadratic function; completing the square; solution of quadratic equations. Express solutions through correct use of 'and' and 'or' or through set notation. Represent linear and quadratic inequalities graphically.	
	Generate and describe linear number sequences	Recognise linear and non linear sequences, generate sequences	Find the nth term for a linear sequence	Testing conjectures about sequences. Representing sequences. Fnding the rule for the nth term of a linear sequence	Recognise and use: sequences of triangular, square and cube numbers; simple arithmetic progression; Fibonacci type sequences; quadratic sequences, and simple geometric progressions	Further Maths - Pascals triangle	Understand and use the binomial expansion of (a + bx)n for positive integer n	Extend to any rational n including its use for approximation

Longcroft School departmental curriculum overview

MATHEMATICS

Strand	Year 6	Year 7	Year 8	Year 9	Year 10	Year 11	Year 12	Year 13
Algebra	Find pairs of numbers that satisfy and equation with two unknowns	Algebraic notation	Indentify formulae, expression, identities and equations	Change the subject of a formula.	Solve linear equations in one unknown algebraically including those with the unknown on both sides of the equation		Solve linear and quadratic inequalities in a single variable and interpret such inequalities graphically. Manipulate polynomials algebraically. Factorisation and simple algebraic division. Use of the factor theorem	Simplify rational expressions including by factorising and cancelling,and algebraic division (by linear expressions only)
	Express missing number problems algebraically.	Substitute into expressions, collecting like terms, simple algebraic frations	Expanding brackets, simplify expressions					
	Find positions on a coordinates grid (positive quadrant)	Represent functions grapically	Explore gradient, linear and non linear graphs	Use the form y = mx + c to identify parallel and perpendicular lines , find the equation of the line through given points, or through one point with a given gradient	Identify and interpret gradients and intercepts of linear functions graphically and algebraically	Recognise, sketch and interpret graphs of linear functions, quadratic functions, simple cubic functions and the reciprocal function. Plotting and interpreting graphs in real contexts to find approximate solutions to problems such as simple kinematic problems	Understand and use the language of kinematics. Understand, use and interpret graphs in kinematics for motion in a straight line. Understand, use and derive the formula for constant acceleration for motion. Interpret algebraic solution of equations graphically and use intersection points of graphs to solve equations.	Extend to correlation coefficients as measures of how close data points lie to a straight line and be able to interpret a given correlation coefficient using a given p-value or critical value. Understand and use the second derivative as the rate of change of gradient; connection to convex and concave sections of curves and points of inflection
			Conversion graphs, direct proportion graphs, y=mx+c		Recognise, sketch and interpret graphs of linear functions, quadratic functions, simple cubic functions and the reciprocal function	Calculating or estimating gradients of graphs. Calculating or estimating the area under a graph. Interpreting gradients of graphs and areas under graphs in the context of kinematics	Understand and use the equation of a straight line and gradient conditions for two straight lines to be parallel or perpendicular. Know and use the Fundamental Theorem of Calculus.	Integrate ekx, 1/x , sinkx,coskx and related sums,differences and constant multiples, rea between two curves

Longcroft School departmental curriculum overview

MATHEMATICS

Strand	Year 6	Year 7	Year 8	Year 9	Year 10	Year 11	Year 12	Year 13
Geometry and measurements	Illustrate and name parts of circles, including radius, diameter and circumference and know that the diameter is twice the radius	Know properties of triangles and quadrilaterals, name and construct polygons	Explore diagonals of quadrilaterals	Surface area of cuboids. Volume of cuboids and prisms. Surface area of prisms	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	Perimeter of polygons.		Understand and use numerical integration of functions, including the use of the trapezium rule and estimating the approximate area under a curve and limits that it must lie between
	Draw 2-D shapes using given dimensions and angles, recognise, describe and build simple 3-D shapes, including making nets	Geometric notation		Explore volumes of cones, spheres and compound shapes.	Standard ruler and compass constructions. Know that the perpendicular distance from a point to a line is the shortest distance to the line. Use these to construct given figures and solve loci problems.	Mixed loci problems		
	Identify regular polygons, including equilateral triangles and squares, as those in which the side-lengths are equal and the angles are equal. Find the perimeter of regular and irregular polygons	Simple angle proofs	Find and prove simple geometric facts	Recognise rotational symmetry,rotate points about a given point. Perform a series of transformations.	Apply and use the concepts of congruence and similarity, including the relationships between lengths, areas and volumes in similar figures	Congruence criteria for triangles. Simple geometric proofs		
	Draw and translate simple shapes on the coordinate plane, and reflect them in the axes.	Draw lines, angles and simple shapes	recognise line symmetry, reflect shapes in a given line					

Longcroft School departmental curriculum overview

MATHEMATICS

Strand	Year 6	Year 7	Year 8	Year 9	Year 10	Year 11	Year 12	Year 13
Geometry and measurements	Recognise angles where they meet at a point, are on a straight line, or are vertically opposite, and find missing angles.	Parallel and perpendicular lines	Interior and exterior angles of a polygon, angles in parallel lines	Apply angle facts, triangle congruence, similarity and properties of quadrilaterals to conjecture and derive results about angles and sides including the base angles of an isosceles triangle are equal, and use known results to obtain simple proofs	Know the formula for Pythagoras' Theorem. Apply it to find angles and lengths in right angled triangles and, where possible, general triangles in two and three dimensional figures.	The sine rule. The cosine rule. Area of a triangle using sine. Mixed problems using trigonometric formulas. Graphs of trigonometric functions.	Understand and use the sine, cosine and tangent functions, their graphs, periodicity and symmetry. Understand and use the trig identities for tan, sin and cos	Know and use exact values in radian form. Work with radian measure. Understand and use the definitions of secant, cosecant and cotangent and of arcsin, arccos and arctan; their relationships to sine, cosine and tangent
	Compare and classify geometric shapes based on their properties and sizes and find unknown angles in any triangles, quadrilaterals, and regular polygons	Angles at a point, vertically opposite, quadrilaterals			Apply addition and subtraction of vectors, multiplication of vectors by a scalar, and diagrammatic and column representation of vectors Use vectors to construct geometric arguments and proofs		Use vectors in two dimensions. Calculate the magnitude and direction of a vector and convert between component form and magnitude and direction form	
	Convert units of measure, using decimal notation up to three decimal places where appropriate	Solve perimeter problems	Circumference of a circle	ace are and volume cylinc	Surface area and volume cones, spheres and frustrums	Calculate exactly with multiples of `pi`		
	Recognise that shapes with the same areas can have different perimeters and vice verse							
	Recognise when it is possible to use formulae for area and volume of shapes, inc. parallelograms and triangles	Area rectangles, parallelograms, triangles, trapezium	Area circle, and compound shapes					

Longcroft School departmental curriculum overview

MATHEMATICS

Strand	Year 6	Year 7	Year 8	Year 9	Year 10	Year 11	Year 12	Year 13
Statistics / Probability	Construct line graphs and pie charts	Solve problems with line charts, bar charts and pie charts	Construct and interprete frequency tables grouped and ungrouped and two way tables	Interpret analyse and compare distributions of data sets from inivariate empirical distributions through appropriate graphical representations involving discrete,continous and grouped data	Infer properties of populations or distributions from a sample, whilst knowing the limitations of sampling		Link to discrete and continuous distributions	
	Calculate and interpret mean as an average	Find median, range and mean	Find the mode, identify outliers, find distribution using statistical measures	Find the modal class. Compare distributions. Find the median and quartiles from cumulative frequency diagrams	Interpret, analyse and compare the distributions of data sets from univariate empirical distributions through appropriate measures of central tendency and spread	Applying statistics to describe a population	Calculate standard deviation, including from summary statistics. Calculate expected frequencies associated with the binomial distribution	Understand and use the Normal distribution as a model; find probabilities using the Normal distribution
		Language of probability, calculate probabilities, probability scale, sample space, set notation, venn diagrams and probability adds to 1.	Construct sample space for more than one event and find probabilities, use tables and venn diagrams	Compare experimental and theoretical probability.Use frequency trees to find probabilities.Simple tree diagrams	Apply ideas of randomness, fairness and equally likely events to calculate expected outcomes or multiple future experiments. Relate relative expected frequencies to theoretical probability.	Expected value. Properties of probability. Tree diagrams. Conditional probability	Understand and use mutually exclusive and independent events when calculating probabilities	Understand and use conditional probability. Understand and use conditional probability formula
			Recognise different types of data				Understand and apply the language of statistical hypothesis testing, developed through a binomial model	Understand and apply correlation coefficients as measures of how close data points lie to a straight line and be able to interpret a given correlation coefficient using a given p-value or critical value
							Conduct a statistical hypothesis test for the proportion in the binomial distribution and interpret the results in context	Conduct a statistical hypothesis test for the mean of a Normal distribution with known, given or assumed variance and interpret the results in context

Longcroft School departmental curriculum overview

MATHEMATICS

Strand	Year 6	Year 7	Year 8	Year 9	Year 10	Year 11	Year 12	Year 13
Statistics / Probability							Understand that a sample is being used to make an inference about the population and appreciate that the significance level is the probability of incorrectly rejecting the null hypothesis	
Ratio and Proportion	Solve problems involving the relative sizes of two quantities where missing values can be found by using integer multiplication and division facts		Convert area and volume measurements	Ratio's in the context of area and volume; gradients as a rate of change	Compare lengths using ratio notation; make links to trigonometric ratios.			
	Solve problems involving the calculation of percentages and use percentages for comparison	Convert metric units	Currency conversion	Scale drawings - Revisit conversion graphs - solve direct proportion problems - inverse proportion				
	Solve problems involving similar shapes where the scale factor is known or can be found	Use multiplicative relationships between known facts	Scale factors, scale diagrams, similar shapes	Working with ratios and fractions . Reverse percentages. Financial maths. Repeated percentage change.	Interpret percentages and percentage changes as a fraction or a decimal, and interpret these multiplicatively; express one quantity as a percentage of another; compare two quantities using percentages; work with percentages greater than 100%;	Solve problems involving percentage change, including percentage increase / decrease and original value problems, and simple interest including in financial mathematics		
	Solve problems involving unequal sharing and grouping using knowledge of fractions and multiples.		Ratio notation, divide into given ratio, work parts and whole, link gradient and ratio and 1:n					
			Direct proportion graphs					

Longcroft School departmental curriculum overview

MATHEMATICS

Strand	Year 6	Year 7	Year 8	Year 9	Year 10	Year 11	Year 12	Year 13
Exponential and Logarithms							Know and use the function a^x and its graph,where a is positive. Understand and use the laws of logarithms Know and use the function e^x and its graph. Know that the gradient of e^{kx} is equal to ke^{kx} and hence understand why the exponential model is suitable in many applications Know and use the function lnx and its graph Use logarithmic graphs to estimate parameters in relationships of the form $y= ax^n$ and $y = kb^x$, given data for x and y Understand and use exponential growth and decay:use in modelling	
Proof							Understand and use the structure of mathematical proof, proceeding from given assumptions through a series of logical steps to a conclusion, use methods of proof,including proof by deduction, proof by exhaustion. Disproof by counter example.	Proof by contradiction (including proof of the irrationality of root 2 and the infinity of primes, application to unfamiliar proofs

Longcroft School departmental curriculum overview

MATHEMATICS

Strand	Year 6	Year 7	Year 8	Year 9	Year 10	Year 11	Year 12	Year 13
Forces and Newtons Law							Understand the concept of a force: understand and use Newtons first law.	
							Understand and use Newton's second law for motion in a straight line	Extend to situations where forces need to be resolved.
							Understand and use weight and motion in a straight line under gravity; gravitational acceleration, g, and its value in SI units to a varying degree of accuracy.	
							Understand and use Newton's third law; equilibrium of forces on a particle and motion in a straight line	Understand and use Newton's third law, equilibrium of forces on a particle; resolving forces in 2 dimensions, equilibrium of a particle under coplanar forces
Parametric Equations								Understand and use the parametric equations of curves and conversion between Cartesian and parametric forms
								Use parametric equations in modelling in a variety of contexts
								Differentiate simple functions and relations defined parametrically.

Longcroft School departmental curriculum overview
MATHEMATICS

Termly Curriculum Content

	Autumn			Spring			Summer		
Year	Topics	Links to prior learning	How does this prepare students for future learning?	Topics	Links to prior learning	How does this prepare students for future learning?	Topics	Links to prior learning	How does this prepare students for future learning?
7	Sequences - generate and describe linear sequences Understanding and using algebraic notation Equality and Equivalence Place value, ordering numbers and integers	Use simple formulae. Generate and describe linear number sequences. Express missing number problems algebraically. Solve number and practical problems that involve all of the above. Identify the value of each digit in numbers given to three decimal places. Multiply and divide numbers by 10, 100 and 1000 giving answers up to three decimal places.	Autumn Block 2 Generate sequences from an algebraic rule Spring Block 4 Revisit notation and substitution in the context of directed number. Spring Block 5 Additional Higher content. Simple algebraic fractions Summer 3 Explore related algebraic expressions. Using coordinates. Spring Block 4 Revisit collecting like terms in the context of directed number. Spring Block 4 Form and solve two-step equations Spring block 2 Use factors and multiples. Spring Block 4 Order directed number. Summer Block 5 Prime factorisation. HCF and LCM	Solving problems with addition and subtraction Solving problems with multiplication and division Fractions and percentages of amounts	Solve addition and subtraction multi-step problems in contexts, deciding which operations and methods to use and why Multiply multi-digit numbers up to 4 digits by a two-digit whole number using the formal written method of long multiplication · Divide numbers up to 4 digits by a two-digit whole number using the formal written method of long division, and interpret remainders as whole number remainders, fractions, or by rounding, as appropriate for the context Use estimation to check answers to calculations and determine, in the context of a problem, an appropriate degree of accuracy.	Autumn Block 1 – Circumference of a circle Spring Block 4 · Use the four operations with directed number Spring Block 5 · Add and subtract fractions including mixed numbers Summer Block 3 · Use Known facts. Summer Block 2 · Area of a trapezium · Area of a circle · Area of compound shapes Spring Block 5 Additional Higher content, Simple algebraic Fractions. Summer 3 Explore related algebraic expressions. Revise and extend Y7 coverage. Solve inequalities. Form and solve equations with brackets. Identify and use formulae, expressions, identities and equations.	Addition and subtraction of fractions Constructing, measuring and using geometric notation Developing geometric reasoning Developing number sense	Recognise, describe and build simple 3-D shapes, including making nets. Draw 2-D shapes using given dimensions and angles. Compare and classify geometric shapes based on their properties and sizes. Illustrate and name parts of circles, including radius, diameter and circumference and know that the diameter is twice the radius Describe positions on the full coordinate grid (all four quadrants) · Draw and translate simple shapes on the coordinate plane, and reflect them in the axes Find unknown angles in any triangles,	Multiply and divide fractions. Additional Higher content Multiply and divide mixed numbers Summer Blocks 1/2/3 Revise and extend Y7 coverage. Additional Higher content Explore diagonals of quadrilaterals Summer Block 1 Revise Y7 coverage. Angles in parallel lines. Interior and exterior angles of polygons. Additional Higher content Angles formed by diagonal of quadrilaterals Revisit and extend Y7 work including: · Convert between units

Longcroft School departmental curriculum overview

MATHEMATICS

		Multiply one-digit numbers with up to two decimal places by whole numbers. Use written division methods in cases where the answer has up to two decimal places. Solve problems which require answers to be rounded to specified degrees of accuracy Associate a fraction with division and calculate decimal fraction equivalents (for example, 0.375) for a simple fraction (for example ⅜). Recall and use equivalences between simple fractions, decimals and percentages, including in different contexts		Operations and equations with directed numbers Addition and subtraction of fractions	Round any whole number to a required degree of accuracy. Use negative numbers in context, and calculate intervals across zero. Solve number and practical problems that involve all of the above	Summer 3 Explore related algebraic expressions. Revise and extend Y7 coverage. Solve inequalities. Form and solve equations with brackets. Identify and use formulae, expressions, identities and equations. Additional Higher Content: Form and solve equations with inequalities and unknowns on both sides	Sets and probability Prime Numbers and proof	quadrilaterals, and regular polygons Identify common factors, common multiples and prime numbers	of time · order of operations · Calculate with money · Use estimation Additional Higher context · Convert metric units of length and area · Use error interval notation Autumn Block 6 · Review and extend Y7 coverage · Construct sample spaces for more than one event · Use sample spaces to find probabilities · Use tables and Venn diagrams to find probabilities · Additional Higher content Use the product rule for finding total number of outcomes Spring Block 5 · Revisit Y7 comparing and ordering · Write numbers of any size in standard form Additional Higher content · Use negative and fractional indices
	Fraction, decimal and percentage equivalence Solving problems with addition and subtraction		Spring Block 4 Use the four operations with directed number. Spring Block 5 Add and subtract fractions including mixed numbers. Summer Block 3 Use known facts						
8	Ratio and Scale Multiplicative Change	Use multiplicative relationships between known facts Use multiplicative relationships between known facts	Ratios in the context of area and volume; gradients as a rate of change Scale drawings - Revisit conversion graphs - solve direct proportion problems - inverse proportion	Brackets, equations and inequalities	Understand the difference between equality and equivalence, collecting like terms. Simple algebraic fractions. Explore related algebraic expressions	Change the subject of a formula. Testing algebraic conjectures. Expand a pair of binomials. Form and solve equations and inequalities with unknowns on both sides	Number sense Angles in parallel lines and Polygons	Order of operations. Round to powers of 10 and 1 significant figure. Properties of triangles and quadrilaterals. Angles at a point.	Financial maths. Estimate powers and roots. Error intervals and calculations with bounds Chains of reasoning to find angles. Bearings. Standard ruler and compass constructions. Loci

Longcroft School departmental curriculum overview

MATHEMATICS

	Multiplying and dividing fractions Working in the Cartesian Plane Representing data Tables and Probability	Add and subtract fractions including mixed numbers Represent functions graphically – Sequences Construct and interpret Pie Charts. Solve problems with line charts and bar charts Use the language of probability. Calculate simple probabilities. Use the probability scale. Sample spaces. Understand and use set notation, including Venn diagrams	Fraction arithmetic including exact values Use the form y = mx + c to identify parallel and perpendicular lines , find the equation of the line through given points, or through one point with a given gradient Construct and interpret diagrams for grouped discrete data and continuous data Compare experimental and theoretical probability. Use frequency trees to find probabilities. Simple tree diagrams	Sequences Indices Fractions and Percentages Standard Index form	Recognise linear and non-linear sequences. Generate sequences from an algebraic rule Algebraic notation Interchange between fractions and decimals below 1. Explore fractions above 1. Find fractions of an amount. Solve problems with fractions greater than 1. Understand and use place value. Compare and order numbers. Use factors and multiples. Index laws.	Testing conjectures about sequences. Representing sequences. Finding the rule for the nth term of a linear sequence Laws of indices. Work with powers and roots Working with ratios and fractions. Reverse percentages. Financial maths. Repeated percentage change. Standard form	Area of trapezia and circles Line Symmetry and reflection The data handling cycle Measures of location	Adjacent angles on a straight line. Solve perimeter problems. Area of rectangles, parallelograms and triangles. Area of a trapezium Solve problems with line charts and bar charts. Construct and interpret pie charts. Find the median and the range. Find the mean	Surface area of cuboids and cylinders. Volume of cuboids, cylinders and other prisms. Explore volumes of cones, spheres and compound shapes. Surface area of prisms Recognise rotational symmetry, rotate points about a given point. Perform a series of transformations Interpret analyse and compare distributions of data sets from invariant empirical distributions through appropriate graphical representations Find the modal class. Compare distributions. Finding the median and quartiles from cumulative frequency diagrams
9	Coordinates and Linear Graphs Sequences	Plot graphs of equations that correspond to straight line graphs in the co-ordinate plane Substituting numerical values into formulae and expressions	Identify and interpret gradients and intercepts of linear functions graphically and algebraically. Recognise, sketch and interpret graphs of linear functions, quadratic functions, simple cubic functions and the reciprocal function Deduce expressions to calculate the nth term of linear and quadratic sequences	Basic Number Factors and Multiples Basic Fractions	Rounding numbers and measures to an appropriate degree of accuracy An ability to multiply and divide with whole numbers is assumed. Equivalent fractions and simplifying fractions. Calculate exactly with fractions	Order of operations, including brackets, powers, roots and reciprocals Factors, multiples and primes assorted problems Apply the four operations, including formal written methods, to simple fractions (proper and improper) and mixed numbers - both positive and negative	Ratio and Proportion Rounding	Equivalent fractions and simplifying fractions. Expressing one quantity as a fraction of another Using ratio notation, and reducing ratios to simplest form Round numbers and measures to an appropriate degree of accuracy (e.g. to a specified number of decimal places or significant figures)	Understand and use proportion as equality of ratios. Relate ratios to fractions and to linear functions. Apply and interpret limits of accuracy including upper and lower bounds

Longcroft School departmental curriculum overview

MATHEMATICS

	Equations Basic Algebra Perimeter and Area Circumference and area 2D Representation of 3D shapes	Simplify and manipulate algebraic expressions (including those involving surds) by: collecting like terms multiplying a single term over a bracket taking out common factors Use conventional notation for priority of operations, including brackets, powers, roots and reciprocals. Understand and use the concepts and vocabulary of expressions, equations, formulae, identities, inequalities, terms and factors Students will need to understand the definition of polygon. A knowledge of the four operations is assumed—in particular the ability to multiply. Know and use the formulae: Circumference = 2π Radius = πd Area = πr^2	Solving two linear simultaneous equations algebraically by elimination. Solving two linear simultaneous equations graphically or algebraically by substitution Simplify and manipulate algebraic expressions (including those involving surds) by collecting like terms, multiplying a single term over a bracket, taking out common factors. Solve linear equations in one unknown algebraically including those with the unknown on both sides of the equation Lengths, areas and volumes in similar shapes	Basic Decimals Basic Percentages Angles Scale diagrams and bearings Transformations Pythagoras Inc. (3D)	Apply the four operations, including formal written methods, to decimals – both positive and negative Understand and use place value (e.g. when calculating with decimals) Express one quantity as a percentage of another. Compare two quantities using percentages. 2D geometry – terms and notation Alternate and corresponding angles on parallel lines Co-Ordinates. Rotation Reflection Translation Enlargement Conventions for labelling the sides and angles of triangles. Angles at a point, angles at a point on a straight line, vertically opposite	Interpret percentages and percentage changes as a fraction or decimal and interpret these multiplicatively Finding percentages and percentage changes multiplicatively using decimals Properties of special triangles and quadrilaterals. Congruence criteria for triangles. Simple geometric proofs. Scale drawings Apply addition and subtraction of vectors, multiplication of vectors by a scalar, and diagrammatic and column representation of vectors. Use vectors to construct geometric arguments and proofs. Trigonometric ratios – sin, cos and tan Pythagoras— and surds assorted problems.	Basic Probability Collecting and Representing Data Scatter Graphs	Use inequality notation to specify simple error intervals due to truncation or rounding Record, describe and analyse the frequency of outcomes of probability experiments using tables and frequency trees. Interpret and construct tables, charts and diagrams including, for categorical data: frequency tables bar charts, pie charts, pictograms vertical line charts for ungrouped discrete numerical data tables and line graphs for time series data know their appropriate use. Interpret, analyse and compare distributions of data sets from univariate empirical distributions through appropriate graphical representation.	Probability and sampling. Enumerating sets and combinations of sets systematically, using tables, grids, Venn diagrams and tree diagrams. Tree diagrams Construct and interpret diagrams for grouped discrete data and continuous data, i.e. histograms with equal and unequal class intervals and cumulative frequency graphs, and know their appropriate use. Applying statistics to describe a population.

					angles. Alternate and corresponding angles on parallel lines. The sum of angles in a triangle and the angle properties of polygons. Properties of special triangles and quadrilaterals				
10	Standard Form Calculating with Percentages Measures Statistical Measures Indices Construction and Loci Number recap and review Algebra recap and review	Understand and use place value (e.g. when working with very large or very small numbers) Interpret fractions and percentages as operators. Converting terminating decimals into fractions and vice versa. Changing between standard units and compound units in numerical and algebraic contexts Interpreting fractions and percentages as operators Using powers and roots 2D geometry – terms and notation A knowledge of the four operations is assumed. Substituting numerical values into formulae and	Rounding numbers and measures to an appropriate degree of accuracy. Plotting and interpreting graphs in real contexts to find approximate solutions to problems such as simple kinematic problems Applying statistics to describe a population Converting between normal numbers and standard form Constructing triangles. Mixed loci problems Using inequality notation to specify simple error intervals Recognise, sketch and interpret graphs of linear functions,	Pythagoras Theorem and basic Trigonometry Probability Sketching Graphs Vectors	2D geometry – terms and notation. Conventions for labelling the sides and angles of triangles. Angles at a point, angles at a point on a straight line, vertically opposite angles. Alternate and corresponding angles on parallel lines. Properties of special triangles and quadrilaterals Calculate and interpret conditional probabilities through representation using expected frequencies with two-way tables, tree diagrams and Venn diagrams Recognise, sketch and interpret graphs of linear functions, quadratic functions, simple cubic functions and the reciprocal function Apply addition and subtraction of vectors, multiplication of	Use of Pythagoras theorem in 2D and 3D. Be able to apply trigonometry and Pythagoras theorem to 2 and 3 dimensional problems including the angle between a line and a plane and the angle between two planes. Conditional probability Plotting and interpreting graphs in real contexts to find approximate solutions to problems such as simple kinematic problems	Real Life Graphs Volume Direct and Inverse Proportion Inequalities	Recognise, sketch and interpret graphs of linear functions, quadratic functions, simple cubic functions and the reciprocal function Know and apply the formulae to calculate the volume of cuboids and other right prisms (including cylinders) Constructing and interpreting equations that describe direct and inverse proportion Solving linear equations in one unknown algebraically where the unknown is on both sides of the equation	Calculating or estimating the area under a graph. Interpreting gradients of graphs and areas under graphs in the context of kinematics Calculate exactly with multiples of `pi` Recognising and interpreting graphs that illustrate direct and inverse proportion Solve linear inequalities in one or two variables and quadratic inequalities in one variable

Longcroft School departmental curriculum overview

MATHEMATICS

		expressions. Plotting straight-line graphs of the form y = mx + c	quadratic functions, simple cubic functions and the reciprocal function		vectors by a scalar, and diagrammatic and column representation of vectors				
	Congruence and similarity	Angles at a point, angles at a point on a straight line, vertically opposite angles	Simple geometric proofs	Properties of Polygons	Derive and use the sum of angles in a triangle	Congruence criteria for triangles (SSS, SAS, ASA, RHS)			
	SURDS	A knowledge of graphs will allow you to link arithmetic, geometric and quadratic sequences to linear, exponential and quadratic graphs respectively.	Pythagoras' theorem Pythagoras— and surds assorted problems. Trigonometric ratios – sin, cos and tan. Inverse trigonometric functions						
11	Algebra: introduction to quadratics and rearranging formulae	Using and interpreting algebraic notation		Inequalities	Solving linear equations in one unknown algebraically where the unknown is on both sides of the equation		Gradients and Rates of change	Identifying and interpreting gradients and intercepts of linear functions graphically and algebraically	
	Linear and quadratic equations and their graphs	Understand and use standard mathematical formulae Rearrange formulae to change the subject		Vectors (Higher)	Apply addition and subtraction of vectors, multiplication of vectors by a scalar, and diagrammatic and column representation of vectors		Pre- calculus and area under a curve (Higher)	Plotting and interpreting graphs in real contexts to find approximate solutions to problems such as simple kinematic problems	
	Algebra; Further Quadratics, Rearranging Formulae and Identities	Simplify and manipulate algebraic expressions by expanding products of two binomials or factorising quadratic expressions		Further Sketching Graphs	Substituting numerical values into formulae and expressions. Plotting straight-line graphs of the form y = mx + c		Algebraic fractions (Higher)	Using and interpreting algebraic notation	
	Growth and Decay	Solving problems involving percentage change		Sine and cosine rule (Higher)	Trigonometric ratios – sin, cos and tan. Inverse trigonometric functions				
	Equations of a Circle (Higher)	Circle parts – definitions and properties.							

Longcroft School departmental curriculum overview

MATHEMATICS

	Further Equations and Graphs Simultaneous equations Direct and Inverse proportion (Higher)	Pythagoras' theorem Simplifying and manipulating algebraic expressions by collecting like terms		Transforming functions (Higher) Numerical methods (Higher) Circle Theorems (Higher)	Interpreting functions and composite functions Relationships between operations, including inverse operations Conventions for labelling the sides and angles of triangles (essential). Angles at a point, angles at a point on a straight line, vertically opposite angles (essential). The sum of angles in a triangle and the angle properties of polygons (essential) Properties of special triangles and quadrilaterals (essential)				