Long Term Curriculum Plan

Subject –Maths

Lessons per week Key Stage 3:	**4 x 40mins**
Lessons per week Key Stage 4:	**4 x 40mins**

Higher Level – Blue type

Year 7						
	Aut 1	**Aut 2**	**Spr 1**	**Spr 2**	**Sum 1**	**Sum 2**
	Algebraic Thinking	**Place Value & Proportion**	**Application of Number**	**Directed Number & Fractional Thinking**	**Lines & Angles**	**reasoning with Number:**
Year 7	**Sequences** Continuing, describing and finding missing terms in arithmetic and geometric sequences	**Place value 2** Write numbers as powers of 10 Rounding to decimal places and significant figures	**Addition and Subtraction** Written and mental methods for integers and decimals Solve problems involving Perimeter Financial maths Using Timetables Frequency trees Bar charts and vertical line charts	***Directed number*** Understand directed numbers Perform calculations across zero Four operations with negative numbers Roots of positive numbers Solving two step equations	**Geometric Notation** Angle notation Classifying angles Parallel and perpendicular lines Types of triangles and quadrilaterals Constructing triangles Draw and interpret pie charts	**Sets and probability.** Identify and represent sets. Interpret and create Venn diagrams. Probability of an event
	Algebraic Notation Understand and use algebraic notation Use function machines and bar models to solve one and two step equations	**Fractions, decimals and percentages 1** Convert between fractions, decimals and percentages Using a calculator Use and interpret pie charts		**Working with fractions** Understand and use equivalent fractions Add and subtract fractions Use fractions in algebraic contexts	**Geometric Reasoning** Know and use angles at a point, vertically opposite, on a line, in a triangle and quadrilateral Find angle sum of any polygon	**Prime numbers and proof** Square, triangle and prime numbers HCF and LCM Make and test conjectures
	Equality and Equivalence Collect like terms Simplify expressions **Place value 1**	Add and subtract numbers in standard form				

	Work out integer and decimal intervals on a number line Calculate median and range				Understand and use angles in parallel lines	
	Cultural development: See subject mapping document					

Year 8

	Aut 1	Aut 2	Spr 1	Spr 2	Sum 1	Sum 2
	Proportional reasoning	**Representations**	**Algebraic techniques**	**Developing number**	**Developing geometry**	**Reasoning with data**
Year 8	**Ratio & scale** Understand the meaning and representation of ratio and ratio notation. Divide a value into a given ration. Solve problems involving rations of the form 1:n(or n:1) and ration m : n. Express rations in their simplest integer form and in the form 1:n. Compare rations and related fractions. Understand π as the ratio between diameter and circumference. Understand gradient of a line as a ratio.	**Working in the cartesian plan** Work with coordinates in all four quadrants. Identify and draw lines that are parallel to the axes. Recognise and use the line y = x. recognise and use lines of the form y – kx. Link y = kx to direct proportion problems. Explore the gradient of the line y = kx. Recognise and use lines of the form y = x + a and explore graphs with negative gradient (y = -kx, y = a – x, x + y = a)	**Brackets, equations & inequalities** Form algebraic expressions and use directed number with algebra. Multiply out a single bracket and factorise into a single bracket. Expand multiple single brackets and simplify. Expand a pair of binomials. Solve equation, including with brackets. Form and solve equation with brackets. Understand and solve simple inequalities.	**Fractions & %** Convert fluently between key fractions, decimals and percentages. Calculate key fractions, decimals and percentages of an amount without a calculator. Calculate fractions, decimals and percentages of an amount using calculator methods. Convert between decimals and percentage greater than 100%. Percentage decrease with a multiplier and calculate percentage increase and decease using a multiplier. Express on number as a fraction or a percentage of another without a calculator and express on number as a fraction or a percentage of another using calculator methods.	**Angles in parallel lines 7 polygons** Understand and use basic angles rules and notation. Investigate angles between parallel lines and the transversal. Identify and calculate with alternate and corresponding angles. Identify and calculate with co-interior, alternate and corresponding angles. Solve complex problems with parallel line	**The data handling cycle** Set up a statistical enquiry, design and criticise questionnaires. Draw and interpret pictograms, bar charts, vertical line charts and multiple bar charts. Draw and interpret Pie charts and line graphs. Choose the most appropriate diagram for a given set of data. Represent and interpret grouped quantitative data. Find and interpret the range. Compare distributions using

					angles. Construct triangles and special quadrilaterals. Investigate the properties of special quadrilaterals. Identify and calculate with sides and angles in special quadrilaterals.	charts. Identify misleading graphs.
	Multiplicative change Solve problems involving direct proportion and explore conversion graphs. Explore direct proportion graphs. Explore relationships between similar shapes. Understand scale factors as multiplicative representations and draw and interpret scale diagrams. Interpret maps using scale factors and ratios.	**Representing data** Draw and interpret scater graphs and describe linear correlation. Draw and use line of best fit (1) & (2). Identify non-linear relationships and different types of data. Read and interpret ungrouped frequency tables and grouped frequency tables. Represent grouped discrete data and continuous data grouped into equal classes. Represent data in two-way tables.	**Sequences** Generate sequences given a rule in words. Generate sequences given a simple algebraic rule. Generate sequences given a complex algebraic rule. Find the rule for the nth term of a linear sequence.	**Standard index form** Investigate positive powers of 10. Work with numbers greater than 1 in standard form. Investigate negative powers of 10. Work with numbers between 0 and 1 in standard form. Compare and order numbers in standard form. Mentally calculate with numbers in standard form. Add, subtract, multiply and divide numbers in standard form. Use a calculator to work with numbers in standard form. Understand and use negative and fractional indices.	**Area of trapezium & circles** Calculate the area of triangles, rectangles, and parallelograms. Calculate the area of a trapezium. Calculate the perimeter and area of compound shapes (1). Investigate the area of a circle. Calculate the area of a circle with and without a calculator. Calculate the perimeter and area of compound shapes (2)	

	Multiplying & dividing fractions Represent multiplication of fractions. Multiply a fraction by an integer. Find the product of a pair of unit fractions or any pair of any fractions. Divide and integer by a fraction and by a unit fraction. Understand and use the reciprocal. Divide any pair of fractions.	**Tables & probability** Construct sample spaces for 1 or more events. Find probabilities from a sample space. Find probabilities from two-way tables and from Venn diagrams. Use the product rule for finding the total number of possible outcomes.	**Indices** Add and subtract expressions with indices. Simplify algebraic expressions by dividing indices. Use the addition law for indices. Use the addition and subtraction law for indices. Explore powers of powers.	**Number sense** Round numbers to powers of 10, and 1 significant figure. Round numbers toa given number of decimal places. Estimate the answer to a calculation. Understand and use error interval notation. Calculate using the order of operations and calculate with money. Convert metric measures of length and metric units of weight and capacity.	**Line symmetry & reflection** Recognise line symmetry. Reflect a shape in a horizontal or vertical line 1 (shapes touching the line). Reflect a shape in a horizontal or vertical line 2 (shapes not touching the line). Reflect a shape in a diagonal line 1 (shapes touching the line). Reflect a shape in a diagonal line 2 (shapes not touching the line).	**Measures of location** Understand and use the mean, median and mode. Chose the most appropriate average. Find the mean from an ungrouped frequency table. Find the mean from a grouped frequency table. Identify outliers. Compare distributions using average and the range.
	Cultural development: Seem subject mapping document.					

Year 9

		Aut 2	Spr 1	Spr 2	Sum 1	Sum 2
	Reasoning with Algebra	**Constructing in 2 & 3 dimensions**	**Reasoning with Number**	**Reasoning with Geometry**	**Reasoning with proportion**	**Representations and revision**
Year 9	**Straight line graphs** Lines parallel to the axes, y = x and y = -x. using tables of values. Compare gradients and intercepts. Understand and use y = mx + c.	**Three-dimensional shapes** Know names of 2-D and 3-D shapes. Recognise prisms (including language of edges/vertices). Accurate nets of cuboids and other 3-d shapes. Plans and elevations. Find	**Numbers** Integers, real and rational numbers. Understand and use surds. Work with directed number. Solve problems with integers. Solve problems with	**Deduction** Angles in parallel lines. Solving angles problems (using chains of reasoning). Angles problems with algebra. Conjectures with angles and shapes. Link	**Enlargement and similarity** Recognise enlargement and similarity. Enlarge a shape by a positive integer scale factor. Enlarge a	**Probability** Single event probability. Relative frequency. Expected outcomes. Independent events. Use tree diagrams. Use tree diagrams to solve 'without

	Write and equation in the form y = mx + c. Find the equation of a line from a graph. Interpret gradient and intercepts of real-life graphs. Model real-life graphs inverse proportion. Explore perpendicular lines.	area of 2-D shapes. Surface area of cubes and cuboids. Surface area of triangular prisms. Surface area of a cylinder. Volume of cubes, cuboids, other 3-D shapes – prisms and cylinders. Explore volumes of cones, pyramids, and spheres.	decimals. HCF and LCM. Adding, subtracting, multiplying and dividing fractions. Solve problems with fractions. Numbers in standard form.	constructions and geometrical reasoning.	shape by a negative scale factor. Work out missing sides and angles in a pair of given similar shapes. Solve problems with similar triangles. Explore ratios in right-angled triangles.	replacement' problems. Use diagrams to work out probabilities.
	Forming and solving equations Solve one and two – stpe equations and inequalities and inequalities with brackets. Inequalities with negative number and solve equations with inequalities in context. Substituting into formulae and equations. Rearranging the formulae (one-step). Rearrange formulae (two step). Rearrange complex formulae including brackets and squares.	**Constructions and congruency** Draw and measure angles. Construct and interpret scale drawings. Locus of distance from a point. Locus of distance from a straight line/shape. Locus equidistant from two points. Construct a perpendicular bisector. Construct a perpendicular from a point. Construct a perpendicular to a point. Locus of distance from two lines. Construct an angle bisector. Construct triangles from given information. Identify congruent figures. Explore congruent triangles and identify.	**Using Percentages** Use the equivalence of fractions, decimals and percentage. Calculate percentage increase and decrease. Express a change as a percentage. Solve 'reverse' percentage problems. Recognise and solve percentage problems (non-calculator and calculator). Solve problems with repeated percentage change.	**Rotation and translations** Identify the order of rotational symmetry of a shape. Compare and contrast rotational symmetry with lines of symmetry. Rotate a shape about a point on a shape. Rotate a shape about a point not on a shape. Translate points and shapes by a given vector. Compare rotation and reflection of shapes. Find the result of a series of transformations.	**Solving ratio & proportion problems** Solve problems with direct proportion. Direct proportion and conversion graphs. Solve problems with inverse proportion. Graphs of inverse relationships. Solve ratio problems given the whole or a part. Solve 'best buy' problems. Solve problems ratio and algebra.	**Algebraic representation** Draw and interpret quadratic graphs. Interpret other graphs, including reciprocal and piecewise. Investigate graphs of simultaneous equations. Represent inequalities.

	Testing conjectures Factors, Multiples and Primes, true or false? Always, sometimes, never true, show that. Conjectures about number. Expand a pair of binomials. Conjectures with algebra. Explore the 100 grid.		**Maths and money** Solve problems with bills and bank statements. Calculate simple interest. Calculate compound interest. Solve problems with Value Added Tax. Calculate wages and taxes. Solve problems with exchange rates. Solve unit pricing problems.	**Pythagoras' Theorem** Squares and square roots. Identify the hypotenuse of a right-angled triangle. Determine whether a triangle is right-angled. Calculate the hypotenuse of a right-angled triangle. Calculate missing sides in right-angled triangles. Use Pythagoras' theorem on coordinate axes. Explore proofs of Pythagoras' theorem. Use Pythagoras' theorem in 3-D shapes.	**Rates** Solve speed, distance, and time problems with and without a calculator. Use distance-time graphs. Solve problems with density, mass and volume. Solve flow problems and their graphs. Rates of change and their units. Convert compound units.	**Revision**
	Cultural development: See subject mapping document.					
Year 10						
Year 10	**Aut 1**	**Aut 2**	**Spr 1**	**Spr 2**	**Sum 1**	**Sum 2**
	Similarity	**Developing Algebra**	**Geometry**	**Proportions & proportional change**	**Delving into data**	**Using Number**
	Congruence, similarity & enlargement) Enlarge a shape by a positive integer scale factor. Enlarge a shape by a fractional scale factor. Enlarge a shape by a negative scale factor. Identify similar	**Equations & inequalities** Understand the meaning of a solution. Form and solve one-step and two-step equations and inequalities. Show solutions to inequalities on a number line. Interpret representations on number lines as inequalities.	**Angles & bearings** Using cardinal directions and related angles. Draw and interpret scale diagrams. Understand and represent bearing. Measure and read bearings. Calculate bearings using angles	**Ratios & fractions** Compare quantities using. Link ratios and fractions. Share in a ratio (given total or one part). Use ratios and fractions to make comparisons. Link ratios and graphs. Solve problems with currency conversion. Link	**Collecting, representing & interpreting data** Understand populations and samples. Construct a stratified sample. Primary and	Non calculator methods Mental/written methods of integer/decimal addition and subtraction. Mental/written methods of integer/decimal multiplication and division. The four rules

	shapes. Work out missing sides and angles in a pair given similar shapes. Use parallel line rules to work out missing angles. Establish a pair of triangles are similar. Explore areas of similar shapes (1 & 2). Explore volumes of similar shapes. Solve mixed problems involving similar shapes. Understand and use condition for congruent triangles. Prove a pair of triangles are congruent.	Represent solutions to inequalities using set notation. Draw straight line graphs. Find solutions to equations using straight line graphs. Represents solutions to single inequalities on a graph. Represent solutions to multiple inequalities on a graph. Form and solve equations with unknowns on both sides. Form and solve inequalities with unknowns on both sides. Form and solve more complex equations and inequalities. Solve quadratic equations by factorisation. Solve quadratic inequalities in one variable.	rules. Solve bearings problems using Pythagoras and trigonometry.	ratios and scales. Use and interpret ratios of the form 1 : N and N : 1. Solve 'best buy' problems. Combine a set of ratios. Link ratio and algebra. Ratio in area problems. Ratio in volume problems. Mixed ratio problems.	secondary data. Construct and interpret frequency tables and frequency polygons. Construct and interpret two-way tables. Construct and interpret line and bar charts (including composite bar charts). Construct and interpret pie charts. Criticise charts and graphs. Construct histograms. Interpret histograms. Find and interpret averages from a list. Find and interpret averages from a table. Construct and interpret time series graphs. Construct and interpret stem-and-leaf diagrams. Construct and interpret cumulative frequency diagrams. Use cumulative frequency diagrams to find measures. Construct and	of fraction arithmetic. Exact answers. Rational and irrational numbers (convert recurring decimals here). Understand and use surds. Calculate with surds. Rounding to decimal places and significant figures. Estimating answers to calculations. Understand and use limits of accuracy. Upper and lower bounds. Use number sense, solve financial maths problems. Break down and solve muti-step problems.
			Working with circles Recognise and label parts of a circle. Calculate fractional parts of a circle. Calculate the length of an arc. Calculate the area of a sector. Circle theorem: Angles at the centre and circumference. Circle theorem: Angles in the same segment. Circle theorem: Angles in cyclic quadrilateral. Understand and use the volume of a cylinder and cone. Understand and use the volume of a sphere. Understand and use the surface area of a cylinder and cone.	**Percentages & Interest** Convert and compare fractions, decimals, and percentages. Work out percentages of amounts (with and without a calculator). Increase and decrease by a given percentage. Express one number as a percentage of another. Calculate simple and compound interest. Repeated percentage change. Find the original value after a percentage change. Solve problems involving growth and decay. Understand iterative processes.		**Types of number & sequences** Understand the difference between factors and multiples. Understand primes and express a number as a product of its prime factors. Find the HCF and LCM of a set of numbers. Describe and continue arithmetic and geometric sequences. Explore other sequences. Describe and continue sequences involving surds. Find the rule for the nth term of a linear sequence. Find the rule

			Solve area and volume problems involving similar shapes.		interpret box plots. Compare distributions using charts and measures. Compare distributions using complex charts and measures. Construct and interpret scatter graphs. Draw and use a line of best fit. Understand extrapolation.	for the nth term of a quadratic sequence.
	Trigonometry Explore ratio in similar right-angled triangles. Work fluently with the hypotenuse, opposite and adjacent sides. Use the tangent ratio to find missing side lengths. Use sine, cosine, and tangent to find the missing side lengths and angles. Calculate sides in right-angled triangles using Pythagoras' theorem. Select the appropriate method to solve right-angled triangle problems. Work with key angles in right-angled triangles (1 & 2). Use trigonometry in 3-D shapes. Use the formula 1/1 ab sin C to find the area of a triangle. Understand and use the sine rule to find missing lengths. Understand and use the cosine rule to find missing angles. Choosing and using the sine and cosine rules (1&2).	**Simultaneous equations** Understand that equations can ave more than one solution. Determine whether a given (x,y) is a solution to a pair of linear simultaneous equations. Solve a pair of linear simultaneous equations by substituting a known variable and an expression (1 & 2). Solve a pair of linear simultaneous equations using graphs and by subtracting equations. Solve a pair of linear simultaneous equations by adding equations. Use a given equation to derive related facts. Solve a pair of linear simultaneous equations by adjusting one equation and by adjusting both equations. Form a pair of linear simultaneous equations from given information. Form and solve a pair of linear simultaneous equations from given information. Determine whether a given (x,y) is a solution to both a linear and quadratic equation. Solve a pair of simultaneous equations (one linear, one quadratic) using graphs. Solve a pair of simultaneous equations (one linear, one quadratic) algebraically.	**Vectors** Understand and represent vectors. Use and read vector notation. Draw and understand vectors multiplied by a scalar. Draw and understand addition and subtraction of vectors. Explore vector journeys in shapes. Explore quadrilaterals using vectors. Understand parallel vectors. Explore collinear points using vectors. Use vectors to construct geometric arguments and proofs.	**Probability** Know how to add, subtract and multiply fractions. Find probabilities using equally likely outcomes. Use the property that probabilities sum to 1. Using experimental data to estimate probabilities. Find probabilities from tables, Venn diagrams and frequency trees. Construct and interpret sample spaces for more than one event. Calculate probability with independent events. Use tree diagrams for independent events. Use tree diagrams for dependent events. Construct and interpret conditional probabilities (tree diagrams) construct and interpret conditional probabilities (Venn diagrams and two-way tables).		**Indices & roots Square and Cube numbers.** Calculate higher powers and roots. Powers of ten and standard form. The addition and subtraction rules for indices. Understand and use the power zero and negative indices. Work with powers of powers. Understand and use fractional indices. Calculate with numbers in standard form.

		Solve a pair of simultaneous equation involving a third unknown.				
	Cultural development: See subject mapping document					

Year 11

	Aut 1	Aut 2	Spr 1	Spr 2	Sum 1	Sum 2
Year 11	**Graphs**	**Algebra**	**Reasoning**	**Revision & communication**	**Revision**	
	Gradient & lines Equations of lines parallel to the axis and plot straight line graphs. Interpret y = mx + c. Find the equations of straight-line graph (1).find the equation of a straight line from a graph (2). Equation of a straight-line graph given one point and two points and the gradient. Determine whether a point is on the line. Solve linear simultaneous equations graphically. Recognise when straight lines are perpendicular. Find the equations of perpendicular lines.	**Expanding & factorising** Expand and factorise with a single bracket. Expand binomials. Factorise quadratic expressions. Factorise complex quadratic expressions. Solve equations equal to 0 and by factorisation. Solve complex quadratic expressions by factorisation. Complete the square.	**Multiplicative reasoning.** Use scale factors. Understand direct proportion. Construct complex direct proportion equations. Calculate with pressure and density understand inverse proportion. Construct inverse proportion equations. Ratio problems.	**Transforming & construction** Perform and describe line symmetry and reflection. Perform and describe rotation/rotational symmetry. Perform and describe translations of shapes. Perform and describe enlargements of shapes. Perform and describe negative enlargements of shapes. Identify transformations of shapes. Perform and describe a series of transformations of shapes. Identify invariant points and lines. Perform standard constructions using ruler	Pupils will prepare for their exams. Mock exams Practice papers and revision sessions.	

				and protractor or ruler and compasses. Solve loci problems. Understand and use trigonometrical graphs. Sketch and identify translations of the graph of a given function. Sketch and identify reflections of the graph of a given function.		
	Non-linear graphs Plot and read from a quadratic graph and from cubic graphs. Plot and read from reciprocal graphs. Recognise graph shapes and identify and interpret roots and intercepts of quadratics Understand and use exponential graphs. Find and use the equation of a circle centre (0,0). Find the equation of the tangent to any curve.	**Changing the subject** Solve linear equation and inequalities. Form and solve equations and inequalities in the context of shape. Change the subject of a simple formula and known formula. Change the subject of a complex formula. Change the subject where the subject appears more than once. Solve equations by iteration.	**Geometric Reasoning** Angles at points. Angles in parallel lines and shapes. Exterior and interior angles of polygons. Proving geometric facts. Solve problems involving vectors. Review of circle theorems. Circle theorem: angle between radius and chord. Circle theorem: Angle between radius and tangent. Circle theorem: two tangents from a point. Circle theorem: Alternate segment theorem. Review Pythagoras' theorem and using trig ratios.	**Listing & describing** Work with organised lists. Sample spaces and probability. Use the product rule for counting. Complete and use Venn diagrams. Construct and interpret plans and elevations. Use data to compare distributions. Interpreting scatter diagrams.		
	Using graphs Reflect shapes in given lines. Construct and interpret conversion graphs and real-life straight graphs.	**Functions** Use function machines. Substitution into expressions and formulae. Use function	**Algebraic reasoning** Simplify complex expressions. Find the rule for the nth term of a linear sequence. Find the rule for the nth term	**Show that…** 'show that' with number. 'show that' with algebra. 'show that' with shape. 'show that' with angles. 'show that' with data. 'show that' with vectors.		

	Interpret and construct distance//time graphs. Recognise and interpret graphs that illustrate direct and inverse proportion find approximate solutions to equation using graphs. Estimate the area under a curve.	notation. Work with composite functions.	of a quadratic sequence. Use rules for sequences. Solve linear simultaneous equations. Solve simultaneous equations with one quadratic. Formal algebraic proof. Inequalities in two variables.	'show that' with congruent triangles. Formal proof with congruent triangles.		
	Cultural development: See subject mapping document					