Alcester Academy Curriculum Planning: Key Stage 4 (Year 9) FOUNDATION

Department:	**Maths**		**Year Group: 9**				
Term	Topic/ subject	Assessment Objectives	Knowledge acquisition	Skill building ***Intent***	Wider reading opportunities to include numeracy and SMSC	Final assessment task and title	SEND & PP Identify where access and learning is supported
Autumn term 1	Unit 1a Integers and place value (4hours)	Order integers and decimals and use inequalities. Use all four operations on numbers including negative numbers. Use BIDMAS and rounding effectively.	Knowledge acquisition will be developed through the building of prior knowledge, revisiting skills covered, and through regular quick fire assessments throughout the term.	Estimate answers to calculations involving the four rules of operation Directed number work with multi-step calculations.	Use of key words: Integer, number, digit, negative, decimal, addition, subtraction, multiplication, division, remainder, operation, estimate, power, roots, factor, multiple, primes, square, cube, even, odd	Half Term Assessment 1	Use of manipulatives and non-examples to concrete knowledge and understanding. Regular recall strategies every lesson.
	Unit 1b Decimals (5 hours)	Use all four operations with decimals, round to nearest whole or given decimal places. Use Significant figures in calculations and estimating.		Mental maths problems with negative powers of 10, eg 2.5 × 0.01, 0.001 Directed number work with decimal numbers. Decimals in real-life problems as much as possible, eg Best Buys.	SMSC: Introduction to the historical and cultural context of the key ideas concepts such as use of Napier Bones for multiplication. Much of this work is building on previous knowledge through application in real life or problem solving scenarios to encourage students to develop resilience in working on maths problems.	Half Term Assessment 1	
	Unit 1c Indices, powers and roots (7 hours)	Use squares and cubes, and roots. Use the laws of indices to multiply or divide powers. Effectively use a calculator with powers and brackets.		Entering negative numbers into the calculator. Use brackets and the hierarchy of operations with powers inside the brackets, or raising brackets to powers.	Use of key words: Integer, number, digit, negative, decimal, addition, subtraction, multiplication, division, remainder, operation, estimate, power, roots, factor, multiple, primes, square, cube, even, odd	Half Term Assessment 1	
	Unit 1d Factors, multiples and primes (5 hours)	Recognise special numbers including odds, evens, primes, factors and multiples. Use prime factor decomposition, find LCM and HCF and use these solutions to solve problems.		Solve simple problems using HCF, LCM and prime numbers. Understand that every number can be written as a unique product of its prime factors	Use of key words: Integer, number, digit, negative, decimal, addition, subtraction, multiplication, division, remainder, operation, estimate, power, roots, factor, multiple, primes, square, cube, even, odd	Half Term Assessment 1	
	Unit 2a Algebra: the basics (5hours)	Use algebra notation, write expressions, equations, identities, formulas. Collect like terms, multiply	Knowledge acquisition will be developed through the building of prior knowledge, revisiting skills covered,	Methods to understand expressions, eg there are '*b*' boys and '*g*' girls in a class, what is the total '*t*' number of students in the class. Forming expressions and equations using area and perimeter of 2D shapes.	Use of key words: Expression, identity, equation, formula, substitute, term, 'like' terms, index, power, collect, substitute, expand, bracket, factor, factorise, linear, simplify	Half Term Assessment 1	Regular recall strategies every lesson.

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		together algebraic terms, use index laws in algebra.	and through regular quick fire assessments throughout the term.		Use of key words: Expression, identity, equation, formula, substitute, term, 'like' terms, index, power, collect, substitute, expand, bracket, factor, factorise, linear, simplify		
Autumn term 2	Unit 2b Expanding and factorising single brackets (4 hours)	Use algebra notation, write expressions, equations, identities, formulas. Collect like terms, multiply together algebraic terms, use index laws in algebra.		Argue mathematically that $2(x + 5) = 2x + 10$.	The use of algebra to form the "general case" allows students to see how mathematics is useful in real-life. Additionally throughout the course the students will learn how to organise their work in a systematic way, so that it can be understood by others as well as themselves to enable them to communicate mathematically	Within 2nd assessment early Spring Term	Use of manipulatives and non-examples to concrete knowledge and understanding. Regular recall strategies every lesson.
	Unit 2c Expressions and substitution into formulae (6 hours)	Use substitution of positive and negative numbers into expressions including brackets and powers. Use word formulas to solve problems including substitution.	Knowledge acquisition will be developed through the building of prior knowledge, revisiting skills covered, and through regular quick fire assessments throughout the term.	Forming and solving equations involving algebra and other areas of mathematics such as area and perimeter.	Use of key words: Expression, identity, equation, formula, substitute, term, 'like' terms, index, power, collect, substitute, expand, bracket, factor, factorise, linear, simplify The use of algebra to form the "general case" allows students to see how mathematics is useful in real-life. Additionally throughout the course the students will learn how to organise their work in a systematic way, so that it can be understood by others as well as themselves to enable them to communicate mathematically.	Within 2nd assessment early Spring Term	Use of manipulatives and non-examples to concrete knowledge and understanding. Regular recall strategies every lesson.
	Unit 5a Solving equations (8 hours)	Know the difference between Equation Expression Identity & Formula. Write simple expressions and equations, use function machines and solve simple equations. Solve equations with unknown on both sides or with brackets. Use rearranging equations and substitution. Given a problem, form and equation and solve.	Knowledge acquisition will be developed through the building of prior knowledge, revisiting skills covered, and through regular quick fire assessments throughout the term.	Given expressions for the angles on a line or in a triangle in terms of a, find the value of a. Given expressions for the sides of a rectangle and the perimeter, form and solve an equation to find missing values.	Use of **key words**: Arithmetic, geometric, function, sequence, nth term, derive, quadratic, triangular, cube, square, odd, even, solve, change, subject, inequality, represent, substitute, bracket, expand, linear, equation, balance, accuracy.	Within 2nd assessment early Spring Term	Use of manipulatives and non-examples to concrete knowledge and understanding. Regular recall strategies every lesson.

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Spring term 1	Unit 10a Transformations (10 hours)	Recognise, describe and draw rotations giving centre of rotation, direction and number of degrees. Use reflections of shapes including simple equations of straight lines. Use translations defined by a column vector. Enlarge shapes through a scale factor enlargement and centre of enlargement. Identify a scale factor, and area scale factors. Use congruence of shapes within transformations, and combinations of transformations	Knowledge acquisition will be developed through the building of prior knowledge, revisiting skills covered, and through regular quick fire assessments throughout the term.	Recognise similar shapes because they have equal corresponding angles and/or sides scaled up in same ratio. Understand that translations are specified by a distance and direction (using a vector). Recognise that enlargements preserve angle but not length. Understand that distances and angles are preserved under rotations, reflections and translations so that any shape is congruent to its image. Understand that similar shapes are enlargements of each other and angles are preserved. Describe and transform 2D shapes using combined rotations, reflections, translations, or enlargements. Describe the changes and invariance achieved by combinations of rotations, reflections and translations.	Use of **key words:** Transformation, rotation, reflection, enlargement, translation, single, combination, scale factor, mirror line, centre of rotation, centre of enlargement, column vector, vector, similarity, congruent, angle, direction, coordinate, describe SMSC links: Multi-cultural links to carpet designs using transformations can be made. The use of formal mathematical language is encouraged when describing transformations.	Within 2nd assessment early Spring Term	Use of visual aids to support Regular recall strategies. Topic resources, such as tracing paper and mirrors used to support understanding.
	Unit 4a Fractions, decimals and percentages (9 hours)	Use diagrams for equivalent fractions and compare fractions. Simplify factions to their simplest form. Order, compare, convert fractions including mixed numbers. Find fractions of a quantity using multiplying and dividing of fractions. Use the unit fraction. Multiply and divide fractions.	Knowledge acquisition will be developed through the building of prior knowledge, revisiting skills covered, and through regular quick fire assessments throughout the term.	Relate simple fractions to percentages and vice versa. Work with improper fractions and mixed numbers, eg divide 5 pizzas between 3 people. Link fractions with probability questions. Solving word problems involving fractions and real life problems, eg finding a perimeter from a shape with fractional side lengths. Consider fractions and percentages of amounts, eg 12.5% = 0.125 = $\frac{1}{8}$. Practise converting between different forms.	Use of **key words**: Decimal, percentage, inverse, addition, subtraction, multiplication, division, fractions, mixed, improper, recurring, integer, decimal, terminating, percentage, VAT, increase, decrease, multiplier, profit, loss	Within 3rd assessment Start of summer term	Use of manipulatives and non-examples to concrete knowledge and understanding. Regular recall strategies every lesson.
Spring term 2	Unit 4b Percentages (8 hours)	Express a number as a percentage of another. Find simple percentages of a value. Find an increase or decrease, use percentages over 100%. Use percentage in real life. Use a multiplier to increase or decrease by a percentage.	Knowledge acquisition will be developed through the building of prior knowledge, revisiting skills covered, and through regular quick fire assessments throughout the term.	Using a mixture of calculator and non-calculator methods for percentages. Investigate comparisons between simple and compound interest calculations. Use a multiplier to increase or decrease by a percentage.	Number fluency through easily converting between fractions, decimals and percentages is a useful skill in making more complex topics easier to understand, especially in problem solving contexts, which is essential in helping students make informed decisions in life. Choosing the most appropriate method in solving problems results in increased confidence and many of these skills are transferrable to real-life situations, and therefore helping the students become reflective, responsible and insightful individuals	Within 3rd assessment Start of summer term	Use of manipulatives and non-examples to concrete knowledge and understanding. Regular recall strategies every lesson.

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Spring term 2	Unit 3a Tables, graphs and charts (14 hours)	Know which charts and graphs to use for differing data sets. Construct and interpret bar, line, and pie charts. Construct a frequency polygon and interpret a range of data from it.. Compare averages and spread of two data sets looking for simple patterns and relationships.	Knowledge acquisition will be developed through the building of prior knowledge, revisiting skills covered, and through regular quick fire assessments throughout the term.	Use a time–series data graph to make a prediction about a future value. Explain why same-size sectors on pie charts with different data sets do not represent the same number of items, but do represent the same proportion. Make comparisons between two data sets. Evaluate statements in relation to data displayed in a graph/chart.	These statistics based topics provide opportunities for students to work together and allows for discussion and debate on the use and abuse of statistics in the media and how data is best presented to eliminate bias	Within 3rd assessment Start of summer term	Use of real life data, manipulatives and non-examples to concrete knowledge and understanding. Regular recall strategies every lesson.
Summer term 1	Unit 3b Pie charts (3 hours)	Measure and draw angles. Construct pie charts for discrete or continuous data and interpret the result. Find mode and frequency from a pie chart, and compare two pie charts understanding population size.	Knowledge acquisition will be developed through the building of prior knowledge, revisiting skills covered, and through regular quick fire assessments throughout the term.	Explain why same-size sectors on pie charts with different data sets do not represent the same number of items, but do represent the same proportion. Make comparisons between two data sets. Evaluate statements in relation to data displayed in a graph/chart.	These statistics based topics provide opportunities for students to work together and allows for discussion and debate on the use and abuse of statistics in the media and how data is best presented to eliminate bias.	Within 3rd assessment Start of summer term	Use of real life data, manipulatives and non-examples to concrete knowledge and understanding. Regular recall strategies every lesson.
	Unit 3c Scatter graphs (4 hours)	Construct and interpret scatter diagrams. Use lines of best fit including making predictions from it, and identify outliers. Understand types of correlation and their meaning as a relationship of data	Knowledge acquisition will be developed through the building of prior knowledge, revisiting skills covered, and through regular quick fire assessments throughout the term.	Identify outliers and explain why they may occur. Given two sets of data in a table, model the relationship and make predictions. Use the line of best fit make predictions; interpolate and extrapolate apparent trends whilst knowing the dangers of so doing	These statistics based topics provide opportunities for students to work together and allows for discussion and debate on the use and abuse of statistics in the media and how data is best presented to eliminate bias	EOY Assessment	Use of real life data for students. Use of manipulatives and non-examples to concrete knowledge and understanding.
Summer term 1	Unit 6a Shape properties (4 hours)	Estimate and measure angles, use clock and anticlockwise, know degrees in full, half and quarter turns. Use parallel and perpendicular lines. List properties of well known quadrilaterals. Use angles at a point, straight line, right angle and opposite angles. Distinguish between types of triangle, and know properties of	Knowledge acquisition will be developed through the building of prior knowledge, revisiting skills covered, and through regular quick fire assessments throughout the term.	Name all quadrilaterals that have a specific property. Use geometric reasoning to answer problems giving detailed reasons. Find the size of missing angles at a point or at a point on a straight line. Geometrical problems involving algebra.	Use of **key words**: Quadrilateral, angle, polygon, interior, exterior, proof, tessellation, rotational symmetry, parallel, corresponding, alternate, co-interior, vertices, edge, face, sides, triangle, perpendicular, isosceles, scalene, clockwise, anticlockwise, hexagons, heptagons, octagons, decagons, obtuse, acute, reflex, quadrilateral, triangle, regular, irregular, two-dimensional, three-dimensional, measure, line, angle, order, intersecting	EOY Assessment	Hands on approach and discovery of rules Use of manipulatives and non-examples to concrete knowledge and understanding

		triangles including angles. Use properties of interior and exterior angles to complete proofs. Use corresponding and alternate angles, and the properties of parallel lines.			**SMSC:** Mathematics applied in different cultures such as Rangoli patterns, symmetry, tessellations and Islamic geometric patterns.		
Summer term 2	Unit 6a Angle facts (8 hours)	Classify the properties of types of triangles and quadrilaterals. Use regular and irregular shapes in calculations. Know angles facts to include angle sum of triangles and other polygons,	Knowledge acquisition will be developed through the building of prior knowledge, revisiting skills covered, and through regular quick fire assessments throughout the term.	Name all quadrilaterals that have a specific property. Use geometric reasoning to answer problems giving detailed reasons. Find the size of missing angles at a point or at a point on a straight line. Geometrical problems involving algebra. Use angle facts to demonstrate how shapes would 'fit together', and work out interior angles of shapes in a pattern. Given the size of its exterior angle, how many sides does the polygon have?	Use of **key words**: Quadrilateral, angle, polygon, interior, exterior, proof, tessellation, rotational symmetry, parallel, corresponding, alternate, co-interior, vertices, edge, face, sides, triangle, perpendicular, isosceles, scalene, clockwise, anticlockwise, hexagons, heptagons, octagons, decagons, obtuse, acute, reflex, quadrilateral, triangle, regular, irregular, two-dimensional, three-dimensional, measure, line, angle, order, intersecting	EOY Assessment	Hands on approach and discovery of rules Use of manipulatives and non-examples to concrete knowledge and understanding
	Unit 6b Interior and exterior angles of polygons. (6 hours)	Know names of shapes up to 10 sides, and the terms regular and irregular. Use angle sums of both irregular and regular shapes. Use interior and exterior angles of shapes. Use congruence. Know that some polygons fit together and others do not, and why	Knowledge acquisition will be developed through the building of prior knowledge, revisiting skills covered, and through regular quick fire assessments throughout the term.	Deduce and use the angle sum in any polygon. Derive the angle properties of regular polygons. Given the size of its exterior angle, how many sides does the polygon have? Problems whereby students have to justify the number of sides that a regular polygon has given an interior or exterior angle.	Mathematics applied in different cultures such as Rangoli patterns, symmetry, tessellations and Islamic geometric patterns	EOY Assessment	Hands on approach and discovery of rules Use of manipulatives and non-examples to concrete knowledge and understanding