Alcester Academy Curriculum Planning: Key Stage 4 (Year 10 Foundation)

Department: Maths	**Year Group: 10 sets 4 and 5**						
Term	Topic/ subject	Assessment Objectives	Knowledge acquisition	Skill building	Wider reading opportunities to include numeracy and SMSC	Final assessment task and title	SEND & PP
Autumn 1 Unit 8 3/4 week Unit 9 3 weeks	8a Perimeter and area. 8b 3D forms and volume.	Find the perimeter of any shape. Learn and use the formula for area of triangles, rectangles, trapeziums, circles and parallelograms Find the volume and surface area of cubes, cuboids and prisms.	Estimate and check answers using approximation and estimation. Change between standard and compound units. Use standard units of measure. Measure lines and angles. Use area of triangles, parallelograms & trapezia. Find perimeter of 2D shapes including composite shapes. Calculate surface area of prisms. Sketch nets of cuboids and prisms. Identify properties of the faces, surface, edges and vertices of cubes, cuboids, prisms, cylinders, cones and spheres. Use volume of prisms including cuboids. Convert between metric volume measures	Find the area/perimeter of a given shape, stating the correct units. Given two 2D that shapes have equal areas, work out all the dimensions of the sides of the shapes. Problems involving straight-forward and compound shapes in a real-life context. Justify whether a certain number of small boxes fit inside a larger box. Calculate the volume of a triangular prism with correct units. Convert between metric measures of volume and capacity e.g. 1ml = $1cm^3$. Plot and draw the graph for $y = 2x - 4$. Which of these lines are parallel: $y = 2x + 3$, $y = 5x + 3$, $y = 2x - 9$, $2y = 4x - 8$. Find the equation of	Use of **key words:** Triangle, rectangle, parallelogram, trapezium, area, perimeter, formula, length, width, prism, compound, measurement, polygon, cuboid, volume, symmetry, vertices, edge, face, units, conversion	Mini assessments/plenaries using exam questions. Assessment through a written homework tasks.	Building from counting squares to find perimeter and area with grid paper. Use of 3D objects and real nets to help build understanding.

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	9b Straight-line graphs	Plot graphs from there equation and find the equation of a line.	Use function machines to find inputs and outputs, plot horizontal and vertical graphs. Recognise and plot equations of the form y=mx+c, using a table of values or gradient and intercept. Use gradient with parallel lines. Find the equation of a straight line from a graph. Use a graph to find approximate solutions.	the line through one point with a given gradient. Find approximate solutions to a linear equation from a graph.	Use of **key words:** Linear, graph, distance, time, coordinate, quadrant, real-life graph, gradient, intercept, function, solution, parallel	Non Calculator and Calculator GCSE papers. Foundation (Sets 4 and 5) Crossover (Sets 2 and 3) Higher (Set 1)	
Autumn 2 Unit 10 3 Weeks	9a Real-life graphs. (1 week) 10 Transformations	Interpret and draw graphs from real life situations Transformations I: translations, rotations and reflections	Use axes and points in all four quadrants. Find midpoints on lines. Use accurate axes, and read off scales and axes. Draw and interpret real life graphs such as conversions, ready reckoners, fixed charges, distance time, velocity time. Identify speed and distance for sections or all of distance time graphs. Find gradient of a straight line graph, and interpret as rate of change. Use rotations in clock and anticlockwise directions. Use centre, angle and direction in	Interpret a description of a journey into a distance–time or speed–time graph. Interpret gradient as the rate of change in distance–time and speed–time graphs. Understand that translations are specified by a distance and direction (using a vector). Describe and transform a given shape by either a rotation or a translation. Understand that distances and angles are preserved under rotations and	**SMSC:** A topic ideally suited to see how Mathematics can be applied in a real-life context whilst developing understanding of its abstract nature. Use of **key words:** Transformation, rotation, reflection, enlargement, translation, single, combination, scale factor, mirror line, centre of rotation, centre of	Mini assessments/plenaries using exam questions. Assessment through a written homework tasks. Use of past papers to start preparation for formal exams.	Plotting graphs from videos. Tracing paper provided. Non-examples to concrete knowledge and understanding. Regular recall strategies every lesson

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	11a Ratio	Transformations II: enlargements and combinations Fluency with problems involving ratio	providing rotations, or calculating rotations. Use column vectors to translate a shape, or recognise the column vector translation. Understand the congruence of shapes that have been rotated or translated. Use reflections in a variety of way including mirror lines, transformation of shapes, coordinates and equations of lines. Use enlargement using a centre and a scale factor, recognise similar shapes are enlargements. Write ratio, simplify ratio, share out a given ratio. Use ratio in real life situations. Write ratio in the form 1:n or n:1, and use fractions to represent ratio.	translations, so that any figure is congruent under either of these transformations. Describe and transform a given shape by a reflection. Understand that distances and angles are preserved under reflections, so that any figure is congruent under this transformation. Understand that similar shapes are enlargements of each other and angles are preserved. Problems involving sharing in a ratio that include percentages rather than specific numbers. Write lengths, areas and volumes of two shapes as ratios in simplest form. Express a multiplicative relationship between two quantities as a ratio or a fraction.	enlargement, column vector, vector, similarity, congruent, angle, direction, coordinate, describe **SMSC:** Multi-cultural links to carpet designs using transformations can be made. The use of formal mathematical language is encouraged when describing transformations. Use of **key words:** Ratio, proportion, share, parts, fraction, function, direct proportion, inverse proportion, graphical, linear, compare **SMSC:** The skills developing in being able to reason proportionally provide useful life skills.		Use of bar-model method to build understanding of ratio.
Spring 1 Unit 11 3-4 weeks	11b Proportion	Solve problems involving proportional relationships in a range of context.	Solve problems involving direct and inverse proportion. Find best buys and alter recipes for differing numbers of people. Convert between currencies. Understand the meaning of direct and inverse proportions and reference these to a graph.	Recognise when values are in direct proportion by reference to the graph form. Understand inverse proportion: as x increases, y decreases. Scale up recipes and decide if there is enough of each ingredient.		Mock exams: Full set of GCSE papers Foundation (Set 4 and 5) Higher (Sets 1, 2 and 3)	PP students will be provided with revision guides and equipment. Representatives to understand relationships.

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Spring 2 Unit 13 3 weeks	13 Probability	Probability of single events	Distinguish between events using impossible, unlikely, even, likely and certain. Use a probability scale from 0 to 1 and give values in fractions, decimals and percentages. Use theoretical and experimental probability. Work out complete lists of outcomes. Calculate probability in a variety of situations and tables. Use sum of probabilities = 1, and perform calculations using this.	Mark events on a probability scale and use the language of probability. If the probability of outcomes are x, $2x$, $4x$, $3x$ calculate x. Calculate the probability of an event from a two-way table or frequency table. Find a missing probability from a list or table including algebraic terms.	Use of **key words:** Probability, dependent, independent, conditional, tree diagrams, sample space, outcomes, theoretical, relative frequency, fairness, experimental **SMSC:** Through exploring probability students will develop an awareness of fairness both in a mathematical; context and in real-life scenarios.	Mini assessments/plenaries using exam questions. Assessment through a written homework tasks.	Real life situations and games to help understanding of probability Non-examples to concrete knowledge and understanding. Regular recall strategies every lesson
		Probability of combined events	Use relative frequency in finding the probability of an event. Use estimated probability. List outcomes for combined events and draw sample spaces. Work out probability from Venn diagrams using union and intersection notation. Use tree diagrams with dependent and independent events.	Understand the use of the 0–1 scale to measure probability. List all the outcomes for an experiment. Find the probability of successive events, such as several throws of a single dice. Work out probabilities from Venn diagrams to represent real-life situations and also 'abstract' sets of numbers/values.			
Unit 7 2 weeks	7 The averages	Calculate averages and know methods for sampling data	Calculate mean, median, mode and range, including from a frequency table. Estimated mean, range, mode, median from a grouped table. Mode mean and range from a	State the median, mode, mean and range from a small data set. Extract the averages from a stem and leaf diagram. Range, modal class, interval containing the median, and estimate of the mean from a grouped data frequency table. Recognise the advantages and disadvantages between measures of average.	Use of **key words:** Mean, median, mode, range, average, discrete, continuous, qualitative, quantitative, data, sample, population, stem and leaf, frequency, table, sort, pie chart, estimate, primary, secondary, interval, midpoint, survey		Use of recall starters to review previous learning and build upon it.

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			bar chart, median mode and range from a stem and leaf diagram. Compare averages and data from two distribution charts. Find out the amount of people in a sample and give presumptions.	Use proportion to take a sample. Find bias in sample methods.	**SMSC:** Students will be encouraged to seek out cross-curricular links with other subjects (Art, Design and Technology, Geography and Graphics amongst others) and to take pride in understanding and being able to use mathematical tools applied in other curricular areas.	Short assessment at of term Non cal and calculator. To assess topics taught	
Summer 1 Unit 14 2-3 weeks	14 Multiplicative reasoning	Solve compound interest problems Calculations with compound measures.	Use Fractions and percentages as operators, use standard units including mass, length, time and money. Convert between standard units. Express one quantity as a percentage of another, and solve problems including percentage change. Use inverse and direct proportion, and use compound units. Solve problems involving speed, density and pressure.	Know that measurements using real numbers depend upon the choice of unit, with speedometers and rates of change. Change m/s to km/h. Understand direct proportion as: as *x* increase, *y* increases. Understand inverse proportion as: as *x* increases, *y* decreases. Interpret equations that describe direct and inverse proportion. Know how to change a decimal to an amount of time. Rearrange formulas when working with compound measures.	Use of **key words:** Ratio, proportion, best value, proportional change, compound measure, density, mass, volume, speed, distance, time, density, mass, volume, pressure, acceleration, velocity, inverse, direct **SMSC:** The skills developing in being able to reason proportionally provide useful life skills.	Mini assessments/plenaries using exam questions. Assessment through a written homework tasks.	Students will be given clear concise methods to organise information.
Unit 12 2-3 weeks	12 Right-angled triangles: Pythagoras and trigonometry	Find missing lengths and angles using Pythagoras and Trigonometry	Use roots and integer indices, round numbers to given accuracy. Simplify and manipulate algebraic expressions and formulae. Use triangle properties in completing a proof. Use Pythagoras' theorem and Trigonometry rules to find angles and lengths in right angled triangles. Use set values	Combined triangle problems that involve consecutive application of Pythagoras' Theorem or a combination of Pythagoras' Theorem and the trigonometric ratios. Know the exact values of sin θ and cos θ for $\theta = 0°, 30°, 45°, 60°$ and $90°$; know the exact value of tan θ for $\theta = 0°, 30°, 45°$ and 60	Use of **key words:** Triangle, right angle, angle, Pythagoras' Theorem, sine, cosine, tan, trigonometry, opposite, hypotenuse, adjacent, ratio, elevation, depression, length, accuracy **SMSC:** The history of mathematical concepts will be explored.		Non-examples to concrete knowledge and understanding. Regular recall strategies every lesson

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	15a Plans and elevations	Interpret and draw plans and elevations of 3D shapes	of sin, cos and tan without a calculator. Use clockwise and anticlockwise, draw and measure angles and lines to a set accuracy. Use the directions of a compass. Draw sketches of 3D objects and identify faces, edges and vertices, identify planes of symmetry. Make accurate drawings and constructions of triangles and other 2D shapes. Use front, side and plan elevations.	Understand and draw front and side elevations and plans of shapes made from simple solids. Given the front and side elevations and the plan of a solid, draw a sketch of the 3D solid. Be able to estimate the size of given angles. Convert fluently between metric units of length.	Use of **key words:** Construct, circle, arc, sector, face, edge, vertex, two-dimensional, three-dimensional, solid, elevations, congruent, angles, regular, irregular, bearing, degree, bisect, perpendicular, loci, map, scale, plan, region		Use of 3D objects and multi-link cubes.
Summer 2 Unit 15 3 weeks	15b Constructions, loci and bearings	Use a pair of compasses for constructions. Find a given region. Calculate and draw bearings.	Identify congruence within shapes. Construct triangles and know rules regarding similarity on sides and angles. Construct perpendicular bisector including from a point, bisect an angle, construct angles 90 and 45 degrees. Identify and construct regions given a set of rules, and identify locus. Use scales and scale diagrams including map use. Use 3 figure bearings to and from points. Draw accurate bearings diagrams.	Sketch the locus of point on a vertex of a rotating shape as it moves along a line, i.e. a point on the circumference or at the centre of a wheel. Given the bearing of a point *A* from point *B*, work out the bearing of *B* from *A*. Use accurate drawing to solve bearings problems; Solve locus problems including bearings.		Mock exams: Full set of GCSE papers Foundation (Set 4 and 5) Higher (Sets 1, 2 and 3)	Physical examples of Loci to build understanding. Non-examples to concrete knowledge and understanding. Regular recall strategies every lesson