Maths Long Term Plan Year 10 Higher

Chichester Free School
Nurture • Challenge • Inspire

Temperance Term

W/C	1	2	3	4	5	6	7	8	
Area of Study	**Number 1**			**Algebra 1**					
Core learning	**Working with integers** To identify the correct operations required and use written calculations to solve worded problems. To calculate with all four operations of arithmetic using positive and negative numbers. To apply the hieracrchy of operations to accurately work out calculations involving two or more operations. To identify and write the inverses for operations and apply these to check the results of calculations and develop the skills required to solve the equations.	**Properties of integers** To recall and understand key definitions. To consolidate their understanding of basic place value. To apply their knowledge of factors and primes to express a number as a product of its prime factors. To simplify a collection of numbers that have been multiplied together by writing them in index form. To use the 'listing method' to find the highest common factor and lowest common multiple of a set of numbers. To use a prime factor tree to find the highest common factor and lowest common multiple of a set of numbers.	**Working with fractions** To apply knowledge of factors and multiples to simplify fractions and identify equivalent fractions. To apply and explain an algorithm to find the median fraction. To apply the four operations to fractions. To apply knowledge of the four operations to solving problems involving fractions. To calculate fractions of amounts. To express one number as a fraction of another.	**Working with decimals** To apply knowledge of place value to convert decimals to fractions and order fractions. To be able to add, subtract, multiply and divide decimals. To use a calculator to complete more complicated calculations that involve decimals. To be able to add, subtract, multiply and divide decimals without using a calculator. To convert recurring decimals to fractions.	**Basic Algebra** To interpret and work with algebraic notation including an understanding of correct, formal language and notation. To form algebraic expressions from worded instructions and geometric problems. To simplify products and quotients and apply the index laws to simplify. To simplify algebraic expressions by collecting like terms. To simplify products and quotients. To expand the product of a single term and binomial. To factorise out common factors and recognise that the HCF must be factored out for an expression to be fully factorised. To form expressions from word problems and use algebra to solve problems in different contexts including number problems.	**Further Algebra** To know what a quadratic expression is. To be able to expand the product of two binomials. To be able to factorise expressions of the form ax^2 + bx + c. To complete the square on a quadratic expression. To simplify and manipulate algebraic fractions.			HALF TERM
Opportunities for Challenge: Open middle, goal free, exam questions, "by example", SSDD are good resources but always choose problems based on the current topic.									
Assessment			Progress Check			Progress Check			

W/C	9	10	11	12	13	14	
Area of study	**Assessment**	**Algebra 1**		**Geometry 1**			
Core learning	**Revision**	**Equations** To solve linear equations. To understand that identities are equations for which there are an infinite number of solutions as they are true for all values x can take. To form and solve quadratic equations. To understand that different types of equations have a different possible number of solutions. To solve linear simultaneous equations. To solve linear and quadratic simultaneous equations. To know how to read and interpret graphs in various contexts. To be able to use graphs to find approximate solutions to equations. To use iterative methods to find approximate solutions to equations. To use equations and graphs to solve problems.	**Properties of polygons and 3D objects** To know the names and features of common polygons and polyhedrons. To know how to describe and label common features of plane figures. To identify and describe line and rotational symmetry. To know and use properties of triangles and quadrilaterals, including their interior angle sum. To know and use the properties of 3D solids.	**Angles** To recall knowledge of basic angle facts including: vertically opposite angles, angles on a line and angles around a point. To apply basic and parallel angle facts to find the size of angles in various scenarios. To recall knowledge of parallel line angle facts including: corresponding angles, alternate angles and co-interior angles. To understand a proof for the sum of interior angles of a triangle being 180. To calculate the size of an interior or exterior angle of a regular polygon.	**Perimeter** To calculate the perimeter of a simple shape. To understand that the perimeter of a shape is its boundary. To calculate the perimeter of composite shapes. To form expressions and equations for the perimeter of a given shape. To know and use a formula for the circumference of a circle. To be able to find arc length of a given sector and hence the perimeter of the sector.	**Area** To know and use the formulae for calculating the area of rectangles, triangles, parallelograms, and trapeziums. To use formulae to calculate the area of composite shapes. To form algebraic expressions for the area of a shape. To know and use the formula for calculating the area of a circle. To calculate the area of a sector.	CHRISTMAS
Opportunity for Challenge: Open middle, goal free, exam questions, "by example", SSDD are good resources but always choose problems based on the current topic.							
Assessment	Formal, summative			Progress Check			

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Justice Term

W/C	15	16	17	18	19	20	
Area of study	**Number 2**						
Core learning	**Rounding and estimation** Round to the nearest positive integer power of ten and apply this to real-life examples. Round values to a specified number of decimal places. Round values to a specified number of significant figures. Truncate values and understand when this is useful. Use rounding to estimate without using a calculator. Use inequalities and identify the lower and upper bounds, using this to mind minimum and maximum solutions. Calculate the upper and lower bounds of a calculation for discrete and continuous quantities.	**Percentages** Convert between fractions, decimals and percentages. Use fractions, multipliers or calculators to work out percetnages of amounts. Express a quantity as a percentage of another. Calculate percentage increase or decrease. Calculate the original amount given a percentage increase or decrease.	**Powers and roots** Write a series of numbers multiplied together in index form. Write an exponent on a calculator. Understand 0 and negative indices. Apply the laws of indices. Work with fractional indices. ++++Estimate powers and roots of a number. Solve problems involving powers and roots.	**Standard form** Apply understanding of multiplying and dividing by powers of ten to convert numbers to and from standard form. Use a scientific calculator efficiently for standard form calculations. Apply the laws of indices to multiply and divide numbers in standard form without the use of a calculator. Apply laws of indices and conversion to add and subtract numbers in standard form. Solve contextual problems involving standard form.	**Surds** Use a calculator to approximate the values of numbers involving surds. Calculate exact solutions to problems using surds. Simplify expressions containing surds. Manipulate surds when multiplying and dividing. Rationalise the denominator of a fraction. Solve complex problems involving surds.	HALF TERM
Opportunity for Challenge: Open middle, goal free, exam questions, “by example”, SSDD are good resources but always choose problems based on the current topic.							
Assessment		Progress check			Progress check		

W/C	21	22	23	24	25	26	
Area of study	**Assessment**	**Algebra 2**					
Core learning		**Functions and sequences** Generate terms of a sequence using a term-to-term rule. Generate terms of a sequence using a position-to-term rule. Find the nth term of a sequence. Use correct notation to write rules to find any term in a sequence. Generate terms of a sequence from a function rule. Interpret expressions as functions with inputs and outputs. Find the inverse of a function. Identify special sequences. Find the nth term of a linear sequence. Find the nth term of a quadratic sequence.	**Formulae** Write formulae to represent real-life contexts. Substitute numerical values into a formula. Use formulae from the topic of kinematics. Rearrange formulae to change the subject. Work with formulae in a variety of contexts.	**Inequalities** Understand and interpret inequalities and use the correct symbols to express inequalities. Use a number line and set notation to represent an inequality. Solve linear inequalities in one variable and represent the solution set on a number line and in set notation. Solve quadratic inequalities. Solve (several) linear inequalities in two variables and represent the solution set on a graph.		EASTER
Opportunity for Challenge: Open middle, goal free, exam questions, “by example”, SSDD are good resources but always choose problems based on the current topic.							
Assessment				**Progress check**			

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Courage Term

W/C	27	28	29	30	31		
Area of study	Geometry 2				Probability		HALF TERM
Core learning	Section 1: 3D objects •To apply what you already know about the properties of 3D objects •To work with 2D representations of 3D objects •To construct and interpret plans and elevations of 3D objects	Section 2: Units and measure •To convert metric units for capacity, mass and length •To convert metric units of area and volume •To understand units of time are not metric •To convert units of time and solve related problems •To convert currencies using scale factors •To convert compound measurements •To use formulae: speed = distance/time, density = mass/volume, pressure = force/area, to find any one of the variables given values for the other two •To read and use scales on maps including both line/bar scales and ratio scales •To form scales to construct scale drawings to fit a given dimension •To read and use bearings in scale drawings •To understand the connection between a bearing of B from A and A from B on a given line segment	Section 3: Volume and surface area •To calculate the volume of prisms (including cylinders) •To calculate the surface area of prisms (including cylinders) •To calculate the volume and surface area of a cone •To calculate the volume and surface area of a sphere •To calculate the volume and surface area of composite 3D shapes •To find the volume and surface area of a pyramid		Section 1: Basic probability •To understand and use the vocabulary of probability •To express probabilities as a number between 0 (impossible) and 1 (certain), either as a decimal, fraction or percentage •To relate relative frequency to theoretical probability •To represent and analyse outcomes of probability experiments •To calculate the probability of an event NOT happening •To understand that the probabilities of mutually exclusive events sum to 1 •To use tables and frequency trees to organise outcomes, understanding that a frequency tree is not the same as a probability tree •To calculate probabilities in different contexts	Section 2: Further probability •To construct and use representations (tables, tree diagrams and Venn diagrams) •To use the language and notation of basic set theory •To use the addition rule, including an understanding of mutually exclusive events •To use the multiplication rule, including an understanding of independent events •Calculate numbers of possible outcomes using the product rule for counting •To use methods of conditional probability, including questions phrased in the form 'given that'	
	Opportunity for Challenge: Open middle, goal free, exam questions, "by example", SSDD are good resources but always choose problems based on the current topic.						
Assessment							
W/C	32	33	34	35	36	37	SUMMER
Area of study	**Assessment and Revision**		**Statistics**				
Core learning			Section 1: Collecting, interpreting and representing data •To be able to infer properties of populations or distributions from a sample, while knowing the limitations of sampling •To be able to interpret and construct tables, charts and diagrams, including frequency tables and bar charts •To be able to draw and interpret pie charts and pictograms for categorical data and vertical line charts for ungrouped, discrete numerical data •To be able to draw and interpret histograms and cumulative frequency diagrams for continuous data and know their appropriate use •To use tables and line graphs for time series data		Section 2: Analysing data •To calculate summary statistics from raw and grouped data •To compare two or more sets of data •To estimate quartiles from a cumulative frequency diagram •To identify why a graph may be misleading •To construct scatter diagrams •To describe correlation •To draw a line of best fit •To identify outliers		
	Opportunity for Challenge: Open middle, goal free, exam questions, "by example", SSDD are good resources but always choose problems based on the current topic.						
Assessment							