Mathematics Department Curriculum Overview Level 2 Document Key Stage 4 Year 10

Maths	Autumn 1 (Half term 1)	Autumn 1 continued (Half term 1)	Autumn 2 (Half term 2)	Autumn 2 continued (Half term 2)
Year 10S	**Curriculum (S)** **1 Number Properties 1** • Understand the division, multiplication, addition and subtraction of integers, decimals and fractions including understanding the effects of multiplying and dividing by numbers less than 1. • Understand how to place integers, decimals, fractions and directed numbers in order of size including where fraction to decimal conversion needs to be done. • Understand the written methods for +/-/x/÷ with integers, decimals to 3 or 4 decimal places, negative numbers and fractions. • Understand how to put the symbols =, ≠, , ≤, ≥ between pairs of numbers. • Understand how to order fractions with different denominators. • Understand how to find a fraction half-way between two others. • Consolidate the use of BIDMAS in more complex calculations. **2 Geometry & Measures** • Understand the names of and relationship between angles in parallel lines and use this to solve problems using properties of angles, of parallel and intersecting lines. • Understand how to solve problems in triangles and special quadrilaterals using their properties and justifying and explaining reasoning with diagrams and text. • Understand how to derive the formula for finding the sum of interior angles of any polygon (2D shape) is 180 x (n-2) where n represents the number of sides. • Understand that the sum of exterior angles = 360° and therefore 360 ÷ n (where n represents the number of sides) = the size of an exterior angle and 360 ÷ an exterior angle = n (the number of sides of the shape) • Understand how to draw the nets of cylinders, pyramids and cones. **3 Number Properties 2** • Understand how to identify the prime factors for a specified number by expressing a number as a product of its prime factors giving answers in product index form. • Understand how to use the prime factors to find the HCF and LCM of sets of numbers. and apply prime factor decomposition in order to solve problems. • Understand index notation for integer powers and use the rules for multiplication and division of integer powers. • Understand that a number to the power of 1 is itself and to the power of 0 is 1. • Start to interpret and compare numbers in standard form with positive or negative integer or zero powers of 10.	**Curriculum (S)** **4 Algebra 1** • Understand how to substitute positive and negative integers into formulae and expressions and Substitute negative integers into formulae and expressions including expressions with squared terms. • Be able to extend this to substitute fractions and decimals into formulae and expressions. • Understand how to use formulae for perimeter and area of standard shapes and derive and use the formulae for the volume and surface area of standard prisms including a cylinder. **5 Fractions, decimals, %** • Understand how to find a percentage of a number with and without a calculator and how a single multiplier can be used. • Understand how to find 50%, 25%, 10%, 5% and use these to find other percentages without a calculator. • Understand how to Increase and decrease by a percentage with and without a calculator and understand how a single multiplier can be used. • Understand how to solve problems involving percentage change. Understand that fractions, percentages and decimals can be interchanged use fractions, percentages and decimals to compare proportions. • Understand how convert between fractions, percentages and decimals and use the most appropriate method in any given question. • Understand how to solve original value problems (reverse percentages) and simple interest in financial mathematics. • Understand how to work out the price after VAT, the income after tax and the value of savings after a period of compound interest. • Understand how to calculate a fraction of an amount. • Recognise fractions less than 1 and fractions greater than 1. • Be able to Identify complicated fractions of shapes.	**Curriculum (S)** **6 Approximation** • Understand how to round numbers to the nearest integer, 10, 100, 1000. • Understand how to round to a given number of decimal places and round to a given number of significant figures. • Understand how to estimate answers to calculations using rounding to one significant figure and solve worded estimation problems. • Be able to use a calculator to enter complex calculations and round the answer to a given degree of accuracy. • Start to appreciate that no measurement can be 100% accurate and find possible upper and lower limits to rounded measurements in simple cases **7 Algebra 2** • Understand and use the vocabulary of expression, equation, term and factor. • Understand how to simplify expressions involving sums products and powers. • Understand how to expand a single bracket with a letter and number outside the bracket. • Know how to factorise a single bracket with a letter and number as the common factor. • Understand how to expand double brackets to give a quadratic expression of form $x^2 + bx + c$. and how to solve linear equations with the unknown on both sides and brackets. **8 Collecting & Interpreting Data** • Be able to construct frequency tables where discrete data is grouped and estimate the mean when discrete data is represented in a frequency table. • Understand how to find the location of the median and mode of data in grouped frequency tables and calculate the range. • Consider how to deal with outliers contained within given data. • Be able to construct and interpret two-way tables, Venn diagrams and line graphs for time series data. **9 Sequences and Graphs** • Understand how to generate a sequence by spotting a pattern or using a term-to-term rule given algebraically or in words. • Using a term-to-term rule to generate the different terms of a sequences. • Find a position-to-term nth term rule for linear arithmetic sequences, algebraically and in words. • Recognise sequences, triangular, square and cube numbers and simple arithmetic progressions. • Recognise the Fibonacci sequence. • Recognise simple geometric sequences. • Using a position-to-term rule (e.g. 6n - 4) generate the different terms of a sequence and extend this to rules such as n^2, $2n^2 + 1$. • Start to deduce rules for sequences such as 3, 12, 27, 48 ($3n^2$) and 2, 5, 10, 17 ($n^2 + 1$) by making the connection with the square number sequence.	**Curriculum (S)** **10 Proportion 1** • Understand what a ratio actually means and reduce a ratio to its lowest form. • Understand equivalent ratios how to divide quantities in a given ratio with and without a • calculator. • Understand how to compare proportions when given a ratio of two quantities. • Start to appreciate that a ratio or fraction can be used to represent a multiplicative relationship between two quantities given as a ratio. • Understand how to use ratio to calculate amounts in a variety of contexts. • Use the ratio 1 : n with map scales and plans. • State the meaning of the term proportion and calculate proportional amounts in a variety of contexts using methods including the unitary method. • Understand how to convert between families of terminating fractions and decimals **11 Ratio and Scale** • Understand how to construct scale drawings. • Understand how to use and interpret scale drawings • Interpret scales on a range of measuring instruments • Understand how to interpret map/model scales as a ratio and estimate lengths using a scale diagram. • Understand how to give a bearing between the points on a map or scale plan, solve and interpret bearings problems and scaled drawings. • Identify the scale factor of an enlargement of a shape as the ratio of the lengths of two corresponding sides and solve simple problems related to similar enlarged shapes.

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Maths	Spring 1 (Half term 3)	Spring 2 (Half term 4)	Summer 1 (Half term 5)	Summer 2 (Half term 6)
Year 10S	**Curriculum (S)** **12 Shape Properties** • Understand how to label correctly diagrams and use correct geometric notation. • Know how to draw accurately triangles from a written description. • Understand how to identify from correctly labelled diagrams, congruent shapes, similar shapes and those with line and a given order of rotational symmetry **13 Algebra 3** • Understand how to change the subject of a formula including those with powers and roots. • Be able to argue mathematically that algebraic expressions are equivalent. • Understand an algebraic proof. • Understand algebraic input and output function machines including those with two stage operations and fractions. • Understand how to construct function machines given a function and vice versa. • Understand the difference between an identity and an equation. **14 Transformations** • Understand how to complete rotations and describe rotations. • Understand how to complete and describe reflections, given a reflection line and equations of lines. • Understand how to complete and describe enlargements with positive scale factors, extending to simple fractional scale factors. • Understand how to complete and describe translations. **15 Probability** • Understand how to calculate missing probabilities by subtracting known probabilities from 1. • Carry out experiments and record results and understand what the results show, e.g. does something have a high or low probability based on results? • Through carrying out different experiments and analysing results appreciate that the estimate of a probability will be more accurate the more results you have. • Understand how to represent outcomes of events systematically and use Venn diagrams correctly to represent sets of data understanding the terminology for intersection and union etc. • Solve problems linking probability and Venn diagrams. **16 Triangles & Construction** • Be able to recall and apply Pythagoras' theorem, finding a long or short side (2 sides given). • Solve problems is a variety of contexts including problems where a diagram is not given. • Understand and recall common Pythagorean triples. • Recall standard constructions and use them to solve a variety of problems requiring the use of these constructions.	**Curriculum (S)** **17 Interpreting Data** • Understand how to draw and interpret a scatter graph and stem and leaf diagram. • Understand how to collect, record and group data. • Understand how to calculate the mean, mode, median and range from a list of data, a frequency table and grouped data. • Understand how to draw bar charts and pie charts. • Understand how to compare sets of data. **18 Circles** • Be able to label a circle with all its properties. • Understand how to calculate and solve problems relating to the area and circumference of a circle. • Understand how to split a compound shape into 2 or more identified shapes and calculate their areas and perimeter including where the shapes or context involves a circle or parts of a circle. **19 Proportion 2** • Understand how to solve a direct or inverse proportion problem when the information is given graphically. • Understand how to solve a direct or inverse proportion problem when the information is given as a formula. • Be able to solve numerical problems which are direct or inverse proportion. • Understand how to solve compound interest problems. • Be able to use repeated percentage change for growth and decay problems. **20 Solving equations and inequalities** • Understand how to solve equations up to and including the variable on both sides, both algebraically and by drawing a graph. • Be able to create an equation from a worded problem and find the solution and interpret the answer using a graph a as necessary. • Understand how to solve a quadratic equation graphically. • Solve problems involving the area and perimeter of shapes where forming and solving algebraic equations is required.	**Curriculum (S)** **21 Plotting and sketching graphs** • Understand how to draw the graph of y = mx + c by using intercept and then plotting other points by using the gradient. • Extend as appropriate Understand how to find the equation of a line given two points or one point and the gradient. • Understand that lines in the form y = mx + c will always result in a straight line and that the c gives the y-intercept and m is the gradient. • Calculate the gradient of a given straight line. • Understand how to find the equation a straight line by calculating the gradient and y-intercept. • Understand that as the line gets steeper the gradient increases and m increases. • Plot quadratic graphs and recognise that they will always result in a parabola. • Understand how to draw graphs of quadratic functions using a table of values and extend as appropriate to finding the turning point and the roots graphically. • Be able to find the line of symmetry of a quadratic graph. **Financial Maths** **16 Triangles & Constructions (continued)** • Understand how to extend the application of Pythagoras Theorem to solve problems in a variety of contexts including problems where a diagram is not given. • Be able to apply Pythagoras Theorem to solve geometrical problems where finding a length is required in order to solve the problem (e.g. finding perimeters and areas) • Understand how to draw the 2-D representations of a 3-Dshape, in side/front elevation and plan view. • Understand how to sketch a 3-D shape from 2-D representations (front/side/plan views) **20 Solving equations and inequalities (continued)** • Understand how to solve linear inequalities in one variable and represent the solution set on a number line. **21 Plotting and Sketching graphs (continued)** • Understand how to use conversion and similar graphs • Understand how to plot, draw and interpret graphs of real life situations including speed time and distance time graphs. • Know find a formula represented by a graph, for example a linear graph for a fixed cost plus an amount per hour, by relating the graph to y=mx+c	**Curriculum (S)** **1 Number Properties 1 (consolidate and extend number)** • Continue to use 4 operations with integers including worded problems (consolidation of previous basic numeracy work) • Use 4 operations with decimals up to three or more decimal places. • Use 4 operations with directed numbers including where BIDMAS is involved. • Be able to add, subtract, multiply and divide fractions (mixed and proper fractions) • Be able to understand and use inverse operations. • Use BIDMAS including indices, reciprocals, roots and negatives. **16 Triangles and Constructions (continued)** • Understand the concept of trigonometry and solve simple problems, with the aid of a calculator, finding missing sides in right angled triangles and extend to finding missing angles when given two sides **Revision** **Year 10 'Mock' Exams weeks** **Year 10 Work Experience week**