Year 10 Higher Curriculum Overview [2021-2022] Subject – Maths- Higher						
	Knowledge & Understanding			**Literacy Skills**	**Employability Skills**	**Assessment Opportunities**
	Composites	**Components** [includes understanding of KEY concepts & subject specific vocab]	**Formal Retrieval** [if any]	**Opportunities for developing literacy skills**	**[if any]**	
HT1 Unit 1a Number **Unit 1b Fractions, decimals and percentages**	**Integers and decimals** Week 1	• Calculate upper and lower bounds • Identify factors, multiples and prime numbers • Find the HCF and LCM • Use index notation for squares and cubes • Convert between recurring decimals and exact fractions and use proof • Calculate upper and lower bounds when working with measurements and also calculations involving perimeter, areas and volumes of 2D and 3D shapes. • Give the final answer to an appropriate degree of accuracy following an analysis of the upper and lower bounds of a calculation	• Mathsbox skills check 10 questions – once per week • Mathsbox skills check 20 questions HWK – once a week • Weekly retrieval chart current and long-term skills	• Key words – learned and understood • Encourage use of subject language • Questioning • Pupil explanations and reasoning • Engage with worded exam questions	• Retail • Hairdressers • Builders • Constructions • Teachers • Medical	Sam testing
	Indices, roots, reciprocals and hierarchy of operations Week 2	• Use index notation for integer powers of 10, including negative powers • Use the square, cube and power keys on a calculator and estimate powers and roots of any given positive number				Sam testing

		• Find the value of calculations using indices including positive, fractional and negative indices • Solve problems using index laws				
Unit 1c **Number skills**	**Factors, multiples, primes, standard from and surds** Week 3 and 4	• Identify factors, multiples and prime numbers • Find the prime factor decomposition of positive integers • Find the LCM and HCF of two numbers, by listing, Venn diagrams and using prime factors • Convert large and small numbers into standard form and vice versa • Add, subtract, multiply and divide numbers in standard form • Interpret a calculator display using standard form and know how to enter numbers in standard form • Understand surd notation • Simplify surd expressions			• Statistician • Data Analyst • Law	Sam testing
Unit 2 **Algebra**	**Rearranging and solving** Week 5, 6, and 7	• Know the difference between a term, expression, equation, formula and an identity • Write and manipulate an expression by collecting like terms • Substitute positive and negative numbers into expressions and formulae • Multiply brackets				Sam testing

		- Factorise quadratic expressions - Solve linear equations - Change the subject of a formula - Simple proofs and use of ≡ in "show that" style questions - Use iteration to find approximate solutions to equations				
Unit 2b sequences	**Sequences** Week 8	- Recognise simple sequences - Generate sequences of numbers - Find and use (to generate terms) the nth term of an arithmetic sequence - Identify which terms cannot be in a sequence by finding the nth term - Continue a quadratic sequence and use the nth term to generate terms - Find the nth term of quadratic sequences - Distinguish between arithmetic and geometric sequences - Recognise and use simple geometric progressions - Continue geometric progression and find term to term rule			- Business and administration - SAP consultant	Sam testing End of term test
HT2 Unit 3 3a Averages	**Averages and range** Week 1	- Design and use two-way tables for discrete and grouped data - Use information provided to complete a two-way table - Calculate mean and range, find median and mode from a small data set - Construct and interpret stem and leaf diagrams	- Key words – learned and understood - Encourage use of subject language - Questioning - Pupil explanations and reasoning	- Key words – learned and understood - Encourage use of subject language - Questioning - Pupil explanations and reasoning	Statistician Data Analyst	Sam testing

		• Calculate the mean, mode, median and range from a frequency table • Construct and interpret grouped frequency tables for continuous data: • for grouped data, find the interval which contains the median and the modal class • estimate the mean with grouped data	• Engage with worded exam questions			
Unit 3b **Representing and interpreting data**	**Linear graphs** Week 2 and 3	• Produce and interpret composite bar charts, dual bar charts and i.e. charts • Produce and interpret frequency polygons for grouped data: • Produce frequency diagrams for grouped discrete data: • Produce histograms with equal class intervals: • estimate the median from a histogram with equal class width or any other information • Produce line graphs: • Construct and interpret time–series graphs • Draw and interpret scatter graphs in terms of the relationship between two variables; and draw line of best fit and comment on correlation				
Unit 4 **4a FDP**	**Fractions and percentages** Week 4 and 5	• Express a given number as a fraction of another • Find equivalent fractions and write them in their simplest form			• Jobs that require basic number skills e.g. checkout assistant	Sam testing

		• Convert a fractions decimals and percentages • Multiply and divide fractions, • Convert a fraction to a recurring decimal and vice versa • Find the reciprocal of an integer, decimal or fraction • Express a given number as a percentage of another number • Express one quantity as a percentage of another where the percentage is greater than 100% • Find a percentage of a quantity • Work out a percentage increase or decrease. • Find the original amount given the final amount after a percentage increase or decrease (reverse percentages), including VAT • Use calculators for reverse percentage calculations by doing an appropriate division			• Hairdressers • Retail • Construction	
4b Ratio and proportion	**Ratio and proportion** Week 6	• Write ratios in their simplest form • Divide a given quantity into two or more parts in a given part: part or part: whole ratio • Use a ratio to find one quantity when the other is known • Write a ratio as a fraction and as a linear function • Identify direct proportion from a table of values, by comparing ratios of values • Scale up recipes • Convert between currencies			• Chef • Hairdresser • Hospitality	Sam testing

Unit 5 5a Angles	Polygons, angles and parallel lines Week 7	• Understand 'regular' and 'irregular' as applied to polygons • Calculate interior and exterior angles • Know angle facts to work out angles in parallel lines.			• Builders • Architect	Sam testing End of term test
HT3 Unit 5b Shape and space	Pythagoras and trigonometry Weeks 1 and 2	• Understand, recall and use Pythagoras' Theorem in 2D • Calculate lengths and angles using Pythagoras • Understand, use and recall the trigonometric ratios sine, cosine and tan, and apply them to find angles and lengths in general triangles in 2D figures • Use the trigonometric ratios to solve 2D problems • Find angles of elevation and depression • Know the exact values of sin ϑ and cos ϑ for ϑ = 0°, 30°, 45°, 60° and 90°; know the exact value of tan ϑ for ϑ = 0°, 30°, 45° and 60°.	• Key words – learned and understood • Encourage use of subject language • Questioning • Pupil explanations and reasoning • Engage with worded exam questions		• Builders • Architect	Sam testing

Unit 6 Graphs	**Graphs** Week 3	• Draw and interpret straight-line graphs • Draw distance–time and velocity–time graphs • Find the coordinates of the midpoint of a line segment with a diagram given and coordinate, from coordinates • Find the equation of the line through two given points.			• Statistician • Data Analyst	Sam testing
Unit 6b **Linear graphs**	**Linear graphs and coordinate geometry** Week 4	• Plot and draw graphs of $y = a$, $x = a$, $y = x$ and $y = -x$, drawing and recognising lines parallel to axes, plus $y = x$ and $y = -x$ • Identify and interpret the gradient of a line segment • Find the equation of a straight line from a graph in the form $y = mx + c$ • Plot and draw graphs of straight lines of the form $y = mx + c$ • Find the equation of the line through one point with a given gradient • Identify and interpret gradient • Interpret and analyse information in graphs				Sam testing

		• Explore the gradients of parallel lines and lines perpendicular to each other				
Unit 6c Quadratic, cubic and other graphs	**Quadratic, cubic and other graphs** Week 5	• Recognise a linear, quadratic, cubic, reciprocal and circle graph from its shape • Generate points and plot graphs of simple quadratic functions, • Find approximate solutions of a quadratic equation from the graph of the corresponding quadratic function • Interpret graphs of quadratic functions from real-life problems • Draw graphs of simple cubic functions using tables of values • Interpret graphs of simple cubic functions, including finding solutions to cubic equations • Draw graphs of the reciprocal function • Draw circles, centre the origin, equation $x^2 + y^2 = r^2$.			• Scientist	Sam testing
Unit 7 7a shape and space	**Perimeter, area and circles** Week 6	• Recall and use the formulae for the area of a triangle, rectangle, trapezium and parallelogram • Calculate the area and perimeter of compound shapes • Recall the definition of a circle and name and draw parts of a circle			• Builders • Architect • Constructions	Sam testing End of term test

		• Recall and use formulae for the circumference of a circle and the area • Calculate perimeters and areas of composite shapes made from circles and parts of circles • Calculate arc lengths, angles and areas of sectors of circles • Find radius or diameter, given area or circumference of circles in a variety of metric measures				
HT4 **Unit 7b** **Volume**	**Surface area and volume** Weeks 1 and 2	• Find the surface area of prisms • Draw sketches of 3D solid and identify planes of symmetry of 3D solids, and sketch planes of symmetry • Recall and use the formula for the volume of a cuboid or prism • Convert between metric measures of volume and capacity, • Use volume to solve problems • Find the volume and surface area of a cylinder • Recall and use the formula for volume of pyramid • Find the surface area of a pyramid • Use the formulae for volume and surface area of spheres and cones • Find the surface area and volumes of compound solids constructed from cubes, cuboids, cones, pyramids, spheres, hemispheres, cylinders	• Key words – learned and understood • Encourage use of subject language • Questioning • Pupil explanations and reasoning • Engage with worded exam questions			Sam testing

Unit 7c Accuracy and bounds	**Accuracy and bounds** Week 3	• Calculate the upper and lowers bounds of numbers and expressions, of calculations involving perimeters, areas and volumes of 2D and 3D shapes • Use inequality notation to specify an error bound.			• Quantity surveyor	Sam testing
Unit 8a Transformations	**Transformations** Weeks 4	• Rotate 2D shapes • Recognise and describe reflections and reflect 2D shapes • Recognise and describe single translations using column vectors • Translate a given shape by a vector • Enlarge a shape on a grid using enlargements by a positive integer, positive fractional, and negative scale factor • Describe and transform 2D shapes using combined rotations, reflections, translations, or enlargements • Draw 3D shapes using isometric grids • Understand and draw front and side elevations and plans of shapes made from simple solids				Sam testing

Unit 8b Constructions, loci and bearings	**Constructions, loci and bearings** Week 5	• Use and interpret maps and scale drawings, using a variety of scales and units • Read and construct scale drawings, drawing lines and shapes to scale • Estimate lengths using a scale diagram • Understand, draw and measure bearings • Calculate bearings and solve bearings problems • Use the standard ruler and compass constructions: • Use constructions to solve loci problems including with bearings			• Engineer	Sam testing
Quadratics and equations **HT5**	**Solving quadratics and simultaneous equations** Week 6	• Factorise quadratic expressions • Set up and solve quadratic equations • Solve quadratic equations • Find the exact solutions of two simultaneous equations				End of half term test
Unit 9b Inequalities	**Inequalities** Week 1	• Show inequalities on number lines • Write down whole number values that satisfy an inequality • Solve simple linear inequalities in one variable, and represent the solution set on a number line • Solve two linear inequalities in x, find the solution sets and compare	• Key words – learned and understood • Encourage use of subject language • Questioning			Sam testing

		them to see which value of x satisfies both solve linear inequalities in two variables algebraically	• Pupil explanations and reasoning • Engage with worded exam questions			
Unit 10 Probability	**Probability** Week 2	• Write probabilities using fractions, percentages or decimals • Understand and use experimental and theoretical measures of probability • Find the probability of successive events, such as several throws of a single dice • List all outcomes for single events, and combined events, systematically • Draw sample space diagrams and use them for adding simple probabilities • Work out probabilities from Venn diagrams • Use union and intersection notation • Draw a probability tree diagram based on given information, and use this to find probability and expected number of outcomes;			• Statistician • Gaming	Sam testing
Unit 11 Multiplicative reasoning	**Multiplicative reasoning** Week 3	• Express a multiplicative relationship between two quantities as a ratio or a fraction, • Solve proportion problems using the unitary method • Work out which product offers best value and consider rates of pay • Use kinematics formulae from the formulae sheet to calculate speed, acceleration, etc • Recognise when values are in direct proportion by reference to the graph form, and use a graph to find the value of k in $y = kx$				Sam testing

| Unit 12 Similarity and congruence | Similarity and congruence

Week 4 | • Set up and use equations to solve word and other problems involving inverse proportion and relate algebraic solutions to graphical representation of the equations. | | | | |
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| | | • Understand and use SSS, SAS, ASA and RHS conditions to prove the congruence of triangles using formal arguments, and to verify standard ruler and pair of compasses constructions
• Understand similarity of triangles and of other plane shapes
• Prove that two shapes are similar
• Identify the scale factor of an enlargement of a similar shape
• Write the lengths, areas and volumes of two shapes as ratios in their simplest form
• Find missing lengths, areas and volumes in similar 3D solids
• Know the relationships between linear, area and volume scale factors of mathematically similar shapes and solids
• Solve problems involving frustums of cones where you have to find missing lengths first using similar triangles. | | | | Sam testing |

Unit 13 a Graphs of trigonometric functions	**Graphs of trigonometric functions** Week 5	• Recognise, sketch and interpret graphs of the trigonometric functions (in degrees) $y = \sin x$, $y = \cos x$ and $y = \tan x$ for angles of any size. • Know the exact values of $\sin \vartheta$ and $\cos \vartheta$ for $\vartheta = 0°$, 30°, 45°, 60° and 90° and exact value of $\tan \vartheta$ for $\vartheta = 0°$, 30°, 45° and 60° and find them from graphs. • Apply to the graph of $y = $ f(x) the transformations $y = -$f(x), $y = $ f($-x$) for sine, cosine and tan functions f(x). • Apply to the graph of $y = $ f(x) the transformations $y = $ f(x) + a, $y = $ f ($x + a$) for sine, cosine and tan functions f(x).	• Key words – learned and understood • Encourage use of subject language • Questioning • Pupil explanations and reasoning • Engage with worded exam questions	• Scientist	Sam testing End of half term test
HT6 Unit 13b Further trigonometry	**Further trigonometry** Week 1	• Know and apply Area = $\frac{1}{2} ab \sin C$ to calculate the area, sides or angles of any triangle. • Know the sine and cosine rules and use to solve 2D problems (including involving bearings). • Use the sine and cosine rules to solve 3D problems. • Calculate the length of a diagonal of a cuboid. • Find the angle between a line and a plane.	• Key words – learned and understood • Encourage use of subject language • Questioning • Pupil explanations and reasoning Engage with worded exam questions		Sam testing
Unit 14 a Data handling	**Collecting data** Week 2	• Specify the problem and plan: • decide what data to collect and what analysis is needed • understand primary and secondary data sources • consider fairness		• Data analyst	Sam testing

Unit 14b **Data handling**		• Understand what is meant by a sample and a population • Understand how different sample sizes may affect the reliability of conclusions drawn • Identify possible sources of bias and plan to minimise it • Write questions to eliminate bias, and understand how the timing and location of a survey can ensure a sample is representative				
	Cumulative frequency, box plots and histograms Week 3	• Construct and interpret cumulative frequency tables, cumulative frequency graphs/diagrams and from the graph: • find the median and quartile values and interquartile range • Compare the mean and range of two distributions, or median and interquartile range, as appropriate • Interpret box plots • Produce box plots from raw data • Construct and interpret histograms from class intervals with unequal width • Use and understand frequency density From histograms: • complete a grouped frequency table • understand and define frequency density • Estimate the mean and median from a histogram with unequal class widths or any other information from a histogram, such as the number of people in a given interval.				Sam testing

| Unit 15
Algebra and
Quadratics | **Quadratics and graphs**

Weeks 4 and 5 | • Construct and interpret cumulative frequency tables, cumulative frequency graphs/diagrams and from the graph:
• find the median and quartile values and interquartile range and compare them
• Interpret box plots to find median, quartiles, range and interquartile range and draw conclusions
• Produce box plots from raw data and when given quartiles, median and identify any outliers
• Know the appropriate uses of histograms
• Construct and interpret histograms from class intervals with unequal width
• Use and understand frequency density

From histograms:

• complete a grouped frequency table
• understand and define frequency density
• Estimate the mean and median from a histogram with unequal class widths or any other information from a histogram, such as the number of people in a given interval. | | | • Scientist | Sam testing |
| Unit 16
Circle theorems | **Circle theorems**

Week 6 | • Recall the definition of a circle and identify (name) and draw parts of a circle, including sector, tangent, chord, segment
• Prove and use the circle facts
• Find and give reasons for missing angles on diagrams | | | • Design and Architecture
• Construction (limited) | Sam testing |