

Year 10 Higher Curriculum Overview [2022-2023]

Subject – Maths- Higher (sets x1/2/3/4)

	Knowledge & Understanding			Literacy Skills Opportunities for developing literacy skills	Employability Skills [if any]	Assessment Opportunities
	Composites	Components [includes understanding of KEY concepts & subject specific vocab]	Formal Retrieval [if any]			
HT1 Unit 1a Number	<u>Integers and decimals</u> Week 1	<ul style="list-style-type: none"> • 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 	<ul style="list-style-type: none"> • 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 	<ul style="list-style-type: none"> • Key words – learned and understood • Encourage use of subject language • Questioning • Pupil explanations and reasoning • Engage with worded exam questions 	<ul style="list-style-type: none"> • Retail • Hairdressers • Builders • Constructions • Teachers • Medical 	Sam testing
Unit 1b Fractions, decimals and percentages	<u>Indices, roots, reciprocals and hierarchy of operations</u> Week 2	<ul style="list-style-type: none"> • 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

		<ul style="list-style-type: none"> Find the value of calculations using indices including positive, fractional and negative indices Solve problems using index laws 				
Unit 1c Number skills	<p><u>Factors, multiples, primes, standard form and surds</u></p> <p>Week 3 and 4</p>	<ul style="list-style-type: none"> 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 			<ul style="list-style-type: none"> Statistician Data Analyst Law 	Sam testing
Unit 2 Algebra	<p><u>Rearranging and solving</u></p> <p>Week 5, 6, and 7</p>	<ul style="list-style-type: none"> 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 Factorise quadratic expressions Solve linear equations Change the subject of a formula Simple proofs and use of \equiv in “show that” style questions Use iteration to find approximate solutions to equations 				Sam testing

<p>Unit 2b sequences</p>	<p><u>Sequences</u></p> <p>Week 8</p>	<ul style="list-style-type: none"> • 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 			<ul style="list-style-type: none"> • Business and administration • SAP consultant 	<p>Sam testing End of term test</p>
<p>HT2 Unit 3 3a Averages</p>	<p><u>Averages and range</u></p> <p>Week 1</p>	<ul style="list-style-type: none"> • 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 • 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 	<ul style="list-style-type: none"> • Key words – learned and understood • Encourage use of subject language • Questioning • Pupil explanations and reasoning • Engage with worded exam questions 	<ul style="list-style-type: none"> • Key words – learned and understood • Encourage use of subject language • Questioning • Pupil explanations and reasoning 	<ul style="list-style-type: none"> • Statistician • Data Analyst 	<p>Sam testing</p>

<p>Unit 3b Representing and interpreting data</p>	<p><u>Linear graphs</u> Week 2 and 3</p>	<ul style="list-style-type: none"> • 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 				
<p>Unit 4 4a FDP</p>	<p><u>Fractions and percentages</u> Week 4 and 5</p>	<ul style="list-style-type: none"> • Express a given number as a fraction of another • Find equivalent fractions and write them in their simplest form • 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 			<ul style="list-style-type: none"> • Jobs that require basic number skills e.g. checkout assistant • Hairdressers • Retail • Construction 	<p>Sam testing</p>

		<ul style="list-style-type: none"> • 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 				
4b Ratio and proportion	<u>Ratio and proportion</u> Week 6	<ul style="list-style-type: none"> • 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 			<ul style="list-style-type: none"> • Chef • Hairdresser • Hospitality 	Sam testing
Unit 5 5a Angles	<u>Polygons, angles and parallel lines</u> Week 7	<ul style="list-style-type: none"> • Understand 'regular' and 'irregular' as applied to polygons • Calculate interior and exterior angles • Know angle facts to work out angles in parallel lines. 			<ul style="list-style-type: none"> • Builders • Architect 	Sam testing End of term test Sam testing

<p style="text-align: center;">HT3 Unit 5b Shape and space</p>	<p><u>Pythagoras and trigonometry</u> Weeks 1 and 2</p>	<ul style="list-style-type: none"> • 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 $\sin \vartheta$ and $\cos \vartheta$ for $\vartheta = 0^\circ, 30^\circ, 45^\circ, 60^\circ$ and 90°; know the exact value of $\tan \vartheta$ for $\vartheta = 0^\circ, 30^\circ, 45^\circ$ and 60°. 	<ul style="list-style-type: none"> • Key words – learned and understood • Encourage use of subject language • Questioning • Pupil explanations and reasoning • Engage with worded exam questions 		<ul style="list-style-type: none"> • Builders • Architect 	
<p style="text-align: center;">Unit 6 Graphs</p>	<p><u>Graphs</u> Week 3</p>	<ul style="list-style-type: none"> • 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. 			<ul style="list-style-type: none"> • Statistician • Data Analyst 	<p>Sam testing</p>
	<p><u>Linear graphs and coordinate geometry</u> Week 4</p>	<ul style="list-style-type: none"> • 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 				<p>Sam testing</p>

<p style="text-align: center;">Unit 6b Linear graphs</p>		<ul style="list-style-type: none"> • 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 • Explore the gradients of parallel lines and lines perpendicular to each other 				
<p style="text-align: center;">Unit 6c Quadratic, cubic and other graphs</p>	<p><u>Quadratic, cubic and other graphs</u> <u>Week 5</u></p>	<ul style="list-style-type: none"> • 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 $x^2 + y^2 = r^2$. 			<ul style="list-style-type: none"> • Scientist 	<p>Sam testing</p>

<p style="text-align: center;">Unit 7 7a shape and space</p>	<p><u>Perimeter, area and circles</u></p> <p style="text-align: center;">Week 6</p>	<ul style="list-style-type: none"> • 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 • 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 			<ul style="list-style-type: none"> • Builders • Architect • Constructions 	<p>Sam testing</p> <p>End of term test</p>
<p style="text-align: center;">HT4 Unit 7b Volume</p>	<p><u>Surface area and volume</u></p> <p style="text-align: center;">Weeks 1 and 2</p>	<ul style="list-style-type: none"> • 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 	<ul style="list-style-type: none"> • Key words – learned and understood • Encourage use of subject language • Questioning • Pupil explanations and reasoning • Engage with worded exam questions 			<p>Sam testing</p>

<p style="text-align: center;">Unit 7c Accuracy and bounds</p> <p style="text-align: center;">Unit 8a Transformations</p>		<ul style="list-style-type: none"> Find the surface area and volumes of compound solids constructed from cubes, cuboids, cones, pyramids, spheres, hemispheres, cylinders 				
	<p><u>Accuracy and bounds</u></p> <p>Week 3</p>	<ul style="list-style-type: none"> Calculate the upper and lower 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. 			<ul style="list-style-type: none"> Quantity surveyor 	Sam testing
	<p>Transformations</p> <p>Weeks 4</p>	<ul style="list-style-type: none"> 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 Use and interpret maps and scale drawings, using a variety of scales and units 				Sam testing

<p>Unit 8b Constructions, loci and bearings</p>	<p>Constructions, loci and bearings Week 5</p>	<ul style="list-style-type: none"> • 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 			<ul style="list-style-type: none"> • Engineer 	<p>Sam testing</p>
<p>Quadratics and equations HT5</p>	<p><u>Solving quadratics and simultaneous equations</u> Week 6</p>	<ul style="list-style-type: none"> • Factorise quadratic expressions • Set up and solve quadratic equations • Solve quadratic equations • Find the exact solutions of two simultaneous equations 				<p>End of half term test</p>
<p>Unit 9b Inequalities</p>	<p><u>Inequalities</u> Week 1</p>	<ul style="list-style-type: none"> • 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 them to see which value of x satisfies both solve linear inequalities in two variables algebraically 	<ul style="list-style-type: none"> • Key words – learned and understood • Encourage use of subject language • Questioning • Pupil explanations and reasoning • Engage with worded exam questions 			<p>Sam testing</p>

<p>Unit 10 Probability</p>	<p><u>Probability</u> Week 2</p>	<ul style="list-style-type: none"> • 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; 			<ul style="list-style-type: none"> • Statistician • Gaming 	<p>Sam testing</p>
<p>Unit 11 Multiplicative reasoning</p>	<p><u>Multiplicative reasoning</u> Week 3</p>	<ul style="list-style-type: none"> • 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 $y = kx$ • Set up and use equations to solve word and other problems involving inverse proportion and relate algebraic solutions to graphical representation of the equations. 				<p>Sam testing</p>

<p>Unit 12 Similarity and congruence</p>	<p><u>Similarity and congruence</u></p> <p>Week 4</p>	<ul style="list-style-type: none"> • 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. 				<p>Sam testing</p>
<p>Unit 13 a Graphs of trigonometric functions</p>	<p><u>Graphs of trigonometric functions</u></p> <p>Week 5</p>	<ul style="list-style-type: none"> • 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 $\vartheta = 0^\circ, 30^\circ, 45^\circ, 60^\circ$ and 90° and exact value of $\tan \vartheta$ for $\vartheta = 0^\circ, 30^\circ, 45^\circ$ 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 $f(x)$. 	<ul style="list-style-type: none"> • Key words – learned and understood • Encourage use of subject language • Questioning • Pupil explanations and reasoning • Engage with worded 		<ul style="list-style-type: none"> • Scientist 	<p>Sam testing End of half term test</p>

HT6 Unit 13b Further trigonometry		<ul style="list-style-type: none"> Apply to the graph of $y = f(x)$ the transformations $y = f(x) + a$, $y = f(x + a)$ for sine, cosine and tan functions $f(x)$. 	exam questions			
	<u>Further trigonometry</u> Week 1	<ul style="list-style-type: none"> 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. 	<ul style="list-style-type: none"> Key words – learned and understood Encourage use of subject language Questioning Pupil explanations and reasoning Engage with worded exam questions			
Unit 14 a Data handling	<u>Collecting data</u> Week 2	<ul style="list-style-type: none"> Specify the problem and plan: decide what data to collect and what analysis is needed understand primary and secondary data sources consider fairness 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 			<ul style="list-style-type: none"> Data analyst 	Sam testing

<p>Unit 14b Data handling</p>	<p><u>Cumulative frequency, box plots and histograms</u></p> <p>Week 3</p>	<ul style="list-style-type: none"> • 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 <p>From histograms:</p> <ul style="list-style-type: none"> • 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. 				<p>Sam testing</p>
<p>Unit 15 Algebra and Quadratics</p>	<p><u>Quadratics and graphs</u></p> <p>Weeks 4 and 5</p>	<ul style="list-style-type: none"> • 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 			<ul style="list-style-type: none"> • Scientist 	<p>Sam testing</p>

		<ul style="list-style-type: none"> • 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 <p>From histograms:</p> <ul style="list-style-type: none"> • 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. 				
<p>Unit 16 Circle theorems</p>	<p><u>Circle theorems</u> Week 6</p>	<ul style="list-style-type: none"> • 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 			<ul style="list-style-type: none"> • Design and Architecture • Construction (limited) 	<p>Sam testing</p>