Mathematics – KEVI HWGA Curriculum Map

Curriculum Purpose:		
Context	Beyond KEVI HWGA:	Mathematics is a creative and highly inter-connected discipline that has been developed over centuries, providing the solution to some of history's most intriguing problems. It is essential to everyday life, critical to science, technology, and engineering, and necessary for financial literacy and most forms of employment. A high-quality mathematics education therefore provides a foundation for understanding the world, the ability to reason mathematically, an appreciation of the beauty and power of mathematics, and a sense of enjoyment and curiosity about the subject.
	KS5	A level Mathematics course gives students the opportunity to study 'pure' topics such as geometry, calculus and trigonometry and to use these ideas within the 'applied' topics such as mechanics and statistics. Students need an enthusiasm for problem-solving, and the course suits those with the tenacity to keep going in the hunt for possible solutions to awkward problems. Although mathematics is highly logical, it also requires imagination and determination to work well on your own: working on problems is the surest way to develop the knowledge and intuition required to do well and to develop the discipline needed to clearly communicate the solution. The 'applied' disciplines of mechanics and statistics require mathematical modelling to make sense of real-life problems. Students will learn how to model real-life situations in mathematical terms, how models are refined and how to identify limitations within this process. Students will be expected to use technology where appropriate; for example, the use of spreadsheets and graphical calculators to support statistical analysis.
	KS4	Mathematics is an interconnected subject in which pupils need to be able to move fluently between representations of mathematical ideas. The programme of study for key stage 4 is organised into apparently distinct domains, but pupils should develop and consolidate connections across mathematical ideas. They should build on learning from key stage 3 to further develop fluency, mathematical reasoning, and competence in solving increasingly sophisticated problems. They should also apply their mathematical knowledge wherever relevant in other subjects and in financial contexts. KS4 (Y10-11) follow the Pearson Edexcel specification for Higher tier and OCR specification for foundation tier.
	KS3	In KS3, we teach for Mastery. Mastering maths means students of all ages acquiring a deep, long-term, secure and adaptable understanding of the subject. The phrase 'teaching for mastery' describes the elements of classroom practice and school organisation that combine to give students the best chances of mastering maths. Achieving mastery means acquiring a solid enough understanding of the maths that's been taught to enable students to move on to more advanced material.
	KS1/2 links	Students in KS3 will be familiar with the mastery approach in from their primary education. Therefore, we have ensured mastery continues in KS3

Year 7

KEVI HWGA Curriculum Map

KING EDWARD VI HANDSWORTH WOOD GIRLS' ACADEMY

Big Qs ***Linked to NC***	Autumn 1	Autumn 2	Spring 1	Spring 2	Summer 1	Summer 2
Year 7	*Why is the number system the most important topic in maths?* Students will understand; place value systems including base 10 (Place Value) Students develop their understanding of different models for multiplication and division. Students also explore the axioms of number and which operations they can be applied to (Axioms & Arrays) Students will understand and Establish the order of operations (order of operations) Students will be introduced to factors, multiples and important sets of numbers such as prime numbers, square numbers and cube numbers. Once the fundamental concepts have been introduced students are given the opportunity to develop their understanding, conjecture, problem solve and generalise in a series of structured tasks (Factors and multiples)	*Where are negative numbers used in real life?* Students will understand; how to carry out a prime factor decomposition, LCM and HCF, square roots and cube roots. Students manipulate the prime factor decomposition to find how many factors a number has and also to problem solve. During this unit, indices are used to denote powers greater than 2 for the first time. (prime factors) Students will understand Negative numbers in context and using negative numbers with all four operations, representing the number structure (Positive and negative numbers) Students use algebraic notation to express the multiples of integers and see collecting like terms as a development of the distributive property. Students will understand; writing expressions, recognising equivalent expressions and substituting (Expressions, equations an inequalities)	*Where is geometry used in the real world?* Students will understand; how to draw and measure angles, angles on straight line and around a point, angles in parallel lines, creating expressions from angle facts (Angles) Students will be classifying polygons according to their properties, rotational and line symmetry, internal angle sum of triangles and quadrilateral (Classifying shapes)	*How are the use of graphs beneficial in real life?* Student be introduced to using a ruler, protractor and compasses to construct 2-D shapes and using properties of quadrilaterals to explore standard constructions (constructing triangles) Students will understand; how to plot points in four quadrants, horizontal and vertical lines, midpoints of line segments and problem solving on a coordinate grid (Coordinates)	*When do we see the use of shapes and fractions in everyday situations?* Students will use formulae to find area of triangles and quadrilaterals, formulae and solving equations. Also engage with generalised statements about the relationship between area and perimeter (Area of 2d shapes) Students are expected to consider how different transformations acting on an object produce different images. Reflection, rotation, translation and enlargement by a positive scale factor are first applied to an object on a grid before moving onto a coordinate axis line and rotational symmetry (Transforming figures) Students will find equivalent fractions, converting between fractions and decimals, recurring decimals, multiply and divide fractions, fractions of amounts, mixed numbers and improper fractions (conceptualising fractions)	*Why is ratio and proportion so important in the real world?* Students will extend their understanding of applying the four operations to non-integer values. This includes non-integers represented as fractions, decimal fractions and mixed numbers. Students find fractions of amounts by considering the multiplication of an amount by a fraction (All operations with fractions) Students will understand; ratio notations, understand the relationship between ratio and fractions, work with ratios and quantities, linking equivalence to fractions and decimal fractions (Ratio) Students to the use of percentages to compare quantities and find a given percentage of a quantity. Students then increase and decrease quantities by a given percentage and find the original quantity given a percentage of the quantity. Bar models provide an excellent representation of percentage change and equivalence between amounts (percentages)

Key Knowledge, Concepts and skills	Numbers and numerals, axioms and arrays, order of operations, factors and multiples	Prime factor decomposition Positive and negative numbers, Introducing expressions, equations, and inequalities	Angles and classifying 2d shapes	Constructing triangles and quadrilaterals Coordinates	Area of 2-D shapes, transforming 2- D figures Conceptualizing and comparing fractions	All operations acting on fractions Ratio Percentages
Feedback & Assessment	**Base line test EOHT Assessment Low stakes quiz KO Quiz**	**EOT Assessment Low stakes quiz KO Quiz**	**EOHT Assessment Low stakes quiz KO Quiz**	**EOT Assessment Low stakes quiz KO Quiz**	**EOHT Assessment Low stakes quiz KO Quiz**	**EOY Assessment Low stakes quiz KO Quiz**
HPL	ACP: Seeing Alternate Perspectives VAA: Collaborative	ACP: Meta-Cognition VAA: Confident	ACP: Precision VAA: Enquiring	ACP: Automaticity VAA: Creative and Enterprising	ACP: Self-Regulation VAA: Risk-Taking	ACP: Connection Finding VAA: Practice
Careers	Accountancy https://babington.co.uk/blog/accounting/good-mathematician-good-accountant/	Aerospace and defence https://www.youthemployment.org.uk/careers-hub-job-role/aerospace-engineer/	Architect https://www.arch2o.com/architects-need-maths-check-5-reasons/	Software Engineering/Video Games https://www.mathscareers.org.uk/jaz-pearson-software-engineer/	Chef https://nationalcareers.service.gov.uk/job-categories/hospitality-and-food	Hair and Beauty Nutritionist https://nationalcareers.service.gov.uk/job-categories/beauty-and-wellbeing

Year 8

KING EDWARD VI HANDSWORTH WOOD GIRLS' ACADEMY

KEVI HWGA Curriculum Map

Big Qs ***Linked to NC***	Autumn 1	Autumn 2	Spring 1	Spring 2	Summer 1	Summer 2
Year 8	***Will a sequence of reciprocals ever have a 0 term?*** Students will generate terms of a linear sequences, generate terms of a non-linear sequences, identify different types of linear and non-linear sequences, find a given term in a linear sequence, develop a rule for finding a term in a linear sequence and generalizing the position to term rule for a linear sequence (n!" term) – (Sequences) Student will classify expressions, equations, inequalities and identities, derive equations from different contexts, solve linear equations with an unknown on one side then both sides, solve equations involving fractional terms and brackets and interpret the solution to an equation based on the context from which it is derived (forming and solving equations) Students develop their understanding of inequalities from to include number line representations, understanding when inequalities are or are not satisfied, and finding solutions to simple linear inequalities. Students form	***How can graphs help you represent, display analyse data?*** Students will understand; how to plot points in four quadrants. Students will plot coordinates from a rule to generate a straight line, develop a rule into an algebraic representation, develop concept of gradient using graphs of the form $y=ax$ before moving to equations of the form $y=ax+b$, identify key features of a linear graph including the y-intercept and the gradient, make links between the graphical and the algebraic representation of a linear graph, recognise different algebraic representations of a linear graph, identify parallel lines from algebraic representations (linear graphs) Students will understand how to draw real life graphs, experience describing, comparing and visualizing changing rate. They will be able to contextualise speed and compare in in different measures. (Real-life graphs)	***Can graphs help you solve algebraic proportional problems?*** Students will understand how to draw real life graphs, experience describing, comparing and visualizing changing rate. They will be able to contextualise speed and compare in in different measures. (Real-life graphs) Students explore multiplicative relationships and balance, and revisit key concepts such as scale factor and constant of proportionality. Students compare directly and inversely proportional relationships before finding missing values and generalising. Finally, direct and inverse relationships emerge as different parts of speed × time = distance are held constant. (Direct and Inverse Proportion)	***How is statistical analysis beneficial in real life?*** Students are introduced to the fundamentals of data collection and analysis including question writing, classifying data, collecting data using tally charts, and interpreting data in bar and pie charts. (Univariate data) Students extend their understand of what bivariate data is, and how it can be represented, to this week where they make deductions from the data, such as predict non-existent data, find averages, and assessing causality. (Bivariate Data)	***For an infinite–sided regular polygon, what would the values of the interior and exterior angles be?*** Students will know the sum of interior angles of a triangle and use to solve angle problems (revise from Year 7). Explore different methods for finding the sum of the interior angles of polygons by splitting the shape into triangles. Generalise different methods for finding the sum of interior and define the sum of the exterior angles of a polygon. Use the sum of the interior and exterior angles of a polygon to solve problems (Angles in a polygon) Students will understand conventions for drawing and measuring bearings, plot and measure the position of an object on a given bearing and distance from a specified point, solve problems (Bearings)	***Where is geometry used in the real world?*** Students build on their understanding of circles as geometric 'tools' for constructing shapes of known side lengths to include calculating circumference and arc lengths. Students understand Pi as the ratio between radius squared and circumference, work out area of circles, sectors and compound shapes. (Circles) Students learn the vocabulary to investigate properties of solid shapes. They are challenged to develop their visualisation skills working with 2-D representations and nets. Students work with prisms, cross sections and surface area. (Volume and surface area of prisms)

	and solve inequalities based on geometric properties, contexts and pictorial representations, and experience manipulations that do and do not preserve inequality relationships. (forming and solving inequalities)					

Key Knowledge, Concepts and skills	Generating term to term sequence for linear and non-linear, find the nth term Forming and solving equations and inequalities	Plot linear graph and find the equation of the line and parallel line Drawing and interpreting real-life graphs	Drawing and interpreting real-life graphs, multiplicative relationships, proportion	Calculate averages, representing data using a suitable diagram Bivariate data, scatter diagramm	Angles in a polygon and their properties. Draw, measure and solve problems involving bearings	Circumference of circle, area of a circle, prisms and cylinders, volume, surface area
Feedback & Assessment	**EOHT Assessment** **Low stakes quiz** **KO Quiz**	**EOT Assessment** **Low stakes quiz** **KO Quiz**	**EOHT Assessment** **Low stakes quiz** **KO Quiz**	**EOT Assessment** **Low stakes quiz** **KO Quiz**	**EOHT Assessment** **Low stakes quiz** **KO Quiz**	**EOY Assessment** **Low stakes quiz** **KO Quiz**
HPL	ACP: Critical or Logical Thinking VAA: Perseverance	ACP: Intellectual Playfulness VAA: Resilience	ACP: Speed and Accuracy VAA: Confident	ACP: Strategy Planning VAA: Enquiring	ACP: Generalisation VAA: Risk-Taking	ACP: Complex and Multi-step Problem Solving VAA: Practice
Careers	Science and Research https://nationalcareers.service.gov.uk/job-categories/science-and-research	Hospitality and Food (fractions, percentages) https://nationalcareers.service.gov.uk/job-categories/hospitality-and- food	Chef https://nationalcareers.service.gov.uk/job-categories/hospitality-and-food	**Actuarial Analyst/Statistician** **https://www.mathscareers.org.uk/morgan-smith-woodhams-actuarial-analyst/**	Software Engineering/Video Games https://www.mathscareers.org.uk/jaz-pearson-software-engineer/	Engineering https://nationalcareers.service.gov.uk/job-categories/engineering-and-maintenance

Year 9

KING EDWARD VI HANDSWORTH WOOD GIRLS' ACADEMY

KEVI HWGA Curriculum Map

Big Qs ***Linked to NC***	Autumn 1	Autumn 2	Spring 1	Spring 2	Summer 1	Summer 2
Year 9	***STEM: Explain why a tall, thin mug of tea will cool more slowly from its surface that a short wide one.*** Students are introduced to theoretical probability in a variety of contexts and with a variety of representations. Combined events are considered with the use of sample spaces, two-way tables and probability tree diagrams. They compare experimental to theoretical probability. (Probability) Students build on their existing understanding of Venn diagrams by being introduced to set notation. Students are introduced to probability presented in Venn diagrams and set notation. Students interpret and convert between representations to solve problems. (Sets and Venns)	***When finding a missing angle, can you only use one ratio?*** Students work on algebraic manipulation, including some revision of solving linear equations. Students are formally introduced to some formal algebraic manipulation methods such as equation scaling and addition and subtraction of equations within a system. They will solve simultaneous equations bye manipulating equations, substituting and eliminating variables. (Solving linear simultaneous equations algebraically) Students explore linear graphs to connect understanding of solutions to linear equations in two variables to the coordinates of points that lie on their graphs, including intersections as simultaneous equations. (Solve simultaneous equations graphically)	***Can two events be mutually exclusive?*** Students are introduced to loci and use the properties of circles to find the locus of points that are a specific distance from a point. Students develop this to find the locus of points that are equidistant from two points and use this to construct perpendicular bisectors. They will be introduced to the conditions of congruency and ways to construct triangles. (Constructions, congruence and loci) Students are introduced to Pythagoras' Theorem and start to look at different contexts in which Pythagoras' theorem can be used, suchas within 2-D shapes, 3-D shapes and the Cartesian plane (Pythagoras theorem)	***What is the ratio of the side lengths of a wide screen TV measuring 42"? How can you set up an equation using Pythagoras to solve this question?*** Students are introduced to the idea of similarity in the context of enlargement. They use, then learn, how to find the scale factor from the unit ratio. After working with inter-shape relationships, they revisit the idea of constants of proportionality. They are introduced to the centre of enlargement and use this. (Similarity and enlargement) Students are introduced to the sine, cosine and tangent rule to work out missing lengths and angles of right-angled triangles. (Trigonometry)	***Where in the real life would you need to think about congruent and similar shapes?*** Students look at quadratic expressions and equations. They also begin looking at quadratic graphs and common visual features of them, such as the curve and turning point. Students also look at graphs of quadratic functions. (Quadratic expressions and equations) Students are introduced to rational and irrational numbers, and surds. (surds)	***Why are indices and standard form crucial to know when learning about galaxy and space?*** Students will look at indices and roots, including cases with negative indices and an index of zero. Students will then focus on the index laws, looking at multiplication, division, and raising to further powers. (Indices) Students are introduced to numbers written in standard form as tools to consider and compare very large and very small numbers. (Standard form) Decimal multipliers to calculate percentage change is built on by considering repeated change, first with different percentages and then with the same percentage (compound change). Graphical representations of growth and decay are considered (Growth and Decay)

Key Knowledge, Concepts and skills	mutually exclusive events, experimental and theoretical probability, sample space diagram, two-way tables, Venn diagrams	Forming and solving linear equations and inequalities Solving algebraically and graphically Solving simultaneous equations	Constructing lines and triangles Showing congruency Displaying regions for loci Using Pythagoras' Theorem	Similarity in shapes and triangles through enlargement enlargement, negative and fractional scale factors Ratios in triangles, tangent ratio, sine ratio, cosine ratio, using trigonometry to find angles	quadratic equations, graphs of quadratic functions rational and irrational numbers	Indices Calculation and estimates in standard form Compound measures using multipliers
Feedback & Assessment	**EOHT Assessment** **Low stakes quiz** **KO Quiz**	**EOT Assessment** **Low stakes quiz** **KO Quiz**	**EOHT Assessment** **Low stakes quiz** **KO Quiz**	**EOT Assessment** **Low stakes quiz** **KO Quiz**	**EOHT Assessment** **Low stakes quiz** **KO Quiz**	**EOY Assessment** **Low stakes quiz** **KO Quiz**
HPL	**ACP: Originality** **VAA: Perseverance**	**ACP: Intellectual Confidence** **VAA: Resilience**	**ACP: Big Picture Thinking** **VAA: Enquiring**	**ACP: Critical or Logical Thinking** **VAA: Confident**	**ACP: Originality** **VAA: Collaborative**	**ACP: Automaticity** **VAA: Practice**
Careers	Engineering https://nationalcareers.service.gov.uk/job-categories/engineering-and-maintenance Chemist https://nationalcareers.service.gov.uk/job-profiles/chemist	Interior Design https://nationalcareers.service.gov.uk/job-categories/creative-and-media	Science and Research https://nationalcareers.service.gov.uk/job-categories/science-and-research	Construction https://nationalcareers.service.gov.uk/job-profiles/construction-labourer	Software Engineering/Video Games https://www.mathscareers.org.uk/jaz-pearson-software-engineer/	Biologist (Indices, standard form) https://nationalcareers.service.gov.uk/job-profiles/biologist

Year 10 Foundation						
	What is the real-world benefit of the number 60 having lots of factors? Unit 1: Number Students will learn about calculations, decimal numbers, place value, factors and multiples, squares, cubes and roots, index notation and prime factors. *(Computer Science)* ***Sally is 54 years old, and her mother is 80, how many years ago was Sally's mother three times her age?*** Unit 2: Algebra Students will learn about Algebraic expressions, simplifying expressions, substitution, formulae, expanding brackets, factorising, using expressions and formulae. *(Science)*	***What are the different types of bar charts?*** Unit 3: Graphs, tables, and charts Students will learn about frequency tables, two-way tables, representing data, time series, stem and leaf diagrams, pie charts and scatter graphs. *(Physical Education)* ***What are unit fractions?*** Unit 4: Fractions and percentages Students will learn about working with fractions, operations with fractions, fractions, decimals, and percentages and calculating percentages. *(Music)* ***What is the difference between equations and formulae?*** Unit 5: Equations, inequalities, and sequences Students will learn about solving equations, inequalities, formulae, generating sequences and using the nth term of a sequence. *(Science)*	***For an infinite–sided regular polygon, what would the values of the interior and exterior angles be?*** Unit 6: Angles Students will learn about properties of shapes, angles in parallel lines, angles in triangles, exterior and interior angles, and geometrical patterns. *(Design Technology)* ***How many pairs of integers can you find where the mean and the range are the same?*** Unit 7: Averages and range Students will learn about mean, mode, median and range, types of averages, estimating the mean and sampling. *(Physical Education)* ***Estimate the area of skin on different parts of your body. Do you need to include all the faces?*** Unit 8: Perimeter, area, and volume 1 Students will learn about rectangles, parallelograms, triangles, trapezia, changing units, area of compound shapes, surface area of 3D solids and volume of prisms. (Art)	***Can you explain why the coefficient of x is the gradient of the straight-line graph?*** Unit 9: Graphs Students will learn about coordinates, linear graphs, gradient, y = mx + c, real-life graphs, and distance-time graphs. *(Science)* ***You want to increase your page by 120%. What is the scale factor?*** Unit 10: Transformations Students will learn about translation, reflection, rotation, enlargement, describing enlargements and combining transformations. *(Art & Design Technology)* ***If you double an amount being shared, does each of the shared parts in the answer double?*** Unit 11: Ratio and proportion Students will learn about writing ratios, using ratios, ratios, and measures, comparing using ratios, using proportion, proportion and graphs and proportion problems. *(Food Technology)*	***How can you tell if a right- angled triangle question requires you to use Pythagoras' Theorem or SOHCAHTOA?*** Unit 12: Right-angled triangles Students will learn about Pythagoras' theorem, the three trigonometric ratios, sine, cosine, and tangent. Finding lengths and angles using trigonometry. *(Music)* ***You wake up one morning and look out of the window. What might the weather be doing that day?*** Unit 13: Probability Students will learn about calculating probability, experimental probability, Venn diagrams and tree diagrams. *(Religious Education)*	***True or false? Two objects that have the same mass always have the same density.*** Unit 14: Multiplicative reasoning Students will learn about percentages, growth and decay, compound measures, distance, speed and time, direct and inverse proportion. *(Physics)* ***Measured from North, what is the angle of each of the main compass directions N, E, S, W, and the intermediate directions NE, SE, SW, NW?*** Unit 15: Constructions, loci, and bearings Students will learn about 3D solids, plans and elevations, accurate drawings, scale drawings and maps, constructions, loci, regions, and bearings. *(Art & Design)*
Feedback & Assessment	**EOHT Assessment Unit Test KO Quiz**	**EOT Assessment Unit Test KO Quiz**	**EOHT Assessment Unit Test KO Quiz**	**EOT Assessment Unit Test KO Quiz**	**EOHT Assessment Unit Test KO Quiz**	**Finals Unit Test KO Quiz**
HPL	**ACPS:** Connection Finding, Originality. Speed & Accuracy, Meta-Cognition, Complex & Multistep Problem Solving, Self-Regulation **VAAs:** Practice, Perseverance, Resilience					
Careers	Unit 1: Estimator Unit 2: Dietitian	Unit 3: Data Analyst Unit 4: Sales Unit 5: Quality Manager	Unit 6: Environmental Engineer Unit 7: Sports Coach Unit 8: Farm Manager	Unit 9:Construction Manager Unit 10: Animator Unit 11: Chef	Unit 12: Civil Engineer Unit 13: Meteorologist	Unit 14: Retail Banker Unit 15: Architect

Year 10 Higher						
	How many prime numbers are there? Unit 1: Number Students will learn about number problems and reasoning, place value and estimating, HCF and LCM, calculating with powers (indices), zero, negative and fractional indices, standard form, and surds. *(Computer Science)* ***Sally is 54 years old, and her mother is 80, how many years ago, was Sally's mother three times her age?*** Unit 2: Algebra Students will learn about algebraic indices, expanding and factorising, equations, formulae, linear sequences, and non-linear sequences. *(Science)*	***House prices are followed closely by economists, who tend to favour a median measure rather than the mean. Why is that?*** Unit 3: Interpreting and representing data Students will learn about Statistical diagrams, time series, scatter graphs, averages, and range. *(Physical Education)* ***The ancient Egyptians only ever used unit fractions – what are unit fractions?*** Unit 4: Fractions, ratio, and percentages Students will learn about Fractions, ratios, ratio and proportion, percentages, fractions, decimals, and percentages *(Music)* ***A square has a diagonal length of 1m. What is the area of the square?*** Unit 5: Angles and trigonometry Students will learn about angle properties of triangles and quadrilaterals, interior and exterior angles of a polygon, Pythagoras' theorem, and trigonometry. *(Design Technology)*	***How are smartphones programmed to read the acceleration the phone experiences?*** Unit 6: Graphs Students will learn about linear graphs, graphing rates of change, real-life graphs, line segments, quadratic graphs, cubic and reciprocal graphs. *(Science)* ***What is the difference between the accuracy and the precision of a measurement?*** Unit 7: Area and volume Students will learn about perimeter and area, units and accuracy, prisms, circles, sectors of circles, cylinders and spheres, pyramids, and cones *(Art)* ***An enlargement by a scale factor of x produces the same image as a rotation of y degrees. What are the values of x and y?*** Unit 8: Transformations and constructions Students will learn about 3D solids, reflection and rotation, enlargement, transformations and combinations of transformations, bearings, and scale drawings, constructions, and loci *(Art & Design Technology)*	***What are the differences between equations and inequalities?*** Unit 9: Equations and inequalities Students will learn about solving quadratic equations, completing the square, solving linear and quadratic simultaneous equations, and solving linear inequalities. *(Science)* ***Why learn about experimental probability?*** Unit 10: Probability Students will learn about combined events, mutually exclusive events, experimental probability, independent events and tree diagrams, conditional probability, Venn diagrams and set notation. *(Religious Education)* ***The area of a city grows by 10% each year. Assume the city is circular, by what percentage does its diameter grow in 5 years?*** Unit 11: Multiplicative reasoning Students will learn about growth and decay, compound measures, ratio, and proportion *(Physics)*	***True or false? Two objects that have the same mass and volume will have the same density.*** Unit 12: Similarity and congruence Students will learn about congruence, geometric proof and congruence, similarity, and similarity in 3D solids. *(Art & Design Technology)* ***What happens if you use the sine rule on a right-angled triangle trigonometry question?*** Unit 13: More trigonometry Students will learn about accuracy, graph of the sine and cosine function, the tangent function, calculating areas and the sine rule, the cosine rule and 2D trigonometric problems, solving problems in 3D and transforming trigonometric graphs. *(Music)*	***Would you expect the interquartile range of heights of Year 7 or Year 11 students to be larger?*** Unit 14: Further statistics Students will learn about sampling, cumulative frequency, box plots, drawing histograms, interpreting histograms, comparing, and describing populations. *(Geography)* ***What is the difference between a plot and a sketch of a quadratic graph?*** Unit 15: Equations and graphs Students will learn how to Solve simultaneous equations graphically, represent inequalities graphically, graphs of quadratic functions, solve quadratic equations graphically and graphs of cubic functions. *(Physical Education)*
Feedback & Assessment	**EOHT Assessment Unit Test KO Quiz**	**EOT Assessment Unit Test KO Quiz**	**EOHT Assessment Unit Test KO Quiz**	**EOT Assessment Unit Test KO Quiz**	**EOHT Assessment Unit Test KO Quiz**	**Finals Unit Test KO Quiz**
HPL	**ACPS:** Connection Finding, Originality. Speed & Accuracy, Meta-Cognition, Complex & Multistep Problem Solving, Self-Regulation **VAAs:** Practice, Perseverance, Resilience					
Careers	Unit 1: Cost Estimator Unit 2: Dietitian	Unit 3: Data Analyst Unit 4: Sales Unit 5: Civil Engineer	Unit 6: Construction Manager Unit 7: Farm Manager Unit 8: Animator	Unit 9: Quality Manager Unit 10: Meteorologist	Unit 11: Retail Banker Unit 12: Architect	Unit 13: Astronomer Unit 14: Statistician

Year 11 Foundation	***You want to increase your page by 120%. What is the scale factor?*** Unit 10: Transformations Students will learn about translation, reflection, rotation, enlargement, describing enlargements and combining transformations. *(Art & Design Technology)* ***If you double an amount being shared, does each of the shared parts in the answer double?*** Unit 11: Ratio and proportion Students will learn about using and comparing ratios and using proportion. *(Food Technology)* ***How can you tell if a question requires you to use Pythagoras' Theorem?*** Unit 12: Right-angled triangles Students will learn about Pythagoras' theorem, the three trigonometric ratios, finding lengths and angles using trigonometry. *(Music)*	***Will two objects that have the same mass have the same density?*** Unit 14: Multiplicative reasoning Students will learn about percentages, growth and decay, compound measures, distance, speed and time, direct and inverse proportion. *(Physics)* ***Measured from North, what is the angle of each of the main compass directions: N, E, S, W?*** Unit 15: Constructions, loci, and bearings Students will learn about 3D solids, plans and elevations, accurate drawings, scale drawings and maps, constructions, loci, regions, and bearings. *(Art & Design)* ***Why do you think we use the word, factorising?*** Unit 16: Quadratic equations and graphs Students will learn about expanding double brackets, using quadratic graphs, factorising quadratic expressions, and solving quadratic equations. *(Physical Education)*	***One estimate for the age of the universe is 13.8 billion years. How many seconds is this?*** Unit 18: Fractions, indices, and standard form Students will learn about multiplying and dividing fractions, the laws of indices, writing large numbers in standard form, writing small numbers in standard form, and calculating with standard form. *(Physics)* ***Which of the four shape transformations produce images that are always congruent with their original shapes?*** Unit 19: Congruence, similarity, and vectors Students will learn about similarity and enlargement, using similarity, congruence, and vectors. *(Art & Design Technology)* ***There are 5 Platonic solids. What are they called? Can you prove why there are only 5 Platonic Solids and no more?*** Unit 20: More algebra Students will learn about graphs of cubic and reciprocal functions, non-linear graphs, solving simultaneous equations graphically and algebraically, rearranging formulae and proof. *(Science)*	***What are your secure and insecure areas in mathematics?*** Students will use this time to consolidate on what they have learnt previously and addressing their weak areas. Along with identifying what action is planned to secure the insecurities.	***What are your secure and insecure areas in mathematics?*** Students will use this time to consolidate on what they have learnt previously and addressing their weak areas. Along with identifying what action is planned to secure the insecurities.	***Examinations***
Feedback & Assessment	**EOHT Assessment Unit Test KO Quiz**	**Mock Exams Unit Test KO Quiz**	**EOHT Assessment Unit Test KO Quiz**	**Mock Exams**	**Exam Papers**	**Exam Papers**
HPL	**ACPS:** Connection Finding, Originality. Speed & Accuracy, Meta-Cognition, Complex & Multistep Problem Solving, Self-Regulation **VAAs:** Practice, Perseverance, Resilience					
Careers	Unit 10: Animator Unit 11: Chef Unit 12: Civil Engineer	Unit 14: Retail Banker Unit 15: Architect Unit16:Agriculturalconsultant	Unit18: Research Scientist Unit 19: Mechanical Engineer Unit 20: Structural Engineer			

Year 11 Higher						
	Would you expect the interquartile range of heights of Year 7 or Year 11 students to be larger? Unit 14: Further statistics Students will learn about sampling, cumulative frequency, box plots, drawing histograms, interpreting histograms, comparing, and describing populations. *(Geography)* ***What is the difference between a plot and a sketch of a quadratic graph?*** Unit 15: Equations and graphs Students will learn how to Solve simultaneous equations graphically, represent inequalities graphically, solve quadratic equations graphically and graphs of cubic functions. *(Physical Education)* ***Why is it called the alternate segment theorem?*** Unit 16: Circle theorems Students will learn about radii and chords, tangents, angles in circles and how to apply circle theorems. *(Art & Design Technology)*	***What are the similarities between the functions that computer programmers write, and the functions used in GCSE Maths?*** Unit 17: More algebra Students will learn how to Rearrange formulae, manipulate algebraic fractions, solve problems involving Surds and algebraic fraction equations, functions, and algebraic proof. *(Physics)* ***How do sailing boats sail into the wind?*** Unit 18: Vectors and geometric proof Students will learn how to use vectors, vector notation and Vector arithmetic. They will use these to solve problems involving parallel vectors and collinear points and solve geometric problems. (Physics & Computer Science) ***How could being able to measure the tangent to a curve be important in designing high-speed roads?*** Unit 19: Proportion and graphs Students will learn more about Direct and inverse proportion. They will also explore exponential functions, non-linear graphs, translating graphs of functions and reflecting and stretching graphs of functions. *(Design Technology)*	***What are your secure and insecure areas in mathematics?*** Students will use this time to consolidate on what they have learnt previously and addressing their weak areas. Along with identifying what action is planned to secure the insecurities.	***What are your secure and insecure areas in mathematics?*** Students will use this time to consolidate on what they have learnt previously and addressing their weak areas. Along with identifying what action is planned to secure the insecurities.	***What are your secure and insecure areas in mathematics?*** Students will use this time to consolidate on what they have learnt previously and addressing their weak areas. Along with identifying what action is planned to secure the insecurities.	***Examinations***
Feedback & Assessment	**EOHT Assessment** **Unit Test** **KO Quiz**	**Mock Exams** **Unit Test** **KO Quiz**	**EOHT Assessment** **Unit Test** **KO Quiz**	**Mock Exams**	**Exam Papers**	**Exam Papers**
HPL	**ACPS:** Connection Finding, Originality. Speed & Accuracy, Meta-Cognition, Complex & Multistep Problem Solving, Self-Regulation **VAAs:** Practice, Perseverance, Resilience					
Careers	Unit 14: Data Analyst Unit 15: Structural Engineer Unit 16: Civil Engineer	Unit 17: Mechanical Engineer Unit 18: Astronomer Unit 19: Research Scientist				

Year 12

KEVI HWGA Curriculum Map

Big Qs ***Linked to NC***	Autumn 1	Autumn 2	Spring 1	Spring 2	Summer 1	Summer 2
Year 12	***How does quadratic equations relate to formulating the speed of an object?*** Students will learn about Algebraic expressions, Quadratics Equations & inequalities (Pure: Chapter 1,2,3) ***How do particle physicists use graphs to determine the nature of subatomic particles?*** Students will learn about graphs & transformations, straight line graphs (Pure Chapter 4 and 5) ***How can we ensure we avoid bias with our sampling methods?*** Students will learn about Data collection, (Applied: chapter 1) ***How can surveyors use Trigonometry when planning building projects?*** Students will build upon GCSE Trigonometry and about Trigonometric Ratios (Pure chapters 9 ,10)	***How did the government use Statistics to address the nation during COVID-19?*** Students will learn about measures of location and spread and representations of data (Applied Chapters 2,3) ***What are the utilities of Pascal's Triangle***? Students will learn about Binomial Expansion (Pure Chapter 8) ***What are the foundations of mathematical modelling?*** Students will learn about modelling in mechanics and kinematics (Applied Chapters 8,9) ***How are geostationary satellites used to learn about the Earth's surface and atmosphere?*** Students will learn about algebraic methods (Pure Chapter 7)	***What forces are involved when a car air-bag is inflated?*** Students will learn about Newton's Laws of Motion and Vectors (Applied Chapters 10, 11) ***How do sports teams plan strategies for future games?*** Students will learn about Correlation and Probability (Applied Chapters 4,5) ***How can we calculate a rate of change?*** Students will be introduced to the concept of Differentiation? (Pure Chapter 12)	***How can ascertain whether your results from an experiment were obtained by chance?*** Students will learn about Statistical Distributions and Hypothesis Testing (Applied Chapter 6 and 7) ***How do you prove that the sum of two consecutive prime numbers is always even?*** Students will learn about constructing mathematical arguments (Pure Chapter 7) ***How can we accurately calculate the area under a curved graph?*** Students will be introduced to the concept of Integration (Pure Chapter 13)	***What base of logarithms are used to express the size of seismic activity?*** Students will learn about exponentials and logarithms (Pure Chapter 14) ***When does a space rocket experience variable acceleration?*** Students will learn about variable acceleration (Applied Chapter 11)	**Revision applied & pure continued + EOY exams** **Start yr13 content Pure only**

Key Knowledge, Concepts and skills	Multiply and divide integer powers, expand a single term over brackets, expanding triple brackets, factorise linear quadratics and cubic expressions, use laws of indices, simplify and rationalise surds, sketch graphs, use intersection points of graphs to solve equations, translate graphs, stretch graphs Expand a single term over brackets, expanding triple Brackets. Midpoint of a line segment, equation of the perpendicular bisector of a line segment, equation of a circle, circle properties	Use Pascals triangle to identify binomial coefficients and use them to expand simple binomial expressions, Use combinations and factorial notation, make approximations using the binomial expansion. Acceleration, velocity and distance travelled.	Find Derivatives, identify increasing and decreasing functions, sketch the gradient function. Forces, Newtons First Law. Venn Diagram, Independent, Mutually Exclusive.	Find indefinite and definite integrals. Proof by deduction, exhaustion, counterexample. 1 tail, 2 tail, critical value, acceptance region. ,	Use laws of logs to solve problems. Use calculus for kinematics for motion in a straight line.	
Feedback & Assessment	**EOHT Assessment**	**EOT Assessment**	**EOHT Assessment**	**EOT Assessment**	**EOHT Assessment**	**EOY Assessment**
HPL	**ACP: Self Regulation** **VAA: Resilience**	**ACP: Connection Finding** **VAA: Perserverance**	**ACP: Flexible Thinking** **VAA:Confident**	**ACP: Automaticity** **VAA: Enquiring**	**ACP: Strategy Planning** **VAA: Creative and Enterprising**	**ACP: Complex and Multi-step Problem Solving** **VAA: Practice**
Careers	**Applied** Data Analytics Statistician (data collecton) (Data analyst-statistician | Explore careers | National Careers Service) Investment Analyst (correlation) (Investment analyst job profile | Prospects.ac.uk) Data Scientist (representations of data) (Data scientist job profile | Prospects.ac.uk)	**Pure** Architectural Technologist (straight line graphs) (Architectural technologist job profile | Prospects.ac.uk) Epidemiologist (straight- line graphs) (Epidemiologist job profile | Prospects.ac.uk) **Applied** Risk Manager (hypothesis testing) (Risk manager job profile | Prospects.ac.uk)	**Pure** Engineers (circles) (Engineering and maintenance | Explore careers (nationalcareers.service.gov.uk) **Applied** Games Programmer (forces and motions) (Computer games developer | Explore careers | National Careers Service)	**Pure** Astronomer (trigonometric ratios) Astronomer | Explore careers | National Careers Service Cartoonist (trigonometric ratios) Job Guide - Cartoonist (inputyouth.co.uk) **Applied** Pilot (vectors) (Airline pilot | Explore careers | National Careers Service)	**Pure** Nuclear Scientist (logarithms) (Nuclear engineer | Explore careers | National Careers Service)	

Year 13

KING EDWARD VI HANDSWORTH WOOD GIRLS' ACADEMY

KEVI HWGA Curriculum Map

Big Qs ***Linked to NC***	Autumn 1	Autumn 2	Spring 1	Spring 2	Summer 1	Summer 2
Year 13	***How are algebraic methods used in the day-to-day operations in the finance and business world?*** Students will learn about Algebraic methods, functions and graphs (Pure: Chapter 1,2) ***How does the use of Binomial expansion help to provide a basis in probability theory to estimate fluctuations in economics?*** Students expand their previous knowledge of binomial expansion. (Pure : Chapter 4) ***How did the government use statistics to address the nation regarding COVID19?*** Students will learn about Regression and correlation , (Applied: Chapter 1,2,3) ***How a quadratic equation can model the perfect trajectory of a basket ball or a cannon ball ?*** Students will delve into the study of moments, Forces and Friction and Projectiles. (Applied: Chapter 4,5,6)	***Why is the use of radians as a measure more appropriate than degrees at higher level maths?*** Students will appreciate and use radians, advanced trigonometric functions. (Pure : Chapters 5,6) ***How can sequences and series help us to model a range of real-life financial problems?*** Students will learn about different types of sequences (Pure : Chapters 3) ***How can we identify if a distribution can be appropriately modelled using a Normal Approximation?*** Students will build on the knowledge of Probability from Year 1 and be introduced to the Normal Distribution. (Applied Chapters 2, 3)	***How is differentiation and optimisation used in engineering to reduce waste cost?*** Students will also learn how to draw and differentiate parametric function, more advanced Differentiation (Pure: Chapter 8, 9) ***Why are numerical methods a rapidly moving field in mathematical sciences ?*** Students will learn application of Numerical methods. (Pure: Chapter 10) ***How can we synthesise our knowledge of Trigonometry to help us model real-life situations?*** Students will develop their skills in Trigonometric Modelling (Pure: Chapter 7) ***How do engineers apply classical mechanics when modelling the forces acting upon an object?*** Students will learn the application of forces and further kinematics (Applied: Chapter 7,8)	***How can integrals be used to calculate the moment of inertia of a games utility vehicle?*** Students will build upon their knowledge of Integration from Year 1 (Pure Chapter 11) ***What are the similarities and differences between the different types of Hypothesis Testing in you're A-Level Course?*** Students will build upon their knowledge of Integration from Year 1 (Applied Chapter 3 CNTD)	***Diagnostic Teaching*** ***Revision (past papers)*** **FINAL Exams**	

Key Knowledge, Concepts and skills	Multiply and divide algebraic fractions, convert improper fractions into partial fraction forms, estimating coefficients in exponentials models, calculate moment correlation Turning effect, resultant moment, equilibrium problems, no- uniform problems, problems at the point of tilting, resolving forces, triangle law, smooth & rough planes, friction coefficient, vertical components, quadratic, modelling trajectories, derive formula for time and range.	Substitution, arithmetic sequences, , set notation, Venn diagrams, conditional probability, two way tables, tree diagrams, normal distribution curve, standard deviation, binomial distribution approximation. Arc length, fractions, area of a circle, trigonometric graphs, Pythagoras, angle approximations, trigonometric identities increasing and decreasing functions, consecutive proof, ratio, partial fractions, binomial expansion, Pascal's triangle, infinite series.	Double angle, proof, substitution, rearranging, proving identities, , trigonometric modelling, converting parametric to cartesian form, trigonometric identities, coordinate geometry, modelling using parametric functions. Differentiate and Integrate trigonometric functions, exponentials, logarithms, parametric functions, implicit differentiation, second derivatives, rates of change. Locating roots, iteration, Newton-Raphson procedure, apply numerical methods to solve problems. Solving for unknown forces in equilibrium system, statics, pulleys, tension, inclined planes, smooth & rough, problems with connected particles, vector equations of motion, displacement, velocity, acceleration, differentiation, vectors with respect with time	Integration, trigonometric function, hypothesis testing in the normal distribution		
Feedback & Assessment	**EOHT Assessment**	**EOT Assessment**	**EOHT Assessment**	**EOT Assessment**	**EXAMS**	**EXAMS**
HPL	**ACP: Self Regulation** **VAA: Resilience**	**ACP: Big Picture Thinking** **VAA: Perserverance**	**ACP: Precision** **VAA:Practice**	**ACP: Speed and Accuracy** **VAA: Risk-Taking**		
Careers	**Pure** Military (quadratic functions) (Careers | The British Army (mod.uk) **Applied** Geneticist (conditional probability) (Geneticist | Explore careers | National Careers Service)	**Pure** Computing (binomial expansion) (Computing, technology and digital | Explore careers (nationalcareers.service.gov.uk) **Applied** Sports Science (projectiles) (Performance sports scientist | Explore careers | National Careers Service)	**Pure** Astronomer (trigonometric ratios) Astronomer | Explore careers | National Careers Service **Applied** Gymnast (forces) Careers - British Gymnastics (british-gymnastics.org)	**Applied** Environmental Engineer (differentiation and integration) (Environmental engineer job profile | Prospects.ac.uk)		
Concept Threshold	Functions (A-Level Physics) Regression and Correlation (A-Level Biology)	Binomial Expansion (A-Level Computer Science) Forces and Projectiles (A-Level Physics)	Trigonometric Functions (A-Level Physics) Kinematics (A-Level Physics)	Integration (A-Level Physics)		