Subject	Mathematics	Head of Department	Freeman Appiah

Whole school curriculum purpose	Subject purpose
Our overall mission is to provide the young people of Greenwich with equal or better life chances than any other school in the UK with the accompanying vision of being a school where young people thrive and grow in an environment that brings out the best in everyone. In order to achieve this, we know that we must provide an excellent curriculum for our students, ensuring that they receive a world-class education which brings out the best in all of them and prepares them for success in education and life. Therefore, our curriculum equips our pupils with powerful knowledge, maximises their cognitive development and nourishes their whole person and individual passions. Our overriding aim is that this curriculum liberates and empowers, providing students with the confidence to understand and shape the world around them, to be active and economically self-sufficient citizens, and to 'enter into the conversation of mankind' (Michael Oakeshott).	The purpose of the maths curriculum is to provide a secure understanding of mathematical concepts, from basic principles of mathematics to complex topics that combine several areas of study into a single question about the world around them, interrogate patterns and quantify relationships. The curriculum promotes retention of knowledge and a depth of learning rather than an accelerated curriculum, resulting in pupils who are confident in taking their studies further into sixth form, university and beyond. In all year groups, there is an intentional focus on numeracy which will support pupils not only in their study of maths but will also enable them to access mathematical questions in other subjects such as sciences, social sciences, business and technology. Mathematics, as a fundamental part of human thought and logic, is an effective way to build mental discipline and help increase the confidence of our pupils to thrive in all settings of society. Mathematics is a hierarchical subject, so we prioritise depth over acceleration to ensure students are continually developing and building on their foundational knowledge. Mathematics is a dynamic, engaging, and problem-solving discipline which promotes passion and creative thinking. Through regular retrieval, interleaving and independent practice, students develop their confidence and efficient methods to thrive within this exciting and extensive subject. At Key Stage 5, the department offers a "Maths for All" strategy which involves Level 3 A-Level Maths for most students; Level 3 A-Level Further Mathematics for the most able mathematicians and Level 3 Core Maths for students who need Maths skills beyond GCSE for other level 3 qualifications, but do not study A-Level Maths. In all the 3 courses, students develop their knowledge of how to construct and present mathematical arguments; apply their mathematical skills to make logical and reasoned decisions in solving problems in both and pure and applied mathematics. Students problem-solve and communicate their mathematical solutions wit the aid of acquired skills and technology such as most sophisticated graphical calculators. Our curriculum is designed to enable us to deliver the mathematics and further mathematics courses in parallel.

Whole school curriculum principles	Subject principles
• **Entitlement**: Our curriculum is designed to be inclusive and cater for all of our students; all students have the right to learn what is in the curriculum, and our teachers have a duty to ensure that they are all taught the whole of it. • **Coherence**: Taking the National Curriculum as its starting point, our curriculum is carefully sequenced so that powerful knowledge builds term by term and year by year. We make meaningful connections within subjects and between subjects. • **Mastery**: We ensure that foundational knowledge, skills, and concepts are secure before moving on. Pupil's revisit prior learning and apply their understanding in new contexts. • **Adaptability**: The core content – the 'what' – of our curriculum is stable and in line with what the best schools are teaching, but we ensure we bring it to life for our own local context in South-East London. Equally, teachers will adapt lessons – the 'how' – to meet the needs of their own classes. • **Representation**: We are committed to the idea of 'the mirror and the window', that pupils see themselves in our curriculum, ensuring diversity and equality, but that our curriculum takes all pupils beyond their immediate experience, building cultural capital and aspiration.	• **Entitlement**: All pupils in maths are exposed to extensive number, algebra, geometry, proportion, and statistics content and are not taught on separate pathways until Key Stage 4. This ensures that all pupils can access all areas of maths and have time to develop their skills before limiting their entitlement to Higher maths. • **Coherence**: Our curriculum has been carefully sequenced to ensure that knowledge is revisited without having a spiral curriculum, and to ensure that classic misconceptions between topic areas are avoided. • **Mastery**: Mathematical concepts are taught in-depth and continually revisited through careful interleaving of content into future teaching topics. The focus on retention of knowledge is at the core of the maths curriculum; the mastery approach supports this. • **Adaptability**: Teachers are provided with a fully resourced curriculum that will meet the expectations of the maths curriculum in Key Stage 3 and Key Stage 4. Teachers are expected to adapt these resources and have autonomy in the way they are delivered in the classroom. • **Representation**: Maths is universal, providing all pupils with an elegant and logical way of viewing the world. Where our resources include names and places, these have been selected to be inclusive. We believe that a secure understanding of maths is an essential starting point for all young people.

		Education with character: Our curriculum, which includes the taught subject timetable as well as spiritual, moral, social, and cultural development, is intended to spark curiosity and to nourish both the head and the heart.	• Education with character: Mathematics is a common language in which all pupils can solve, analyse, and problem solve. Our curriculum supports pupils to build logical reasoning, critical thinking and is mentally rigorous.

Curriculum Overview

Term 1

	Autumn 1	Why this? Why now?	Autumn 2	Why this? Why now?
Year 7	**Number**: Place value and Number sense, Addition and Subtraction, Perimeter, Rounding & Estimation (in real life situations)	To ensure a solid foundation in number and addition / subtraction, applying this to the context of perimeter and 2D shapes.	**Number**: Multiplication and Division, Factors and Multiples, Area of rectangles, triangles and parallelograms	To ensure a solid foundation in multiplication and division, applying this to the context of area. Factors and multiples builds from Primary School understanding and provides the basis for LCM, HCF in Year 8, and adding and subtracting fractions throughout.
Year 8	**Number**: Indices, Prime Factorisation, Rounding, Fractions, Directed Numbers Review	Prime factorisation builds on knowledge and understanding of indices Key skill of fractions ready for application to other areas later on in the curriculum.	**Algebra**: Linear Equations, Coordinates & Basic Graphs	Students develop key skills and methods of solving equations. Understanding of coordinates supports further application in graph and algebra work later on.
Year 9	**Number**: Place value and number properties, Decimals, Rounding and Estimation, Indices, Powers and Roots, Factors, multiples and primes, Ratio	Builds on study from Year 8, by revisiting and extending this knowledge. Key concept of ratio and link to fractions topic.	**Number**: Fractions, Decimals and Percentages, Proportion	Develops understanding of different representations of same values, this is structured by a closer focus on each area following overview.
Year 10	**Algebra**: Rearrange formulae, Linear Graphs, Compound measures	Rearranging formulae is a key skill when extending algebra topic, which is fundamental when studying Maths at a higher level. This also links to science where formulae are continually used. Linear graphs and gradients prepares students for next level, this leads into gradients of curves and gradient function at A Level. This is	**Algebra**: Quadratic Graphs & Roots, Linear Simultaneous Equations, Further graphs, Expanding and Factorising (H), Algebraic Fractions (H)	Simultaneous equations introduced as a key problem-solving method. Quadratics introduced as next order of equation that can be solved. Expanding and factorising links to key values on graphs.

		important hierarchical knowledge; students need the base knowledge to be able to move on.		
Year 11 Foundation	**Geometry & Algebra**: Pythagoras, Right Angled Trigonometry, Bearings and scale drawings	Introduces important area of trigonometry, and allows for it's links to Pythagoras to be explored. These skills are put into real-life contexts through application to bearings and scale drawings.	**Geometry**: Transformations, Congruence	Continues the formal and rigorous idea of proof through congruence, and reviews key topic of transformations (doing and describing).
Year 11 Higher	**Geometry & Algebra**: Algebraic Proof, Quadratic equations, Further Simultaneous Equations, Functions, Iteration, Quadratic Inequalities	Introduces formal proof, important for taking the subject beyond GCSE. Function work builds on algebra rules and methods such as substitution. Quadratic equations extended and solved using different methods which is a key problem-solving concept.	**Geometry**: Bearings & Scale Drawings, Circle Theorems, Further Trigonometry, Trig Graphs	Knowledge of circle geometry is built on in this unit. Trigonometry is further extended to applications for any triangle and links to work with bearings.
Year 12 Core Maths				
Year 12 Maths	Algebraic Expressions, Indices, Surds, Quadratics, Equations and Inequalities, Graphs and Transformations		Coordinate Geometry and Further Algebra (Algebraic Methods and Binomial Expansion)	
Year 12 Further Maths				
Year 13 Maths	Proof (Ch 1) , Further Trigonometry (A2) and Parametric Equations		Differentiation, Numerical Methods and Integration Part 1	
Year 13 Further Maths				

Term 2

	Spring 1	Why this? Why now?	Spring 2	Why this? Why now?
Year 7	**Number**: Fractions as part of a whole, Fractions as an operation	Key knowledge of fractions is developed and applied to other areas.	**Number & Algebra**: Order of Operations, Basic Rules of Algebra, Expand & Factorise, Substitution	Algebra rules follow same order of operations. Understanding of 'language' of algebra to lead into substitution and generalisation of problems. Leads into later work with equations
Year 8	**Geometry**: Units of Measurement, Angles, Circumference	This unit introduces pi as circle ratio Knowledge of angles is developed as a key skill for later geometry work in parallel lines and circles.	**Number**: Proportional Reasoning, Fractions Decimals & Percentages, Ratio	Students develop their ability to recognise different representations of same values. Linking fractions as part of a whole to ratio as part to part of whole.
Year 9	**Number & Algebra**: Notation, Simplifying & Index Laws, Expanding & Factorising, Expressions & Substitution	Students understanding of indices is extended into the index laws. Further application to algebraic expressions is continued.	**Algebra & Geometry**: Linear Equations, Linear Inequalities, Perimeter & Area, Pythagoras	Students build their knowledge from Year 8 equations work, where they revisit and extends this key area
Year 10	**Number & Probability**: Probability (H only – Capture/Recapture), Standard Form, Proportion (H)	Probability covered in depth by students. Key statistical method for predicting and modelling is looked at. Proportion builds on previous numerical work and links with algebra and equations.	**Number**: Simple Interest, Further Ratio, Growth & Decay, Recurring Decimals (H)	Students build on knowledge of ratio and percentages. Percentages builds onto calculator methods.
Year 11 Foundation	**Statistics & Geometry**: Vectors, Similar Shapes, Construction & Loci	Introduction of vectors and their pure maths application. Opportunity to extend knowledge of scale drawings through construction and loci. Similar shapes links to right-angled trig.	*GCSE revision programme – developed to suit the requirements of individual students and classes*	
Year 11 Higher	**Statistics & Geometry**: Further Statistics, Transformations, Congruence, Vectors	Further work in done to develop the knowledge of the statistical elements of the maths curriculum. Introduction of vectors and their pure maths application. This area is developed further at A Level.	**Algebra & Geometry**: Gradients and areas under curves, Kinematics, Graphical Transformations, Construction & Loci	Knowledge of gradients and straight-line graph work is extended and applied to curves. Introduces beginning of gradient function seen at A Level.
Year 12 Core Maths				
Year 12 Maths	Trigonometry and 2D Vectors		Differentiation, Integration and the Applications	
Year 12 Further Maths				
Year 13 Maths	Integration Part 2, **Applied AS Unit 1**			
Year 13 Further Maths				

Term 3

	Summer 1	Why this? Why now?	Summer 2	Why this? Why now?
Year 7	**Geometry**: Angles, Polygons, Symmetry & Reflection, Coordinates	Key area of angles introduced which forms the basis for much of geometry subject area.	**Statistics**: Mean, Two-Way Tables, Venn Diagrams	Venn diagram understanding is developed by students, in preparation for prime factorisation and probability
Year 8	**Geometry & Statistics**: Area of circles and trapezia, Presenting & Interpreting Data, Averages	Knowledge of circumference work and use of pi is extended.	**Geometry**: 3D Visualisation, Volume	Students develop their understanding of 3D shapes leading into volume topic.
Year 9	Geometry: Properties of Shapes, Angle Facts, Parallel Lines, Circles, Volume	Students build on shape work of Y7 and Y8. Extends angle facts and parallel lines work from Y8 as well as revisiting this area. Introduces more circle geometry in preparation for circle theorems and equations at GCSE.	**Geometry & Algebra**: Surface Area, Basic Vectors, Sequences, Plans & Elevations	Students build on area work and links to 3D shape and volume. Plans and elevations extends understanding of 3D visualisation.
Year 10	**Number & Statistics**: Statistics, Surds (H), Bounds (H)	Statistics work looks at representing data in variety of ways and shows the most appropriate for different data sets. Surds are introduced as important concept in working with exact values and avoiding rounding errors.	**Geometry**: Right Angles Trig (H), Similar Shapes (H), Quadratic Sequences (H). *Foundation classes will revise key concepts based on End of Year test data*	Introduces important area of trigonometry. This builds a foundational knowledge to allow further extension in Y11. Extends sequences work to introduce more complex number sequences.
Year 11 Foundation	*GCSE revision programme – developed to suit the requirements of individual students and classes*			
Year 11 Higher	*GCSE revision programme – developed to suit the requirements of individual students and classes*			
Year 12 Core Maths				
Year 12 Maths	Exponentials, Logarithm, Algebraic and Partial Functions **(Proof is taught later),** Functions and Modelling **(A2 Content)**		Sequence and Series, Binomial Theorem 2, 3D Vectors	
Year 12 Further Maths				
Year 13 Maths				
Year 13 Further Maths				