# Mathematics Curriculum Map

---

## Curriculum Intent

The curriculum has been designed to empower children with virtues that enable them to excel academically and spiritually inspiring them to serve humanity selflessly (Nishkam), with an abundance of love, compassion and forgiveness. The curriculum aims to support students to learn about peace, forgiveness, love and faith in the Divine through their academic subjects, faith practice and personal development.

Our curriculum is constructed around our vision to ensure we remain:

**Faith-inspired**: learning from the wisdom of religion
*Our students explore the divine context of humanity and wonder of all creation. They not only learn about, but also learn from, the wisdom of religions and in so doing explore the infinite human potential to do good unconditionally. We support students to develop aspects of their own religious, spiritual or human identities. They learn about serenity through prayer and humility in service and in so doing, they deepen their own respective faith, and respect the common purpose of all religious traditions, as well as respecting the beliefs of those with no faith tradition. They explore the unique divinity of the individual, and our common humanity.*

**Virtues-led**: nurturing compassionate, responsible human beings
*We believe that the fostering of human virtues forms the foundation of all goodness. Our curricula are carefully enriched to allow experiences where our students, teachers and parents alike learn to grow through a conscious focus on virtues. Our virtues-led education approach helps to provide guidance to enable students to understand their choices in order to help lead better lives. Our students become self-reflective and flourish; they are able to build strong, meaningful relationships and understand their responsibilities to the global family and all creation, founded in faith. Students learn to experience faith through lived out through righteous living in thought, action and deed.*

**Aspiring for Excellence**: in all that we do.
*Our students and staff alike aim to become the best human beings they can possibly be, in all aspects of spiritual, social, intellectual and physical life. We foster a school culture which inspires optimism and confidence, hope and determination for all to achieve their best possible. This is accomplished through a rich and challenging curriculum, along with excellent teaching to nurture awe and wonder. Students gain a breadth and depth of knowledge and a love of learning to achieve their full potential.*
The curriculum at Nishkam School West London has been carefully crafted to be broad, balanced and stimulating, giving every Nishkam student the opportunity to be knowledgeable, multi-skilled, highly literate, highly numerate, creative, expressive, compassionate and

confident people.  Knowledge-rich, skills based and Faith-inspired, the Curriculum at Nishkam School West London is delivered through three **Golden Threads** that are unique to our ethos and virtues:

| 1 | Love and forgiveness vs. Enmity and Hate |
|---|---|
| 2 | Peace and Collaboration vs. Conflict and War |
| 3 | Trust in God |

Every composite of our curriculum is constructed of components that have each of these threads at their core.  These elements can be clearly identified in our subject-based curriculum maps and Schemes of Learning documents.

We believe that students deserve a creative and ambitious mathematics curriculum, rich in skills and knowledge, which ignites curiosity and prepares them well for everyday life and future employment. The curriculum is necessarily aspirational, focused on excellence and on securing in all learners a love of learning through the acquisition of knowledge, the study and practice of faith, and an understanding of the world around them. One aspect of the curriculum is the school ethos of the golden threads. Students will learn via collaboration, peace, forgiveness, and love through each unit of work.

Our pedagogy is based on a mastery approach to the teaching of mathematics.  We believe in variation to develop a deep and holistic understanding via procedural fluency and repetition of key facts to free up working memory. The concepts in the curriculum are interleaved to ensure that students revisit previously learnt concepts in order to build new learning upon this.  Within lessons, concepts are broken down into small, connected and structured steps enabling application in a variety of contexts. We will use manipulatives and multiple representations to build and scaffold learning.  Teachers plan intelligent questions into their lessons to check for student understanding and marking of student work informs teachers' planning.  Students develop a growth mindset through our mathematics curriculum enabling them to be resilient when they make mistakes.

## Curriculum Implementation:

At NSWL, students follow the National Curriculum programme of student which ensures that our students cover a wide breadth of mathematical concepts.  The key strands which are covered in our curriculum include:

- Number
- Algebra
- Ratio and Proportion
- Geometry
- Measure
- Probability
- Statistics

Each strand is broken down into key topics which are then separated into a sequence of learning objectives which each class moves through at the correct pace for the students.

The curriculum aims to develop a number of mathematical skills which are based on the GCSE qualification objectives. These skills are to:

1. Develop fluent knowledge, skills and understanding of mathematical methods and concepts
2. Acquire, select and apply mathematical techniques to solve problems
3. Reason mathematically, make deductions and inferences, and draw conclusions
4. Comprehend, interpret and communicate mathematical information in a variety of forms appropriate to the information and context.

Being an all-through school allows for a smoother transition between KS2 to KS3 by collaborating with the primary maths lead and the students to harmonise the primary and secondary curriculum. During KS3 our students' study all these topics each year, in ever-increasing depth and complexity to develop fluency in the fundamentals of mathematics. Repetition and practice help to promote recall and application of knowledge which will be required to access more complex problems in KS4. By ensuring the fundamentals are embedded during KS3 we create a solid platform on which to build in KS4, with a focus on application of content to complex problems.

For those that have not yet mastered the fundamentals there is a continued emphasis on repetition of key concepts and in-depth understanding. However, for the more able students, the scheme of learning is designed so that key concepts are recapped quickly before spending more time exposing students to applied questions to develop depth of understanding and problem-solving techniques. From the schemes of learning, teachers are able to choose the starting point for each unit depending on the needs and the ability of the class. This means that each year students revisit a topic, they start further along the progression through that topic. Class sizes get smaller as you move through the sets in secondary phase to provide the support that is needed for students to reach their target grades.

## **Progression of Knowledge & Skills**

| | Autumn 1 | Autumn 2 | Spring 1 | Spring 2 | Summer 1 | Summer 2 |
|---|---|---|---|---|---|---|
| **EYFS** | Match sort, compare amounts | Positional language | Introducing zero | Making pairs | Building Numbers Beyond 10 | Doubling |
| | Compare size, mass & capacity | Representing numbers to 5 | Comparing numbers to 5 | Length & height | Counting patterns Beyond 10 | Sharing & grouping |
| | | One more, one less | | Time | | Even & Odd |
| | Exploring pattern | | Composition of 4&5 | | | |
| | | Shape with 4 sides | Comparing mass | Counting to 9 & 10 | Spatial reasoning- | Spatial Reasoning – Visualise and build |
| | Representing, comparing, composition 1,2,3 | Time | Comparing capacity | Comparing numbers to 10 | Match, rotate, Manipulate | Deepening understanding |
| | | Circles and triangles | 6,7 & 8 | Bonds to 10 | Adding more | |

| | | | Combing 2 amounts, making pairs | 3D shape pattern<br><br>Spatial awareness<br><br>Patterns | Taking Away<br><br>Spatial reasoning - 2 Compose, decompose | Patterns and relationships<br><br>Spatial Reasoning – Mapping |
|---|---|---|---|---|---|---|
| **Year 1** | Place Value within 10<br><br>Addition and Subtraction within 10 | Addition and Subtraction within 10<br><br>Geometry: Shape | Place Value within 20<br><br>Addition and Subtraction within 20 | Place Value within 50<br><br>Length and Height<br><br>Mass and Volume | Multiplication and Division<br><br>Fractions<br><br>Position and Direction | Place Value within 100<br><br>Money<br><br>Time |
| **Year 2** | Place Value<br><br>Addition and Subtraction | Addition and Subtraction<br>Shape<br> Money<br>Multiplication and Division | Multiplication and Division<br>Length and Height<br><br>Mass, capacity and temperature | Consolidation<br><br>Fractions<br><br>Time | Statistics<br><br>Position and Direction | Consolidation<br>-Number bonds within 10 for calc within 20<br>-Money<br>-2D and 3D shapes<br>-Adding and Subtracting on a number line |
| **Year 3** | Place Value<br><br>Addition and Subtraction | Addition and Subtraction<br><br>Multiplication and Division | Multiplication and Division<br><br>Length and Perimeter | Fractions<br><br>Mass and Capacity | Fractions<br><br>Money<br><br>Time | Time cont.<br><br>Shape<br><br>Statistics |
| **Year 4** | Place Value<br><br>Addition and Subtraction | Area<br><br>Multiplication and Division | Multiplication and Division<br><br>Length and Perimeter | Fractions<br><br>Decimals A | Decimals<br><br>Money<br><br>Time | Shape<br><br>Statistics<br><br>Position and Direction |

| Year 5 | Place Value<br><br>Addition and Subtraction | Multiplication and Division<br><br>Fractions | Multiplication and Division<br><br>Fractions | Decimals and Percentages<br><br>Perimeter and Area<br><br>Statistics | Shape<br><br>Position and Direction<br><br>Decimals | Decimals cont.<br><br>Negative Numbers<br><br>Converting Units<br><br>Volume |
|---|---|---|---|---|---|---|
| Year 6 | Place Value<br><br>Addition, Subtraction, Multiplication and Division | Fractions<br><br>Fractions<br><br>Converting Units | Ratio<br><br>Algebra<br><br>Decimals | Fractions, Decimals and Percentages<br><br>Area, perimeter and volume<br><br>Statistics | Shape<br><br>Position and Direction | Trust Project<br><br>Enterprise – Fiver Challenge<br><br>Secondary transition unit (Algebra and calculator work) |
| Year 7 | Students will build on their understanding of the basics of displaying data to have a smooth transition into the secondary phase. Thereafter the students will go into the foundation of number.<br>• Two Way tables<br>• Averages and Range<br>• Grouped data<br>• Factors and Multiples<br>• Negative Numbers<br>• Multiplying and Dividing<br>• Powers and Roots | Students will build on and develop their algebra skills that have been taught in KS2. The number skills will be delved into further while going into fractions with applied questions.<br><br>• Write and Simplifying Algebraic Expressions<br>• Formulae<br>• Factorisation<br>• Fractions | Using the algebra skills and number skills taught the students will go into geometry. They can apply their skills and notations to build in geometric problems<br><br>• Angles on Parallel Lines<br>• Triangles<br>• Quadrilaterals<br>• Polygons | Students will build on their algebra skills and number skills when delving deeply into decimals and equations. They will learn how to use these principles with real life concepts.<br><br>• Decimals<br>• Equations<br>• Expanding Double Brackets<br>• Quadratic Factorisation<br>• Solving Quadratics | Ratios and proportions are essential to building reasoning skills. The students will use what they have learnt to apply ratios and proportion in worded problems. These problems can also be used geometrically when going through shapes.<br><br>• Ratios<br>• Proportion<br>• Area and Perimeter of 2D shapes<br>• Surface Area<br>• Volume | The students will use what they have learnt from algebra and number skills to draw graphs and see patterns in sequences.<br><br>• Sequences<br>• Coordinates<br>• Line Segments<br>• Graphs<br>• Plotting Quadratics and cubic graph<br>• Calculator work |

| 8 | We are revisiting Algebra from Year 7 and some number work to build fluency and greater depth in number and algebra<br><br>• Prime Factor Decomposition<br><br>• Indices<br><br>• Estimat at | The students will delve deeply into geometry to push their understanding and build problem solving skills.<br><br>• Plans and Elevation<br>• Surface Area<br>• Volume<br>• Circles<br>• Pythagoras Theorem<br>• Direct Proportion<br>• Distance Time Graphs | Using what they have learnt last term and in Year 7, the students will extend their geometry skills by learning about transformation.<br><br>• Reflection<br>• Rotation<br>• Translation<br>• Enlargement | Problem solving and complex questions in decimals and percentages will allow students to develop the more sophisticated skills needed to use number skills and algebra in tandem. Students will practise using mathematical equipment such as a compass while working with geometric problems.<br><br>• Recurring Decimals<br>• Percentages<br>• Construction<br>• Loci | Students will get introduced to complex ideas such as probability and similar shapes. This can deepen their number skills and work on geometric worded problems.<br><br>• Calculating Probabilities<br>• Experimental Probabilities<br>• Tree Diagrams<br>• Sample Space<br>• Venn Diagrams<br>• Scales<br>• Bearings<br>• Congruency<br>• Similar Shapes | We will work on graphs, by studying straight line graphs in depth. We will go in depth by going into real life graphs as well as seeing the complexities of graphs.<br><br>• Linear Graphs<br>• Y=MX+C<br>• Parallel and Perpendicular Lines<br>• Inverse Functions |
|---|---|---|---|---|---|---|

| | | | | | |
|---|---|---|---|---|---|
| | in g<br>• Si m pli fyi n g ex pr es si o ns<br>• Ex p a n di n g a n d Fa ct ori sin g<br>• Su bs tit uti o n a n d So lvi n g | | | | |

| 9 Higher | Year 9 is a foundation bridging year between KS3 and KS4. We begin with deepening students' understanding of different representations of number, including standard form and surds.<br><br>• LCM and HCF<br>• Indices<br>• St and d | We revisit algebra however, the focus is on the application of algebraic skills to more complex contexts such as functions and rearranging formulae. In addition, students begin to explore the concept of proof, which is essential when studying maths to a higher level.<br><br>• Expanding and Factorising<br>• Formulae<br>• Equations<br>• Sequences | We further develop students' analytical skills through the study of averages and representing data. They become adept at interpreting graphs and statistics from real-world scenarios and can critically evaluate data and draw conclusions.<br><br>• Stem and leaf Diagrams<br>• Two-way Tables<br>• Scatter Graphs<br>• Averages | We begin with deepening students' understanding of different representations of number, including fraction, decimal and percentages. We also look at real-life applications of number to further enhance their understanding.<br><br>• Fraction<br>• Percentages<br>• Decimals<br>• Ratios<br>• Proportion | We start this term by revisiting geometry topics and deepening the understanding from KS3. We will go into new concepts such as trigonometry to deepen the understanding of geometry<br><br>• Angle Properties<br>• Polygons<br>• Pythagoras Theorem<br>• Trigonometry | We will work on graphs, by studying straight line graphs in depth. We will go in depth by going into real life graphs as well as seeing the complexities of graphs.<br><br>• Linear Graphs<br>• Real Life Graphs<br>• Quadratic Graphs<br>• Reciprocal Graphs<br>• Cubic Graphs |
|---|---|---|---|---|---|---|

| | | | | | | |
|---|---|---|---|---|---|---|
| | ard Form<br><br>• Surds | | | | | |
| **9 Foundation** | Year 9 is a foundation bridging year between KS3 and KS4. We begin with deepening students' understanding of different representations of number.<br><br>• Factors and Multiples | We revist algebra; however, the focus is on the application of algebraic skills to more complex contexts such as functions and rearranging formulae.<br><br>• Algebraic Expressions<br>• Substitution<br>• Formulae<br>• Brackets<br>• Factorising | We further develop students' analytical skills through the study of averages and representing data. They become adept at interpreting graphs and statistics from real-world scenarios and can critically evaluate data and draw conclusions.<br><br>• Two-way tables<br>• Stem and leaf diagrams<br>• Scatter graphs | We begin with deepening students' understanding of different representations of number, including fraction, decimal and percentages. We also look at real-life applications of number to further enhance their understanding.<br><br>• Fraction<br>• Decimals<br>• Percentages | We focus on applying the key algebra skills recapped in Y7 in more complex contexts such as consolidating their understanding of equations through studying sequences<br><br>• Equations<br>• Inequalities<br>• Sequences | We end this term by revisiting geometry topics and deepening the understanding from KS3.<br><br>• Angles on parallel lines<br>• Angles in triangles<br>• Polygons |

| | | | | | |
|---|---|---|---|---|---|
| | • Sq u ar e, c u b es , a n d ro ot s<br>• In d ex n ot at io n<br>• Pri m e Fa ct or s | | | | |
| **10 Higher** | Students begin the GCSE course. We start the year by revisiting angle facts and | We revisit the topics studied at the end of Year 8 by going through transformations. In addition, we will start working with a compass again to complete construction and loci.<br><br>• Rotation<br>• Translation<br>• Reflection<br>• Enlargement | We focus on applying the key algebra skills recapped in half term 1 to more complex contexts such as consolidating their understanding of equations through | The focus of this half term is applying the number skills developed so far to real-life contexts through the topics of compound measures. We will also finish the unit of | This half term we will start to apply them to more complex situations, building on the 3D work that was introduced last half term for example by studying similarity in 3D objects. In addition, we will go | Students' data skills are honed further by revisiting topics first met in Year 7 and recapping them, before extending them to more complex situations such as histograms |

| | | | | | |
|---|---|---|---|---|---|
| | develop a greater understanding of circles. In addition, we continue to make links between algebra and geometry by tackling more complex geometric problems on 3D shapes.<br><br>• Circles, Arcs Lengths and Sectors<br>• Vol | • Construction<br>• Loci | studying sequences. These topics are studied in greater depth than in Year 9 to ensure students develop a strong understanding and begin to form links between the algebra topics covered thus far. In addition, we will revisit probability to merge the two concepts together.<br><br>• Simultaneous Equations<br>• Inequalities<br>• Quadratic Factorisation<br>• Completing the Square<br>• Mutually Exclusive Events<br>• Experimental Probability | probability.<br><br>• Independent Events<br>• Conditional Probability<br>• Venn Diagrams and Set Notation<br>• Growth and Decay<br>• Ratio and Proportion<br>• Compound Measures | through complex trigonometry. This concept will be delved into real life problems.<br><br>• Congruence<br>• Similar Shapes<br>• Trigonometry Graphs<br>• Sine Rule<br>• Cosine Rule<br>• Transformation of trigonometry graphs | and cumulative frequency graphs.<br><br>Thereafter the students will go further into graphs by going through algebraic graphs such as inequality regions.<br><br>• Cumulative Frequency<br>• Box Plots<br>• Histograms<br>• Simultaneous Equations Graphically<br>• Inequalities Graphically<br>• Cubic Graphs<br>• Solving Quadratic Graphs |

| | | | | | |
|---|---|---|---|---|---|
| | ume of Cylinder, Cones, Pyramids and Spheres | | | | |
| **10 Foundation** | Students begin the GCSE course. We start the year by revisiting averages. In addition, we | We will work on graphs, by studying straight line graphs in depth. We will go in depth by going into real life graphs as well as seeing the complexities of graphs.<br><br>• Linear Graphs<br>• Real Life Graphs<br>• Y=MX+C | We revisit the topics studied at the end of Year 8 by going through transformations.<br><br>In addition, the students will do real life complex questions on ratio and proportion | The focus of this half term is applying the number skills developed so far to real-life contexts through the topics of compound measures. We will also finish the unit of probability. | At the beginning of this half-term, we re-visit geometry, this time specifically looking at right-angled triangles and the topics of Pythagoras' Theorem and trigonometry.<br><br>We will also revisit working with a | At the end of this time the students will go through an in-depth look at ratio and proportion. They will also attempt the higher end of the foundation content of algebra to push their abstract thinking. |

| | | | | | |
|---|---|---|---|---|---|
| | continue to make links between algebra and geometry by tackling more complex geometric problems on 3D shapes.<br><br>• Mean<br>• Median<br>• Mode<br>• Range<br>• Sampling<br>• Are<br>e | | • Rotation<br>• Translation<br>• Reflection<br>• Enlargement<br>• Ratio<br>• Proportion | • Calculating probability<br>• Experimental Probability<br>• Venn Diagrams<br>• Tree Diagrams | compass again to complete construction and loci.<br><br>• Pythagoras Theorem<br>• Trigonometry<br><br>• Plans and Elevations<br>• Constructions<br>• Loci | • Growth and Decay<br>• Compound Measures<br>• Direct and Indirect Proportion<br>• Expanding 2 brackets<br>• Quadratic Graphs<br>• Factorising Quadratics |

| | | | | | |
|---|---|---|---|---|---|
| | a of shapes<br>• Perimeter of shapes<br>• Volume of Prisms | | | | |
| **11 Higher** | We start linking back to geometry and revisit angle facts through circle theorems. We will link fractions with algebra | We will further hone students' application and problem-solving skills through the study of complex coordinate geometry problems involving straight lines and circles. Students also further develop their proof and deduction skills through the study of vectors and congruent triangles. In addition, we will complete complex questions to complete the GCSE curriculum,<br><br>• Vector Notation<br>• Vector Arithmetic<br>• Parallel Vectors | The top set will study an extra qualification (AQA Level 2 Further Mathematics). This will be completed in lessons and the students will have the option to take this qualification. This qualification will bridge the gap between GCSE and A-Levels.<br><br>The other classes will recap and address | The top set will study an extra qualification (AQA Level 2 Further Mathematics). This will be completed in lessons and the students will have the option to take this qualification. This qualification will bridge the gap between GCSE and A-Levels.<br><br>The other classes will recap and address | The top set will study an extra qualification (AQA Level 2 Further Mathematics). This will be completed in lessons and the students will have the option to take this qualification. This qualification will bridge the gap between GCSE and A-Levels.<br><br>The other classes will recap and address | The top set will study an extra qualification (AQA Level 2 Further Mathematics). This will be completed in lessons and the students will have the option to take this qualification. This qualification will bridge the gap between GCSE and A-Levels.<br><br>The other classes will recap and address |

| | by going through the concept of algebraic fractions to strength their number skills and algebraic skills. <ul><li>Radii and Chords</li><li>Tangents</li><li>Angles in Circles</li><li>Ap</li></ul> | <ul><li>Solving vectors in geometric problems</li><li>Direct Proportion</li><li>Indirect Proportion</li><li>Exponential Functions</li><li>Transformation of Graphs</li></ul> | misconceptions from the specification through high class quality teaching, addressing misconceptions, feedback and regular assessments. This will prepare them for the GCSE. | misconceptions from the specification through high class quality teaching, addressing misconceptions, feedback and regular assessments. This will prepare them for the GCSE. | misconceptions from the specification through high class quality teaching, addressing misconceptions, feedback and regular assessments. This will prepare them for the GCSE.<br><br>Examination Period | misconceptions from the specification through high class quality teaching, addressing misconceptions, feedback and regular assessments. This will prepare them for the GCSE.<br><br>Examination Period |
|---|---|---|---|---|---|---|

| | | | | | | |
|---|---|---|---|---|---|---|
| | plying Circle Theorems<br><br>- Algebraic Fractions | | | | | |
| **11 Foundation** | We start the year by revisiting angle facts and develop a greater understanding of circles. In addition, | This half term we will start to apply them to more complex situations, building on the 3D work that was introduced last half term for example by studying similarity in 3D objects<br><br>- Similar Shapes<br>- Congruence<br>- Vectors<br>- Cubic, Reciprocal, and non-linear Graphs | The class will recap and address misconceptions from the specification through high class quality teaching, addressing misconceptions, feedback and regular assessments. This will prepare them for the GCSE. | The class will recap and address misconceptions from the specification through high class quality teaching, addressing misconceptions, feedback and regular assessments. This will prepare them for the GCSE. | The class will recap and address misconceptions from the specification through high class quality teaching, addressing misconceptions, feedback and regular assessments. This will prepare them for the GCSE. | The class will recap and address misconceptions from the specification through high class quality teaching, addressing misconceptions, feedback and regular assessments. This will prepare them for the GCSE. |

| | | | | | Examination Period | Examination Period |
|---|---|---|---|---|---|---|
| | we continue to make links between algebra and geometry by tackling more complex geometric problems on 3D shapes.<br><br>• Circles<br>• 2D Shapes<br>• Cylinders, Cones, Pyramid | • Simultaneous equations<br>• Formulae<br>• Proof | | | | |

| | | | | | |
|---|---|---|---|---|---|
| | a n d Sp h er es<br>• Fr a cti o ns<br>• In di c es<br>• St a n d ar d Fo r m | | | | |
| **Year 11 Further Mathematics** | | | The top set students will start the Further Mathematics course. Students will complete a pre-requisite booklet for Further Mathematics. The students will complete this during the Christmas break, and they will do an exam during the first week back (First or Second week of January) | The top set students will start the Further Mathematics course. The student will delve deeper into trigonometry by looking into 3D planes. The students will be introduced to integration differentiation and Matrices which is delved deeper at A-Level Mathematics and Further Mathematics | Revision for GCSE Maths and GCSE Further Mathematics | Examination |

| | | | | | | |
|---|---|---|---|---|---|---|
| | | | - Equating Coefficients<br>- Binomial Expansion<br>- Factor Theorem<br>- Sequences and limiting values in sequences<br>- Simultaneous equations with 3 unknowns<br>- Coordinate Geometry<br>- **Circle Theorem**<br>- **Trigonometry** | - Sine and Cosine rule<br>- 3D trigonometry<br>- Calculus<br>- Matrices | | |
| **Year 12 A Level Mathematics** | We start the year by revisiting algebra and developing the applied aspects of mathematics. Thereafter looking at algebraic methods at a deeper level.<br>- Al g | This half term we will start to look at geometry and how it links to algebra. We will also develop the statistics and mechanics' content.<br>- Coordinate geometry in the (x,y) plane<br>- Further Algebra<br>- Data presentation and interpretation<br>- Kinematics | This half term we will start to look at vectors and how it links to algebra. We will also develop the statistics and mechanics content by introducing certain formulas such as newtons laws.<br><br>- Vectors (2D)<br>- Probability<br>- Statistical Distributions<br>- Forces and Newtons Laws<br>- Trigonometry | This half term we will start to look at calculus and how it links to graphs. We will also develop the statistics and mechanics content by going deeper into newtons Laws.<br><br>- Integration<br>- Statistical Hypothesis Testing<br>- Forces and Newton's law<br>- Differentiation | This half term we will start to look at index laws and how it links to graphs. We will also introduce large concepts such as kinematics and hypothesis testing. This will be introduced and brought in next year to really delve to how to links to other topics. Here the students will do a KAT which assess the students' content in understanding the basis of year 13 Mathematics<br><br>- Exponentials and Logarithms | Trigonometry is the main factor in terms of understanding year 13 core. We will study this topic in depth to show how the topics taught link to year 13.<br>- Trigonometry (A2) |

| | | | | | |
|---|---|---|---|---|---|
| | ebra and Functions<br>• Statistical Sampling<br>• Data presentation and interpretation | | | | • Statistical Hypothesis Testing<br>• Kinematics (Variable Acceleration) | |

| | | | | | | |
|---|---|---|---|---|---|---|
| | • Quantities and units in mechanics<br>• Kinematics | | | | | |
| **Year 12 A Level Further Mathematics** | We start the year by revisiting algebra and developing the applied aspects of | This half term we go deeper in the core content as well as going through the basic modelling of statistics.<br><br>• Matrices<br>• Complex Numbers<br>• Discrete probability distributions<br>• Linear Regression<br>• | This half term the students will look at the core syllabus. This work will extend their knowledge on the sequences and series learnt in A-Level as well as the Calculus.<br><br>• Series<br>• Algebra and Functions | This half term will look at extending knowledge on GCSE vectors as well as looking at different statistical models<br>• Vectors<br>• Poisson and Binomial Distributions<br>• Chi Squared Test | This half term we continue in learning the mathematical models as well as extending knowledge in terms of integration and differentiation<br>• Calculus<br>• Chi Squared Test<br>• Correlation | This half term we start the Year 2 content with complex numbers and more statistical models.<br>• Complex Numbers (A2)<br>• Geometric and negative binomial distribution |

| | | | | | |
|---|---|---|---|---|---|
| | mathematics. The students will work through statistics as their applied section of the course.<br>• Complex Numbers<br>• Matrices<br>• Poisson and Binomial Distr | | • Proof<br>• Poisson and Binomial Distribution<br>• Continuous Distributions | • Continuous Distributions<br>• Kinematics | | • Combinations of random variables<br>• |

| | | | | | |
|---|---|---|---|---|---|
| | ib uti o n <br> • C or rel at io n | | | | |
| **Year 13 A Level** | We start the year by using what we go into a topic which allows them to ease themselv es back into school with partial fractions. Thereafte r they will go into Proofs. This is a different style of questions which students find hard. Students need to | This half term will concentrate on sequences. The students will go deeper in what they have learnt from GCSE probability. <br> • Series and sequences <br> • The Binomial Theorem <br> • Parametric Equations <br> • Probability <br> • Forces at any angle | We start the year by revisiting algebra and developing the applied aspects of mathematics. Thereafter looking at algebraic methods at a deeper level. <br> • Differentiation <br> • Numerical Methods – Trapezium Rule <br> • The normal Distribution <br> • Application of Kinematics <br> • | We start the year by revisiting algebra and developing the applied aspects of mathematics. Thereafter looking at algebraic methods at a deeper level. <br> • Integration <br> • Normal Distribution <br> • Application of Forces | This half term will go into vectors on a 3D plane. The students will finish understanding the model of normal distribution. Students will also delve deeper into kinematics to complete the A-Level course. <br> • Vectors (3D) <br> • The normal Distribution <br> • Further Kinematics | Examination |

| | get used to the exam technique. The students will investigate applied concepts that go deeper in the mechanics and delve more in understanding Scatter graphs from GCSE<br><br>• Proof<br>• Algebraic and Partial Fra | | | | |
|---|---|---|---|---|---|

| | | | | | |
|---|---|---|---|---|---|
| | ctions<br>• Functions and Modelling<br>• Regression and Correlation<br>• Moments | | | | |

| Year 13 A Level Further Mathematics | We start the year by learning new core concepts as well as introducing the links between Year 12 A- Level Mathematics and A-Level Further Mathematics. The applied section will investigate confidence levels.<br><br>• Hyperbolic Functions<br>• Polar | This half term will continue with the core component learnt in the previous half terms. The applied section will go through the Year 12 content into a deeper level.<br>• Polar Coordinates<br>• Further Algebra and Functions<br>• Chi Squared Tests<br>• Probability Generating Functions<br>• Estimation confidence intervals and tests using Normal Distribution | This half term the differentiation and integration will continue and link to differential equations. The applied section will continue with the concept of confidence levels.<br>• Further Calculus<br>• Differential Equations<br>• Quality of Tests and Estimators<br>• Confidence intervals and tests using the t-distributions | This half term differentiation and integration will come be completed to use within differential equations next half term. The applied section will continue with the concept of confidence levels.<br>• Further Calculus<br>• Probability Generating Functions<br>• Confidence intervals and tests using the t-distributions | This half term we consolidate the course as well as finishing the last few topics as stated below. A lot of the time during this half term will be revision.<br>• Differential Equations<br>• Quality of Test and Estimators<br>• Other Hypothesis tests and confidence intervals. | Examination |
|---|---|---|---|---|---|---|

| | | | | | |
|---|---|---|---|---|---|
| | Coordinates<br><br>- Hypothesis Testing<br>- Central Limit Theorem<br>- Estimation, confide | | | | |

| | nce intervals and tests using Normal Distributions | | | | |
|---|---|---|---|---|---|

**Year 6 to 7 Transition**
Throughout the year, there is ongoing collaboration between the Maths Lead in the primary phase and the Curriculum Leader of Maths in the secondary phase. Joint learning walks and book looks are carried out. There are opportunities for cross-phase leaders to spend time in classrooms and teach cross-phase. The cross-phase team ensure that the transition is seamless and that the secondary teachers are provided with a range of information from the Primary classroom.

The transition program from year 6 to 7 involves focusing on the use of calculators and negative numbers, which have been identified as key skills. The Curriculum Leader of Secondary Maths works closely with the Primary Maths Lead to develop a bespoke scheme of learning to ensure that pupils have the skills and knowledge required when moving into year 7. Secondary maths routines such as classroom expectations and homework requirements are shared with the year 6 teachers so they can prepare pupils for the transition.

The Curriculum Leader of Secondary Maths and the Head of Key Stage 3 lead meet with the Primary Assessment Lead to understand the end of key stage 2 data and have access to data overviews via insight tracker. This provides an in-detail component by component review for each student. This allows the curriculum to be altered to the students' needs. The Year 6 teachers provide handover notes about the students to provide a more holistic outlook of the student in mathematics to personalise their learning and to promote engagement around maths.

GL assessments are conducted in the beginning of Year 7. This is an accurate baseline to ensure the best starting point for each student to inform curriculum planning and teaching and learning. Every cohort is different so the data from assessments will inform decisions on what key topics to address during the year and use this as our base for retrieval practice.

**<u>Enrichment Opportunities:</u>**

Students in the Primary Phase take part in several extra-curricular opportunities. These include NSPCC Number Day, the National Young Mathematicians' Award (UKS2), National Numeracy Day, Young Enterprise Fiver Challenge, First Mathematics Challenge (LKS2) and the Primary Mathematics Challenge.

We also offer a Chess club to our students providing them with the opportunity to learn how to play the game, and to play games against each other. We have created Maths inter form challenges and internal chess competitions. Chess can help you to think ahead, not rush your decisions, and weigh the pluses and minuses of your choices. This correlates to challenges we face in everyday life, and just as in chess, we try to make the best choices to develop positive outcomes for our lives. This club is open to all students in all year groups and is undertaken weekly at lunchtime.

The Secondary Phase run a range of enriching activities in and out of the classroom. In the classroom, students can learn about enriching mathematical topics and activities through the exploration of concepts. All students will complete various examples from non-worded to worded questions as well as non-algebraic to algebraic questions. All students in KS3 and KS4 will be stretched by having an in depth investigates concepts taught. For example, in Key Stage 3, students will learn about powers and roots and apply it the fractional and negative indices. In Key Stage 4, students will learn about indices and use that knowledge to complete the inverse function; logarithms. All students will also go through an array of worded problems and algebraic problems to logically think through solutions using what they have explored.

There are a wide range of extra-curricular clubs which are run in the Mathematics department. All students are encouraged to attend to help promote and develop a love of mathematics and problem solving in our students.  UKMT is hugely popular across all year groups in both the individual and teams' challenges, and many of our students have been awarded bronze, silver and gold certificates, some even progressing to the Kangaroo and Olympiad rounds. The whole of year 7 will undertake the challenge as well as we top bands of year 8,9, 10 and 11.

To help the students develop the love for Mathematics we have dedicated a club to the Junior Mathematics Challenge (JMC) and the Senior Mathematics Challenge (SMC) to allows students to think beyond the curriculum and ask questions about Mathematics that promotes the goldens threads; collaboration and love. This club is undertaken weekly and the highest attaining students in mathematics partake in this club.

We have embedded cross curricular links with computing and science by creating STEM lessons. The STEM lessons can help students delve into real world problem using maths and science. These links align with the virtues of the school to build the students' intellectual curiosity. These lessons happen at the end of the term and are built into the curriculum so that all year groups can undertake a STEM activity.

The mathematics department created standalone lessons to promote all the golden threads (peace, collaboration, love and forgiveness) as well as commemorating black history. Students delve into the story behind the book by Margot Lee Shetterly, Hidden Figures. The students will delve into the cold war and how mathematics was used during this time to help the United States of America compete in the space race. The students will undertake activities in understanding some of the mathematical terminology used in the movie for example prime numbers and tessellation. The students will learn about the roles of the main characters which will promote the type of careers you can achieve following mathematical pathway. The students will delve into how graphs are used in real life and how it is used in the Key Stage Three and GCSE curriculum.

At the end of year 11, the top set class will have the opportunity to study two extra maths qualifications, Further Maths GCSE and Additional Maths FSMQ.  It offers the opportunity for stretch and challenge that builds on the Key Stage 4 curriculum and is intended as an additional qualification to the GCSE Mathematics, rather than as a replacement. The content assumes prior knowledge of the Key Stage 4 Programme of Study and covers the areas of algebra and geometry, which are crucial to further study in the subject, in greater depth and breadth. This qualification places an emphasis on higher order technical proficiency, rigorous argument and problem-solving skills. It also introduces calculus and matrices and develops further skills in trigonometry, functions and graphs. As a result, it bridges the gap between GCSE Mathematics and A-Level Mathematics.

The curriculum is intertwined to link with careers. The curriculum has small career related activities or teacher points that teachers can refer to in the lesson. Students will have thought provoking themes and that can be researched at home if they want to know more about those careers. The discussions and culture within the classrooms mean students independently probe into their future by seeing how these concepts practically come into a workplace.

**Curriculum Impact:**

Students will know more, remember more and understand more about the curriculum. Students retain prior-learning and explicitly make connections between what they have previously learned and what they are currently learning.

Students understand the relevance and importance of what they are learning in relation to real world concepts. Students know that maths is a vital life skill that they will rely on in many areas of their daily life. Students have a positive view of maths due to learning in an environment where maths is promoted as being an exciting and enjoyable subject in which they can investigate and ask questions; they know that it is reasonable to make mistakes because this can strengthen their learning through the journey to finding an answer.

Formative assessment is an integral part of our approach to Teaching and Learning. Over the course of their study, we will use weekly cumulative formative diagnostic assessments (in class or for homework) to ensure that students are consistently retrieving their knowledge of different components. The purpose of this is to ensure all knowledge is retained (and any gaps are identified and addressed promptly) and to inform teachers' planning. Using this style of assessment, we will make use of the advantages of spaced practice as well as allowing students to be able to apply their knowledge to a wide variety of contexts.

Students will also sit a summative assessment every full term. This assessment will be cumulative and will assess not only what the students have learned over the previous term, but also their understanding of all relevant material previously taught. Staff are supported to mark these accurately and post assessment moderation also takes place to ensure the validity of the data. All data is analysed centrally (not by teachers) and each Curriculum Leader is given a report outlining the areas of strength and weakness. Curriculum Leaders use this information to inform future planning, support with additional interventions and set changes.

Students are confident to 'have a go' and choose the equipment they need to help them to learn along with the strategies they think are best suited to each problem. Our students have a good understanding of their strengths and targets for development in mathematics and what they need to do to improve. Our books evidence work of a high standard of which students clearly take pride; the components of the teaching sequences demonstrate good coverage of fluency, reasoning and problem solving. Our feedback and interventions support students to strive to be the best mathematicians they can be, ensuring a high proportion of students are achieving above national average outcomes at the end of each phase.