KINGSBURY GREEN ACADEMY

Mathematics

Intent

Mathematics equips all students with essential numeracy, skills and knowledge to enable them to understand, describe and explain the world they live in. Our curriculum is broad and coherent across year groups, and deliberately sequenced to ensure all students can build their mathematical knowledge base. This enhances their cultural capital and enables them to access further opportunities whilst removing barriers to learning.

Implementation

	Year 7	**Year 8**	Year 9	**Year 10**	Year 11	Year 12	Year 13
Knowledge	The National Curriculum for Mathematics is delivered across KS3 and KS4 continually revisiting key skills whilst gradually increasing the level of application to achieve mastery. Topics are themed each term but are also mixed between number, algebra, geometry and measures, ratio and proportion, statistics and probability to maximise opportunities to make links between topics and revisit key skills. Students will advance each year through the topics whilst revisiting previous topics that have not been shown to be mastered. *Term 1*: Place Value, Basic Number, Negative Numbers, Calculator skills, Time, Types of number, Decimals, Indices, Basic algebra**, Inequalities, Rounding and estimation,** Standard Form, Rounding errors and limits, **Set up and solve equations, Proof,** Surds, Completing the Square, Graphing inequalities, **Formulae, Rearranging formulae**, *Terms 2 & 3*:, Arithmetic, Rates of change, Area under a curve, Iteration, Functions, Vectors, Solving equations, Probability, Arithmetic with Fractions, Venn diagrams, Time Basic Percentages, Converting between fractions/decimals/percentages, Fractions of amounts, Ratio, Percentage change, Trigonometry, **Sine and Cosine Rule,** , Similar shapes with lengths, **Converting recurring decimals to fractions** *Term 4*:, Area and Perimeter, Measuring angles, Substitution, Construction, Loci. Symmetry, Transformations, Negative enlargement, Properties of shape, **Volume of prisms, Surface Area of prisms, Factorising,** Volume and Surface area of all shapes, Pythagoras, **Cones and spheres** *Term 5/6*: Co-ordinates, Types of sequences, Angles in shapes, Ratio, Proportion, Similar shapes with lengths, **Fractional enlargement, solving equations with unknowns on both sides, Nth term, Angles in parallel lines**, Simultaneous equations, Quadratics, Similar shapes with area/volume, Averages, Types of Data, Stem and Leaf, Interpreting and Presenting Data, **Scatter Graphs, Sampling,** Averages from a table, Box plots, Cumulative Frequency, **Growth and Decay,** Direct and indirect proportion, Angles in polygons, **Factorise quadratics, perpendicular lines, Quadratic simultaneous equations.** In KS4, the Maths topics have been sequenced to provide a secure foundation of learning in terms 1-2 before teaching the GCSE Statistics course in terms 3-5 of Year 10. In doing this we have considered required prior knowledge for the GCSE Statistics and made sure these topics are covered in terms 1-2. **Examples of progression and sequencing:** In Term 1 Year 7, the number system is taught using examples from area and perimeter to apply number skills. The important study of area and perimeter is then revisited in Term 4 before advancing to more challenging shapes and then surface area in Year 8 and pyramids/spheres in Year 10. Another example of application from Term 2 includes teaching fractions alongside the teaching of probability, advancing to tree diagrams in Year 9 and more conditional examples in Year 10.				Further algebra skills, introduction to calculus, further statistics and introduction to mechanics. Real life applications (Core Maths) Examples of progression from GCSE: Core Maths - GCSE percentages progressing to discussions around Tax, student loans and mortgages A Level maths - Quadratics extended to higher order polynomials, discriminant introduced. Calculus introduced Further Maths - Use of matrices for transformations. Complex numbers to solve quadratics with no real solutions.	Further calculus, further trigonometry, further statistics and mechanics Real life applications (Core Maths) Examples of progression from Year 12: Core Maths - Introducing statistical techniques such as normal distributions A Level - Calculus developed e.g. quotient rule. Partial fractions taught at start of year to facilitate later integration Further maths - Links made with A-Level course, careful sequencing to ensure required Calculus/Trig is in place before hyperbolic functions, MacLaurin series.
Recurring skills/themes	Mastery of key numeracy skills. Development of mathematical knowledge, language and skills with fluency, reasoning and problem solving. Pupils start in Year 7 building foundations especially in number. Then in Year 8 our spiral curriculum reinforces these topics whilst developing fluency and reasoning with more algebra in particular being introduced. In Year 9 we deepen understanding of Year 7 and Year 8 whilst adding in more complex topics such as standard form, Pythagoras and an increase in the level of problem solving. The sequencing and progression of topics through KS3 and KS4 allow for gaps in knowledge to be addressed post COVID.			Development of mathematical knowledge, language and skills that can be applied to solve problems. Our curriculum builds on the KS3 model giving students the opportunity to develop, strengthen and master core concepts in Number, Ratio, Algebra, Geometry, Data and Probability. We then add in the Additional content from the NC where appropriate, such as completing the square, sine rule, surds for those entering higher tier maths.		Concept of mathematical proof. Applying mathematical tools in different contexts. Core Maths is applying Level 2 skills in a Level 3 real –life context with a strong focus on percentages and the use of data. A-Level Maths largely builds on the Additional content from KS4 and introduces topics such as calculus. A-Level Further Maths supplements A-Level Maths whilst introducing topics such as matrices and complex numbers.	
Personal Development	UKMT Maths challenge T4 (All): % change – introduce loans/bank accounts T4 (All) – Ratio and proportion – look at recipes/cooking T5 (Y7): Pie charts – look at real data (e.g. voting) T5 (Y8) : Sampling (look at real examples) T4 (Y9) – Loci – look at mobile phone networks.			UKMT Maths challenge AMSP Y10 Maths Feast Opportunity to study GCSE Further Maths as enrichment. GCSE statistics studied in terms 3 to 5	UKMT Maths challenge Opportunity to study GCSE Further Maths as enrichment. Exam skills specifically addressed with the use of weekly practice papers used for homework and period 6 lessons for Year 11s	Resilience, logical thought, systematic working, problem solving. Core Maths covers real life applications of Mathematics (e.g. loans, mortgages, Tax, NI).	
Assessment	At the end of the term pupils sit assessments in order to measure progress, identify strengths and areas for development. Assessments are split between core, support and challenge. All classes will sit the core paper and also one of the support, additional core or challenge paper. Year 9 pupils will sit a more formal synoptic assessment in term 3, with Years 7 & 8 completing their synoptic assessment in the summer term.			Y10 Assessment model same as KS3 with end of term assessments and a more formal end of year assessment. KS4 has tiers of entry. Statistics – Mock paper completed prior to actual GCSE in term 5.	Term 1 assessment. Then two formal mock windows using full GCSE papers.	Chapter assessments. Y12 end of year assessment using AS papers.	Chapter assessments. Y13 mock windows using A level papers.

Impact

Students develop numeracy skills to allow them to succeed in adult life. Our curriculum, assessment and intent is to ensure students are given opportunities to access the full curriculum. This is measured through assessments as well as evidence of progress through demonstrates and DIRT tasks and engaged students in lessons. Assessments are separated into support/core/gold and percentages reported to students on each of these to support motivation and mental health.	Students develop skills to allow them to succeed in adult life by teaching them financial responsibility . They also achieve the necessary GCSE grades to allow them to access further education and improve their life chances.	A-Level students equipped to move onto Further study in related subjects. Core Maths supports other subjects and helps students be prepared for real world situations (e.g. loans, mortgages, budgeting).