Mathematics

"At King's Oak Academy, we want all children to believe that they are a mathematician".

Mathematics Curriculum Intent

Subject Intent:

At King's Oak, we want all children to believe that they are a mathematician, so we aim for all children to feel like confident, curious, problem-solving learners. We encourage children to know the answer is only the beginning and develop a bank of strategies and resilience to persevere. When learners leave King's Oak, they take with them a mathematical tool kit which will enable them to reason numerically and mathematically in the wider world around them and aid them with further education, apprenticeships, and employment.

In Lower School

We aim to develop mathematical processes and social-emotional learning skills through the mathematical content. In each sequence of learning, all learners are given the opportunity to develop their knowledge, a selection of tools and strategies to help analyse an idea, justify a conjecture, and solve problems whilst enjoying mathematics.

	EYFS	Year 1	Year 2	Year 3	Year 4
Effective learning	÷ Play and explore ÷ Active learning ÷ Creative thinking ÷ Critical thinking	Being a mathematician at KOA entails developing increasingly sophisticated content alongside the processes and skills so that learners develop self-agency and a sense of their place as mathematicians. Learners will cover the content below throughout their academic year, and it will be returned to, and strengthened, periodically through the spiral curriculum model.			

Progress in key knowledge and skills (R-4 content summary from the Ready to Progress guidance)	÷ Cardinality ÷ Composition ÷ Comparison ÷ Pattern ÷ Spatial reasoning ÷ Sense of time	÷ Counting to 100. ÷ Multiples 2, 5, 10. ÷ Composition of numbers to 10. ÷ Part-whole relationships in addition and subtraction ÷ Reason about location of numbers to 20. ÷ Comparing quantities and measures. ÷ Classify & describe 2-D and 3-D shapes by their properties.	÷ 2-digit numbers ÷ Reason about location of numbers to 100 ÷ Addition & subtraction to 10 ÷ Mentally add and subtract 2-digit numbers. ÷ Difference as an additive structure. ÷ Recognise simple multiplicative structures. ÷ Use precise mathematical language to describe 2-D and 3-D shapes and classify / sort.	÷ 3-digit numbers ÷ Apply place value knowledge ×10. ÷ Read scales & divide 100. ÷ Addition & subtraction to 20 ÷ Manipulate the additive relationship. ÷ Multiplication and division for 2, 4, 5, 8, 10 ÷ Columnar addition & subtraction ÷ Multiplication & division ÷ Conceptual understanding of fractions and location ÷ (0 – 1) in number system ÷ Recognise right angles, parallel and perpendicular. ÷ Draw polygons	÷ 4-digit numbers ÷ Apply place value knowledge ×100 to known facts. ÷ Read scales and divide 1000. ÷ Recall multiplication & division facts to 12×12 and apply to solve division problems with remainder. ÷ Multiply & divide by 10 & 100 and understand scaling ÷ Multiplicative relationship, commutative & distributive ÷ Mixed & improper fractions ÷ Polygons on coordinate grid ÷ Specific properties of polygons including perimeter ÷ Identify line symmetry in 2-D

In Middle School

The mathematics curriculum builds on core concepts from lower school, with emphasis on providing time for topics to be explored in depth. Learners will explore mathematical structures that will be explored further in upper school learning, as well as key models which will aid conceptual understanding over time. Learners in years 5 and 6 study mathematics every day. Learners in years 7 and 8 experience four lessons of mathematics, and complete a complimentary SPARX maths homework, each week.

	Year 5	Year 6		Year 7	Year 8
Effective learning	Being a mathematician at KOA entails developing increasingly sophisticated content alongside the processes and skills so that learners develop self-agency and a sense of their place as mathematicians. Learners will cover the content below throughout their academic year, and it will be returned to and strengthened periodically through the spiral curriculum model.		**Block 1**	**Fractional thinking** ÷ Probability ÷ Factors, multiples, primes ÷ Fractions (+/-)	**Delving into data** ÷ Angle ÷ Interpreting & comparing ÷ Averages ÷ Scatter graphs
Progress in key knowledge and skills	÷ Place value and rounding of numbers up to 2 decimal points. ÷ Apply place value knowledge ×0.1 and ×0.01 to known facts. ÷ Read scales and make links to division of 1 into equal parts.	÷ Place value when calculating and reading scales, dividing powers from 1 hundredth to 10 million into 2, 4, 5 and 10 equal parts.	**Block 2**	**Algebraic thinking** ÷ Directed number. ÷ Manipulating algebra. ÷ Exploring sequences.	**Formalising algebra** ÷ Solve equations. ÷ Sequences (nth term) ÷ Graphs of linear functions $y = mx + c$

	÷ Convert between units of measure. ÷ Secure fluency in multiplication and division facts. ÷ Multiply & divide by 10 and 100 and understand this as scaling. ÷ Understand the multiplicative composition of number. ÷ Short multiplication and short division. ÷ Find non-unit fractions of quantity. ÷ Understand and find equivalent fractions. ÷ Recall fraction/decimal equivalents for 1/2, 1/4, 1/5 and 1/10. ÷ Compare, estimate, measure and draw angles in degrees. ÷ Compare and calculate areas of rectangles.	÷ Place value (including rounding of numbers) up to 10 million and with decimals. ÷ Understand two numbers can be related additively & multiplicatively and quantify additive and multiplicative relationships. ÷ Use arithmetic properties, inverse relationships, and place value to derive or complete calculations from a given calculation. ÷ Solve problems involving ratio relationships. ÷ Solve problems with two unknown values. ÷ Compare and simplify fractions using common denominators. ÷ Use reasoning to compare fractions. ÷ Draw, compose and decompose shapes.	**Block 3**	**Proportional reasoning** ÷ Fractions (×/÷) ÷ Proportion ÷ Ratio ÷ Scale diagrams	**Proportional relationships** ÷ Percentages ÷ Fractions, decimals & percentages ÷ Ratio ÷ Units of measure
			Block 4	**Using shape** ÷ Coordinates & straight-line graphs ÷ Properties of shape ÷ Notation/labelling conventions ÷ Perimeter and area ÷ Circles – area & circumference	**Geometrical reasoning** ÷ 3D shape ÷ Volume ÷ Angle and constructing triangles. ÷ Pythagoras

In Upper School (Y9-11)

The Upper School mathematics curriculum follows the AQA specification from the end of year 9 (links provided below). Building on all the core concepts from the previous Key Stages, the emphasis now becomes more academic, with the learning making regular references to assessment material, technique, and strategies. Learners will complete either a Foundation or Higher topic set, based upon their understanding of the KS3 curriculum. All learners experience four lessons of mathematics, and complete a complimentary SPARX maths homework, each week.

	Year 9	Year 10	Year 11 *Foundation*	Year 11 *Higher*
	AQA GCSE Mathematics. Link to exam specification			
Term 1	**Working With numbers** ÷ Rounding and estimation ÷ Error Intervals ÷ Standard form ÷ Indices **Working Algebraically** ÷ Expanding ÷ Factorising	**Properties of Numbers** ÷ Factors, multiples, primes ÷ HCF/LCM ÷ All index laws. ÷ Surds ÷ Pythagoras (surds) ÷ Rationalising the denominator	**Algebra - Solving** ÷ Simplify and rearrange. ÷ Solving quadratics **Geometry** ÷ Congruence ÷ Trig, exact values	**Algebra - Solving** ÷ Further sim equations ÷ Iteration **Geometry - Angle** ÷ Circle theorems ÷ 3D trig

	÷ Identities		÷ Vectors ÷ Arcs and sectors	÷ Non-right-angled trig
Term 2	**AP1** **Numerical reasoning** ÷ Percentages ÷ Money **Probability** ÷ Finding probabilities ÷ Frequency trees ÷ Probability tree diagrams	**Similarity** ÷ Similar shapes ÷ Enlargement ÷ Trigonometry **FDP** ÷ Frac/% as operators ÷ % change, Reverse % ÷ Compound interest ÷ Recurring decimals & fractions	**Algebra - Graphing** ÷ Ratio, equations & graphs ÷ Plotting/sketching graphs ÷ Cubic, reciprocal ÷ Growth & decay ÷ Inequalities **Formal Mock Exams**	**Algebra - Functions** ÷ Composite, inverse ÷ Rearranging **Geometry - L/A/V** ÷ Congruence ÷ Similarity in 3D ÷ Bounds **Formal Mock Exams**
Term 3	**Working with data** ÷ Statistical measures, ÷ Boxplots ÷ Averages from tables **Geometric Reasoning** ÷ Parallel lines, angles ÷ Bearings, Constructions & loci **AP2 + DOOYA**	**Combinations** ÷ Systematic listing ÷ Sample spaces ÷ Venn diagrams ÷ Product rule ÷ Probability trees **Geometry** ÷ Circles, Area, Volume ÷ Surface area	*Class level responsive planning* **Incl. revision AO2/3** **Multiplicative** ÷ Best buys, bank accounts and ratios **Geometric** ÷ Multi-step problems	**Algebra - Graphs** ÷ Growth and decay ÷ Rates of change ÷ Area under curve ÷ Trig Graphs. ÷ Transformations **Proof** ÷ Geometric proof. ÷ Proof using vectors. ÷ Proof using algebra.
Term 4	**Solving** ÷ Solving equations, ÷ Solving inequalities ÷ Simultaneous equations **Sequences** ÷ Linear nth term, ÷ Quadratic nth term	**Algebra Graphs** ÷ Straight-lines ÷ Function notation ÷ Solving quadratics ÷ Real life graphs ÷ Sketching graphs ÷ Perpendicular ÷ Equation of circle, tangent	**Formal Mock Exams** **Class level planning responsive to mock analysis.** **Numerical - Multiplicative** ÷ Ratio with every other topic **Geometric** ÷ Reasoning with angle	

	÷ Fibonacci, quad & geometric		**Algebraic** ÷ Evaluation of others work
Term 5	**Graphing** ÷ Straight line graphs and Sketching graphs ÷ Graphical solutions and parallel lines. **Rearranging** ÷ Rearranging formulae ÷ Units and Measures	**Fractions** ÷ Basics ÷ Algebraic **Describing position** ÷ Transformations ÷ Invariance ÷ Vectors	**Final Exams** **Class level planning responsive to mock analysis**
Term 6	**AP3 + DOOYA** **Scaling** ÷ Proportion ÷ Similarity, Scale diagrams and maps. **Visualising** ÷ Transformations ÷ Plans and elevations ÷ Surface area	**Displaying data** ÷ All charts ÷ Frequency tables ÷ Cumulative frequency ÷ Histograms **Polygons** ÷ Angles **Formal Mock Exams**	