

Subject: MATHEMATICS

Subject Leader

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National Curriculum

KEY STAGE THREE follows a Mastery Curriculum that maps to the National Curriculum – see Dept. for Education September 2013.

KS4 continues with the Mastery Curriculum in Y10 and Y11 with more specific GCSE topic-directed teaching progressively becoming the focus.

Curriculum Intent

Key Stage Three

Key Stage Three at Kingsmead School have adopted a Mastery approach to Mathematics using a series of progressive Stages that students 'Master' before moving to the next step in their learning, teaching is in line with the National Curriculum guidelines. Key Stage Three lays the groundwork ready for Key Stage Four where most students work towards the AQA 8300 GCSE examination, either at Foundation or Higher Tier as appropriate to their ability. In addition, or alternatively, they will normally take the Pearson Edexcel Functional Skills Level 1 at the end of Y10. The Key Stage Three Mastery approach uses a variety of Mathematical Strands and lays the foundation for KS4. The Strands include Number and Place Value, Calculations, Fractions, Decimals, Percentages, Geometry, Ratio, Proportion, Rates of change and Statistics.

In each strand, students will progress at their own rate and pace of learning, moving on only when they have mastered a skill or concept. Students (nationally) are expected to be at Stage 6 in all strands by the start of Year Seven. At Kingsmead priority is usually given to Number strands, should these be below expected attainment. If a student has a particularly low attainment, this may be addressed with additional Numeracy Intervention, in consultation with the Head of Maths or Second in Maths.

Lessons are varied with practical tasks, work involving ICT, in particular the online 'My Maths' scheme, discussion, worksheets, paired and group tasks, mathematical games and written work in exercise books. Wherever possible students' learning styles are taken into consideration and teaching and learning adapted.

In term 1 the focus is on assessing and building on knowledge in Number and Calculations along with Geometry; Shape, Angles, Constructions and Measures and Mensuration. Teaching often uses Manipulatives and Representatives to help assist students in their learning. Various questions and scenarios are used in problem solving activities. Teaching and Learning is targeted towards embedding concrete knowledge of addition, subtraction, multiplication and division through varied and creative methods. Real-world problem solving is often used.

Term 2 provides students with the concept of Algebra (if appropriate) along with Fractions, Decimals and Percentages, Ratio, Proportion and Rates of Change. Algebra consists of introducing students to the notion of letters and general symbols being used to represent numbers and quantities in formulae and equations. The focus on Fractions, Decimals and Percentages and provides students with the opportunity understand to each element and relationships between them. Again Manipulatives and Representatives are often used to in Teaching and Learning along with real-world in problem solving.

Term 3 revisits Number and Place Value and Calculations and also introduces students to Statistics (if appropriate). The focus is to identify where each student is in their learning journey and identify strengths and weaknesses in these strands and build/develop skills to help build confidence in them and extend their learning. Students also focus Geometry; Position and Direction during this term.

ASSESSMENT

Students' progress is monitored with both formative and summative assessment. During each half term, students are assessed to confirm their level of understanding and skills in the relevant strands taught. The outcome is recorded on Classroom Monitor (on-line assessment tracker) and may also be recorded and dated on the teacher copy of the tracking sheets, using the ADSE system (Acquiring, Developing, Secure, Exceeding).

Towards the end of each academic year exams are held for all years, with Years Seven and Eight sitting the same paper, which alternates over a 2-year cycle.

Key Stage Four

Key Stage Four aims to increase fluency of fundamental concepts and methods, introduce and develop reasoning using conjecture, argument and proof and increase confidence and accuracy of problem-solving (both abstract and functional).

Year Ten focuses on balancing the mathematical understanding of students, increasing their confidence and resilience, so that problem-solving is increasingly a skill that comes easily to them. For new students, or those with gaps from Y9 or Key Stage Three, careful programmes suited to building their ability in Number and Calculation can be offered as an adjunct to their teaching towards GCSE. Throughout Year Ten care is given to explaining Mathematics using common sense thinking and practical problems in order to make its study accessible and engaging. This remains true for the growing number of students who wish to take the Higher Tier syllabus; they have an accelerated pathway offered where Trigonometry and complex Geometry, Statistics and Graph work are studied. Various ICT tools will be used throughout Year Ten and the following year ranging from Kahoot to graphing programmes, interactive whiteboards, games and Diagnostic Questions.

Year Eleven focuses on getting students prepared for realistic attempts at mock GCSE or continuing their work towards Functional Skills Level 1. A minority of students choose to follow a Functional Skills pathway, deemed to be more relevant to their future working life, and teachers will then help them beyond Level 1, if already obtained, to sit the Level 2 qualification. Most students are encouraged to keep working towards the GCSE whilst emphasising practical areas of Mathematics useful for working life.

Curriculum Implementation

	Term	Content/Topics	Assessment
Year 7	Autumn Term	1 Number- Place Value Geometry - Shape, Angles & Constructions	Teachers use a variety of informal/formal assessments throughout the topic. Tracking via Classroom monitor.
		2 Number- Calculations Geometry- Measure & Mensuration	Teachers use a variety of informal/formal assessments throughout the topic. Tracking via Classroom monitor.
	Spring Term	3 Number- Place value / Calculations Algebra (if ready for it)	Teachers use a variety of informal/formal assessments throughout the topic. Tracking via Classroom monitor.
		4 Fractions, Decimals & Percentages	Teachers use a variety of informal/formal assessments throughout the topic. Tracking via Classroom monitor.
	Summer Term	5 Number - Place value / Calculations Statistics	Teachers use a variety of informal/formal assessments throughout the topic. Tracking via Classroom monitor.

		6	Number (if required) Geometry - Position and Direction	Teachers use a variety of informal/formal assessments throughout the topic. Tracking via Classroom monitor.
	Term		Content/Topics	Assessment
Year 8	Autumn Term	1	Number - Place Value / Probability Geometry - Shape, Angles & Constructions	Teachers use a variety of informal/formal assessments throughout the topic. Tracking via Classroom monitor.
		2	Number - Calculations Geometry - Measure & Mensuration	Teachers use a variety of informal/formal assessments throughout the topic. Tracking via Classroom monitor.
	Spring Term	3	Number - Place value / Calculations Algebra (if ready for it)	Teachers use a variety of informal/formal assessments throughout the topic. Tracking via Classroom monitor.
		4	Fractions, Decimals & Percentages Ratio, Proportion & Rates of Change	Teachers use a variety of informal/formal assessments throughout the topic. Tracking via Classroom monitor.
	Summer Term	5	Number - Place value / Calculations Statistics	Teachers use a variety of informal/formal assessments throughout the topic. Tracking via Classroom monitor.
		6	Number (if required) Geometry - Position and Direction	Teachers use a variety of informal/formal assessments throughout the topic. Tracking via Classroom monitor.
	Term		Content/Topics	Assessment
Year 9	Autumn Term	1	Number - Place Value <ul style="list-style-type: none"> Valuing, ordering and counting positive and negative integers up to 10^6 Finding difference, rounding and ordering percentages and fractions) Probability <ul style="list-style-type: none"> The probability scale and its implications (+, x fractions and P') Constructing and using P. space diagrams for problem-solving Geometry - Shape, Angles & Constructions <ul style="list-style-type: none"> Properties of 2-D and 3-D shapes Solving Angle Problems in shapes including parallel lines and in triangles and quadrilaterals 	Half-term Topic Test
		2	Number Calculations <ul style="list-style-type: none"> Four Number Operations in both formal and mental methods using algebraic rules Factors and Multiples (HCF and LCM, roots and powers) and using these to solve problems Using Inequalities 	Half-term Topic Test

		<ul style="list-style-type: none"> • Estimation • Introduction to the use of Standard Form Geometry - Measure & Mensuration <ul style="list-style-type: none"> • Units • Perimeter, Area of 2-D shapes (incl. circles), surface areas and Volumes of cuboids and Congruence • Pythagoras 	
Spring Term	3	Number - Place value & Calculations <ul style="list-style-type: none"> • as above, continuing with topics from Terms 1 & 2 • Rounding to specific Decimal Places and Significant Figures Algebra (if ready for it) <ul style="list-style-type: none"> • Algebraic Rules (BIDMAS) • Simple Formulae, equations and Sequences • Cartesian Plane Co-ordinates and simple graphs 	Half-term Topic Test
	4	Fractions, Decimals & Percentages <ul style="list-style-type: none"> • Fluency in all language, concepts and operations involving simple FDP • Mixed Numbers, their meaning and use Ratio, Proportion & Rates of Change <ul style="list-style-type: none"> • Simplification of ratios and equivalence of proportion (interchangeability with fraction notation) • Direct and Inverse Proportion and Scale Factors 	Half-term Topic Test
Summer Term	5	Number - Place value & Calculations <ul style="list-style-type: none"> • as above, continuing with topics from Terms 1,2 & 3 • Calculations in Standard Form and non-decimal bases (eg Binary) Statistics <ul style="list-style-type: none"> • Data Collection, Analysis and Interpretation • Construction of Graphs (for Discrete, Continuous and Grouped samples) • Sampling, Distribution and Correlation (Best-fit, predictions and outliers) 	Half-term Topic Test
	6	Number (if required) <ul style="list-style-type: none"> • as above, continuing with topics from Terms 1 - 5 Geometry - Position and Direction <ul style="list-style-type: none"> • Labelling and Language • Transformations on and off the Cartesian Plane • Vector descriptions of translations and their use in problems and arguments 	End of Year Test

Term		Content/Topics	Assessment (including formal exam options)
Year 10	Autumn Term	1 Number - Place Value <ul style="list-style-type: none"> Valuing, ordering and counting positive and negative integers up to 10^6 Finding difference, rounding and ordering percentages and fractions) Probability <ul style="list-style-type: none"> The probability scale and its implications (+, x fractions and P') Constructing and using P. space diagrams for problem-solving Geometry - Shape, Angles & Constructions <ul style="list-style-type: none"> Properties of 2-D and 3-D shapes Solving Angle Problems in shapes including parallel lines and in triangles and quadrilaterals Using knowledge of Angles and Bearings Standard Constructions using Ruler and Compass 	Half-term Topic Test
		2 Number Calculations <ul style="list-style-type: none"> Four Number Operations in both formal and mental methods using algebraic rules Factors and Multiples (HCF and LCM, roots and powers) and using these to solve problems Using Inequalities Estimation Use of Standard Form including in calculations Geometry - Measure & Mensuration <ul style="list-style-type: none"> Units Perimeter, Area of 2-D shapes (incl. circles), Surface Areas and Volumes of Prisms and other 3-D shapes (including Cylinders and Pyramids) 2-D and 3-D Pythagoras problems 	Half-term Topic Test
	Spring Term	3 Algebra <ul style="list-style-type: none"> Algebraic Rules (BIDMAS) and Simplification Simple Formulae, solving equations and Sequences Cartesian Plane Co-ordinates and simple graphs Fractions, decimals & Percentages <ul style="list-style-type: none"> Increase fluency in all language, concepts and operations involving simple FDP 	Half-term Topic Test

		<ul style="list-style-type: none"> Percentage increase and decrease (including Compound Interest and Devaluation problems) Mixed Numbers, their meaning and use 	
	4	Ratio, Proportion & Rates of Change <ul style="list-style-type: none"> Simplification of ratios and equivalence of proportion (interchangeability with fraction notation) Direct and Inverse Proportion and Scale Factors including Graphical (Time/Distance, Speed and Map problems) 	Half-term Topic Test
	5	Algebra <ul style="list-style-type: none"> Algebraic Rules (BIDMAS) and Simplification Rearranging Formulae (including use of roots), Factorising and Expansion Solving equations and Sequences (including Simultaneous and Quadratic) Cartesian Plane Co-ordinates and graphical solutions to algebraic problems Statistics <ul style="list-style-type: none"> Data Collection, Analysis and Interpretation of different measures of Central Tendency Construction of Graphs (for Discrete, Continuous and Grouped data, including Box Plots and Cumulative Frequency) Sampling, Distribution and Correlation (Best-fit, predictions and outliers) 	Half-term Topic Test
Summer Term	6	Geometry - Position and Direction <ul style="list-style-type: none"> Labelling and Language Transformations on and off the Cartesian Plane including negative S.F. Enlargement Vector descriptions of translations and their use in problems, arguments and Proofs 	Functional skills exams End of Year Exams
	Term	Content/Topics	Assessment (including formal exam options)
Year 11	Autumn Term	1 <ul style="list-style-type: none"> Algebra <ul style="list-style-type: none"> Rearranging Formulae (including use of roots), Factorising (including Difference of 2 Squares) Solving harder equations and Sequences (including Simultaneous and Quadratic and A. fractions) Cartesian Plane Co-ordinates, Graphs and graphical solutions to algebraic problems Geometry (Pythagoras & Trigonometry) <ul style="list-style-type: none"> Use of Ratio and Similarity to solve Trigonometric problems Statistics <ul style="list-style-type: none"> Graphing Data, Grouped, Cumulative data and Problem Solving (including Histograms and use of Quartiles as expressions of Central Tendency) 	Half-term Topic Test

	2	<p>Fractions, Decimals & Percentages</p> <ul style="list-style-type: none"> As above to increase fluency Compound Interest problems Algebraic Fractions use (see Term 1 Algebra) 	Mock Exams
Spring Term	3	<p>Interventions for Focus Groups</p> <ul style="list-style-type: none"> Mathematical Methods interventions; Maths Anxiety Interventions; SEMH interventions as appropriate from review of Mocks <p>Ratio, Proportion and rates of Change</p> <ul style="list-style-type: none"> As above (Spring Term 4, Y10) for fluency Using Graphs to solve problems <p>Geometry - Measure and Mensuration</p> <ul style="list-style-type: none"> As above (Spring Term 2, Y10) for fluency Arc lengths and Sector Areas 	Regular Topic Tests and Reviews
	4	<p>Algebra</p> <ul style="list-style-type: none"> As above (Term 5, Y10 and Term 1 Y11) for fluency both graphically and algebraically <p>Geometry - Position and Direction</p> <ul style="list-style-type: none"> As above (Summer Term 6, Y10) for fluency 	Regular Topic Tests and Reviews
Summer Term	5	<p>Revision - Topics and Questions</p> <ul style="list-style-type: none"> Use of Apps and ICT to give immediate feedback on question attempts <p>Examination techniques & Anxiety strategies</p> <ul style="list-style-type: none"> Discussions and Workshops with Teachers and Therapists to aid focus and resilience 	Regular Topic Tests and Reviews
	6	Examinations	<p>Functional Skills Examinations (E3, L1 & L2)</p> <p>GCSE Exams</p>