fortismere Mathematics Department Curriculum Map 2020 - 21

Curriculum Intent

The mathematics curriculum is designed to enable teachers to lead students progressively through the content and skills which will equip them with a level of mathematical expertise to support educational pathways, to inform both work life and day to day life and to enrich their cultural experience.

Knowledge, Skills & Resilience

Developing students' mathematical competence necessarily involves them increasing their knowledge base, learning and applying techniques which lead to the solution of problems, analysing information in search of patterns or in order to form problem solving strategies and developing a sense of resilience in the face of the unforgiving logic of the correctness of mathematical solutions.

Strands of Learning

Mathematics can be thought of as a series of topic strands and it is useful to trace the progression of these strands through the Key Stages and through increasing degrees of sophistication. The curriculum map attached enables strands to be traced from year 7 to year 11. The central model of learning which students experience requires them to focus on a single strand but as their competence increases, previously acquired skills and material covered form the foundation for further development. Increasingly progress becomes dependent on the synthesis of knowledge and skills which rest on this foundation.

Assessment

Formal assessment structures support learning in units. Students find this clear and manageable. The challenge at examination level is managing a revision process which addresses the many units of work covered over the preceding years and prepares the students for synoptic assessment. Finding a balance between short and longer term assessment to support the accumulation of required knowledge and competencies is an on-going piece of work.

Enrichment & Cross-Curricular

In addition to the formal curriculum, the Department offers the opportunity to participate in a range of activities which support or enrich students' learning. These range from routine weekly informal drop in to the annual UKMT Challenges. The Department is keen to offer more systematic broadening and enriching activities which permit the use of mathematical skills and knowledge in other contexts. The Department is also keen to link with the work of other subject departments in the school to form durable and meaningful cross-curricular links which leverage learning mutually.

'Why this', 'why now'

The 'old' national curriculum classified mathematics into four areas: Number, Algebra, Shape & Space and Handling Data. The revised curriculum further separates Ratio & Proportion and Probability. The significance of Ratio & Proportion in learning and applying mathematics has been recognised and amplified in the formal curriculum and recent GCSE examinations have reflected this priority. In order to provide the necessary base for progression, the KS3 curriculum incorporates a number of topics from the domains listed. The 'why this' and 'why now' rationale for the chosen units is implicit in the progression map from years 7 to 11. Mathematics is an hierarchical subject, the requirement for progressive learning along each 'strand' has driven the ordering which can be seen in the curriculum map. The unit progression is planned to address the specifications of KS3 and KS4 and to provide variety and the opportunity to consolidate when topics are re-visited. It will be obvious that the map is 'lighter' in year 11. This permits a substantial period for examination revision and technique preparation and is deliberate.

The Future

Consideration of the value and effect of homework and the most effective and efficient use of marking are on-going considerations together with the virtue and impact of seeing the map as the first step to a five year curriculum plan.

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Yr7 (KS3)	**Topic Area**	**Key recovery knowledge/skills (what has to be learnt)**	**Resources/support at home**
Autumn 1	Using Numbers	• To carry out calculations from information given in charts and tables • To know and use financial vocabulary • To order positive and negative numbers using a number line • To use and apply comparison symbols such as > (greater than) and < (less than) • To order positive and negative numbers using a number line • To calculate addition, subtraction and multiplication problems involving directed numbers • To use and apply directed number calculations in a real-life situation	MathsWatch Kerboodle
	Sequences	• To use function machines to generate inputs and outputs • To use given inputs and outputs to work out a function • To recognise, describe and generate linear sequences • To identify missing terms in a sequence	MathsWatch Kerboodle
Autumn 2	Perimeter, area and volume	• To use a simple formula to work out the perimeter of a rectangle • To use a simple formula to work out the area of a rectangle • To work out the perimeter and area of compound rectilinear shapes by using simple formulae • To calculate the area of a triangle. • To calculate the area of a parallelogram • To calculate the area of a trapezium • To calculate the surface area of cubes and cuboids • To calculate the volume of cubes and cuboids • To calculate perimeters and areas in a real-life context	MathsWatch Kerboodle
Autumn 2	Decimal numbers	• To multiply and divide decimal numbers by powers of 10 • To use rounding to estimate answers to calculations, to spot possible errors • To order decimals, including numbers with different decimal places • To add and subtract decimal numbers • To multiply and divide decimal numbers • To solve multi-step problems involving decimals in a familiar context	MathsWatch Kerboodle
Spring 1	Working with numbers	• To recognise and use square numbers up to 225 (15^2) and corresponding square roots • To round numbers to more than one decimal place • To round numbers to one or two significant figures • To use the conventions of BIDMAS to carry out calculations • To use an efficient written method of multiplication without a calculator	MathsWatch Kerboodle

		• To convert between common metric units • To use measurements in calculations • To recognise and use appropriate metric units • To apply number skills in real life contexts	
Spring 2	Ratio	• To write a ratio in its simplest terms • To write ratios in the form 1 : *x* • To use ratios to find totals and missing quantities • To write ratios to compare more than two items • To use and apply the connection between ratios and fractions as a proportionality relationship • To use ratios in a real –life context	MathsWatch Kerboodle
Spring 1	Using Algebra	• To use algebra to write simple expressions and recognise equivalent expressions • To substitute numbers into expressions to work out their value • To apply arithmetic rules to algebraic expressions • To use substitution in the context of formulae • To construct formulae from contextual situations • To use a formula to calculate costs	MathsWatch Kerboodle
	Fractions	• To find common equivalent fractions • To write fractions in their simplest form • To compare and order two fractions • To add and subtract fractions with different denominators • To convert between mixed numbers and improper fractions • To add and subtract simple mixed numbers with different denominators • To explore fractions in the context of the part-whole relationship	MathsWatch Kerboodle
Summer 2	Angles	• To use a protractor to measure an angle • To use a protractor to draw an angle • To know the properties of parallel lines • To calculate angles on a line • To calculate angles at a point • To identify opposite equal angles • To calculate angles in parallel lines • To know that the angle sum in a triangle is 180°	MathsWatch Kerboodle
Spring 2	Coordinates and graphs	• To use coordinates to identify and locate position points in all four quadrants • To draw a graph using a simple linear rule • To know the connection between pairs of coordinates and the relationship shown in an equation and a graph	MathsWatch Kerboodle

		• To recognise and draw linear graphs with values of x and y • To recognise and draw the graphs of • y = x and y = –x • To recognise and draw graphs of the form • x + y = a • To know how graphs can be used in real –life situations • To apply graphing skills in a real-life situation	
	Percentages	• To know equivalences between common fractions, decimals and percentages • To understand and use percentages greater than 100% • To calculate a fraction of a quantity without a calculator • To calculate a percentage of a quantity with a calculator • To know when it is appropriate to use a calculator • To calculate the result of a percentage change • To work out the result of a simple percentage change • To apply percentage skills in a real-life context	MathsWatch Kerboodle
Yr8 **(KS3)**	Symmetry	• To recognise shapes that have reflective symmetry • To draw lines of symmetry on a shape • To recognise shapes that have rotational symmetry • To find the order of rotational symmetry for a shape • To be able to reflect a shape in vertical and horizontal mirror lines • To use a coordinate grid to reflect shapes in lines, including $y = x$ • To be able to rotate a shape • To be able to tessellate shapes • To apply aspects of symmetry in real-life contexts	MathsWatch Kerboodle
Summer 1	Equations	• To find missing numbers in simple calculations • To solve equations involving one operation • To solve equations involving two operations • To use algebra to set up and solve equations • To identify and solve multi-step linear equations	MathsWatch Kerboodle
Autumn 2	Probability	• To know the vocabulary of probability • To know and use the 0–1 probability scale • To use sample space diagrams to work out the probability of a combined event • To know the difference between theoretical and experimental probability • To calculate and use experimental probability • To use experimental and theoretical probability in a real-life context	MathsWatch Kerboodle
Spring 1	Statistics	• To calculate and use the mode, median and range of a set of data • To calculate and use the mean average of a set of data	MathsWatch Kerboodle

		• To be able to read and interpret different statistical diagrams • To create and use a tally chart	
Summer 2	Pie charts	• To read and interpret data from pie charts • To use a scaling method to draw a pie chart • To use the averages and range to compare and interpret data sets • To carry out a statistical survey • To use charts and diagrams to interpret data and write a report • To apply data interpretation skills in everyday situations	MathsWatch Kerboodle
Summer 1	3D shapes	• To know the names and properties of common 3D shapes • To use isometric paper to represent shapes made from cubes • To draw nets for 3D shapes • To construct 3D shapes from nets, including more complex shapes • To establish the rule connection faces, edges and • To solve 3D shape problems in everyday situations	MathsWatch Kerboodle
Yr8 (KS3)	**Topic Area**	**Key recovery knowledge/skills (what has to be learnt)**	**Resources/support at home**
Autumn 1	*Working with numbers*	• To carry out multiplications and divisions involving negative numbers • To know and use highest common factors • To know and use lowest common multiples • To know and use powers and roots(including estimating roots) • To be able to identify the prime factors of any integer • To be able to use and apply number skills in a real-life situation	MathsWatch Kerboodle
	Geometry	• To calculate angles in parallel lines • To know the geometric properties of quadrilaterals • To be able to translate a shape • To enlarge a 2D shape by a scale factor • To construct the mid-point and perpendicular bisector of a line • To construct a perpendicular to a line from or at a given point • To complete more complex constructions and produce a set of instructions	MathsWatch Kerboodle
	Percentages	• To write one quantity as a percentage of another • To use a multiplier to calculate a percentage change • To work out a change in value as a percentage increase or decrease • To apply percentages when analysing a real-life situation	MathsWatch Kerboodle
Autumn2	Congruent Shapes	• To recognise congruent shapes • To know the conditions for recognising congruent triangles • To solve geometric problems using the rules of congruency	MathsWatch Kerboodle

		• Applying scale factors in real-life situations	
	Surface area and volume of prisms	• To convert between metric units for area and for volume • To calculate the surface area of a prism • To calculate the volume of a prism • To apply knowledge of area and work systematically to solve a problem	MathsWatch Kerboodle
Spring 1	*Graphs*	• To develop graphical fluency with a range of linear representations • To know the gradient of a line from its linear equation • To establish the equation of a line in the form $y = mx + c$ from its graph • To recognise and draw the graph from a quadratic equation • To solve a quadratic equation from a graph • To draw graphs from real-life situations to show the relationship between two variables	MathsWatch Kerboodle
	Numbers	• To multiply and divide by negative powers of 10 • To round to a specific number of significant figures • To write a large number in standard form • To multiply with numbers in standard form • To apply standard form to solve a problem in a real-life context	MathsWatch Kerboodle
	Probability	• To recognise mutually exclusive outcomes and exhaustive outcomes • To represent a chance on a probability scale • To use a sample space to calculate probabilities • To use relative frequency to estimate probabilities • To apply probability to a real-life situation	MathsWatch Kerboodle
Spring 2	Algebra	• To simplify algebraic expressions involving the four operations of arithmetic • To simplify expressions by collecting up like terms • To multiply out brackets in an expression • To identify and manipulate algebraic expressions • To write algebraic expressions involving powers • To use and apply algebraic manipulation skills in a range of contexts **NB Time will need to be spent to consolidate the online learning from year 7 [lockdown] directly related to this topic.**	MathsWatch Kerboodle
	Shape and Ratio	• To use ratio to compare lengths, areas and volumes of 2D and 3D shapes • To enlarge a 2D shape by a fractional scale factor • To be able to read and use map scales efficiently • To use and apply skills and knowledge of area, ratio and data handling in a real-life context.	MathsWatch Kerboodle

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Summer 1	Fractions and Decimals	• To add and subtract fractions and mixed numbers • To multiply a fraction or a mixed number and an integer • To divide a fraction or a mixed number by an integer • To divide an integer or a mixed number by a fraction • To multiply with combinations of large and small numbers mentally • To divide combinations of large and small numbers mentally	MathsWatch Kerboodle
	Circles	• To know the definition of a circle and be able to name the parts of a circle • To establish the relationship between the circumference and diameter of a circle (π) • To calculate the circumference of a circle • To calculate the area of a circle • To use and apply knowledge of number and circles to solve multi-step problems in real-life contexts	MathsWatch Kerboodle
	Equations and formulae	• To solve equations involving brackets • To solve equations where the answers are fractions or negative numbers • To solve equations with the variable on both sides • To solve equations with fractions and fractional coefficients • To solve simple equations involving squares • To change the subject of a formula, including formulae involving squares • Be able to make links between graphical and algebraic representations to solve equations	MathsWatch Kerboodle
Summer 2	Comparing Data	• To create a grouped frequency table from raw data • To interpret frequency diagrams • To draw a frequency diagram from a grouped frequency table • To be able to compare data from two sources • Be able to interpret and present data in order to make valid comparisons	MathsWatch Kerboodle
	Interpreting data	• To interpret different charts seen in the media • To draw pie charts relative to data size • To read scatter graphs • To interpret correlation • To construct scatter graphs and use a line of best fit to describe data trends • To use and apply data handling skills in a real-life context	MathsWatch Kerboodle
Yr9 (KS3)	**Topic Area**	**Key recovery knowledge/skills (what <u>has</u> to be learnt)**	**Resources/support at home**
Autumn 1	Number	Integers, decimals, fractions, measures, rounding, roots, powers, HCF/LCM, indices, surds, standard form	Resources used in lessons and revision materials uploaded on GC
Autumn 2	Algebra	Simplifying expressions, expanding brackets, factorisation, indices, changing the subject, creating	Resources used in

		equations, iteration, generating and recognising sequences, finding the nth term	lessons and revision materials uploaded on GC
Spring 1	FDP	Four operations to integers, decimals and fractions, working with terminating and recurring decimals, calculating percentages, percentage change, reverse percentages, simple and compound interest, scale factors, ratios, direct and inverse proportion	Resources used in lessons and revision materials uploaded on GC
Spring 2	Graphs	Plotting coordinates, plot straight-line graphs, equations of lines, real life graphs, compound measures, rates of change, sketch and interpret linear, quadratic and cubic functions, parallel and perpendicular lines, solving quadratics graphically, circles	Resources used in lessons and revision materials uploaded on GC
Summer 1	Angles and constructions	Label and name geometric properties, angle facts, congruence, similarity, Pythagoras, plans and elevations, bearings, constructions and loci	Resources used in lessons and revision materials uploaded on GC
Summer 2	Data handling	Discrete and continuous data, sampling, averages, spread of data, representing data, histograms, correlation, cumulative frequency, box plots	Resources used in lessons and revision materials uploaded on GC