Subject: KS3 MATHEMATICS

Faculty Leader	Subject Leader
Mrs Moya Weighill	Mrs Moya Weighill

National Curriculum

The Ecclesbourne School follows the National Curriculum

Aims

The national curriculum for mathematics aims to ensure that all pupils:

- become **fluent** in the fundamentals of mathematics, including through varied and frequent practice with increasingly complex problems over time, so that pupils develop conceptual understanding and the ability to recall and apply knowledge rapidly and accurately.

- **reason mathematically** by following a line of enquiry, conjecturing relationships and generalisations, and developing an argument, justification or proof using mathematical language

- can **solve problems** by applying their mathematics to a variety of routine and non-routine problems with increasing sophistication, including breaking down problems into a series of simpler steps and persevering in seeking solutions.

Curriculum Intent

Purpose of study

Mathematics is a creative and highly inter-connected discipline that has been developed over centuries, providing the solution to some of history's most intriguing problems. It is essential to everyday life, critical to science, technology and engineering, and necessary for financial literacy and most forms of employment. A high-quality mathematics education therefore provides a foundation for understanding the world, the ability to reason mathematically, an appreciation of the beauty and power of mathematics, and a sense of enjoyment and curiosity about the subject.

Curriculum Implementation

Term	Content	Assessment

Year 7	Autumn Term	1	Topic 1 – Sequences Year 6 – Algebra: Continue numerical linear sequences. Explain the term-to-term rule of numerical sequences in words. Describe and continue a sequence given diagrammatically. Predict and check the next term(s) of a sequence. Represent sequences in tabular and graphical forms. Recognise the difference between linear and non-linear sequences. Continue numerical linear sequences. Continue numerical non-linear sequences. Explain the term-to-term rule of numerical sequences in words. Find missing numbers within sequences Topic 2 – Understand and use algebraic notation Year 6 – Algebra: Substitute values into two-step expressions. Given a numerical input, find the output of a single function machine. Use inverse operations to find the input given the output. Use diagrams and letters to generalise number operations. Use diagrams and letters with single function machines. Find the function machine given a simple expression Substitute values into single operation expressions. Find numerical inputs and outputs for a series of two function machines. Use diagrams and letters with a series of two function machines. Find the function machines given a two-step expression. Substitute values into two-step expressions. Generate sequences given an algebraic rule. Topic 3 – Equality and equivalence Year 6 – Algebra: Understand the meaning of equality. Understand and use fact families, numerically and algebraically. Solve one-step linear equations involving +/− using inverse operations. Solve one-step linear equations involving ×/÷ using inverse operations. Understand the meaning of like and unlike terms. Understand the meaning of equivalence. Simplify algebraic expressions by collecting like terms, using the ≡ symbol.	Regular homework and low-stakes in class assessments are used to identify areas to improve and areas of strength. Assessment 1 (45 minutes) - test in formal exam conditions. Calculator allowed. A mix of short questions testing recall and longer questions testing application and understanding of the content. A sub-grade on the scale 9 to 1 will be used with m, s, e representing mastery, secure, emerging within the grade.

		2	Topic 4 – Place value Year 6 – Number & Place Value: Recognise the place value of any number in an integer up to one billion. Understand and write integers up to one billion in words and figures. Round integers to the nearest 10, 100 and 1000. Work out intervals on a number line. Position integers on a number line. Round integers to the nearest power of ten. Compare two numbers using =, ≠, , ≤, ≥. Order a list of integers. Find the range of a set of numbers. Find the median of a set of numbers. Understand place value for decimals. Position decimals on a number line. Compare and order any number up to one billion. Round a number to 1 significant figure. Write 10, 100, 1000 etc. as powers of ten. Topic 5 – Fraction, decimal and percentage equivalence Year 6 – Fractions: Use decimal and fractional numberlines. Convert between simple fractions and decimals. Identify equivalent fractions. Represent tenths and hundredths as diagrams. Represent tenths and hundredths on number lines. Interchange between fractional and decimal number lines. Convert between fractions and decimals – tenths and hundredths. Convert between fractions and decimals – fifths and quarters. Convert between fractions and decimals – eighths and thousandths. Understand the meaning of percentage using a hundred square. Convert fluently between simple fractions, decimals and percentages. Represent any fraction as a diagram. Represent fractions on number lines. Identify and use simple equivalent fractions. Understand fractions as division. Convert fluently between fractions, decimals and percentages.	Regular homework and low-stakes in class assessments are used to identify areas to improve and areas of strength. Assessment 2 (45 minutes) - test in formal exam conditions. Calculator allowed. A mix of short questions testing recall and longer questions testing application and understanding of the content. A sub-grade on the scale 9 to 1 will be used with m, s, e representing mastery, secure, emerging within the grade.

	Spring Term	3	Topic 6 – Addition and subtraction Year 6 – Number: solve addition and subtraction multi-step problems in contexts, deciding which operations and methods to use and why. Properties of addition and subtraction. Mental strategies for addition and subtraction Use formal methods for addition of integers. Use formal methods for addition of decimals. Use formal methods for subtraction of integers. Use formal methods for subtraction of decimals. Choose the most appropriate method: mental strategies, formal written or calculator. Solve problems in the context of perimeter. Solve financial maths problems. Solve problems involving tables and timetables. Solve problems with frequency trees. Solve problems with bar charts and line charts. Topic 7 – Multiplication and division Year 6 – Number: formal methods to multiply and divide integers. Understand and use the order of operations. Properties of multiplication and division. Understand and use factors. Understand and use multiples. Multiply and divide integers and decimals by powers of 10. Multiply by 0.1 and 0.01. Convert metric units. Use formal methods to multiply integers. Use formal methods to multiply decimals. Use formal methods to divide integers. Use formal methods to divide decimals. Understand and use order of operations. Solve problems using the mean. Explore multiplication and division in algebraic expressions. Topic 8 – Fractions and percentages of amounts Year 6 – Fractions: find a percentage of a given amount using mental methods. Find a fraction of a given amount. Use a given fraction to find the whole and/or other fractions. Find a percentage of a given amount using mental methods. Find a percentage of a given amount using a calculator. Solve problems with fractions greater than 1 and percentages greater than 100%.	Regular homework and low-stakes in class assessments are used to identify areas to improve and areas of strength.

		4	Topic 9 – Directed number Year 6 – Number & place value: ordering directed numbers and performing calculations that cross over zero. Understand and use representations of directed numbers. Order directed numbers using lines and appropriate symbols. Perform calculations that cross zero. Add directed numbers. Subtract directed numbers. Multiplication of directed numbers. Multiplication and division of directed numbers. Use a calculator for directed number calculations. Evaluate algebraic expressions with directed number. Introduction to two-step equations. Solve two-step equations. Use order of operations with directed numbers. Topic 10 – Fractional thinking Year 6 – Fractions: add and subtract fractions with any denominator. Understand equivalent fractions. Understand representations of fractions. Convert between mixed numbers and fractions. Add and subtract unit fractions with the same denominator. Add and subtract fractions with the same denominator. Add and subtract fractions from integers expressing the answer as a single fraction. Understand and use equivalent fractions. Add and subtract fractions where denominators share a simple common multiple. Add and subtract fractions with any denominator. Add and subtract improper fractions and mixed numbers. Use fractions in algebraic contexts. Use equivalence to add and subtract decimals and fractions. Add and subtract simple algebraic fractions.	Regular homework and low-stakes in class assessments are used to identify areas to improve and areas of strength.

	Summer Term	5	Topic 11 – Construction and measuring Year 6 – Statistics and measurement: Draw and measure line segments including geometric figures. Interpret simple pie charts using proportion. Interpret pie charts using a protractor. Understand and use letter and labelling conventions including those for geometric figures. Draw and measure line segments including geometric figures. Understand angles as a measure of turn. Classify angles. Measure angles up to 180°. Draw angles up to 180°. Draw and measure angles between 180° and 360°. Identify perpendicular and parallel lines. Recognise types of triangle. Recognise types of quadrilateral. Identify polygons up to a decagon. Construct triangles using SSS, SAS and ASA. Construct more complex polygons. Interpret simple pie charts using proportion. Interpret pie charts using a protractor. Draw pie charts. Topic 12 – Geometrical Reasoning Year 6 – Properties of shapes: Understand and use the sum of angles at a point. Understand and use the sum of angles on a straight line. Understand and use the equality of vertically opposite angles. Know and apply the sum of angles in a triangle. Know and apply the sum of angles in a quadrilateral. Solve angle problems using properties of triangles and quadrilaterals. Solve complex angle problems. Find and use the angle sum of any polygon.	Regular homework and low-stakes in class assessments are used to identify areas to improve and areas of strength. Assessment 3 (45 minutes) - test in formal exam conditions. Calculator NOT allowed. A mix of short questions testing recall and longer questions testing application and understanding of the content. A sub-grade on the scale 9 to 1 will be used with m, s, e representing mastery, secure, emerging within the grade. Assessment 4 (45 minutes) - test in formal exam conditions. Calculator allowed. A mix of short questions testing recall and longer questions testing application and understanding of the content. A sub-grade on the scale 9 to 1 will be used with m, s, e representing mastery, secure, emerging within the grade.

		6	Topic 13 – Developing number sense Year 6 – Number: Know and use mental addition and subtraction strategies for integers. Know and use mental multiplication and division strategies for integers. Use factors to simplify calculations. Use estimation as a method of checking. Know when to use different strategies for calculation. Know and use mental arithmetic strategies for decimals. Know and use mental arithmetic strategies for fractions. Use factors to simplify calculations. Use estimation as a method for checking mental calculations. Use known number facts to derive other facts. Use known algebraic facts to derive other facts. Know when to use a mental strategy, formal written method or a calculator. Topic 14 – Sets and probability Not explicitly covered at KS2 but students will have used Venn diagrams for sorting in various contexts. Identify and represent sets Interpret and create Venn diagrams. Understand and use the intersection of sets. Understand and use the union of sets. Understand and use the complement of a set. Know and use the vocabulary of probability. Generate sample spaces for single events Calculate the probability of a single event Understand and use the probability scale Know that the sum of probabilities of all possible outcomes is 1. Topic 15 – Prime numbers and proof Year 5 – Number: Identify factors, multiples and primes. Recognise square and cube numbers. Find and use multiples. Identify factors of numbers and expressions. Recognise and identify prime numbers. Recognise square and triangular numbers. Find common factors of a set of numbers including the HCF. Find common multiples of a set of numbers including the LCM. Write a number as a product of its prime factors. Use a Venn diagram to calculate the HCF and LCM.	Regular homework and low-stakes in class assessments are used to identify areas to improve and areas of strength.
	Term		**Content**	**Assessment**
Year 8	Autumn Term	1	Topic 1 - Transformations Year 7: Draw and measure angles and line segments. Recognise special triangles, quadrilaterals and polygons up to a decagon. To be able to reflect in given mirror lines, including diagonal lines. To be able to describe a translation using vectors and recognise congruence.	Regular homework and low-stakes in class assessments are used to identify areas to improve and areas of strength. Assessment 1 (45 minutes) - test in formal exam conditions. Calculator allowed. A mix of short questions testing recall and longer questions testing

			Identify congruent shapes. To be able to rotate a shape about a given point. Explore these transformations and symmetries using ICT. Describe rotational and reflective symmetry. Topic 2 – Sequences & the nth Term Year 7: Describe and continue a sequence given diagrammatically. Recognise, continue and find missing numbers for linear and non-linear sequences. Be able to explain the term-to-term rule of numerical sequences in words. Express simple functions in symbols, represent mappings expressed algebraically. Find the inverse of a linear function. Generate sequences from a variety of practical contexts. To be able to find the terms of a sequence given the position to term rule. Continue arithmetic and geometric sequences. Recognise an arithmetic progression and be able to deduce the nth term of a linear sequence for increasing and decreasing sequences. Topic 3 – Angles on Parallel Lines Year 7: Understand and use the sum of angles at a point, on a straight line, in a triangle and a quadrilateral. Understand that vertically opposite angles are equal and find and use the angle sum of any polygon. To be able to use alternate and corresponding angles in parallel lines. To be able to use the interior and exterior angles properties of polygons. To be able to solve problems using the geometrical properties of quadrilaterals. Topic 4 – Averages and Measures of Spread Year 7: Find the range and median of a set of numbers and solve problems using the mean. To be able to find the mean, median and mode of raw data. To be able to find the mean, median and mode from a frequency table. Find the modal class for continuous data. Recognise when it is appropriate to use the range, mean, median and mode, and for grouped data, the modal class.	application and understanding of the content. A sub-grade on the scale 9 to 1 will be used with m, s, e representing mastery, secure, emerging within the grade.
		2	Topic 5 – Place Value & Rounding Year 7: Recognise the place value of any number in an integer up to one billion and understand place value for decimals. Multiply and divide integers and decimals by powers of 10 and multiply by 0.1 and 0.01. Round integers to the nearest power of ten and to 1 significant figure.	Regular homework and low-stakes in class assessments are used to identify areas to improve and areas of strength.

			To multiply and divide integers and decimals by 0.1 and 0.01. To round decimals to the nearest whole number or to one or two decimal places. To write numbers to a stated degree of accuracy (including significant figures). Topic 6 – Directed Number & Four Operations Year 7: Use mental, formal and calculator methods to add, subtract, multiply and divide positive and negative integers and decimals. Order positive and negative integer values. Add and subtract large values and decimals using appropriate written methods. Multiply 2 digit values using an appropriate written method. Divide integer values and decimals by a single digit. Complete long division where the answer is integer. Complete long division where the answer needs rounding to a suitable level of accuracy. Express remainders as fractions Topic 7 – Standard Form Year 7: Write 10, 100, 1000 etc. as powers of ten. Multiply and divide integers and decimals by powers of 10 and by 0.1 and 0.01. To be able to multiply and divide by powers of 10. To be able to understand index notation eg $5^3 = 5 \times 5 \times 5 = 125$. To be able to convert standard form to decimals. To be able to write numbers in standard form. To be able to perform calculations in standard form on a calculator. Topic 8 – Perimeter, Area & Volume Year 7: Recognise types of triangle and quadrilateral and solve problems in the context of perimeter. Substitute values into one step and two-step expressions. I can find the area and perimeter of standard 2D shapes. I can name parts of a circle. I can calculate circumference and area of a circle. I know the names of common 3D solids. I can find the volume of prism. I can find area and perimeter of compound shapes including quadrants and semicircles. Convert between area measures (mm^2 to cm^2, cm^2 to m^2, and vice versa) and between volume measures (mm^3 to cm^3, cm^3 to m^3, and vice versa).	Assessment 2 (45 minutes) - test in formal exam conditions. Calculator allowed. A mix of short questions testing recall and longer questions testing application and understanding of the content. A sub-grade on the scale 9 to 1 will be used with m, s, e representing mastery, secure, emerging within the grade.

	Spring Term	3	Topic 9 – Functions and Graphs Year 7: Find numerical inputs and outputs for a series of two function machines. Represent sequences in tabular and graphical forms. Read and plot co-ordinates in all four quadrants. Plot the graphs of linear functions where y is the subject. Plot the graphs of linear functions where y is given implicitly in terms of x. Recognise that equations of the form y = mx + c correspond to straight-line graphs. Explore the characteristics of linear equations and explain what m and c represent in the equation y=mx+c. Topic 10 – Order of Operations and Accuracy Year 7: Round integers to the nearest power of ten and to 1 significant figure. Use estimation as a method for checking mental calculations. Understand and use order of operations. Recognise and use square and cube numbers and the notation for squared (^{2}) and cubed (^{3}). Use integer powers and associated roots in calculations. Recognise powers of 2, 3, 4, 5 and 10. Understand and use the priority of operations, including brackets powers and roots and reciprocals. Round numbers and measures to an appropriate degree of accuracy - significant figures. Estimate, to an appropriate level of accuracy, the answers to calculations. Topic 11 – Algebraic Manipulation Year 7: Substitute values into single and two-step expressions. Understand the meaning of like and unlike terms and hence simplify algebraic expressions by collecting like terms, using the ≡ symbol. Substitute integers into simple formulae and positive integers into expressions involving small powers. Simplify and manipulate algebraic expressions by collecting like terms and multiply a single term over a bracket (including multiplying by a variable). Use simple index notation for small positive integer powers. Factorise expressions by taking out single-term common factors. Rearrange simple formulae to change the subject.	Regular homework and low-stakes in class assessments are used to identify areas to improve and areas of strength.
		4	Topic 12 – Fractions, Decimals and Percentages Year 7: Interchange between fractional and decimal number lines. Identify and use simple equivalent fractions. Understand fractions as division. Convert fluently between fractions, decimals and percentages. Find a fraction or percentage of a given	Regular homework and low-stakes in class assessments are used to identify areas to improve and areas of strength.

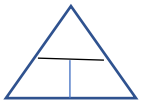
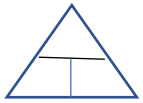
			amount and use a given fraction to find the whole and/or other fractions. Find a percentage of a given amount using mental and calculator methods. Use division to convert a fraction to a decimal. Order fractions by writing them with a common denominator or by converting them to decimals. Add and subtract fractions. Calculate fractions of quantities. Calculate percentages and find the outcome of a given percentage increase or decrease. Multiply and divide an integer by a fraction. Multiply a fraction by a fraction. Know that a recurring decimal is a fraction. Divide a fraction by a fraction. Topic 13 – Equations Year 7: Understand the meaning of equality. Understand and use fact families, numerically and algebraically. Solve one-step linear equations involving ×/÷/+/− using inverse operations. Construct and solve linear equations (unknown on one side). Construct and solve linear equations with integer coefficients (unknown both sides). Construct and solve linear equations involving brackets. Solve equations involving fractions. Topic 14 – Probability Year 7: Interpret and create Venn diagrams, including intersection, union and complement. Know and use the vocabulary of probability and the probability scale. Generate sample spaces for single events and calculate the probability of a single event. Know that the sum of probabilities of all possible outcomes is 1. Find and record all possible mutually exclusive outcomes for single events and two successive events in a sample space diagram. Calculate the probability of events using a sample space diagram. Know that if the probability of an event occurring is p, then the probability of it not occurring is 1 – p. Estimate probabilities from experimental data; understand that: if an experiment is repeated there may be, and usually will be, different outcomes; increasing the number of times an experiment is repeated generally leads to better estimates of probability.	
	Summer Term	5	Topic 15 – Scale Drawings and Bearings Year 7: Understand and use the sum of angles at a point and solve complex angle problems Draw and measure angles and line segments including geometric figures. Use scales to make scale drawings. Use compass bearings to specify direction. Begin to use three-figure bearings	Regular homework and low-stakes in class assessments are used to identify areas to improve and areas of strength. Assessment 3 (45 minutes) - test in formal exam conditions. Calculator NOT allowed. A mix of short questions testing recall and longer questions testing application and understanding of the content. A sub-grade on the scale 9 to 1

			Use three-figure bearings to specify direction. Find simple loci, both by reasoning and by using ICT, to produce shapes and paths, e.g. an equilateral triangle.	will be used with m, s, e representing mastery, secure, emerging within the grade. Assessment 4 (45 minutes) - test in formal exam conditions. Calculator allowed. A mix of short questions testing recall and longer questions testing application and understanding of the content. A sub-grade on the scale 9 to 1 will be used with m, s, e representing mastery, secure, emerging within the grade.
		6	Topic 16 – Collecting, Organising & Representing Data Year 7: Interpret simple pie charts using proportion. Interpret and draw pie charts using a protractor. Solve problems with bar charts and line charts. Be able to gather relevant data from a large data set including tables and lists. To be able to plot a scatter graph. To be able to construct and interpret pie charts. To be able to use 2-way tables. Be able to communicate the results of a statistical enquiry and the methods used, justify the choice of what is presented. Topic 17 – Ratio and Proportion Year 7: Identify and use simple equivalent fractions. Solve problems involving the relative sizes of two quantities where missing values can be found by using integer multiplication and division facts. To be able to reduce a ratio to its simplest form. To be able to use direct proportion to solve problems. To be able to use the unitary method to solve problems. To be able to divide a quantity into two or more parts in a given ratio. Year 8 Topic 18 – Real Life Graphs Year 7: Solve problems involving tables and timetables. I can describe a story from a travel graph. I can use conversion graphs. I can plot and interpret a time series. Topic 19 – Problem Solving Year 7: Builds on all prior learning. I can spot patterns. I can find the maths in a problem. I can simplify a question and use algebra. I can choose the best way of showing my findings. I can find convincing arguments. I can find rules. I can make and begin to justify generalisations. I can explore the effects of changing values. I can take account of feedback and learn from	Regular homework and low-stakes in class assessments are used to identify areas to improve and areas of strength.

			mistakes. I can solve a problem, recording methods, solutions and conclusions I can take part in mathematical discussions of results.	
	Term		**Content**	**Assessment**
Year 9	Autumn Term	1	Topic 1 – Calculating with Powers and Roots (including standard form) Year 8: To be able to multiply and divide by powers of 10. To be able to understand index notation eg $5^3 = 5 \times 5 \times 5 = 125$. To be able to convert standard form to decimals. To be able to write numbers in standard form. To be able to perform calculations in standard form on a calculator. Use a calculator efficiently and appropriately to perform complex calculations with numbers of any size, including indices. Use index notation and index laws for multiplication and division of positive integer powers. Interpret and compare numbers in standard form. Interpret the standard form display of a scientific calculator. Use a scientific calculator to perform calculations involving numbers written in standard form. Use numbers written in standard form to solve problems. Topic 2 – Algebraic Manipulation Year 8: Substitute integers into simple formulae and positive integers into expressions involving small powers (e.g. $3x^2 + 4$ or $2x^3$). Simplify and manipulate algebraic expressions by collecting like terms and multiply a single term over a bracket (including multiplying by a variable). Use simple index notation for small positive integer powers. Factorise expressions by taking out single-term common factors. Rearrange simple formulae to change the subject. Multiply across a single bracket by numerical and algebraic terms**.** Factorise by taking out a numerical common factor**.** Solve simple linear equations (including ones with non-integer solutions). Solve equations where simplification is needed eg $7 = 2 \times 3y - 2 + 4y$. Expand and simplify the product of two linear expressions. Factorise by taking out simple algebraic common factors. Solve linear equations including ones with brackets and unknowns on	Regular homework and low-stakes in class assessments are used to identify areas to improve and areas of strength. Assessment 1 (45 minutes) - test in formal exam conditions. Calculator allowed. A mix of short questions testing recall and longer questions testing application and understanding of the content. A sub-grade on the scale 9 to 1 will be used with m, s, e representing mastery, secure, emerging within the grade.

			both sides (including ones with non-integer solutions). Solve linear equations with multiple brackets. Topic 3 – Pythagoras' Theorem Year 7: Be able to square and square root values. Understand, recall and use Pythagoras' theorem. Recall the Pythagorean triples (3, 4, 5) and (5, 12, 13). Use Pythagoras' theorem to solve problems in two dimensions.	
		2	Topic 4 – Percentages Year 8: Calculate percentages and find the outcome of a given percentage increase or decrease. Express one quantity as a percentage of another. Solve simple problems involving percentage change (non-calculator method). Use a multiplier to calculate percentages. Use a multiplier to calculate the result of a percentage change. Use percentages to calculate the original quantity given the result of a proportional change. Topic 5 – Sequences Year 8: Generate sequences from a variety of practical contexts. To be able to find the terms of a sequence given the position to term rule. Continue arithmetic and geometric sequences. Recognise an arithmetic progression and be able to deduce the nth term of a linear sequence for increasing and decreasing sequences. Generate and describe sequences using a term-to-term rule. Recognise the triangle and square numbers. Generate a sequence from the nth term rule. Write an expression to describe the nth term of arithmetic sequences. Write an expression to describe the nth term of geometric sequences. Find the next term and the nth term of quadratic sequences. Deduce the properties of the sequence of triangle and square numbers from spatial patterns.	Regular homework and low-stakes in class assessments are used to identify areas to improve and areas of strength. Assessment 2 (45 minutes) - test in formal exam conditions. Calculator allowed. A mix of short questions testing recall and longer questions testing application and understanding of the content. A sub-grade on the scale 9 to 1 will be used with m, s, e representing mastery, secure, emerging within the grade.
	Spring Term	3	Topic 6 – Probability Year 8: Find and record all possible mutually exclusive outcomes for single events and two successive events in a sample space	Regular homework and low-stakes in class assessments are used to identify areas to improve and areas of strength.

			diagram. Calculate the probability of events using a sample space diagram. Know that if the probability of an event occurring is *p*, then the probability of it not occurring is 1 – *p.* Estimate probabilities from experimental data; understand that: if an experiment is repeated there may be, and usually will be, different outcomes; increasing the number of times an experiment is repeated generally leads to better estimates of probability. Understand the concept of randomness, fairness, equally and unequally likely outcomes. Find probabilities giving the answer as a fraction. Recall that the probabilities of mutually exclusive outcomes sum to 1. Construct and use sample space diagrams. Construct and use Venn diagrams. Construct and use Tree Diagrams for two events. Topic 7 – Surface Area and Volume Year 8: Find the area and perimeter of standard 2D shapes. Name parts of a circle. Calculate circumference and area of a circle. Know the names of common 3D solids. Find the volume of prism. Use correct units for perimeter, area and volume. Calculate the perimeter and area of common 2D shapes and simple compound shapes. Calculate the area and circumference of a circle. Calculate the surface area and volume of prisms. Calculate the surface area and volume of cylinders. Find missing lengths given the area, volume or surface area. Calculate the perimeter and area of compound shapes including parts of circles. Topic 8 – Presentation and Interpretation of Data Year 8: To be able to find the mean, median and mode of raw data. To be able to find the mean, median and mode from a frequency table. Find the modal class for continuous data. Recognise when it is appropriate to use the range, mean, median and mode, and for grouped data, the modal class. Calculate mean, median, mode, quartiles, range and inter-quartile range from raw data. Make comparisons using average and spread. Calculate the mean from a frequency table (including grouped data). Find the median group/value from a frequency table.	

		4	Year 9 Topic 9 – Compound Units Year 8: Describe a story from a travel graph Recall Speed = Distance/Time and calculate speed giving units. Density = Mass/Volume and calculate density giving units. Recall Pressure = Force/Area and calculate pressure giving units. Solve problems using compound measures using the method.  Topic 10 – Ratio and Proportion Year 8: To be able to reduce a ratio to its simplest form. To be able to use direct proportion to solve problems. To be able to use the unitary method to solve problems. To be able to divide a quantity into two or more parts in a given ratio. Simplify ratio. Divide in a given ratio. Apply ratio and proportion to simple real life problems eg recipe or best buy. Understand the link between ratio and fractions. Solve in depth problems involving ratio and proportion. Topic 11 – Simultaneous Equations Year 8: Construct and solve linear equations (unknown on one side). Construct and solve linear equations with integer coefficients (unknown both sides). Construct and solve linear equations involving brackets. Solve equations involving fractions. Find the solution of a pair of simultaneous linear equations using the point of intersection of their lines. Solve a pair of simultaneous linear equations by eliminating one variable.	Regular homework and low-stakes in class assessments are used to identify areas to improve and areas of strength.
	Summer Term	5	Year 9 Topic 12 – Trigonometry Year 9: Solve problems using compound measures using the triangle cover up method.  Label the sides of a right angled triangle in relation to one angle. Recall the definitions of sine, cosine and tangent. Use sine, cosine and tangent in right-angled triangles to find lengths. Use sine, cosine and tangent in right-angled triangles to find angles.	Regular homework and low-stakes in class assessments are used to identify areas to improve and areas of strength. Assessment 3 (45 minutes) - test in formal exam conditions. Calculator NOT allowed. A mix of short questions testing recall and longer questions testing application and understanding of the content. A sub-grade on the scale 9 to 1 will be used with m, s, e representing mastery, secure, emerging within the grade.

				Assessment 4 (45 minutes) - test in formal exam conditions. Calculator allowed. A mix of short questions testing recall and longer questions testing application and understanding of the content. A sub-grade on the scale 9 to 1 will be used with m, s, e representing mastery, secure, emerging within the grade.
		6	Topic 13 – Transformations Year 8: Read and plot co-ordinates in all four quadrants. Plot the graphs of linear functions where y is the subject. Recognise that equations of the form $y = mx + c$ correspond to straight-line graphs. To be able to reflect in given mirror lines, including diagonal lines. To be able to describe a translation using vectors and recognise congruence. Identify congruent shapes. To be able to rotate a shape about a given point. Reflect shapes in a given line eg x=2, y=x. Translate shapes by a given vector. Rotate shapes around a given centre of rotation. Enlarge shapes by a given scale factor. Topic 14 – Constructions Year 7: Draw and measure lines accurately. Draw and measure angles accurately. Construct triangles. Measure and draw lines to the nearest mm. Measure and draw angles to the nearest degree. Construct a triangle. Construct a perpendicular. Construct an angle bisector. Construct an angle of 60°	Regular homework and low-stakes in class assessments are used to identify areas to improve and areas of strength.

Extra-Curricular Opportunities

Weekly maths department challenges

Students in years 7 and 8 have the opportunity to submit their solution to a weekly puzzle and the results are recorded on a leader board displayed in the maths block. 3 points are awarded for a correct answer and 1 point is awarded for an attempt. Students enjoy checking their status on the leader board.

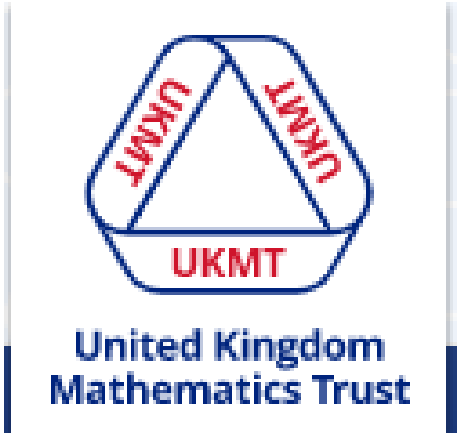
UKMT Individual Maths Challenge

Promoting a love of problem solving

The Junior Mathematical Challenge is a 60-minute, multiple-choice competition aimed at students across the UK.

It encourages **mathematical reasoning**, **precision of thought**, and **fluency** in using basic mathematical techniques to solve interesting problems.

The problems on the Junior Mathematical Challenge are **designed to make students think**. Most are **accessible**, yet still challenge those with more experience.



Once a year approximately 30 Ecclesbourne students take part in the individual maths challenge. Students are awarded Bronze, Silver or Gold certificates and if they score highly enough they qualify for the Junior Kangaroo challenge for the top 8000 in the country or the Junior Mathematical Olympiad for the top 1200 in the country.

UKMT Junior Team Challenge

Promoting teamwork and problem solving

The Team Maths Challenge is a competition giving students the opportunity to tackle a variety of engaging mathematical activities while developing teamwork and communication skills.

Teams of four students from schools around the UK take part in dozens of Regional Finals and high-scoring teams are invited to compete in the National Final.

Teams compete against each other in four rounds.

Group Round

Teams work to solve ten questions of varying type and difficulty in the time allowed. Each team must decide their own strategy: whether to work in pairs, individually or as a team.

Crossnumber

Similar to a crossword but with numerical answers. Teams work in pairs; one pair has the across clues and the other pair has the down clues. The pairs work independently to complete the grid using logic and deduction.

Shuttle

Teams compete against the clock to correctly answer a series of four questions. Each team is divided into Pair A (given Questions 1 and 3) and Pair B (given Questions 2 and 4). Question 1 can be solved independently of the others, but the answer to each subsequent question is dependent on the answer to the previous one.

Relay

Teams split off into pairs, with pairs taking it in turns to solve problems. This round involves lots of movement as well as mathematics: a race against the clock with lots of lively activity and excitement.

Each year 2 year 8 and 2 year 9 students are selected to represent the school at the UKMT Junior Team Challenge.

MangaHigh Challenges

The website www.mangahigh.com organise challenge weeks to encourage students to use this valuable resource. Students across the school endeavour to complete as many tasks as possible both in lessons and at home, with the school being ranked on a leader board. Previously the school made it into the top 10 of schools and was awarded a prize and individuals who gained more than 150 points were awarded a Manga medal.

Resources

Curriculum support

https://www.mymaths.co.uk/ Revision help and practice questions – students have individual accounts for this website. MyMaths offers a wealth of resources that help develop confidence and fluency in maths.

https://www.mangahigh.com/en-gb/ Challenges and Games to improve mastery and stretch – students have individual accounts for this website

https://diagnosticquestions.com/ Weekly quizzes to improve basic skills and help to eliminate misconceptions – students have individual accounts for this website

https://vle.ecclesbourne.derbyshire.sch.uk/ecclesbourne/Curriculum/maths/Living%20Worksheets/LivingWorksheets.aspx "Living Worksheets" – Practice questions that are self-marking

Curriculum enrichment

https://parallel.org.uk/	Simon Singh puzzles for school aged students
https://nrich.maths.org/	Engaging and accessible maths problems and puzzles
https://twitter.com/edsouthall	Often tweets interesting Maths problems
https://www.bbc.co.uk/programmes/p063yhf0	Puzzle for the day
https://www.transum.org/Software/SW/Starter_of_the_day/	a problem for every day of the year
https://www.bbc.co.uk/programmes/b006qshd	bbc radio 4 more or lee
https://www.bbc.co.uk/programmes/b00snr0w	BBC RADIO 4 INFINITE MONKEY CAGE

Impact Statement:

Our curriculum has three key principles

1. *Deep Understanding*

Our practice embeds the importance of deep understanding, rather than simply learning new procedures and rules which can lead to poor retention of key skills. We achieve this by allowing the pupils to represent concepts in a variety of different ways using both objects and pictures and having embedded interleaved learning through regular revision both in class and at home.

2. *Mathematical thinking*

We believe that it is essential for students to develop mathematical thinking in and out of the classroom to fully master mathematical concepts. We want students to think like mathematicians, not just do the maths. We believe that during the learning experience students should; explore, wonder, question, conjecture, experiment and make theories in order to guide their own journey

3. *Mathematical Language*

We believe that pupils should be encouraged to use mathematical language throughout their maths learning to deepen their understanding of concepts. The way students speak and write about mathematics has been shown to have an impact on their success in mathematics. We

therefore use a carefully sequenced, structured approach to introducing and reinforcing mathematical vocabulary throughout maths lessons, so students have the opportunity to work with word problems from the beginning of their learning.

Alongside these three key principles problem solving is at the heart of mathematics. By structuring our curriculum so that all students in a year group are learning the same content at the same time, they have longer to focus on each topic. Our aim is to create the optimal conditions for students to learn through problem solving and to learn to solve problems to develop lifelong transferable skills

Throughout our curriculum we also aim to ensure our pupils gain a love and appreciation for all the mathematics around them and will fully enjoy mathematics.