Subject Curriculum Overview for Academic Year 2024/2025

Subject: Mathematics	Subject Leader: Mr S Card	Year 10 Foundation	
Topic	**Key Learning Points**	**Key Vocabulary**	**Assessments**
Unit 1 – Number	**Key Knowledge** • Inverse operations are operations which reverse the effect of another. For example, subtraction is the inverse of addition. • The number of decimal places a number has is a count of the number of digits after the decimal point (e.g. 2.538 has three decimal places). • The significant figures of a number are all the digits of that number excluding leading zeros (e.g. 34.267 has five significant figures) • A prime number is a number with exactly two factors; itself and 1. • A factor is a number that divides another number, leaving no remainders • The highest common factor (HCF) is the highest factor two or more numbers share • A multiple of a number is in the times table of that number • The lowest common multiple (LCM) is the lowest multiple that two or more numbers share • Square root is the inverse of squaring and is represented with the symbol $\sqrt{\ }$. • Cube rooting is the inverse of cubing and is represented with the symbol $\sqrt[3]{\ }$ • Surd notation on a calculator is leaving an answer in its most accurate form (i.e. $\sqrt{2}$) • Index notation is a way of representing numbers and variables that have been multiplied by themselves many times (e.g. $10^4 = 10 \times 10 \times 10 \times 10$) • The Laws of Indices are $y^a \times y^b = y^{a+b}$ $y^a \div y^b = y^{a-b}$ $(y^a)^b = y^{ab}$ Where y is the same number, referred to as the base number **Applying Knowledge/Methods** • Use order of operations with positive and negative numbers • Simplifying calculations by cancelling	Inverse Decimal place Significant figure Prime Factor Multiple HCF LCM Square root Cube root Surd Index Systematic Estimate Round	Unit Tests are completed at the end of each unit. End of Term tests are completed at the end of each Term. The End of Summer Term test (Year 10 Mock) is based on a past paper but only includes content taught up to this point in the curriculum.

	• Apply systematic listing strategies • Round to a given number of decimal places • Multiply and divide decimal numbers • Round to a given number of significant figures • Estimate answers to calculations • Use one calculation to find the answer to another • Recognise two-digit prime numbers • Write a number as a product of its prime factors • Find factors and multiples of numbers • Find common factors multiples • Find highest common factors and lowest common multiples using prime decomposition • Find square roots and cube roots • Recognise and use powers of 2, 3, 4 and 5 • Use index notation for powers of 10 • Use index notation in calculations • Use the laws of indices		
Unit 2 – Algebra	**Key Knowledge** • An expression is a collection of numbers, operators and/or symbols which represent a value. They do not contain an equals sign • A formula is a particular type of equation which allows us to calculate particular quantities (i.e. the formula for area of a rectangle is A = b x h) • The identity symbol ≡ is used to show that two expressions are identical • The symbol ≠ means not equal to **Applying Knowledge/Methods** • Write and simplify expressions • Multiply and divide expressions • Use the index laws with expressions • Write more complex expressions • Substitute into expressions • Write and use a formula	Expression Formula/ Formulae Identity Simplify Substitute Expand Factorise	

	• Use Maths and Science formulae • Expand brackets • Simplify expressions with brackets • Write and use formulae with brackets • Factorise algebraic expressions		
Unit 3 – Graphs, tables and charts	**Key Knowledge** • There are 360^{o} in a circle • Pie charts only gives us proportions, it does not show frequency • A line of best fit is a single straight line which goes through the points on a scatter graph so that approximately half the points are above the line and half are below **Applying Knowledge/Methods** • Design tables and data collection sheets • Read and use data from tables • Read and use two-way tables • Draw and interpret comparative and composite bar charts • Plot and interpret time series graphs • Use trends to predict what might happen in the future • Construct and interpret stem and leaf diagrams and back to back stem and leaf diagrams. • Draw and interpret pie charts • Plot and interpret scattergraphs • Determine whether or not that is a relationship between data sets • Draw a line of best fit on a scattergraph • Use the line of best fit to predict values	Pie charts Frequency table Two-way table Stem and leaf Scattergraph Correlation Comparative Composite	
Unit 4 – Fractions and percentages	**Key Knowledge** • A percentage means ‘the number of parts per 100’ • A fraction is a numerical value which is part of a whole. The numerator and denominator are both whole numbers • A common denominator is when two or more fractions have the same denominator		

	• An improper fraction is a fraction where the numerator is larger than or equal to the denominator • A mixed number is a number containing an integer and a proper fraction **Applying Knowledge/Methods** • Compare fractions • Add and subtract with fractions • Find a fraction of a quantity or measurement • Multiply whole numbers, fractions and mixed numbers • Simplify calculations by cancelling • Divide a whole number by a fraction • Divide a fraction by a whole number or a fraction • Convert fractions to decimals and vice versa • Work out divisions with decimal answers • Write one number as a fraction of another • Convert percentages to fractions and vice versa • Write one number as a percentage of another • Convert percentages to decimals and vice versa • Find a percentage of a quantity • Calculate simple interest • Calculate percentage increases and decreases • Use percentages in real-life scenarios • Calculate VAT		
Unit 5 – Equations, inequalities and sequences	**Key Knowledge** • Inverse operations are operations which reverse the effect of another. For example, subtraction is the inverse of addition. • An equation is a statement of equality between two algebraic expressions • An inequality is a relationship between to values which are not equal • A formula is a particular type of equation which allows us to calculate particular quantities (i.e. the formula for area of a rectangle is A = b x h) • The nth term rule of a sequence is a rule which connects a numbers position in the sequence to the sequence itself **Applying Knowledge/Method**	Inverse Equation Inequality Formula Linear N^{th} term rule Sequence Arithmetic	

	• Solve one step and two step equations • Solve linear equations containing brackets • Solve linear equations with unknowns on both sides • Use correct notation to show inclusive and exclusive inequalities • Represent inequalities on a number line • List integers which satisfy an inequality • Solve simple inequalities • Solve two sided inequalities • Substitute into formulae • Change the subject of a formula • Recognise and extend sequences • Use the n^{th} term rule to generate terms of a sequence • Find the n^{th} term rule of an arithmetic sequence		
Unit 6 – Angles	**Key Knowledge** • Corresponding angles in parallel lines are equal • Alternative angles in parallel lines are equal • Co-interior angles in parallel lines add to 180^o • The sum of the interior angles of any polygon is calculated using (n – 2) x 180, where n is the number of sides **Applying Knowledge/Method** • Solve geometric problems involving side and angle properties of quadrilaterals. • Identify congruent shapes • Understand and use the angle properties of parallel lines • Solve angle problems in triangles • Understand angle proofs about triangles • Calculate the interior and exterior angles of regular polygons • Find missing interior angles of any polygon • Find missing exterior angles of any polygon • Decide whether a polygon will tesselate or not	Quadrilateral Congruent Parallel Interior Exterior Polygon Tesselate	

Unit 7 – Averages and range	**Key Knowledge** • The mean average is calculated by summing all the terms and then dividing by the number of terms • The median of a set of data is the middle value when the data is in order • The mode of a set of data is the most frequent value • The range is calculated by subtracting smallest data point from the largest data point • A grouped frequency table is a table organising large data sets into class intervals to make the data more manageable • A sample is a smaller, more manageable version of a larger group. It is a subset of the population **Applying Knowledge/Method** • Calculate the mean from a list of numbers • Calculate the mean from a frequency table • Find the modal class, median and range from a frequency table • Estimate the mean and range from a grouped frequency table • Compare sets of data using mean and range • Find the mode, median and range from a stem and leaf diagram • Identify outliers • Recognise advantages and disadvantages of each type of average • Understand the need for sampling • Understand how to avoid bias	Mean Mode Median Range Sample Population Outlier Bias	
Unit 8 – Perimeter, area and volume	**Key Knowledge** • The formula for the area of a rectangle is A = L x W where L is length and W is width • The formula for area of a triangle is $A = \frac{b \times h}{2}$ where b is the base and h is perpendicular height • The formula for area of a parallelogram is $A = b \times h$ where b is the base and h is the perpendicular height	Parallelogram Perpendicular height Trapezia Compound Surface area Volume Cuboid Prism	

	• The formula for area of a trapezium is $A = \frac{a+b}{2} \times h$ where a and b are the parallel sides and h is the perpendicular height. • The volume of a 3D solid is the amount of space inside the solid • The surface area of a 3D solid is the total area of each face and surface of the 3D solid added together **Applying Knowledge/Method** • Calculate the perimeter of rectangles, parallelograms, triangles and trapezia • Calculate the area of rectangles, parallelograms, triangles and trapezia • Find missing sides of rectangles, parallelograms, triangles and trapezia when given the area • Calculate the area of compound shapes made from rectangles and triangles • Convert between area measures • Calculate the surface area of a cuboid • Calculate the surface area of a prism • Calculate the volume of a cuboid • Calculate the volume of a prism • Convert between measure of volume • Solve problems involving surface area and volume		
Unit 9 - Graphs	**Key Knowledge** • Lines are parallel if they have the same gradient • The gradient of a line indicates how steep the line is • The y-intercept of a graph is the point where the graph crosses over the y axis • When drawing distance-time graphs, time is on the x axis and distance is on the y axis **Applying Knowledge/Method** • Find the midpoint of a line segment	Gradient y-intercept Parallel Axes Midpoint Line segment	

	• Recognise, name and plot straight-line graphs parallel to the axes • Recognise, name and plot graphs of y = x and y = -x • Plot straight line graphs from a table of values • Draw graphs to represent relationships • Find the gradient of a line on a graph • Identify the gradient of a line from the equation • Identify the y-intercept of a line from the equation • Find the equation of straight-line graphs from the graph • Sketch graphs when given the gradient and y-intercept. • Draw and interpret graphs from real data • Draw and interpret distance-time graphs • Interpret rates of change graphs • Understand when predictions are reliable		
Unit 10 - Transformations	**Key Knowledge** • A reflection is a mirror image of a shape. An image will reflect through a line known as the line of reflection. • A rotation takes a shape and rotates it a certain number of degrees in either an anti-clockwise or clockwise direction around a certain point • A translation moves a shape but does not change its size or orientation • An enlargement changes the size of an object by multiplying it by a scale factor • The scale factor is the number we multiply each side length by when performing an enlargement **Applying Knowledge/Method** • Translate a shape on a coordinate grid • Use a column vector to describe a translation • Reflect a shape using a mirror line • Draw reflections on a coordinate grid • Describe reflections on a coordinate grid • Rotate a shape on a coordinate grid	Reflection Rotation Translation Enlargement Column vector Scale factor Centre of enlargement Coordinate grid	

	• Fully describe a rotation • Enlarge a shape by a scale factor • Enlarge a shape using a centre of enlargement • Identify the scale factor of an enlargement • Find the centre of an enlargement • Fully describe an enlargement • Transform shapes using more than one transformation • Describe combined transformations of a shape on a grid		
Unit 11 - ICT	4 ICT units will be taught as part of the Maths Curriculum 1. Substitution into Formulae ***Rationale: Be able to explain what an algorithm is.*** 2. Creating Formulae ***Rationale: Be able to create an algorithm to solve set problems.*** 3. Prime Factor Decomposition ***Rationale: Be able to explain what decomposition is.*** 4. HCF and LCM problems ***Rationale: Be able to apply decomposition to solve set problems.***	Algorithm Decomposition Prime HCF LCM	
Unit 12 – Ratio and proportion	**Key Knowledge** • Direct proportion: As one amount increases, another amount increases at the same rate • A ratio is a comparison of two or more numbers that indicates their size in relation to each other. The numbers are separated with a : • A unit ratio is a ratio in the form 1 : n or n : 1 • On a graph for direct proportion, the unit ratio 1 : n gives us the gradient **Applying Knowledge/Method** • Use ratio notation • Write a ratio in its simplest form • Write and use ratios for shapes and their enlargements	Direct proportion Inverse proportion Ratio Unit ratio Gradient Unitary method	

	• Use ratios to convert between units • Divide a quantity into two parts in a given ratio • Divide a quantity into three parts in a given ratio • Solve word problems using ratios • Write ratios in the form 1 : n or n : 1 • Use the unitary method to solve proportion problems • Solve worded proportion questions • Work out which product is better value for money • Recognise and use direct proportion on a graph • Recognise different types of proportion • Solved worded direct and inverse proportion problems		
Unit 13 – Right angled triangles	**Key Knowledge** • Pythagoras' Theorem is $a^2 + b^2 = c^2$ where c is the longest side and a and b are the two shorter sides • The tangent of an angle θ is written as tanθ . Tanθ = $\frac{Opposite}{Adjacent}$. • The sine of an angle θ is written as sinθ . Sinθ = $\frac{Opposite}{Hypotenuse}$. • The cosine of an angle θ is written cosθ . Cos θ = $\frac{Adjacent}{Hypotenuse}$. **Applying Knowledge/Method** • Calculate the length of the hypotenuse in a right-angled triangle • Calculate the length of a shorter side in a right-angled triangle • Calculate the length of a line segment • Solve worded problems using Pythagoras' Theorem • Use the sine ratio to find missing sides in right-angled triangles • Use the sine ratio to find missing angles in right-angled triangles • Use the cosine ratio to find missing sides in right-angled triangles • Use the cosine ratio to find missing angles in right-angled triangles • Use the tangent ratio to find missing sides in right-angled triangles • Use the tangent ratio to find missing angles in right-angled triangles • Solve problems using an angle of elevation or angle of depression	Pythagoras' Theorem Hypotenuse Adjacent Opposite Sine Cosine Tangent Angle of elevation Angle of depression	

	• Solve worded problems using trigonometry • Know the exact values of the sine, cosine and tangent for 30°, 45°, 60° and 90°		
Unit 14 - Probability	**Key Knowledge** • If two events are independent, the occurrence of one event does not affect the chances of the occurrence of the other event • Dependent events are events where the occurrence of one affects the probability of the occurrence of the other • Mutually exclusive events are events that cannot happen at the same time (I.e. rolling an odd number on a dice and rolling a 6) • Mutually exclusive probabilities sum to 1. • If events are exhaustive, at least one of them has to happen (e.g. rolling an odd number on a dice or rolling an even number on a dice) **Applying Knowledge/Method** • Calculate probabilities from equally likely events • Calculate probabilities of mutually exclusive and exhaustive events • Work out probabilities from a sample space diagram • Draw and use sample space diagrams • Estimate and interpret probabilities based on experimental data • Make predictions from experimental data • Draw and use Venn Diagrams • Work out probabilities using tree diagrams	Mutually exclusive Exhaustive Event Sample space diagram Independent Dependent Experimental data Venn Diagram Tree Diagram	

How parents can support learning in the subject this academic year

At the beginning of each new block of work, students will stick a **Knowledge Checklist** into their orange book. This contains a list of the learning objectives for the block (given above), key vocabulary which has been carefully defined and important facts that the students need to know. Helping students to learn the vocabulary and key knowledge will be hugely beneficial to their progress.

Practise is so important so please encourage students to complete homework on a weekly basis, suggest they attend Maths Club (Monday after school) which allows them to work on any aspect of their maths with support from several teachers or develop their interest in other areas of maths. Talking and using maths at home is a great way to link maths to everyday situations, for instance scaling up or down ingredients for a recipe, discussing time or money, estimating costs, looking at best value products in the supermarket, converting between units of measure etc.

Due to the hierarchical structure of Mathematics, it is vital that students catch up on any work missed through absences. If a student is absent they are expected to use their Knowledge Checklist to locate a video clip which will explain the work. Students should copy down the examples and work through the questions

given. When they return they will need to copy up the missed notes from another student. If they need support with the work then please encourage them to attend Maths Club where staff will be there to help and support.

Recommended Reading

Murderous Maths Series – Poskitt Kjartan
Look into my eyes (Ruby Redfort) – Lauren Child
The number devil: A Mathematical adventure – Hans Magnus Enzensberger
Alex's adventures in Numberland – Alex Bellos
Can you solve my problems? – Allex Bellos
Math with bad drawings: Illuminating the ideas that shape our reality – Ben Orlin

Points to note

Students are expected to bring a scientific calculator to every maths lesson. The model we currently recommend is the Casio Classwiz FX-83GTX-S. This calculator can be purchased through the school via parentpay.