

Subject Curriculum Overview for Academic Year 2023/2024

Subject: Mathematics		Subject Leader: Mr S Card	Year 7	AUTUMN TERM
Topic	Key Learning Points		Key Vocabulary	Assessments
Unit 1 – Number Skills	<p>Key Knowledge</p> <ul style="list-style-type: none"> 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 timestable of that number The lowest common multiple (LCM) is the lowest multiple that two or more numbers share <p>Applying Knowledge/Methods</p> <ul style="list-style-type: none"> Use a written method to add and subtract whole numbers of any size Use a written method to multiply whole numbers Use a written method to divide whole numbers Use inverse operations to check an answer Round whole numbers to the nearest 10 000, 100 000, 1 000 000. Round money to the nearest pound or penny Order positive and negative numbers Add and subtract positive and negative numbers Begin to multiply with negative numbers Find all the factor pairs for any whole number Identify common factors, the highest common factor and the lowest common multiple Recognise prime numbers Recognise square numbers Use the priority of operations, including powers Use index form for powers 		Inverse Prime Factor Multiple HCF LCM Square Index/Power	Units 1 and 2 will be assessed by October half term.
Unit 2 – Introduction to Algebra	<p>Key Knowledge</p> <ul style="list-style-type: none"> An algebraic expression is a collection of symbols and operators grouped together to show the value of something. They may also contain numbers Like terms contain exactly the same variables <p>Applying Knowledge/Methods</p> <ul style="list-style-type: none"> Algebraic expressions from words 		Terms Variables Operators Squaring Coefficient Expression Expand	Units 1 and 2 will be assessed by October half term

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	<ul style="list-style-type: none"> Simplify algebraic expressions by collecting like terms Multiply algebraic terms together Expand a single bracket within an expression Simplifying expressions by dividing Substitute values into expressions 	Substitute	
Unit 3 – Analysing and Displaying Data	<p>Key Knowledge</p> <ul style="list-style-type: none"> 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 <p>Applying Knowledge/Methods</p> <ul style="list-style-type: none"> Calculate the averages ‘mean’, ‘median’ and ‘mode’ from a set of data Calculate the measure of spread ‘range’ from a set of data Compare sets of data using averages and range Collect data using tally charts Understand and draw line graphs Understand and draw bar charts Understand and draw dual and compound bar charts Understand and draw frequency bar charts Understand and draw frequency polygons 	Median Mode Range Mean Axis Tally Dual Compound	Units 3 and 4 will be assessed by end of Autumn Term
Unit 4 – Decimals and Measures	<p>Key Knowledge</p> <ul style="list-style-type: none"> Know that 10mm = 1cm, 100cm = 1m, 1000m = 1km Know that 1000g = 1kg, 1000kg = 1 ton Know that 	Metric Prefix Kilo Centi Mili Perimeter	Units 3 and 4 will be assessed by end of Autumn Term

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	<p>10ml = 1cl, 100cl = 1litre, 1000ml = 1 litre</p> <ul style="list-style-type: none"> The formula for the perimeter of a rectangle is $P = 2L + 2W$ where L is length and W is width The formula for the area of a rectangle is $A = L \times W$ where L is length and W is width <p>Applying Knowledge/Methods</p> <ul style="list-style-type: none"> Add and subtract decimals Multiply and divide decimals by single-digit whole numbers Divide numbers that give decimal answers Measure and draw lines to the nearest millimetre Write decimals in order of size Round decimals to the nearest whole number and to 1 decimal place Round decimals to make estimates and approximations of calculations Round money to the nearest pound or penny Solve problems involving money and time Convert measurements into the same units to compare them Solve simple problems involving units of measurement in the context of length, mass and capacity Convert between metric units of length, mass and capacity Use scale diagrams Read scales Work out the perimeters of composite shapes and polygons Solve perimeter problems Find areas of simple polygons Find areas of irregular shapes Calculate the areas of shapes made from compound rectangles 	<p>Area Scale Polygon</p>	
Unit 5 – Fractions and Percentages	<p>Key Knowledge</p> <ul style="list-style-type: none"> Know that percentage means ‘the number of parts per 100’ Know that a fraction is a numerical value which is part of a whole. The numerator and denominator are both whole numbers <p>Applying Knowledge/Methods</p> <ul style="list-style-type: none"> Use fraction notation to describe parts of a shape Compare simple fractions Use a diagram to compare two or more simple fractions 	<p>Percentage Fraction Whole Ascending Descending Equivalent Numerator Denominator</p>	<p>Units 5 and 6 will be assessed by February Half Term.</p>

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	<ul style="list-style-type: none"> • Order fractions • Change an improper fraction to a mixed number • Identify equivalent fractions • Simplify fractions by dividing numerator and denominator by common factors • Add and subtract simple fractions • Calculate simple fractions of quantities • Work with equivalent fractions and decimals • Write one quantity as a fraction of another • Convert a percentage to a fraction or decimal • Work with equivalent percentages, fractions and decimals • Use different strategies to calculate with percentages • Express one quantity as a percentage of another 		
Unit 6 – Proportion and Ratios	<p>Key Knowledge</p> <ul style="list-style-type: none"> • Direct proportion: As one amount increases, another amount increases at the same rate • To know 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 : <p>Applying Knowledge/Methods</p> <ul style="list-style-type: none"> • Use direct proportion in simple contexts • Solve simple problems involving direct proportion • Use the unitary method to solve simple word problems involving direct proportion • Use ratio notation • Reduce a ratio to its simplest form • Reduce a three-part ratio to its simplest form by cancelling • Find equivalent ratios • Divide a quantity into two parts in a given ratio • Solve word problems involving ratio • Use ratios and measures • Use fractions to describe and compare proportions • Understand and use the relationship between percentages, fractions, ratio and proportion 	Direct Proportion Unitary Ratio Simplify	Units 5 and 6 will be assessed by February Half Term.

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Unit 7 – Functions and formula	<p>Key Knowledge</p> <ul style="list-style-type: none"> • A function is an operation or series of operations that link an input and an output • A formula is a fact or relationship that is expressed in terms of mathematical symbols <p>Applying Knowledge/Methods</p> <ul style="list-style-type: none"> • Generate inputs and outputs using function machines • Generate inputs and outputs using function machines with multiple steps • Substitute numerical values into formulae • Write formulae from words or a diagram • Write a formula using algebra 	<p>Inputs/outputs</p> <p>Terms</p> <p>Variables</p> <p>Operators</p> <p>Squaring</p> <p>Coefficient</p> <p>Formula</p> <p>Expand</p> <p>Substitute</p>	Units 7 and 8 will be assessed by end of Spring Term
Unit 8 – Lines and Angles	<p>Key Knowledge</p> <ul style="list-style-type: none"> • An acute angle is an angle which measures between 0 and 90 degrees • An obtuse angle is an angle which measures between 90 and 180 degrees • A reflex angle is an angle which measures between 180 and 360 degrees • Know that angles in a triangle sum to 180 • Know that angles in a quadrilateral sum to 360 <p>Applying Knowledge/Methods</p> <ul style="list-style-type: none"> • Use a protractor to measure and draw angles • Estimate the size of angles • Use a ruler and protractor to draw triangles accurately • Use the rules for angles on a straight line, angles around a point and vertically opposite angles • Solve problems involving angles • Use the rule for the sum of angles in a triangle • Calculate interior and exterior angles • Solve angle problems involving triangles • Identify and name types of quadrilaterals • Use the rule for the sum of angles in a quadrilateral • Solve angle problems involving quadrilaterals 	<p>Acute</p> <p>Obtuse</p> <p>Right Angled</p> <p>Reflex</p> <p>Sum</p> <p>Regular</p> <p>Irregular</p> <p>Polygon</p> <p>Quadrilateral</p>	Units 7 and 8 will be assessed by end of Spring Term

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Unit 9 – Real Life Application of Money	<p>Key Knowledge</p> <ul style="list-style-type: none"> • Know that in the UK, VAT is calculated at 20% <p>Apply Knowledge</p> <ul style="list-style-type: none"> • Be able to calculate VAT and include VAT to the total price of goods. • Calculate simple interest • Calculate wages from time worked and salary/pay per hour • Calculate how much tax someone would pay based on the annual salary • Understand how bank statements work • Calculate missing values from bank statements • Understand and read utility bills • Calculate cost of gas and electricity when given unit price and standing charge 	VAT Interest Salary Annual Quarterly Credit Debit Unit price Standing charge	Units 9 and 10 will be assessed by May Half Term
Unit 10 - Probability	<p>Key Knowledge</p> <ul style="list-style-type: none"> • Know that probabilities are measured on a scale of 0 to 1 • Mutually exclusive events are events that are impossible to occur at the same time <p>Applying Knowledge/Methods</p> <ul style="list-style-type: none"> • Use a probability scale with words • Identify outcomes and equally likely outcomes • Calculate probabilities • Use a probability scale from 0 to 1 • Calculate more complex probabilities • Calculate the probability of an event not happening • Record data from a simple experiment • Estimate probability based on experimental data • Make conclusions based on the results of an experiment • Use probability to estimate the expected number of times an outcome will occur • Apply probabilities from experimental data in simple situations 	Outcome Mutually Exclusive Experiment Theoretical Prediction	Units 9 and 10 will be assessed by May Half Term

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Unit 11 – Sequences	<p>Key Knowledge</p> <ul style="list-style-type: none"> • Know that numbers in a sequence are referred to as terms • Know that to find a term to term rule, we look at the relationship between consecutive terms. • Know that the relationship between a position and term is referred to as the nth term <p>Applying Knowledge/Methods</p> <ul style="list-style-type: none"> • Recognise, describe and continue number sequences • Generate terms of a sequence using a one-step term-to-term rule • Find missing terms in a sequence • Find patterns and rules in sequences • Describe how a pattern sequence grows • Write and use number sequences to model real-life problems • Generate and plot coordinates from a rule • Solve problems and spot patterns in coordinates • Find the midpoint of a line segment • Describe and continue special sequences • Use the term-to-term rule to work out more terms in a sequence • Recognise an arithmetic sequence and a geometric sequence • Recognise, name and plot graphs parallel to the axes • Recognise, name and plot the graphs of $y = x$ and $y = -x$ • Plot straight-line graphs using a table of values • Draw graphs to represent relationships • Generate terms of a sequence using a position-to-term rule • Use linear expressions to describe the nth term of simple sequences 	<p>Term Position nth Term Arithmetic Linear Geometric</p>	Units 11 and 12 will be assessed by end of Summer Term
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Unit 12 - Transformations	<p>Key Knowledge</p> <ul style="list-style-type: none"> • Congruent means exactly the same shape and size • Similar shapes are exactly the same shape and have the same angles but the side lengths are different. One is an enlargement of the other. • The scale factor is the number we multiply each side length by when performing an enlargement • An object has symmetry if it can be split into two identical parts. • 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 <p>Applying Knowledge/Methods</p> <ul style="list-style-type: none"> • Identify congruent shapes • Enlarge shapes using given scale factors • Work out the scale factor given an object and its image • Recognise reflection and rotational symmetry in 2D shapes • Solve problems using line symmetry • Identify all the symmetries of 2D shapes • Identify reflection symmetry in 3D shapes • Recognise and carry out reflections in a mirror line • Reflect a shape on a coordinate grid • Describe a reflection on a coordinate grid • Describe and carry out rotations on a coordinate grid • Translate 2D shapes • Transform 2D shapes by combinations of rotations, reflections and translation 	Congruent Similar Scale Factor Reflection Rotation Translation	
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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. The objectives are referenced to a Mathswatch video clip which will explain the work, give examples and practise questions. These can be used for pre-learning to gain an insight into what is coming up, consolidation of understanding or catching up on work missed.

Practice is 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

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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? – Alex 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.