Subject Curriculum Overview for Academic Year 2023/2024

Subject: Mathematics	Subject Leader: Mr S Card	Year 8	AUTUMN TERM
Topic	**Key Learning Points**	**Key Vocabulary**	**Assessments**
Unit 1 – Number Skills	**Key Knowledge** • A square number is the product of a number multiplied by itself e.g. 64 is a square number because it is the product of 8 x 8 • Square root is the inverse of squaring and is represented with the symbol $\sqrt{\ }$. • A cube number is product of a number multiplied by itself twice e.g. 64 is also a cube number because it is the product of 4 x 4 x 4 • Cube rooting is the inverse of cubing and is represented with the symbol $\sqrt[3]{\ }$ • 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 written methods to add and subtract more than two numbers (including decimals) • Estimate answers to calculations • Use a written method to divide decimal numbers by integers • Add, subtract, multiply and divide positive and negative numbers, including larger numbers and decimals • Calculate using squares, square roots, cubes and cube roots • Say which integers a square root lies between • Calculate combinations of squares, square roots, cubes, cube roots and brackets • Use index form • Write a number as the product of its prime factors • Use prime factor decomposition to find the highest common factor (HCF) and lowest common multiple (LCM)	Inverse Prime Factor Multiple HCF LCM Square Index/Power	Units 1 and 2 will be assessed by October half term.

Unit 2 – Expressions and Equations	**Key Knowledge** • An expression is a collection of numbers, operators and/or symbols which represent a value. They do not contain an equals sign • An equation is a statement of equality between two algebraic expressions **Applying Knowledge/Methods** • Understand and simplify algebraic powers • Write and use expressions involving powers • Expand brackets • Write and simplify algebraic expressions and formulae using brackets and division • Factorise expressions • Solve equations using the balancing method • Find the inverse of a simple function • Write and solve one-step equations using function machines • Solve and write two-step equations using function machines • Solve problems using equations	Terms Variables Coefficient Expression Formula Expand Substitute Factorise Balance Equation	Units 1 and 2 will be assessed by October half term.
Unit 3 – Statistics, Graphs and Charts	**Key Knowledge** • There are 360^{o} in a circle • Pie charts only gives us proportions, it does not show frequency **Applying Knowledge/Methods** • Interpret pie charts • Draw pie charts • Calculate the mean from a frequency table • Use two-way tables • Use tables for grouped data • Draw stem and leaf diagrams for data • Interpret stem and leaf diagrams • Compare two sets of data using statistics or the shape of the graph • Construct line graphs • Choose the most appropriate average to use • Draw a scatter graph • Draw a line of best fit on a scatter graph • Describe types of correlation • Interpret graphs and charts • Explain why a graph or chart could be misleading	Pie Charts Frequency Table Two Way Table Stem and Leaf Scatter Graph Correlation	Units 3 and 4 will be assessed by end of Autumn Term

Unit 4 – Area and Volume	**Key Knowledge** • 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 • 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. • Know that 5 miles ≈ 8 kilometres • Know that 1 foot ≈ 30 centimetres • Know that 1 kilogram ≈ 2.2 pounds **Applying Knowledge/Methods** • Use the formula for the area of a triangle • Calculate the area of compound shapes made from rectangles and triangles • Use the formula for the area of a parallelogram • Use the formula for the area of a trapezium • Convert between different measures for area, volume and capacity • Use tonnes and hectares • Calculate the volume of cubes and cuboids • Calculate the volume of 3D solids made from cuboids • Solve volume problems • Sketch nets of 3D solids • Draw plans and elevations of 3D solids • Calculate the surface area of cubes and cuboid	Compound Tonnes Hectares Metric Imperial Net Plan Elevation	Units 3 and 4 will be assessed by end of Autumn Term

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Subject: Mathematics	Subject Leader: Mr S Card	Year 8	SPRING TERM
Topic	**Key Learning Points**	**Key Vocabulary**	**Assessments**
Unit 5 – Calculating with Fractions	**Key Knowledge** • 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 • The reciprocal of a number is the number it requires to make a product of 1. i.e. the reciprocal of 2 is ½ **Applying Knowledge/Methods** • Order fractions • Add and subtract fractions with any size denominator • Multiply integers and fractions by a fraction • Use appropriate methods for multiplying fractions • Find the reciprocal of a number • Divide integers and fractions by a fraction • Use strategies for dividing fractions • Write a mixed number as an improper fraction • Use the four operations with mixed numbers	Fraction Whole Ascending Descending Equivalent Numerator Denominator	Units 5 and 6 will be assessed by February Half Term
Unit 6 – Formulae and Equations	**Key Knowledge** • 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) • An equation is a statement of equality between two algebraic expressions **Applying Knowledge/Methods** • Substitute into formulae • Find the value of a variable which is not the subject of a formula • Rearrange simple formulae • Rearrange more complex formulae • Solve more complex equations involving division and brackets	Substitute Rearrange	Units 5 and 6 will be assessed by February Half Term

Unit 7 – Real Life Graphs	**Applying Knowledge/Methods** • Draw, use and interpret conversion graphs • Interpret a distance–time graph • Draw a simple distance–time graph • Draw and use graphs to solve distance–time problems • Draw and interpret line graphs • Draw and interpret line graphs and identify trends • Draw and interpret linear and non-linear graphs from a range of sources • Draw and interpret curved graphs from a range of sources	Conversion Distance Time Linear Trend	Units 7 and 8 will be assessed by end of Spring Term
Unit 8 – Lines and Angles	**Key Knowledge** • Parallel sides are sides which are equidistant from each other • The sum of interior angles of a polygon is calculated using (n – 2) x 180° where n is the number of sides • The sum of exterior angles of any polygon is always 360° **Applying Knowledge/Methods** • Classify quadrilaterals by their geometric properties • Solve geometric problems using side and angle properties of special quadrilaterals • Identify alternate angles on a diagram • Understand proofs of angle facts • Identify corresponding angles • Solve problems using properties of angles in parallel and intersecting lines • Calculate the sum of the interior and exterior angles of a polygon • Work out the sizes of interior and exterior angles of a polygon • Solve geometric problems, showing reasoning • Solve problems involving angles by setting up equations	Geometric Alternate Corresponding Co-Interior Exterior Polygon Parallel	Units 7 and 8 will be assessed by end of Spring Term

Subject Curriculum Overview for Academic Year 2023/2024

Subject: Mathematics	Subject Leader: Mr S Card	Year 8	SUMMER TERM
Topic	**Key Learning Points**	**Key Vocabulary**	**Assessments**
Unit 9 – Real Life Application of Money	**Key Knowledge** • There are a number of different currencies and we use exchange rates to convert between them • A budget is an estimate of income and expenditure over a set period of time • A mortgage is a loan from a bank or building society which allows the lender to purchase a house **Application of knowledge/ methods** • Be able to convert between different currencies using an exchange rate • Look at how to budget for a holiday and find best deals • Look at how to budget for small events such as days out • Be able to apply geometry skills to redesigning a garden and working out costs • Look at redecorating a room within a house and calculating costs • Be able to calculate to costs incurred when buying a house • Apply number skills to other real – life scenarios	Currency Exchange rate Income Expenditure Bank Building society Stamp Duty	Units 9 and 10 will be assessed by May Half Term
Unit 10 – Decimals and Ratio	**Key Knowledge** • Decimal places refer to the digits to the right of a decimal point • Significant figures are the number of digits in a value, excluding leading zeroes. • A unit ratio is a ratio in the form 1 : n or n : 1 **Applying Knowledge/Methods** • Round decimals to 2 or 3 decimal places • Round numbers to a given number of significant figures • Round numbers to an appropriate degree of accuracy • Order decimals of any size, including positive and negative decimals • Multiply any number by 0.1 and 0.01 • Multiply larger numbers • Multiply decimals with up to and including 2 decimal places • Divide by 0.1 and 0.01 • Multiply and divide by decimals • Solve problems involving decimals and all four operations • Divide a quantity into three or more parts in a given ratio • Use ratios involving decimals • Solve ratio and proportion problems • Use unit ratios	Rounding Ordering Accuracy Ratio Proportion	Units 9 and 10 will be assessed by May Half Term

Unit 11 – Straight Line Graphs	**Key Knowledge** • The gradient of a straight line is how steep the line is. It is represented by the letter m • The y – intercept is where a straight line crosses the y axis. It is represented by the letter c **Application of Knowledge/Methods** • Recognise when values are in direct proportion with or without a graph • Plot graphs and read values to solve problems • Plot a straight-line graph and work out its gradient • Plot the graphs of linear equations • Write the equations of straight-line graphs in the form $y = mx + c$	Direct Proportion Gradient Linear	Units 11 and 12 will be assessed by end of Summer Term
Unit 12 – Percentages, Decimals and Fractions	**Key Knowledge** • A recurring decimal is a decimal which repeats itself indefinitely • A terminating decimal is a decimal which has digits that end • A multiplier is a number we multiply with to increase or decrease an amount by a percentage **Applying of Knowledge/Methods** • Change time to decimal hours • Recall equivalent fractions and decimals • Recognise recurring and terminating decimals • Order fractions by converting them to decimals or equivalent fractions • Recall equivalent fractions, decimals and percentages • Use different methods to find equivalent fractions, decimals and percentages • Use the equivalence of fractions, decimals and percentages to compare two proportions • Express one number as a percentage of another when the units are different • Work out an amount increased or decreased by a percentage • Use mental strategies to solve percentage problems • Use a multiplier to calculate amounts increased or decreased by a percentage • Use the unitary method to solve percentage problems	Equivalent Terminating Recurring Proportions Multiplier Unitary	Units 11 and 12 will be assessed by end of Summer Term

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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 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.