

Subject :	Maths
Scheme title	Half term 1 - April
Purpose of scheme	To develop fluency, problem solving and reasoning skills across the 6 key areas of number, algebra, geometry and measures, statistics, probability and ratio and proportion
Skills	<p>Number - Fractions and Decimals</p> <ul style="list-style-type: none"> • Understand positive and negative integers (P) • Add and subtract negative numbers (P) • Multiply and divide negative numbers (P) • Find the fraction of a shape shaded • Put integers and simple fractions in order (P) • Find equivalent fractions • Simplify fractions • Calculate fractions of quantities • Add and subtract fractions • Solve problems involving fractions (P) • Add and subtract mixed numbers • Find the reciprocal of a number • Multiply and divide fractions • Express simple decimals and percentages as fractions • Arrange fractions and decimals in order • Express fractions as decimals and percentages • Find one quantity as a fraction or percentage of another • Solve problems involving decimals • Round numbers to a given power of 10, up to three decimal places and one significant figure <p>Geometry and Measure - Angles</p> <ul style="list-style-type: none"> • Recognise acute, obtuse and right angles (P) • Be able to measure angles, use a protractor and a compass • Recognise reflex angles • Estimate angles and measure them accurately (P) measuring angles, using protractors • Understand the terms 'perpendicular' and 'parallel' • Identify scalene, isosceles, equilateral and right-angled triangles • Use properties of angles at a point and on a straight line • Use angles properties of triangles including the sum of 180 (P) types of triangles, properties of triangles • Show that the exterior angle of a triangle is equal to the sum of the interior opposite angles (P) angle properties, sum of interior and exterior angles • Angles in parallel lines – corresponding, alternate, supplementary • Calculate 3 figure bearings
Key Words	<p>Negative Integer Fraction Equivalent Order Quantity Acute Obtuse Reflex Supplementary Corresponding Scalene Isosceles Exterior Interior</p>
Key Words	Students are able to understand and apply the skills identified above.
End Point	
Assessment method	<p>After each topic in bold (listed opposite), students complete a reflection grid which is marked in class then later teacher marked. This will be stuck in books to record progress and support revision.</p> <p>Students complete one GCSE style assessment once per term. Results are recorded centrally by teachers on a central spreadsheet. Students complete RAG analysis to identify their strengths and areas for development. Assessments are cumulative and grade boundaries reflect GCSE Maths.</p>

Year Group:

Half term 2 - September	Half term 3 - November
<p>To develop fluency, problem solving and reasoning skills across the 6 key areas of number, algebra, geometry and measures, statistics, probability and ratio and proportion</p>	<p>To develop fluency, problem solving and reasoning skills across the 6 key areas of number, algebra, geometry and measures, statistics, probability and ratio and proportion</p>
<p>Algebra - Working with Symbols</p> <ul style="list-style-type: none"> •Simplify an expression such as $3x + 2x - x$ (P) adding and subtracting negative integers, recognising similar letters •Simplify an expression such as $3x + 2 - 5x + 4$ •Understand the rules of arithmetic as applied to algebra, such as $x - y$ is not the same as $y - x$ (P) •Work out the value of an expression such as $4y - 3y$ when $x=1$ and $y=2$ (P) substituting values, adding and subtracting negative integers, multiplying a number by a letter •Work out the value of an expression such as $5x - 3y$ when $x = -2$ and $y = -3$ •Expand brackets such as $x(x + 2)$ in context (P) multiplying numbers •Expand and simplify an expression such as $x(2x+1) - x(2x - 3)$ (P) multiplying, collecting like terms, working with negative numbers •Factorise an expression such as $x^2 + 4x$ (P) highest common factors/factors, multiplications •Expand and factorise double brackets including the difference of two squares •Represent inequalities on a number line and identify integer solutions •Solve inequalities (P) solving equations (similar methods) <p>Number - Percentages</p> <ul style="list-style-type: none"> •Understand that percentage means 'number of parts per 100' and use this to compare proportions (P) •Work out a percentage of a given quantity (P) simple percentages e.g. 1%, 5%, 10% etc. (P) •Increase or decrease by a given percentage •Express one quantity as a percentage of another •Use ratio notation, including reduction to its simplest form and its links to fraction notation (P) dividing by 2 and knowing when to divide by another number •Solve simple ratio and proportion problems, such as finding and simplifying a ratio (p) •Work out a percentage increase or decrease •Solve problems involving reverse percentages and percentage change <p>Ratio, Proportion and rates of change – Ratio</p> <ul style="list-style-type: none"> •Solve more complex ratio and proportion problems •Identify and work with fractions in ratio problems •Solve ratio and proportion problems using the unitary method •Bank Statements and timetables <p>Geometry and Measure - Area and Perimeter</p> <ul style="list-style-type: none"> •Estimate the area of an irregular shape by counting squares and part squares (P) •Work out the area and perimeter of a simple rectangle, such as 5m by 4m (P) timetables •Work out the area and perimeter of a harder rectangle, such as 2.6m by 8.3m (P) multiplying and adding decimals •Find the area of a triangle and a parallelogram and compound shapes •Name the parts of a circle, identify and apply circle definitions and properties, including: centre, radius, chord, diameter, circumference, tangent, arc, sector and segment •Calculate the circumference and area of a circle (P) use a calculator •Work out the area and perimeter of a semi-circle (P) use knowledge/formulae from full circles •Calculate exactly with multiples of pi •Calculate arc lengths, angles and areas of sectors and circles. <p>Statistics - Scatter Graphs</p> <ul style="list-style-type: none"> •Draw a scatter graph by plotting points on a graph •Interpret the scatter graph •Draw a line of best fit on the scatter graph •Interpret the line of best fit •Identify the type and strength of the correlation •Know that correlation does not imply causation. 	<p>Algebra - Equations</p> <ul style="list-style-type: none"> •Set up and solve a simple equation such as $5x = 10$ or $x + 4 = 7$ (P) inverse operations •Set up and solve an equation involving fractions such as $x/4 = 12$ or $2x - 3 = 8$ (P) inverse operations •Set up and solve more complicated equations such as $3x + 2 = 6 - x$ or $4x(2x-1) = 20$ (P) multiplying negative numbers, collecting like terms, inverse operations •Set up and solve an equation such as $4x + 5 = 3(x + 4)$ •Solve quadratic equations by factorising <p>Geometry and Measure - Constructions</p> <ul style="list-style-type: none"> •Measure a line accurately to the nearest millimetre (P) •Measure and draw an angle to the nearest degree (P) •Draw a triangle given three sides, or two sides and the included angle, or two angles and a side •Given the lengths of two sides and a non-included angle may not produce a unique triangle •Draw a quadrilateral such as a kite, parallelogram or rhombus with given measurements •Construct perpendicular bisectors and angle bisectors •Use simple scale drawings •Use scales, such as a scale on a map •Construct and interpret plans and elevations of 3D shapes •Measure and draw lines accurately •Measure and draw angles accurately •Use map scales to find a distance <p>Geometry and Measure - Loci</p> <ul style="list-style-type: none"> •Understand the idea of a locus (P) constructions, using a compass •Construct the locus of points equidistant from two fixed points •Construct the locus of points equidistant from two fixed lines •Solve loci problems, for example the locus of points less than 3 cm from a point <p>Algebra - Co-ordinates and Graphs</p> <ul style="list-style-type: none"> •Use co-ordinates in the first quadrant, such as plotting the point (2,1) (P) •Use co-ordinates in all four quadrants, such as (2,-1), (-2,-3) and (-2,1) (P) •Draw lines such as $x=3$, $y = 4$ and $y = x$ •Find approximate solutions to equations using a graph •Identify lines which are parallel using $y = mx + c$ (P) gradient, defining parallel •Find the equation of a line through two points or through one point given its gradient. •Use simple real-life graphs, such as read values from conversion graphs •Use real-life graphs to find values, such as distances from distance-time graphs •Make simple interpretations of real-life graphs •Interpret horizontal lines on a distance-time graph •Carry out further interpretation of real-life graphs, for example find the average speed in km/h from a distance-time graph over time in minutes (P) converting units •Plot and interpret graphs (including reciprocal graphs and graphs of non-standard functions in real contexts, to find approximate solutions to problems such as simple kinematic problems involving distance, speed and acceleration <p>Ratio, Proportion and rates of change – Similarity</p> <ul style="list-style-type: none"> •Select congruent shapes •Understand congruence and similarity including the relationship between similar lengths. •Compare lengths, areas and volumes using ratio notation and/or scale factors; make links to similarity (including trigonometric ratios)
<p>Factors Multiples Expand Arithmetic Integer Rearrange Formulae Substitute Negative Expressions Inequalities</p>	<p>Inverse Operations Quadratic Measure Scale Accurately Bisectors Locus Equidistant Constructions Quadrants Reciprocal Units Gradient Approximate Units converting</p>
<p>Students are able to understand and apply the skills identified above.</p>	<p>Students are able to understand and apply the skills identified above.</p>
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Half term 4 - January	Half term 5 - February	Half term 6 - April
To develop fluency, problem solving and reasoning skills across the 6 key areas of number, algebra, geometry and measures, statistics, probability and ratio and proportion	To develop fluency, problem solving and reasoning skills across the 6 key areas of number, algebra, geometry and measures, statistics, probability and ratio and proportion	To develop fluency, problem solving and reasoning skills across the 6 key areas of number, algebra, geometry and measures, statistics, probability and ratio and proportion
<p>Algebra - Formulae</p> <ul style="list-style-type: none"> Use a formula in words such as: Total pay = rate per hour x number of hours + bonus Use formulae from mathematics and other subjects such as $v = u + at$ Use formulae such as $P = 2L + 2W$ to find W given P and L (P) substitution Derive formulae such as $C = 35h + 55$ Derive more complex formulae Distinguish between an expression, an equation and a formula, argue mathematically to show algebraic expressions are equivalent, and use algebra to support and construct arguments. Substitute positive numbers into a simple formula such as $P = 2L + 2W$ Substitute negative numbers into a simple formula such as $F = 1.8C + 32$ Substitute numbers into more complicated formulae such as $C = (3k^3 + 4d)/9$ Rearranging formulae <p>Geometry and Measure - Area, Length and Volume</p> <ul style="list-style-type: none"> Find the volume of a shape by counting cubes Find the volume of a cuboid (P) multiplying, cube numbers Convert between square and cube units such as changing 3.7 m^3 to cm^3 Find the volume of prisms including cylinders (P) area of a circle Find the surface area of simple prisms Find corresponding lengths in similar shapes Surface area and volumes of spheres, pyramids, cones and composite solids <p>Probability</p> <ul style="list-style-type: none"> Understand and use the vocabulary of probability (P) Understand and use the probability scale (P) Display outcomes systematically and display systematic listings. Understand the differences between experimental and theoretical probability Use a two-way table to find probability Understand mutually exclusive events Identify different mutually exclusive events and know, if they cover all possibilities, then the sum of their probabilities is 1 Use probability to estimate outcomes for a population Understand and use relative frequency Use a probability model to predict the outcomes of future experiments; understand that empirical unbiased samples tend towards theoretical probability distributions, with increasing sample size Calculate the probability of independent and dependent combined events, including using tree diagrams and other representations, and know the underlying assumptions Number - Indices and standard form Work out or know simple squares and square roots (p) Work out or know simple cubes and cube roots (P) multiplying numbers Use standard form (P) working with indices, multiplying numbers by 10, 100, 1000 Use index notation and index laws for multiplication and division for positive integer powers 	<p>Geometry and Measure – Transformations</p> <ul style="list-style-type: none"> Revisit rotation/reflection/translation Enlarge a shape by a positive scale factor (P) multiplying by positive numbers Find the measurements of the dimensions of an enlarged shape Enlarge a shape by a positive scale factor from a given centre Find the ratio of corresponding lengths in similar shapes and identify this as the scale factor of enlargement Use ratios in similar shapes to find missing lengths Enlarge shapes with fractional scale factors (P) multiplying fractions <p>Geometry and Measure - Pythagoras</p> <ul style="list-style-type: none"> Use of square numbers, and calculators (P) Use Pythagoras' theorem to find the third side of a right-angled triangle (P) multiplying/dividing, being able to square root numbers Use Pythagoras' theorem to prove that a triangle is right-angled <p>Geometry and Measure - Measures</p> <ul style="list-style-type: none"> Decide which is the most appropriate unit of measurement to use in everyday situations (P) Measure the length of a line (P) using rulers and pencils Make sensible estimates of lengths Use standard units of mass, length, time, money and other measures. (P) convert measures Use compound measures, such as speed and pressure (numerical and algebraic contexts) Recognise that measurements may be inaccurate by up to one half unit either side Convert between related compound units (speed, rates of pay, prices, density, pressure) in numerical and algebraic contexts <p>Ratio, Proportion and rates of change - Proportion</p> <ul style="list-style-type: none"> Set up, solve and interpret growth and decay problems. Solve problems based on compound interest. Understand that X is inversely proportional to Y is equivalent to X is proportional to $1/y$ Interpret equations that describe direct and inverse proportion Interpret the gradient of a straight line graph as a rate of change; recognise and interpret graphs that illustrate direct and inverse proportion 	<p>Geometry and Measure - Properties of Polygons</p> <ul style="list-style-type: none"> Recognise and name shapes such as parallelogram, trapezium and rhombus (P) Use a standard convention for labelling sides and angles on polygons Derive the sum of angles in a triangle Classify a quadrilateral using its geometric properties Calculate interior and exterior angles of a quadrilateral/regular polygons <p>Algebra - Quadratics</p> <ul style="list-style-type: none"> Draw graphs of simple quadratics such as $y = x^2$, $y = x^2 - 4$ and $y = 3x^2$ Draw graphs of harder quadratics such as $y = x^2 + 2x + 1$ Use a quadratic graph to estimate x- and y-values, giving answers to an appropriate degree of accuracy Expand double brackets Factorise and solve quadratics including the difference of 2 squares <p>Algebra – Simultaneous Equations</p> <ul style="list-style-type: none"> Solve simultaneous equations Derive simultaneous equations <p>Geometry and Measure - Vectors</p> <ul style="list-style-type: none"> Addition and Subtraction of Vectors Multiplication of a vector by a scalar Represent vectors on a diagram
<p>Symmetry</p> <p>Reflection</p> <p>Rotation</p> <p>Co-ordinates</p> <p>Parallel</p> <p>Formulae</p> <p>Substitution</p> <p>Expression</p> <p>Equation</p> <p>Volume</p> <p>Area</p> <p>corresponding</p>	<p>Similar</p> <p>Ratio</p> <p>Enlargement</p> <p>Prove</p> <p>Right angle</p> <p>Measure</p> <p>Estimate</p> <p>Pressure</p> <p>Standard form</p> <p>Accurate</p> <p>Positive</p> <p>Index law</p>	<p>Quadratics</p> <p>Sum</p> <p>Quadrilateral</p> <p>Expand</p> <p>Bracket</p> <p>Vector</p> <p>Substitute</p> <p>Scalar</p> <p>Interior</p> <p>Exterior</p> <p>Regular</p> <p>Simultaneous</p> <p>Geometric</p> <p>Parallelogram</p> <p>Rhombus</p> <p>Polygon</p>
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