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| Subject : | Maths |
| Scheme title | Half term 1 - June |
| 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 - Types of Number</p> <ul style="list-style-type: none"> • Understand place value in large number (P) • Multiply and divide whole numbers by 10, 100, 1000,... (P) • Add and subtract large numbers (P) • Multiply and divide large numbers (up to three digits by two digits) (P) • Use hierarchy of operations to carry out calculations (BODMAS/BIDMAS) (P) • Understand positive and negative integers (P) • Add and subtract positive and negative numbers (P) • Multiply and divide positive and negative numbers (P) <p>Number – LCM/HCF</p> <ul style="list-style-type: none"> • Find the factors of a number (P) • Find the multiples of a number (P) • Find the least common multiple (LCM) of two numbers (P) • Find the highest common factor (HCF) of two numbers (P) <p>+B1• Use Venn diagrams</p> <ul style="list-style-type: none"> • Recognise prime numbers (P) • Write a number as a product of prime factors • Unique factorisation theorem states that every integer greater than 1 is prime or can be written as the product of primes. <p>Algebra - Sequences</p> <ul style="list-style-type: none"> • Continue a sequence of diagrams or numbers (P) • Write the terms of a simple sequence (P) • Find a term in a sequence with positive numbers (P) • Write the term-to-term rule in a sequence with positive numbers (P) • Find a term in a sequence with negative or fractional numbers (P) • Write the term-to-term rule in a sequence with negative or fractional numbers (P) • Write the terms of a sequence or a series of diagrams given the nth term • Write the nth term of a sequence or a series of diagrams <p>Recognise and use sequences or triangular, square and cube numbers, Fibonacci type sequences, quad-ratic sequences and geometric sequences.</p> <p>Geometry and Measure - Angle Facts</p> <ul style="list-style-type: none"> • Recognise acute, obtuse, reflex and right angles (P) • Understand the terms 'perpendicular' and 'parallel' (P) • Identify scalene, isosceles, equilateral and right-angled triangles (P) |
| Key Words | <p>Integer Multiply Divide BODMAS Negative numbers Prime number Factor Multiple LCM HCF Sequence Acute Obtuse Reflex Parallel Scalene Isosceles Perpendicular</p> |
| End Point | Students are able to understand and apply the skills identified above. |
| 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> |

Half term 2 - September

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

Number – Fractions

- Find the fraction of a shape shaded (P)
- Put fractions with same denominator in order (P)
- Simplify fractions (P)
- Compare and order fractions with different denominators (P)
- Convert improper fractions to mixed numbers and vice versa (P)
- Add and subtract fractions (P)
- Add and subtract mixed numbers
- Multiply and divide fractions (P)
- Multiply and divide mixed numbers
- Solve problems involving fractions
- Calculate fractions of quantities (P)
- Find one quantity as a fraction of another (P)
- Express simple decimals and percentages as fractions (P)
- Express fractions as decimals and percentages (P)
- Work interchangeably with terminating decimals and their corresponding fractions (such as 3.5 and 7/2 or 0.375 and 3/8)

Algebra - Working with Symbols

- Simplify an expression such as $5a + 2a - 3a$ (P)
- Simplify an expression such as $4a + 5b - a + 2b$ (P)
- Understand the rules of arithmetic as applied to algebra such as $x - y$ is not equal to $y - x$ (P)
- Understand that $3a$ means 3 times a , $x/4$ means x divided by 4 and $x2$ means x multiplied by x (P)
- Work out the value of an expression such as $3x + 2y$ when $x = 4$ and $y = 3$ (P)
- Work out the value of an expression such as $2x - 3y$ for negative and fractional values of x and y
- Expand brackets such as $4(x - 3)$
- Expand and simplify an expression such as $3(3x - 7) - 2(3x + 1)$
- Expand double brackets
- Factorise an expression such as $6x + 8$

Number - Decimals

- Write down the place value of a decimal digit such as the value of 3 in 0.63 (P)
- Order decimals to find the biggest and the smallest (P)
- Round to the nearest integer (P)
- Round numbers to given powers of ten and to a given number of decimal places (P)
- Round a number to one significant figure and to any significant figures
- Estimating answers when rounding
- Add and subtract decimals (P)
- Multiply decimals such as 2.4×0.7
- Estimate answers to calculations involving decimals
- Divide a number by a decimal such as $1 \div 0.2$ and $2.8 \div 0.7$
- Convert simple fractions to decimals and decimals to fractions (P)
- Recognise that recurring decimals are exact fractions and vice versa
- apply and interpret limits of accuracy when rounding or truncating.

Algebra - Co-ordinates and Linear Graphs

- Use co-ordinates in the first quadrant (P)
- Use co-ordinates in all four quadrants (P)
- Draw lines such as $x = 3$ and $y = x$ (P)
- where appropriate, interpret simple expressions as functions with inputs and outputs
- Find the co-ordinates of the midpoint of a line segments
- Produce a table of values for equations such as $y = 3x - 5$ or $x + y = 7$ and draw their graphs
- Solve problems such as finding where the line $y = 3x - 5$ crosses the line $y = 4$ graphically
- Find the y-intercept of straight-line graphs
- Find the gradients of straight-line graphs
- Identify the equation of the line from a graph
- Use $y=mx+c$ to identify parallel lines

Denominator

- Simplify
- Mixed number
- Expression
- Expand
- Factorise
- Integer
- Significant figure
- Recurring decimal
- Quadrant
- Midpoint
- Line segment
- Gradient

Students are able to understand and apply the skills identified above.

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.

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| Half term 3 - November | Half term 4 - January |
|---|---|
| <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>Number - Percentages</p> <ul style="list-style-type: none"> Understand that percentage means 'number of parts per 100' (P) Change a percentage to a fraction to a decimal and vice versa (P) Compare percentages, fractions and decimals (P) Work out a percentage of a given quantity (P) Increase or decrease by a given percentage. For example, find the new price of a £490 TV after a 15% reduction Express one quantity as a percentage of another Work out a percentage increase or decrease Work out the percentage change between two values Solve problems involving percentage change and reverse percentage Solve problems involving simple and compound interest <p>Algebra - Equations and Inequalities</p> <ul style="list-style-type: none"> Solve a simple equation such as $5x = 10$ or $2x + 4 = 8$ Solve an equation involving fractions such as $x/3 = 4$ Solve equations with unknowns on both sides such as $3x + 2 = 6 - x$ Solve equations which include brackets such as $4(2x - 1) = 20$ Solve equations with unknowns on both sides and brackets such as $4x + 5 = 3(x + 4)$ Solve equations with fractions, unknowns on both sides and brackets such as $x/2 - x/8 = 9$ or $(2x-7)/4 = 1$ <p>.....</p> <ul style="list-style-type: none"> Recognise the notation for inequalities (P) <p>.....</p> <ul style="list-style-type: none"> Represent and interpret inequalities on a number line Solve an inequality such as $2x - 7 < 9$ Find the integer solutions of an inequality such as $-8 < 2n \leq 5$ <p>Geometry and Measure - Volume and Area</p> <ul style="list-style-type: none"> Find the area and perimeter of a triangle, a parallelogram and a trapezium (P) Find the area and perimeter of compound shapes made from triangles and rectangles <p>.....</p> <ul style="list-style-type: none"> Calculate the circumference and area of a circle (P) Work out the area and perimeter of a semi-circle Calculate exactly with multiples of pi Calculate arc lengths, angles and areas of sectors and circles. <p>.....</p> <ul style="list-style-type: none"> Find the volume of a cuboid (P) Find the volume of prisms including cylinders Find the surface area of simple prisms <p>Geometry and Measure - Constructions</p> <ul style="list-style-type: none"> Construct perpendicular bisectors and angle bisectors Use simple scale drawings (P) Select congruent shapes Understand congruence and similarity Draw a triangle given three sides, or two sides and the included angle, or two angles and a side | <p>Algebra – Formulae</p> <ul style="list-style-type: none"> Use a formula written in words such as: Total pay = rate per hour x no. of hours + bonus (P) Derive expressions and formulae Derive more complex expressions and formulae Substitute positive numbers into a simple formula such as $P = 2L + 2W$ (P) Use a formula such as $P = 2L + 2W$ to find W given P and L (P) Substitute negative numbers into a simple formula Substitute numbers into more complicated formulae such as $C = ((A+1))/9$ Use formulae from mathematics and other subjects to solve problems Distinguish between a term, an expression, an equation, a formula and an identity mass and volume and speed, distance and time Rearrange linear formula such as $p = 3q + 5$ <p>Number - Indices and Standard Form</p> <ul style="list-style-type: none"> Work out or know simple squares and square roots (up to 15) (P) Work out or know simple cubes and cube roots (up to 5 and 10) (P) Use the terms square, positive square root, negative square root, cube and cube root (P) Use index notation and index laws for multiplication, division and brackets for positive integer powers <p>.....</p> <ul style="list-style-type: none"> Convert between ordinary numbers and standard form and vice versa Calculate with standard form <p>Ratio and Proportion and rates of change – Compound Measures</p> <ul style="list-style-type: none"> Plot points on conversion graphs (P) Read values from conversion graphs (P) Read a value from a conversion graph for a negative value Construct linear functions from real-life situations and plot their corresponding graphs Interpret horizontal lines on a distance-time graph Carry out simple interpretation of graphs such as finding a distance from distance-time graphs Carry out more advanced interpretation of real-life graphs, such as finding simple average speed from distance-time graphs and recognising when the fastest average speed takes place Find the average speed in km/h from a distance-time graph over time in minutes <p>Geometry and Measure - Pythagoras Theorem</p> <ul style="list-style-type: none"> Use Pythagoras' theorem to find the third side of a right-angled triangle Use Pythagoras' theorem to prove that a triangle is right-angled |
| <p>Solve Unknown Percentage Ratio Inequality Unitary Volume Area Trapezium Arc Sector Prism Pi</p> | <p>Formula Substitute Square root Cube root Power Standard form Transformation Rotation Reflection Translate Enlarge Scale Factor Vector Conversion Horizontal and vertical Distance time graph Real life graph Perpendicular Scale Congruent Similar</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 5 - February | Half term 6 - April |
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| 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>Statistics - Collecting Data</p> <ul style="list-style-type: none"> • Design and use tally charts for discrete and grouped data (P) • Understand and name the different types of data • Design and use data collection sheets, • Design and use two-way tables for discrete and grouped data • Identify possible sources of bias and use of data collection sheets • Understand the data – handling cycle • Understand that increasing sample size generally leads to better estimates • Infer properties of a population from a sample, while knowing the limitations of sampling • Interpret and construct tables and line graphs for time series data <p>Statistics - Representing Data</p> <ul style="list-style-type: none"> • Construct and interpret a pictogram (P) • Construct and interpret a bar chart (P) • Construct and interpret a dual bar chart • Interpret a pie chart • Construct a pie chart <p>-----</p> <ul style="list-style-type: none"> • Construct a histogram for data with equal class intervals • Interpret a line graph for time series data • Use of Venn Diagrams • Use set notation with Venn diagrams <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 • Draw reciprocal and cubic graphs • Find the equation of the line through two given points, or through one point with a given gradient. Identify and interpret roots, intercepts and turning points of quadratic functions graphically; deduce roots algebraically. <p>-----</p> <ul style="list-style-type: none"> • Expand double brackets (P) • Factorise quadratics including difference of 2 squares • Solve quadratics by factorising • Find approximate solutions using a graph <p>Algebra - Simultaneous Equations</p> <ul style="list-style-type: none"> • Derive simultaneous equations from real life situation • Solve two simultaneous equations in two variables (linear/linear) algebraically; find approximate solutions using a graph • Translate simple situations or procedures into algebraic expressions or formulae; derive an equation (or two simultaneous equations), solve the equation(s) and interpret the solution | <p>Statistics - Statistical Measures:</p> <ul style="list-style-type: none"> • Find the mode for a set of numbers (P) • Modal class for grouped data • Find the median for an odd set of numbers/ the median class for grouped data (P) • Find the median for an even set of numbers (P) • Work out the range for a set of numbers (P) • Consider outliers when calculating the range of a distribution. • Calculate the mean for a set of numbers (P) • Compare the mean and range of two distributions • Calculate the mean for a frequency distribution • Find the mean for grouped frequency table <p>Geometry and Measure - Reflect, Rotate, Translate</p> <ul style="list-style-type: none"> • Draw a line of symmetry on a 2-D shape/all lines (P) using pencils, rulers, drawing shapes • Draw the reflection of a shape in a mirror line • Name, draw or complete 2-D shapes from information about their symmetry • Reflect shapes in the axes of a graph • Reflect shapes in lines parallel to the axes, such as $x = 2$ and $y = -1$ (P) define parallel • Reflect shapes in lines such as $y = x$ and $y = -x$ (p) equations of straight lines • Describe fully reflections in any line parallel to the axes, $y = x$ or $y = -x$ and rotations about any point • Give the order of rotational symmetry of a 2-D shape • Rotate shapes about the origin/any point (P) coordinates • Describe fully reflections in a line and rotations about the origin • Find the centre of rotation and describe it fully • Translate a shape using vector descriptions <p>Geometry and Measure - Trigonometry</p> <ul style="list-style-type: none"> • Identify the adjacent, opposite and hypotenuse side of a right-angle triangle • Be able to choose the approximate ratio to use to solve a missing side or angle problem. • Use sine, cosine and tangent to calculate a missing side in a right-angled triangle • Use sine, cosine and tangent to calculate an angle in a right-angled triangle • Solve angle of elevation/depression problems. <p>Ratio, Proportion and Rates of Change - Ratio and Proportion</p> <ul style="list-style-type: none"> • Use ratio notation, including reduction to its simplest form and its various links to fraction notation (P) • Express a multiplicative relationship between two quantities as a ratio or a fraction • Divide a quantity in a given ratio • Solve simple ratio and proportion problems, such as finding the ratio of one quantity to another • Solve more complex ratio and proportion problems such as sharing out a quantity in a given ratio • Solve ratio and proportion problems using the unitary method • Write a ratio as a linear function |
| <p>Discrete</p> <p>Bias</p> <p>Sample size</p> <p>Histogram</p> <p>Time series</p> <p>Venn</p> <p>Quadratic</p> <p>Reciprocal</p> <p>Cubic</p> <p>Factorise</p> <p>Simultaneous</p> <p>Pythagoras</p> <p>Right angled</p> <p>Hypotenuse</p> <p>Equivalent</p> <p>Integer</p> <p>Power</p> <p>Significant figure</p> | <p>Modal</p> <p>Median</p> <p>Outlier</p> <p>Frequency</p> <p>Scatter graph</p> <p>Best fit</p> <p>Correlation</p> <p>Probability</p> <p>Experimental</p> <p>Theoretical</p> <p>Mutually exclusive</p> <p>Population</p> <p>Trigonometry</p> <p>Adjacent</p> <p>Opposite</p> <p>Elevation</p> <p>Depression</p> <p>Sine</p> <p>Cosine</p> <p>Tangent</p> |
| Students are able to understand and apply the skills identified above. | |
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