

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	Number - Prime Factors • Finding factors and multiples (P) • find the least common multiple (LCM) of two simple numbers • find the highest common factor (HCF) of two simple numbers • find the least common multiple (LCM) of two or more numbers • find the highest common factor (HCF) of two or more numbers • Know Prime Numbers (P) • write a number as a product of prime factors • Basic understanding of indices rules (positive powers only) • Unique factorisation theorem states every integer greater than 1 is prime or can be written as the product of prime numbers. • Completing Venn Diagrams (P) • Use of Venn diagrams for finding HCF and LCM Algebra - Working with symbols • Simplifying expressions(+ - x ÷)(P) • Expand brackets such as $4(x - 3)$ • Expand and simplify an expression such as $3(3x - 7) - 2(3x + 1)$ • Finding common factors of terms(P) • Factorise an expression such as $6x + 8$ • Expand and simplify two brackets such as $(x - 3)(x + 5)$ • Expand and simplify two brackets such as $(3x + 1)(2x - 3)$ • Expanding triple brackets. Ratio, Proportion and Rates of Change - Ratio • Simplify ratio • Divide a quantity in a given ratio • Write a ratio as a linear fraction • Solve simple ratio and proportion problems, such as finding the ratio of teachers to students • Solve more complex ratio and proportion problems such as sharing money in the ratio of age • Express a multiplicative relationship between two quantities as a ratio or fraction • Solve ratio and proportion problems using the unitary method
Key Words	Factor Multiple Prime Product Venn Sequence Series Substitute Expression Expand Probability Mutually exclusive Estimate Frequency
End Point	Students are able to understand and apply the skills identified above.
Assessment method	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. Students complete one formal assessment per term using diagnostic questions or in written form.

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 - Surds • Simplifying Surds(P) • Multiplying Surds, inc $(3 - \sqrt{5}) (3 + \sqrt{5})$ (P) • Rationalise the denominator of a surd • Geometric sequences where the common ratio is a surd • Simplify surds, such as write $(3 - \sqrt{5})^2$ in the form $a + b\sqrt{5}$ Number - Rounding, Estimating & accuracy (bounds and error intervals) • Calculate exactly with multiples of pi • Estimate powers and roots of any given positive number • Round numbers to different degrees of accuracy, decimal places and significant figures • Estimating(P) • Check calculations using approximations and estimations • Apply and interpret limits of accuracy when rounding or truncating ie. Upper and Lower bounds Algebra - Sequences • 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 numbers • Find the quadratic nth term • Substitute into Expressions(P) • Recognise and use sequences of triangular, square and cube numbers, simple arithmetic progressions, Fibonacci type sequences, quadratic sequences, and simple geometric progressions (r^n where n is an integer, and r is a positive rational number (or a surd)) (and other sequences) Algebra - Equations • Solve an equation such as $3x + 2 = 6 - x$ and $4(2x - 1) = 20$ • Solve an equation such as $4x + 5 = 3(x + 4)$ • Solve an equation such as $x/2 - x/8 = 9$ or $(2x-7)/4 = 1$ • Factorise & solve a quadratic such as $x^2 + 4x + 3$ • Solving Quadratic Equations by Factorising and use of the Formula, Completing the square
Equivalent Denominator Reciprocal Recurring Ratio Unitary Estimate Approximations Surds Rationalise Geometric Expand Linear equation Factorise Quadratic Formula Inequality Cyclic Quadrilateral
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Year Group:

Half term 3 - November

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 - Indices and Standard Form

- Use the terms square, positive square root, negative square root, cube and cube root (P)
- Recall integer squares from 2×2 to 15×15 and the corresponding square roots (P)
- Recall the cubes of 2, 3, 4, 5 and 10 and the corresponding cube roots (P)
- Use index notation and index laws for positive powers
- Use index notation and index laws for negative powers
- Use index notation and index laws for fractional powers such as $16^{1/2}$ and 160.5
- Use index notation and index laws for fractional powers such as $8^{2/3}$ and $8^{-2/3}$
- Convert between ordinary and standard index form numbers
- Use standard index form for calculations involving multiplication and/or division

Algebra - Formulae

- Distinguish between an expression, an equation, an identity and a formula
- Substitute numbers into formulae such as $C = (A+1)D/9$ (P)
- Derive complex expressions and formulae
- Rearrange linear formulae such as $p = 3q + 5$
- Rearrange formulae involving brackets, indices, fractions and square roots
- Rearrange formulae where the variable appears twice

Geometry and Measure - Transformations

- Rotation
- Reflection
- Translation giving the co-ordinates as a vector
- Enlargement (fractional and negative)
- Be able to look at a shape that has been transformed and describe which transformation has taken place describing all the relevant facts

Algebra – Linear Graphs

- To use and interpret co-ordinates in all 4 quadrants (P).
- To substitute into expressions.;
- To plot linear graphs.
- Identify gradient and intercept
- To recognise $y=mx+c$
- To recognise horizontal and vertical straight line graphs.
- Find the equation of a straight line

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 a probability model to predict the outcomes of future experiments; understand that empirical unbiased samples tend towards theoretical probability distributions, with increasing sample size
- Understand and use relative frequency
- Product rule for counting outcomes efficiently
- Draw tree diagrams
- Calculate the probability of independent and dependent combined events, including using tree diagrams and other representations, and know the underlying assumptions
- Understand independent and non-independent events
- Find the probabilities of successive independent events
- Find probabilities of successive dependent events
- The and/or rules of probability.

Square root

Cube root

Index notion

Gradient

Midpoint

Perpendicular line

Identity

Formula

Rearrange

Transformations

Rotation

Translation

Reflection

Enlargement

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Half term 4 - January	Half term 5 - February
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
Number - Percentages • Compare harder percentages, fractions and decimals • Work out more difficult percentages of a given quantity • Increase or decrease by a given percentage – non-calculator and calculator (multiplier) • Express one quantity as a percentage of another • Work out a percentage increase or decrease • Understand how to use successive percentages • Work out reverse percentage problems Algebra - Real life graphs • Interpret real-life graphs • Find simple average speed from distance-speed graphs • Recognise from a distance-time graph when the fastest average speed takes place • Discuss and interpret graphs modelling real situations Algebra - Simultaneous Equations • Solve a pair of simultaneous equations such as $x + y = 5$ and $2x + y = 10$ • Solve a pair of simultaneous equations such as $x + y = 5$ and $2x - y = 10$ • Solve a pair of simultaneous equations such as $x + 3y = 9$ and $3x - 2y = 5$ • Solve a pair of simultaneous equations such as $y = 4x + 5$ and $y = x^2$ • 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 Geometry and Measure - Pythagoras • Use Pythagoras' theorem to find the third side of a right-angled triangle • Use Pythagoras' theorem to prove that a triangle is right-angled • Find the distance between two points from their coordinates • Use Pythagoras' theorem in 3-D problems Algebra - Inequalities • Understand Inequality signs(P) • Represent and interpret inequalities on a number line, using set notation and on a graph • Solve an inequality such as $2x - 7 < 9$ • Solve an inequality such as $3x + 2 \leq 4 - x$ • Find the integer solutions of an inequality such as $-8 < 2x \leq 5$ • Represent linear inequalities in two variables, such as $x + y < 7$, as a region on a graph and using set notation • Solve quadratic inequalities • Represent inequalities on a number line • Represent and solve inequalities algebraically	Statistics – Collecting data • 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 • Understand and name other types of data collection methods • Identify possible sources of bias • Understand the data – handling cycle • Understand that increasing sample size generally leads to better estimates • Infer properties of populations or distributions from a sample, whilst knowing the limitations of sampling • Select and justify a sampling scheme and a method to investigate a population • Use sampling methods including random and stratified sampling Number - Fractions, Decimals • Add and subtract fractions • Convert between Mixed numbers and Top Heavies(P) • Add and subtract mixed numbers • Multiple and Divide proper fractions(P) • Multiply and divide mixed fractions • Multiply and divide mixed numbers • Solve problems involving fractions • Find the reciprocal of a number • Find one quantity as a fraction of another • Simplify fractions such as $x/3 + x/5$ and $2(x-1)^2/(x-1)$ ----- • Add and subtract decimals • Multiply and divide decimals • Understand the effects of multiplying and dividing by numbers between 0 and 1 • Convert fractions to decimals • Calculate exactly with fractions Statistics - Statistical Measures • Calculate the mean, median, mode range for a frequency distribution • Find the modal class, mean, median & range for grouped data • Find the upper and lower quartiles and calculate inter-quartile range for a frequency distribution Geometry - Constructions and loci • Construct perpendicular bisectors and angle bisectors • Construct perpendicular lines from a point to a line, perpendicular on a line and an angle of 60° • Understand the idea of locus
Multiplier Reverse percentage Real life graph Factorise Proof Simultaneous Pythagoras Hypotenuse Sine Cosine Tangent	Bias Sampling Stratified Sampling Histogram Box plot Quartiles Cumulative Perpendicular Bisector Locus
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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 Algebra - Quadratics - Factorise an expression such as $x^2 - 5x + 14$ or $x^2 - 9$ - Solve an equation such as $x^2 - 5x + 14 = 0$ - Factorise an expression such as $3x^2 + 7x + 2$ or $3x^2 - 27$ - Simplify an expression such as $(x^2+3x+2)/(x^2+1)$ by factorising - Solve problems using equations that factorise such as $3x^2 + 7x + 2 = 0$ - Solve problems using equations such as $2x^2 - 6x + 1 = 0$ by using the quadratic formula - Solve an equation such as $x^2 - 8x + 11 = 0$ by completing the square - Solve problems using equations such as $x^2 + 3x + 2 = 5$ by graphical methods - Solve a problem using step-by-step deductions - Derive a proof using reasoning and logic Geometry and Measure - Trigonometry - Use sine, cosine and tangent to calculate a side in a right-angled triangle - Use sine, cosine and tangent to calculate an angle in a right-angled triangle Geometry and Measure - Circle theorems - Know names of circle parts - Know all 6 main circle theorems including problem solving o1) Diameter subtends 90° at circumference o2) Angle at centre is double angle at circumference when subtended from same arc o3) Angles at circumference are equal when subtended from same arc o4) Cyclic Quadrilateral: opposite angles equal 180° o5) Alternate segment theorem: angle in triangle opposite to the alternate segment are equal 6) radius made 90° to tangent & tangents meeting to a point are equal in length Statistics – Representing data - Interpret a pie chart/Construct a pie chart - Construct a histogram (frequency diagram) with equal class intervals - Construct a histogram with unequal class intervals ----- - Use of Venn diagrams - Construct and interpret a tables and line graphs for time series data - Construct and interpret a cumulative frequency diagram for continuous or grouped data - Use a cumulative frequency diagram to estimate median and inter-quartile range - Construct and interpret a box plot - Compare two sets of data using a box plot referencing average and spread
Frequency Modal class Inter-quartile Scatter graph Correlation Mutually exclusive Relative frequency Independent Conditional Quadratic Inequality
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