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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 – Negatives</p> <ul style="list-style-type: none"> •To secure understanding of the number line (P) •To recognise negative numbers in context (such as temperature). (P) •To order numbers including negatives and decimals. •To understand place value in numbers •To write whole numbers in figures and words. •To be able to calculate basic negative number calculations involving temperature. •To understand the effect of multiplying and dividing whole numbers and decimals by 10, 100 and 1000. <p>Number - Rounding</p> <ul style="list-style-type: none"> •To round decimals to nearest integer then to the nearest decimal place (P). •To round to 1 and 2 significant figures •To use rounding to approximate answers (estimation). •To apply inverse operations and approximation to check answers to problems. •Estimating answers <p>-----</p> <ul style="list-style-type: none"> •Fractions: Simplifying, Addition, Subtraction, Multiplication and Division techniques. Include mixed numbers and improper fractions. •To manipulate algebraic fractions (secure knowledge of fraction manipulation (P)) <p>Geometry and Measure - Draw lines and angles</p> <ul style="list-style-type: none"> •To name common 2D shapes. (P) •To identify congruence of 2D shapes •To investigate properties of 2D and 3D shapes (P) •To accurately measure lengths of shapes using rulers (P) <p>-----</p> <ul style="list-style-type: none"> •To recognise acute, obtuse, right angles. •To measure and draw angles using protractor. Include estimation. <p>Algebra - Expanding and simplifying expressions</p> <ul style="list-style-type: none"> •To secure knowledge of multiples and factors (P) •To collect like terms and simplifying expressions <ul style="list-style-type: none"> •To expand over a single bracket including two single brackets (e.g. $2(3x+4) - 3(2x+4)$) •To expand double brackets/ Expanding Triple brackets <ul style="list-style-type: none"> •To factorise linear expressions •To factorise quadratics (extend to $ax^2 + bx + c$) •To complete the square <p>Theme Parks</p> <ul style="list-style-type: none"> •Disneyland (Lesson 1) •Lunar Park (Lesson 2) |
| Key Words | <p>Negative Place value Multiplication Division Significant figure Estimation Symmetry Bracket Expand</p> |
| 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

Ratio, Proportion and Rates of Change – Scales

- To read and interpret scales on a range of measuring instruments and be able to state what each labelled division represents (P)
- To solve problems and making sensible estimates of a range of measures in relation to everyday situations
- To extend to converting areas and volumes.
- Compound units: speed, density and pressure

Algebra - Equations

- To secure knowledge of adding/subtracting & multiplying/dividing with negative numbers (P)
- To secure knowledge of expanding single brackets (P)
- To be able to solve basic one-step and two-step linear equations.
- To be able to solve basic linear equations including brackets
- To be able to solve equations with the unknown on both sides (also with brackets).
- To solve equations involving fractions
- Quadratics and completing the square
- Solve simple algebraic fractions.

Geometry and Measure - Area, Perimeter and Volume

- To be able to find perimeters and areas by counting squares. (P)
- To understand and use formula for area of rectangle. (P)
- To secure knowledge of naming quadrilaterals and parts of a circle (P)
- To find the area of triangle and parallelogram
- To find area and circumference of a circle.
- To find area and perimeter of compound shapes.
- To solve problems and work backwards from areas and volumes to lengths
- To find the volume of a cuboid
- To find the volume of a prism
- To find the Volume of a Cone and Pyramid.
- To extend volume to include algebraic and worded problems.

Statistics - Scatter Graphs

- To understand how to read Scatter Graphs and identify correlation
- To be able to draw a line of best fit.
- To be able to estimate from a line of best fit exam style questions

Geometry and Measure - Pythagoras

- To secure knowledge in solving one step equations & squaring numbers (P)
- To calculate the missing Hypotenuse
- To calculate the missing other side
- To use and Apply Pythagoras to 2D problems.
- Find the surface area of triangular prisms using Pythagoras to find the slanted length

Money

- Loans/Insurance/Car tax/Budgets

Measure

Convert

Length

Area

Volume

Quadratic

Quadrilateral

Parallelogram

Compound shape

Cone

Pyramid

Correlation

Line of best fit

Pythagoras

Hypotenuse

Surface area

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.

Students complete one A3 page assessment once per half term which is teacher marked. Students complete RAG analysis to identify weaknesses and teachers record this on the central spreadsheet building up a profile for each student over the ye

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 - BIDMAS and Decimals

- To secure use of calculators and multiplication methods (P).
- To use of calculators in BIDMAS calculations.
- To secure knowledge of bus stop division (P)
- To subtract decimal values (up to 2 decimal places)
- To divide a whole number by another whole number (3-digit value divided by a 1-digit value)
- To multiply and divide a decimal value by a whole number.

Algebra - Sequences

- To secure knowledge of adding and subtracting with negative numbers (P)
- To complete simple number patterns by adding on (i.e., 6, 10, __, 18, __, __, 30, 34 and 24, 21, 18, 15 ...). Understand that each number in a pattern/sequence is called a 'term'.
- Problem solve with patterns.
- To follow a rule to generate a number pattern.
- To understand and use function machines.
- To recognise and generate terms of a sequence using term-to-term and function machines.
- To calculate the nth term rule
- To set up sequences within worded problems.
- To recognise geometric sequences and generate the next term
- To recognise quadratic sequences and generate the next term

Statistics - Data Types

- To understand and use the terms primary data, secondary data, qualitative and quantitative data, discrete and continuous.
- To recognise and understand the data handling cycle
- To understand bias.
- To understand the different ways of collecting data and use sampling techniques (including stratified sampling).

Geometry and Measure - Transformations 1

- To secure knowledge of coordinates in 4 quadrants (P)
- To label x= and y= lines in a 4 quadrant axis (P)
- To reflect a shape in a vertical or horizontal mirror line. (P)
- To reflect a shape in a diagonal line.
- To reflect of a shape in a given line (y=3)
- To identify all the symmetries of 2D shapes (including rotational symmetry)
- To explore the planes of symmetry in 3D shapes
- To identify a reflection including identifying the mirror line.
- To rotate a shape given the centre of rotation and the angle and direction of rotation
- To translate a shape using words to describe movement and direction
- Use of column vectors for translations

Statistics - Averages

- To secure knowledge of adding/multiplying/dividing & using a calculator (P)
- To calculate the range, mode, median and mean for a set of data.

Calculation

Generate

Function machine

Quadratic

Pattern

Rule

Quadratic

Sequence

Continuous

Discrete

Primary

Secondary

Qualitative

Quantitative

Data handling cycle

Bias

Sampling

Stratified sampling

Reflect

Rotate

Translate

Averages

Hypotenuse

Plane of symmetry

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Half Term 4 - January

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

- To secure knowledge of times tables and factors (P)
- To shade in fractions
- To simplify fractions
- To be able to compare fractions or order fractions by changing the denominators to be the same or by changing them to decimals
- To calculate a fraction of an amount.
- To convert FDP from one to the other
- To use the equivalence of fractions, decimals and percentages to compare proportions

Ratio, Proportion and Rates of Change - Ratio

- To understand and simplify ratios.
- To convert between ratios and fractions.
- To share a ratio by a given amount.
- Direct proportion EXT: Inverse proportion.
- To solve more complex ratio and proportion problems.

Statistics - Data Representation

- To record data into a tally chart.
- To collect Data first into a frequency table then constructing a Bar Chart.
- To construct Bar Chart from a given frequency table; simple interpretation of data.
- To construct and interpret a pie chart
- To interpret graphs and diagrams, including pie charts and line graphs.
- To draw and interpret a frequency polygon

Algebra - Inequalities

- To understand 'greater than' and 'less than' with numerical values (P)
- To represent inequalities on a number line.
- To solve inequalities in one variable and represent the solution set on a number line.
- EXT: Solve two step inequalities

Algebra - Simultaneous Equations

- To secure knowledge of substitution (p)
- To secure in solving 2-step equations (p)
- To use the method of elimination to solve linear simultaneous equations
- To extend to solve simultaneously one linear and one quadratic equation in two variables.

Number - Percentages

- To be able to calculate a percentage increase and decrease.
- To work confidently with reverse percentages.
- To be able to convert a recurring decimal in to a fraction.

Shopping

- Best buy
- Party bags

Simplify

Ratio

Proportion

Frequency

Frequency polygon

Inequalities

Elimination

Simultaneous

Convert

Reverse percentages

Increase

Decrease

Recurring decimal

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| <p>Half Term 5 - February</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>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 – Linear Graphs</p> <ul style="list-style-type: none"> 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 To plot quadratic graphs To use graphs to solve two linear simultaneous equations. To use graphs to solve simultaneous equations (one linear and one quadratic) <p>Geometry and Measure - 2D and 3D Shapes</p> <ul style="list-style-type: none"> To recap mathematical names for common 2D shapes, extending to 3D shapes (P). To classify shapes according to their properties e.g. Parallel lines, angles, symmetry. (P) To classify quadrilaterals by their geometric properties and solve geometrical problems using properties of angles. To understand what a prism is and the mathematical language used to describe faces, edges and vertices. To draw plans and elevations To find the surface area of 3D shapes <p>Probability</p> <ul style="list-style-type: none"> To match events to the phrase which best describes its likelihood (certain, likely, evens, unlikely, impossible) (P) To understand and use the probability scale from 0 to 1 (P) To calculate probabilities To know that the sum of probabilities of all mutually exclusive outcomes is 1 and use this when solving problems To use Venn diagrams to interpret probability To understand relative frequency Venn diagrams using set notation <p>Calculator Use</p> <p>To be confident in using a calculator efficiently and appropriately to perform complex calculations with numbers of any size, knowing not to round during intermediate steps of a calculation. Be able to use a calculator to calculate a fraction or percentage of an amount (including repeated percentage change).</p> <p>Sport</p> <ul style="list-style-type: none"> Olympics/World Cup | <p>Algebra - Re-arranging formula</p> <ul style="list-style-type: none"> To secure understanding of inverse operations (P) To re-arrange one step equations To rearrange two step equations To extend to include powers and x on both sides. <p>Statistics - Cumulative Frequency and Box Plots</p> <ul style="list-style-type: none"> To construct Cumulative Frequency curves; be able to calculate UQ, LQ, IQR and Median. To construct Box Plots. To be able to compare two sets of data. <p>Geometry and Measure - Transformations 2</p> <ul style="list-style-type: none"> To enlarge shapes with a whole number scale factor To enlarge shapes with a whole number scale factor and with a given centre of enlargement To understand the term congruent and which transformations map the original shape onto a congruent image. To enlarge shapes using fractional and negative SF <p>Geometry and Measure - Constructions and Loci</p> <ul style="list-style-type: none"> To use straight edge and compasses to construct triangles. To bisect a line and an angle. To determine the locus of a point that moves according to a given rule. To construct a pentagon <p>Revision for End of year Assessments – Use the QLA analysis on the year 8 spreadsheet to identify specific topics which need re-teaching to your group. This will support revision for the end of year assessments.</p> <p>Maths and Beyond</p> <ul style="list-style-type: none"> Fractals Einstein Problems |
| <p>Acute Obtuse Reflex Bearings Operation Inverse Vector Box plot Compare Scale factor construct</p> | <p>Acute Obtuse Reflex Bearings Operation Inverse Vector Box plot Compare Scale factor construct</p> |
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