



CURRICULUM MAP (Long term plan)

SUBJECT:           MATHS          

YEAR GROUP           8          

	<b>Cycle 1 Autumn</b>	<b>Cycle 2 Spring</b>	<b>Cycle 3 Summer</b>
<b>Substantive knowledge</b> – Essential knowledge & conceptual understanding of the National Curriculum	Number and Proportion and Algebra <b>NP9 – Estimation and Use of Calculator</b> <b>A3 – Manipulating and Simplifying Expressions 2</b> <b>A4 – Linear Equations</b> <b>NP10 – Proportional Reasoning</b> <b>NP11 – Ratio</b>	Number and Proportion, Algebra and Geometry <b>GM2 – Polygons &amp; Angles</b> <b>GM3 – Area</b> <b>A5 – Formulae</b> <b>A6 - The Cartesian Grid</b>	Algebra and Statistics and Probability <b>A6 – The Cartesian Grid (2)</b> <b>SP1 – Discrete Data</b> <b>SP2 – Bivariate Data &amp; Time Series</b> <b>A7 – Sequences 1</b>
<b>Disciplinary knowledge</b> - what skills are practised?	<b>NP9 – Estimation and Use of Calculator:</b> - Using the calculator effectively. - Timetables - with and without the time button on the calculator. Solving problems with time accurately and by estimating. Converting units of time with/without calculator. - Approximating the position of numbers on a number line, approximate metric/imperial conversions (with a calculator). - Approximating powers and roots. - Error intervals for rounded numbers, including representing on a number line. - Estimating the answer to calculations. - Related calculations and truncation and error intervals.	<b>GM2 – Polygons &amp; Angles:</b> - Labelling and recognising the features of triangles (including sum of angles). - Naming, labelling and recognising the features of quadrilaterals (including sum of angles). - Naming and recognising the features of other polygons, including interior angles increasing by 180. - Angles on a straight line, around a point, vertically opposite. - Angles in parallel lines (alternate, corresponding, co-interior). - Bearings. <b>GM3 – Area:</b> - Defining area, counting squares, rectilinear area. - Area of triangles and quadrilaterals (incl. kite, parallelogram, trapezium). - Area of a circle, always give answers in exact form and rounded. - More complex areas of compound shapes, problems involving area.	<b>A6 – The Cartesian Grid (2):</b> - Drawing and recognising graphs of $y=n$ and $x=n$ ; finding integer gradients using 1 across, 'm' up/down. - Use the gradient and y-intercept of a line to write the equation in the form $y = mx+c$ . - Is a point on a line? - Identify parallel lines from their equations. <b>SP1 – Discrete Data:</b> - The data handling cycle, using data to address a hypothesis, overview of the types of data, asking good questions. - Categorical (qualitative) data and frequency tables. - Graphical representations of categorical data - bar charts, pictograms, pie charts. - Numerical (quantitative) data - discrete and continuous, ungrouped and grouped frequency tables.

	<p><b>A3 – Manipulating and Simplifying Expressions 2:</b></p> <ul style="list-style-type: none"> <li>- Expanding a single bracket, simplifying expressions involving expansion of brackets.</li> <li>- Factorising into a single bracket.</li> <li>- Expanding two simple binomials.</li> <li>- Writing more complex algebraic expressions.</li> </ul> <p><b>A4 – Linear Equations:</b></p> <ul style="list-style-type: none"> <li>- Understanding equality and balancing.</li> <li>- Simple one-step solutions (four rules).</li> <li>- Two-step solutions (four rules), including with brackets.</li> <li>- Solving equations with the unknown on both sides.</li> <li>- Simple equations with the unknown in the denominator and applications and problems, including forming and solving equations in a geometric or "real-life" context.</li> </ul> <p><b>NP10 – Proportional Reasoning:</b></p> <ul style="list-style-type: none"> <li>- Direct and inverse proportion.</li> <li>- Comparing quantities (value for money, exchange rates, etc).</li> <li>- Scaling up/down - recipes, shapes (simple enlargements), etc.</li> <li>- Percentage increase and decrease, decimal multipliers.</li> <li>- Finding a percentage change.</li> </ul> <p><b>NP11 – Ratio:</b></p> <ul style="list-style-type: none"> <li>- Ratio notation, expressing relationships as ratios.</li> </ul>	<p><b>A5 – Formulae:</b></p> <ul style="list-style-type: none"> <li>- Evaluating expressions and formulae by substitution, including inputs and outputs (function machines where necessary).</li> <li>- Writing formulae in words and letters, including SDT/DMV/PFA.</li> <li>- Generating sequences from formulae.</li> <li>- Rearranging linear formulae.</li> <li>- Rearranging non-linear formulae (involving powers and roots).</li> </ul> <p><b>A6 - The Cartesian Grid:</b></p> <ul style="list-style-type: none"> <li>- Drawing an accurate Cartesian grid and plotting 2D coordinates in four quadrants.</li> <li>- Introduction to two-dimensional vectors.</li> <li>- Finding the midpoint of a line segment.</li> <li>- Expressing number relationships algebraically.</li> <li>- Expressing number relationships graphically, as a means of picturing the relationship.</li> <li>- Plotting quadratic number relationships on a Cartesian grid given the algebraic form of the relationship.</li> <li>- Reading values of variables from a graph (including quadratic, piecewise linear, exponential and reciprocal graphs).</li> </ul>	<ul style="list-style-type: none"> <li>- Graphical representations of discrete numerical data - vertical line, bar charts, pie charts, pictograms, stem and leaf, etc.</li> <li>- Measures of central tendency of ungrouped data - mean, mode and median, from lists and from a frequency table, including solving simple problems (such as finding the missing number).</li> <li>- Measures of spread - range, interquartile range, outliers (by sight).</li> <li>- Compare data sets through graphs, central tendency and spread.</li> <li>- Selecting the best graph for the job and know how graphs can mislead.</li> </ul> <p><b>SP2 – Bivariate Data &amp; Time Series:</b></p> <ul style="list-style-type: none"> <li>- Draw a scatter graph; Interpret relationships and correlations from a scatter graph, recognise correlation does not imply causation, identify outliers.</li> <li>- Draw a line of best fit by sight, interpolate and extrapolate trends and know the dangers of extrapolation.</li> <li>- Interpret and construct tables and line graphs for time series data (including moving averages as extension).</li> </ul> <p><b>A7 – Sequences 1:</b></p> <ul style="list-style-type: none"> <li>- Generate terms of a sequence from term-to-term and position to term rules.</li> </ul>
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<p><b>Key questions</b> (What is the learning about?)</p>	<p>Do students have a basic understanding on using the school specified calculator?</p> <p>Can students apply estimation in a variety of contexts?</p> <p>Have the students a secure understanding of manipulating expressions and linear equations?</p> <p>Do the students understand the difference between direct and inverse proportion?</p> <p>Can the students recognise the similarities between fractions and ratio?</p>	<p>Are students able to use addition, subtraction and shape knowledge to solve problems with angles and area?</p> <p>Do students have a secure understanding of the properties of shapes?</p> <p>Are students able to transfer their knowledge on equations to using formulae?</p> <p>Can students apply knowledge of the four quadrants to different position and direction contexts?</p>	<p>Can the students make connections between number relationships and their algebraic and graphical representations?</p> <p>Can the students sketch and produce graphs of linear functions using equations <math>x</math> and <math>y</math>?</p> <p>Are the students able to apply statistics knowledge to draw a variety of graphs and tables?</p> <p>Can the students construct and interpret appropriate tables, charts and diagrams for ungrouped and grouped numerical data?</p> <p>Are the students able to make and test conjecture about patterns and relationships?</p> <p>Can the students generate terms of a sequence from a term-to-term rule and position-to-term rule??</p> <p>Are the students able to recognise arithmetic sequences?</p>

<b>Assessment</b>	<p>Live marking during the lesson with misconceptions addressed during the lesson. End of topic PPC: Estimation and Use of Calculator, Manipulating and Simplifying Expressions 2, Linear Equations, Proportional Reasoning and Ratio. EOTT</p>	<p>Live marking during the lesson with misconceptions addressed during the lesson. End of topic PPC: Polygons and Angles, Area and Formulae. EOTT</p>	<p>Live marking during the lesson with misconceptions addressed during the lesson. End of topic PPC: The Cartesian Grid, Discrete Data, Bivariate Data and Sequences 1. EOYT</p>
<b>Literacy (L), Numeracy (N), Oracy (O) opportunities</b>	<p>Word problems presented to students each lesson where they have to understand the mathematical vocabulary to solve the problems. Answers to questions posed by the teachers are answered using mathematical language with reasoning where appropriate developing key vocabulary and confidence in talking mathematically. Peer on peer support when answering questions in class. Key words are displayed at the beginning of a new lesson. Spellings are corrected during live marking and book reviews.</p>		
<b>Cross Curricular Opportunities</b>	<p>Ratio and Proportional Reasoning links to Food Tech.</p>	<p>Links to DT and Art.</p>	<p>Links to Citizenship (statistics), graphs with ICT and Geography for representation of data.</p>
<b>SMSC / Character/Careers/Cultural Capital (personal development)</b>	<p><b>Moral</b> - Across the school, we encourage respect including teaching the value of listening to others views and opinions on problem solving. Students know it is okay to make mistakes and know this is how we learn; we encourage students to find their specific errors and then learn from these leading to deeper learning. <b>Social</b> - In classrooms, we look for opportunities for pupils to use mini-whiteboards to promote self-esteem and build self-confidence. Collaborative learning in the classroom is encouraged in the form of listening and learning from each other which develops their mathematical voice and logical reasoning skills. We participate in team maths challenges for increased pupil involvement. <b>Cultural</b> - We explicitly teach areas of Maths in lots of different subjects across the school to show students the importance of Maths in different roles, for example: statistics in Geography and Science; finance in Citizenship; chronology in History and proportion in Food Tech.</p>		
<b>Equality and Diversity</b>	<p>Diverse representation used with slides presented to students. Maths display boards has a Mathematician of the Month and also Famous Mathematicians from Around the World.</p>		
<b>Super Curriculum (personal development)</b>	<p>UKMT Challenge Dr Frost Maths TT Rockstars</p>	<p>UKMT Challenge Dr Frost Maths TT Rockstars</p>	<p>UKMT Challenge Dr Frost Maths TT Rockstars</p>