

Year 8 - Terms 5 and 6 – Unit Intent All students to improve mathematical knowledge by developing their understanding of mathematical concepts, key words, command verbs, mathematical notation, interpreting mathematical information and use effective methods to solve mathematical problems.

**Please note each cluster of lessons according to ability, feed forward to the next lesson intent. If students complete set clusters, extension activities follow.**

<b>Autumn Term 1 Topic</b>	<b>Group A</b>	<b>Group B</b>	<b>Group C</b>
Number 1			
Number 2			
Handling Data 1			

**Number 1: Group A feeds forward to Autumn 2- decimals, fractions and percentages and all of the topics by developing and securing basic number and calculation skills required to be embedded and strengthened in order to be fluent in calculation skills in all areas of maths.**

<b>Autumn Term 2 Topic</b>	<b>Group A</b>	<b>Group B</b>	<b>Group C</b>
Algebra 1			
Shape, Space and Measures 1			
Algebra 2			

<b>Spring Term 1 Topic</b>	<b>Group A</b>	<b>Group B</b>	<b>Group C</b>
Shape Space and Measures 2			
Algebra 3			

<b>Spring Term 2 Topic</b>	<b>Group A</b>	<b>Group B</b>	<b>Group C</b>
Shape Space and Measures 2			
Shape Space and Measures 3			
Number 3			

Summer Term 1 Topic	Group A	Group B	Group C
Ratio and Proportion 1	1-17	1-13	1-9
Shape Space and Measures 4	1-9	1-7	1-4

Summer Term 2 Topic	Group A	Group B	Group C
Handling Data 2	1-11	1-9	1-4
Algebra 4	1-13	1-8	1 -6

<b><u>Summer Term 1,Topic 1</u></b> <b><u>8 lessons</u></b>	<ol style="list-style-type: none"> <li>1. To know how to use scale factors, scale diagrams and maps.</li> <li>2. To know how to simplify ratio.</li> <li>3. To know the relations between Ratio vs proportion.</li> <li>4. To know how to relate ratios to fractions.</li> <li>5. To know how to interpret maps and scale drawings.</li> <li>6. To know to express a multiplicative relationship between 2 quantities as a ratio or a fraction.</li> <li>7. To know how to divide quantities into ratios.</li> <li>8. To know how to apply ratio to real-life context e.g. Conversion, comparison, mixing concentrations, recipes.</li> <li>9. To know how to compare lengths using scale factor.</li> <li>10. To know how to compare area and volume using scale factor.</li> </ol>	Do it now activities based on prior learning, checking for knowledge. <b><u>Keywords</u></b> <b>Ratio</b> <b>Share</b> <b>parts</b> <b>Divide</b> <b>Simplify</b>	Activelearn, worksheet based activities, Numeracy Ninja booklets.  Assessment completed at the end of the term.	Hegarty Maths tasks or TT Rockstars  Learning of key words /times tables and formulae
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	<p>11. To know how to use and identify direct proportion.</p> <p>12. To know how to use and identify inverse proportion.</p> <p>13. To know how to identify similar shapes (including trig ratios if appropriate).</p> <p>14. To know how to use algebraic representation of/constructing equations and solving direct proportion.</p> <p>15. To know how to use algebraic representation of/constructing equations and solving inverse proportion.</p> <p>16. To know how to interpret equations that describe direct and inverse proportion.</p> <p>17. To know how to recognise and interpret graphs that illustrate direct and inverse proportion.</p> <p>18. To know how to work with general iterative process.</p> <p>19. To know how to interpret the gradient of a straight line graph as a rate of change; recognise and interpret graphs that illustrate direct and inverse proportion.</p> <p>20. To know how to use the CAPTURE-RECAPTURE formula.</p> <p><b>This feeds on from Spring Term 2, Topic 1, 'Shape, Space and Measures' , using scale and interpreting scale on a map and feeds on from Spring Term 2, Topic 2, 'Shape, Space and Measures' using knowledge of the properties of 2D and 3D shapes to identify similar shapes. This also feeds on from Spring Term 2, Topic 3, Algebra 2, being able to rearrange the subject of a formula. This feeds on from Summer Term 1, Topic 1, Ratio and Proportion, Year 7.</b></p> <p><b>This feeds forward to Summer 1, Topic 2 – 'Shapes, Space and Measures' equations involving area and volume. This also feeds forward to Summer Term 1 (Year 9 and GCSE), Topic 1 Ratio and Proportion.</b></p>	<p><b>Proportion</b></p> <p><b>Fraction</b></p> <p><b>Quantity</b></p> <p><b>Scale</b></p> <p><b>Inverse</b></p> <p><b>Direct</b></p> <p><b>Similar</b></p> <p><b>Congruent</b></p>		
<p><b><u>Summer 1</u></b></p> <p><b><u>Topic 2</u></b></p> <p><b><u>8 lessons</u></b></p>	<p>1. To know how to tell the time using 12 hour clock - problem solving questions e.g. It is 12 midday and the minute hand moves 90 degrees clockwise, what is the time?</p> <p>2. To know how to read simple scales.</p>	<p>Do it now activities based on prior learning,</p>	<p>Activelearn, worksheet based activities, Numeracy</p>	<p>Hegarty Maths tasks or TT Rockstar's</p>

	<p>3. To know how to use standard units of measure and related concepts (length, area, volume/capacity, mass, time and money).</p> <ul style="list-style-type: none"> <li>To know how to use standard units of mass, length, time, money and other measures using decimal quantities.</li> </ul> <p>4. To know how to use standard compound measures (speed, distance, time), include distance time graphs.</p> <p>5. To know how to change freely between related standard units e.g. Time, length, area, volume/capacity and mass.</p> <p>6. To know how to change freely between compound units e.g. Speed, rates of pay, prices, density and pressure.</p> <p>7. To know how to identify and interpret gradients and intercepts of linear functions graphically and algebraically.</p> <p>8. To know how to add and subtract vectors.</p> <p>9. To know how to apply multiplication of vectors by a scalar, and diagrammatic and column representations of vectors.</p> <p>10. To know how to prove that two vectors are parallel.</p> <p>11. To know how to use vectors to construct geometric arguments and proofs.</p> <p>12. To know how to calculate or estimate gradients of graphs and areas under graphs (including quadratic and other non-linear graphs), and interpret results in cases such as distance-time graphs, velocity-time graphs and graphs in financial contexts.</p> <p>13. To know how to write upper and lower bounds.</p> <p><b>This feeds on from Spring Term 2, Topic 1, 'Shape, Space and Measures' , using scale and interpreting scale on a map, calculating areas and using measures. This also feeds on from Summer Term 1, Topic 2 (Year 7), Shape, Space and Measures 4.</b></p>	<p>checking for knowledge.</p> <p><b><u>Keywords</u></b></p> <p><b>Time</b></p> <p><b>Measure</b></p> <p><b>Length</b></p> <p><b>Capacity</b></p> <p><b>Mass</b></p> <p><b>Density</b></p> <p><b>Volume</b></p> <p><b>Distance</b></p> <p><b>Gradient</b></p> <p><b>Vectors</b></p> <p><b>Intercept</b></p>	<p>Ninja booklets.</p> <p>Assessment completed at the end of the term.</p>	<p>Learning of key words /times tables and formulae</p>
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	<p><b>This feeds forward to Summer 1, Topic 2 – ‘Shapes, Space and Measures 4’ equations involving area and volume. This also feeds forward to Summer Term 1 (Year 9 and GCSE), Topic 1 Ratio and Proportion.</b></p>			
<p><b><u>Summer 2</u></b>  <b><u>Topic 1</u></b>  <b><u>Handling</u></b>  <b><u>Data 2</u></b>  <b><u>10 lessons</u></b></p>	<ol style="list-style-type: none"> <li>To how to read and interpret pictograms.</li> <li>To know how to read and interpret tally tables.</li> <li>To know how to identify simple scatter graphs relationships.</li> <li>To know how to construct bar charts, frequency tables grouped and ungrouped.</li> <li>To know how to calculate mean, mode and median and range.</li> <li>To know how to apply statistics to describe a population including frequency table.</li> <li>To know how to compare data sets (averages and spread).</li> <li>To know how to construct and interpret appropriate tables, charts, and diagrams, including frequency tables, bar charts, pie charts, and pictograms for categorical data, and vertical line (or bar) charts for ungrouped and grouped numerical data.</li> <li>To know how to construct and plot data on scatter graph - using for estimation.</li> <li>To know how to calculate mean, mode and median range for grouped data.</li> <li>To know how to sample data. <ul style="list-style-type: none"> <li>To know how to use the Capture-recapture formula</li> </ul> </li> <li>To know how to construct tables and line graphs for time series data.</li> <li>To know how to interpret, analyse and compare the distributions of data using box plots.</li> <li>To know how to interpret, analyse and compare the distributions of data using cumulative frequency diagram.</li> <li>To know Interpret, analyse and compare the distributions of data using histograms.</li> <li>To know how to interpret the gradient at a point on a curve as the instantaneous rate of change; apply the concepts of average and instantaneous rate of change (gradients of chords and tangents) in numerical, algebraic and graphical contexts.</li> </ol>	<p>Do it now activities based on prior learning, checking for knowledge.</p> <p><b><u>Keywords</u></b>  <b>Pictograms</b>  <b>Scatter</b>  <b>Grouped</b>  <b>ungrouped</b>  <b>frequency</b>  <b>mean</b>  <b>Mode</b>  <b>Median</b>  <b>Range</b>  <b>Population</b>  <b>Data</b>  <b>Scatter</b>  <b>Sample</b>  <b>Time series</b></p>	<p>Activelearn, worksheet based activities, Numeracy Ninja booklets.</p> <p>Assessment completed at the end of the term.</p>	<p>Hegarty Maths tasks or TT Rockstars</p> <p>Learning of key words /times tables and formulae</p>
	<p><b>This feeds forward from Autumn Term 1, Topic 1, Number 1, using knowledge of ordering</b></p>			

	<p>numbers, adding and dividing numbers to calculate the mean and multiplying numbers for grouped data. This also feeds on from Summer Term 2, Topic 1 (Year 7), Data Handling 2.</p> <p>This feeds forward to Summer Term 1, Topic 2, Data Handling 2 ( Year 9 and GCSE). This also feeds forward to Summer Term 2, Topic 2, being able to calculate gradients of a line.</p>			
<p><b><u>Summer Term 2, Topic 2</u></b> <b><u>10 lessons</u></b></p>	<ol style="list-style-type: none"> <li>1. To know how to use and read a timetable.</li> <li>2. To know how to work with coordinates in one quadrant.</li> <li>3. To know how to plot simple line equations. Find gradients of line equations.</li> <li>4. To know how to find relationships between sequences.</li> <li>5. To know how to recognise and use sequences of triangular, square and cube numbers, simple arithmetic progressions.</li> <li>6. To know how to recognise arithmetic sequences and find the nth term.</li> <li>7. To know how to generate terms of a sequence from either a term-to-term or a position-to-term rule.</li> <li>8. To know how to work with coordinates in all four quadrants.</li> <li>9. To know how to use and interpret scatter graphs of bivariate data; recognise correlation.</li> <li>10. To know how to plot graphs of equations that correspond to straight-line graphs in the coordinate plane.</li> <li>11. To know how to reduce a given linear equation in two variables to the standard form <math>y = mx + c</math>; calculate and interpret gradients and intercepts of graphs of such linear equations numerically, graphically and algebraically.</li> <li>12. To know how to recognise, sketch and interpret graphs of linear functions, quadratic functions.</li> <li>13. To know how to plot and interpret graphs (including reciprocal graphs and exponential graphs) and graphs of non-standard functions in real contexts.</li> <li>14. To know the equation of a circle with centre at the origin, and how to find the equation of a tangent to a circle at a given point.</li> </ol>	<p>Do it now activities based on prior learning, checking for knowledge.</p> <p><b><u>Keywords</u></b>  <b>Coordinates</b>  <b>Gradient</b>  <b>Sequence</b>  <b>Arithmetic</b>  <b>Term</b>  <b>Position</b>  <b>Quadratic</b>  <b>Function</b>  <b>Reciprocal</b>  <b>Exponential</b></p>	<p>Activelearn, worksheet based activities, Numeracy Ninja booklets.</p> <p>Assessment completed at the end of the term.</p>	<p>Hegarty Maths tasks or TT Rockstars</p> <p>Learning of key words /times tables and formulae</p>

	<p>15. To know how to find approximate solutions to problems such as simple kinematic problems involving distance, speed and acceleration.</p> <p>16. To know how to identify and interpret gradients and intercepts of linear functions graphically and algebraically.</p> <p>17. To know how to describe, sketch and draw using conventional terms and notations: points, lines, parallel lines, perpendicular lines, right angles, regular polygons, and other polygons that are reflectively and rotationally symmetric.</p> <p>18. To know how to find approximate solutions to equations numerically using iteration.</p> <p>19. To know how to recognise geometric sequences and appreciate other sequences that arise.</p> <p>20. To know that correlation does not indicate causation; draw estimated lines of best fit; make predictions; interpolate and extrapolate apparent trends whilst knowing the dangers of so doing.</p> <p>21. To know how to recognise and use Fibonacci type sequences, quadratic sequences, and simple geometric progressions (<math>r^n</math> where <math>n</math> is an integer, and <math>r</math> is a rational number <math>&gt; 0</math>).</p> <p>22. To know how to find the equation of the line through two given points, or through one point with a given gradient.</p> <p>23. To know how to identify and interpret roots, intercepts, turning points of quadratic functions graphically; deduce roots algebraically.</p> <p>24. To know how to recognise, sketch and interpret graphs of simple cubic functions, the reciprocal function <math>y = 1/x</math> with <math>x \neq 0</math>.</p> <p>25. To know how to plot and interpret graphs (including reciprocal graphs).</p> <p>26. To know how to use the form <math>y = mx + c</math> to identify parallel lines.</p> <p>27. To know how to deduce expressions to calculate the <math>n</math>th term of quadratic sequences.</p> <p>28. To know how to recognise, sketch and produce graphs of linear and quadratic functions of one variable with appropriate scaling, using equations in <math>x</math> and <math>y</math> and the Cartesian plane.</p>			
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	<p>29. To know how to plot and interpret graphs (including exponential graphs).</p> <p>30. To know how to use the form <math>y = mx + c</math> to identify perpendicular lines.</p> <p>31. To know how to deduce turning points by completing the square.</p> <p>32. To know how to recognise, sketch and interpret graphs of exponential functions <math>y = kx</math> for positive values of <math>k</math>, and the trigonometric functions (with arguments in degrees) <math>y = \sin x</math>, <math>y = \cos x</math> and <math>y = \tan x</math> for angles of any size.</p> <p>33. To know how to recognise and use simple geometric progressions (<math>r^n</math> where <math>n</math> is an integer, and <math>r</math> is a surd) and other sequences.</p> <p>34. To know how to sketch translations and reflections of a given function.</p> <p>35. To know how to calculate or estimate gradients of graphs and areas under graphs (including quadratic and other non-linear graphs), and interpret results in cases such as distance-time graphs, velocity-time graphs and graphs in financial contexts.</p> <p>36. To know how to interpret the gradient at a point on a curve as the instantaneous rate of change; apply the concepts of average and instantaneous rate of change (gradients of chords and tangents) in numerical, algebraic and graphical contexts.</p> <p><b>This feeds forward from Autumn 2, topic 2 Shape, Space and Measures – transforming shapes in equations of a line, this also feeds forward from Spring 2, Topic 3 Number – recognising triangular, square and cube numbers. This also feeds on from Spring Term 1, Topic 2, Algebra, using their knowledge of equations and Summer Term 2 Topic 1, how to calculate the gradient of a line. Also feeds on from Summer Term 2, Topic 2 (Year 7), Algebra 3.</b></p> <p><b>This feeds onto Summer Term 2, Topic 2 (Years 9 and GCSE), Algebra 3.</b></p>			
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