

## Year 9 - Mathematics

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| <b>Curriculum intent</b> | <p>By the end of year 9 we want all students to be equipped with the skills and knowledge to solve problems independently. We want them to demonstrate resilience and have confidence in their secure knowledge. Students will have opportunities throughout each topic to culminate their wealth of mathematical strategies. They will be challenged to use them in a vast range of contexts. This will form the foundation they will take through with them to KS4.</p> <p>Through mathematics lessons we promote mathematical thinking to allow all students to achieve their mathematical potential and engage in the study of mathematics. Using a mastery style approach to mathematics allows all students to develop their fluency, reasoning and problem solving using the concrete, pictorial, abstract (CPA) approach. As students progress through their learning topics from previous learning will be interleaved into future learning so students develop application and skill links between different areas of mathematics.</p> |                                                                                                                                                                                                                                                |                                                                                                                                                                                                                                    |                                                                                                                                                                                                                                                         |                                                                                                                                                                                                                  |                                                                                                                                                                                                                                                                             |
| <b>Term</b>              | <b>Autumn 1</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | <b>Autumn 2</b>                                                                                                                                                                                                                                | <b>Spring 1</b>                                                                                                                                                                                                                    | <b>Spring 2</b>                                                                                                                                                                                                                                         | <b>Summer 1</b>                                                                                                                                                                                                  | <b>Summer 2</b>                                                                                                                                                                                                                                                             |
| <b>Knowledge</b>         | <ul style="list-style-type: none"> <li>• Straight Line Graphs</li> <li>• Forming and Solving Equations</li> <li>• Testing Conjectures</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | <ul style="list-style-type: none"> <li>• 3D Shapes</li> <li>• Constructions and Congruency</li> </ul>                                                                                                                                          | Numbers<br><br>Using Percentages<br><br>Maths and Money                                                                                                                                                                            | Deduction<br><br>Rotation and Translation<br><br>Pythagoras                                                                                                                                                                                             | Enlargement and Similarity<br><br>Solving Ratio and Proportion problems<br><br>Rates                                                                                                                             | Probability<br><br>Algebraic Representation                                                                                                                                                                                                                                 |
| <b>Term</b>              | <b>Autumn 1</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | <b>Autumn 2</b>                                                                                                                                                                                                                                | <b>Spring 1</b>                                                                                                                                                                                                                    | <b>Spring 2</b>                                                                                                                                                                                                                                         | <b>Summer 1</b>                                                                                                                                                                                                  | <b>Summer 2</b>                                                                                                                                                                                                                                                             |
| <b>Skills</b>            | Lines parallel to the axes, $y = x$ and $y = -x$<br>Using tables of values<br>Compare gradients<br>Compare intercepts<br>Understand and use $y = mx + c$<br>Write an equation in the form $y = mx + c$<br>Find the equation of a line from a graph<br>Interpret gradient and intercepts of real-life graphs.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | Know names of 2D/3D Shapes.<br>Recognise prisms<br>Recognise nets and shapes.<br>Plans and Elevations<br>Find the area of 2D shapes.<br>Surface area of cubes and cuboids.<br>Surface area of triangular prisms.<br>Surface area of a cylinder | Integers, real and rational numbers.<br>Understand and use surds.<br>Work with directed numbers.<br>Solve problems with integers and decimals.<br>HCF and LCM<br>Four operations with fractions.<br>Solve problems with fractions. | Angles in parallel lines<br>Solving angle problems<br>Angle problems with algebra<br>Conjectures with shapes and angles<br>Link constructions and geometrical reasoning.<br>Identify the order of rotational symmetry.<br>Rotate a shape about a point. | Recognise enlargement and similarity<br>Enlarge a shape by a positive integer scale factor.<br>Enlarge a shape by a positive integer scale factor from a point.<br>Enlarge a shape by a fractional scale factor. | Single event probability<br>Relative Frequency<br>Expected outcomes<br>Independent events<br>Use tree diagrams<br>Use diagrams to work out probabilities.<br>Draw and interpret quadratic graphs<br>Interpret other graphs<br>Investigate graphs of simultaneous equations. |

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|                    | <p>Solve one-and two-step equations and inequalities</p> <p>Solve one-and two-step equations and inequalities with brackets</p> <p>Inequalities with negative numbers</p> <p>Solve equations with unknowns on both sides</p> <p>Solve inequalities with unknowns on both sides</p> <p>Solving equations and inequalities in context</p> <p>Substituting into formulae and equations</p> <p>Rearranging formulae(one-step)</p> <p>Factors, Multiples and Primes True or False?</p> <p>Always, Sometimes, Never true</p> <p>Show Conjectures about number</p> <p>Expand a pair of binomials</p> <p>Conjectures with algebra Explore the 100 grid</p> | <p>Volume of a cube and cuboid</p> <p>Volume of other 3D shapes – Cylinders and Spheres.</p> <p>Draw and measure angles</p> <p>Construct and interpret scale drawings.</p> <p>Locus of a distance from a point</p> <p>Locus of a distance from a straight line</p> <p>Locus equidistant from two points</p> <p>Construct a perpendicular bisector.</p> <p>Construct a perpendicular from a point.</p> <p>Locus of distance from two lines.</p> <p>Construct an angle bisector.</p> <p>Construct triangles.</p> <p>Identify congruent triangles.</p> | <p>Use numbers in standard form.</p> <p>Use equivalence between FDP</p> <p>Calculate percentage increase and decrease.</p> <p>Express a change as a percentage</p> <p>Solve revers percentage problems.</p> <p>Recognise and solve percentage problems.</p> <p>Solve problems with repeated percentage change.</p> <p>Solve problems with bills and bank statements.</p> <p>Calculate simple and compound interest.</p> <p>Solve problems with VAT</p> <p>Calculate Wages and Taxes</p> <p>Solve problems with exchange rates.</p> <p>Solve unit pricing problems.</p> | <p>Translate points and shapes by a given vector.</p> <p>Compare rotation and reflection of shapes.</p> <p>Find the result from a series of transformations.</p> <p>Identify the hypotenuse and determine whether a triangle is right-angled.</p> <p>Calculate the hypotenuse of a right-angled triangle.</p> <p>Calculate missing sides in a right-angled triangle.</p> <p>Use Pythagoras theorem on a coordinate axis.</p> | <p>Enlarge a shape by a negative scale factor.</p> <p>Work out missing sides and angles from a pair of similar shapes.</p> <p>Solve problems with direct proportion.</p> <p>Direct proportion and conversion graphs</p> <p>Solve problems with inverse proportion.</p> <p>Graphs of inverse relationships</p> <p>Solve ratio problems</p> <p>Solve best buy problems</p> <p>Solve problems with ratio and algebra.</p> <p>Solve speed distance time problems</p> <p>Use distance-time graphs</p> <p>Solve problems with density mass and volume</p> <p>Solve flow problems and their graphs.</p> <p>Rates of change and their units.</p> |                                                                                            |
| <b>Assessments</b> | <p>MRT</p> <p>MAT 1 – Identify types of graphs and using <math>y = mx + c</math>.</p> <p>MAT 2 – Solving equations, rearranging formula.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | <p>MRT</p> <p>MAT 1 – Surface area of a prism.</p> <p>MAT 2 – Volume of a prism, draw a perpendicular bisect.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                   | <p>MRT</p> <p>MAT 1 – Find HCF LCM, working with directed number.</p> <p>MAT 2- Finding percentage of an amounts, calculating interest.</p>                                                                                                                                                                                                                                                                                                                                                                                                                            | <p>MRT</p> <p>MAT 1 – Identify missing angles using chain of reasoning.</p> <p>MAT 2 – Finding missing sides of right angled triangles using Pythagoras.</p>                                                                                                                                                                                                                                                                 | <p>MRT</p> <p>MAT 1 – Carry out and describe an enlargement.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | <p>MRT</p> <p>MAT 1 – Solve ratio problems.</p> <p>MAT 2 – Solve probability problems.</p> |

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| <p><b>Curiosity</b></p> | <ul style="list-style-type: none"> <li>• Work out how much it would cost to re-carpet a room in your house. This will require you to measure the area of the floor in the room.</li> <li>• Get baking! The best way to practice weighing skills is to bake. Try this recipe to make cupcakes - <a href="https://www.bbcgoodfood.com/recipes/cupcakes">https://www.bbcgoodfood.com/recipes/cupcakes</a> . Or why not try something more challenging with this doughnut recipe - <a href="https://www.bbcgoodfood.com/recipes/watermelon-doughnuts">https://www.bbcgoodfood.com/recipes/watermelon-doughnuts</a></li> <li>• Map skills – practice orienteering in the local area. Here is Etherow Lodge parks orienteering course (10 minute walk from school) - <a href="https://gmoa.org.uk/borough_tameside/etherow-lodge-park-orienteering/">https://gmoa.org.uk/borough_tameside/etherow-lodge-park-orienteering/</a> .</li> <li>• Look at a newspaper (in print or online) and make a note of all the times you see a percentage referred to in a headline. Read some of the articles to see if there are more</li> </ul> | <ul style="list-style-type: none"> <li>• Test out your solving skills here <a href="https://www.abcya.com/games/mystic_numbers">https://www.abcya.com/games/mystic_numbers</a></li> <li>• Further your area skills ready for algebra applications here <a href="https://www.geogebra.org/m/Yr8kxmtU">https://www.geogebra.org/m/Yr8kxmtU</a> <ul style="list-style-type: none"> <li>• Black History Month</li> </ul> </li> <li>• Try this loci constructions task to develop your understanding <a href="https://www.transum.org/software/SW/Starter_of_the_day/Students/Pairs.asp?Topic=23">https://www.transum.org/software/SW/Starter_of_the_day/Students/Pairs.asp?Topic=23</a></li> <li>• Apply your loci skills to exact scale drawings in this goat problem <a href="https://www.transum.org/Software/SW/Starter_of_the_day/starter_March6.ASP">https://www.transum.org/Software/SW/Starter_of_the_day/starter_March6.ASP</a></li> </ul> | <ul style="list-style-type: none"> <li>• How golden are you? Apply the golden ratio to your body measurements to see if you are golden!? <a href="https://nrich.maths.org/7668">https://nrich.maths.org/7668</a></li> <li>• Make a glass of juice, then work out the ratio of juice to water you used. Think about how you could work this out using measuring equipment.</li> <li>• How does the recipe change? Here are some online questions to help you - <a href="https://www.transum.org/Maths/Exercise/Ratio/Recipe.asp">https://www.transum.org/Maths/Exercise/Ratio/Recipe.asp</a> . Alternatively, pick a recipe from a cookbook at home and practice changing the measurements based on how many people you would cook for?</li> </ul> | <ul style="list-style-type: none"> <li>• How many crazy averages facts can you find on the internet? Sort them out into the ones you believe are true and the ones you think are made up – here are some to start you off <a href="https://funfactz.com/tags/average/">https://funfactz.com/tags/average/</a></li> <li>• Choose a Venn Diagram quiz to complete here <a href="https://www.sporcle.com/games/tags/venndiagram">https://www.sporcle.com/games/tags/venndiagram</a></li> <li>• Try this with a real deck of cards or the online version here <a href="https://www.funtrivia.com/trivia-quiz/SciTech/Pick-A-Card-Any-Card-269306.html">https://www.funtrivia.com/trivia-quiz/SciTech/Pick-A-Card-Any-Card-269306.html</a> <ul style="list-style-type: none"> <li>• PI day</li> </ul> </li> </ul> | <ul style="list-style-type: none"> <li>• Try your problem solving skills by working out what the number could be <a href="https://www.topmarks.co.uk/Flash.aspx?f=ThinkingOfANumber3">https://www.topmarks.co.uk/Flash.aspx?f=ThinkingOfANumber3</a></li> <li>• Make a necklace or bracelet. Pick two colour (or more) and stick to a ratio for the colours (e.g. for every red bead there will be 2 yellow beads).</li> </ul> <p>Maths challenge date TBC</p> | <ul style="list-style-type: none"> <li>• Make a set of revision flashcards for each topic you cover in class, include a full wagoll with notes and a practice question ready to use in Year 10 and 11 <a href="https://collegeinfo.ek.com/flash-card-study-tips/">https://collegeinfo.ek.com/flash-card-study-tips/</a></li> <li>• Make a how to use your calculator guide! It will come in helpful for future learning</li> <li>• Try a mini exam paper <a href="https://www.onmaths.com/mock_exams/mini-mock-1-foundation-calculator/">https://www.onmaths.com/mock_exams/mini-mock-1-foundation-calculator/</a></li> </ul> |
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