|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **Year 9 – Mathematics 2024-25** | | | | | | |
| **Curriculum intent** | 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 representations of mathematical ideas. As students progress, topics from previous learning will be interleaved into future learning so students develop application and skill links between different areas of mathematics.  In Year 9, students will embed and deepen their understanding of number, algebra, geometric concepts by building upon the learning completed in Years 7 and 8.  Starting the year, students learn about algebraic manipulation and how this links to graphical representations and formula; further develop their knowledge of proportion when learning about rates, similarity, and percentages; geometry, though studying area, constructions, transformations and Pythagoras’ Theorem; statistics, through learning about averages, representing data and probability.  Throughout the year, students will build upon and revisit concepts to deepen their understanding, but to also enable them to apply them flexibly in problem-solving contexts. | | | | | |
| **Term** | **Autumn 1** | **Autumn 2** | **Spring 1** | **Spring 2** | **Summer 1** | **Summer 2** |
| **Knowledge** | * Brackets, Equations, and Inequalities * Fractions and Percentages | * Standard Index Form * Angles in Parallel Lines and Polygons * Area of Trapezia and Circles * Measures of Location | * Straight Line Graphs * Forming and Solving Equations * Three-dimensional Shapes | * Using Percentages * Maths and Money * Rotation and Translation | * Pythagoras’ Theorem      * Enlargement and Similarity * Rates | * Probability * Constructions |
| **Term** | **Autumn 1** | **Autumn 2** | **Spring 1** | **Spring 2** | **Summer 1** | **Summer 2** |
| **Skills** | * Form algebraic expressions. * Use directed number with algebra. * Multiply out a single bracket. * Factorise into a single bracket. * Expand multiple single brackets and simplify. * Expand a pair of binomials. * Solve equations, including with brackets. * Form and solve equations with brackets. * Understand, form and solve simple inequalities. * Solve and form equations and inequalities with unknowns on both sides. * Identify and use formulae, expressions, identities and equations. * Convert and calculate fluently between fractions, decimals and percentages with and without a calculator. * Calculate percentages using multipliers. * Express a number as a fraction or percentage of another number. * Work with percentage change. * Find the original amount given a percentage. * Choose appropriate methods to solve percentage problems. | * Investigate and understand positive and negative powers of 10. * Work, compare and mentally calculate with numbers in standard form. * Add, subtract, multiply and divide numbers in standard form. * Use a calculator to work with numbers in standard form. * Understand negative and fractional indices. * Understand angle rules and notation. * Identify, calculate and solve parallel line problems involving: alternate, corresponding and co-interior angles. * Calculate angles in quadrilaterals. * Calculate interior angles in polygons. * Calculate the area and perimeter of triangles, rectangles, parallelograms, trapezia, compound shapes and circles. * Calculate parts of a circle. * Understand the mean, median and mode. * Choose the most appropriate average. * Find the mean from grouped and ungrouped frequency tables. * Identify outliers. * Compare distributions using averages and range. | * Find and draw points and lines on and parallel to the axis and . * Use tables of values. * Compare gradients and intercepts. * Use and write equations in the form . * Find the equation of a line graph. * Interpret gradients and intercepts of real-life graphs. * Model real-life graphs involving inverse proportion. * Explore perpendicular lines. * Solve one and two step equations and inequalities. * Solve inequalities involving directed numbers. * Solve equations and inequalities with unknowns on both sides. * Understand equations and inequalities in context. * Formulate equations. * Rearrange formulae. * Name and know the properties of 2D and 3D shapes. * Draw and identify nets of 3D shapes. * Draw and understand plans and elevations of 3D shapes. * Calculate the surface area of cubes, cuboids, triangular prisms and cylinders. * Calculate the volume of cubes, cuboids, prisms, cylinders, cones, pyramids and spheres. | * Express a change as a percentage. * Solve reverse percentage problems. * Recognise and solve percentage problems with and without a calculator. * Solve problems with repeated percentage change. * Solve problems with bills and bank statements. * Calculate simple and compound interest. * Calculate wages and taxes. * Solve problems with exchange rates. * Solve unit pricing problems. * Identify the order of rotational symmetry of a shape. * Compare rotational symmetry with line symmetry. * Rotate shapes. * Translate shapes. * Compare transformations. * Find the result of a series of transformations. | * Identify the hypotenuse of a right-angled triangles. * Determine whether a triangle is right-angled. * Calculate missing sides in right-angled triangles. * Use Pythagoras’ Theorem on coordinate axes, 3D shapes and proof. * Enlarge shapes by positive, fractional and negative scale factors. * Work out missing sides in similar shapes. * Solve problems with similar triangles. * Explore ratios in right-angled triangles. * Solve speed, distance and time problems. * Use distance-time graphs. * Solve problems with density, mass and volume. * Solve flow problems and their graphs. * Calculate rates of change. * Convert compound units. | * Calculate relative frequency and find expected outcomes. * Calculate the probability of independent events. * Use probability tree diagrams to solve problems with and without replacement. * Use diagrams to work out probabilities. * Use diagrams to work out probabilities. * Draw and measure angles. * Draw locus from points and straight lines. * Construct bisectors. * Construct triangles. * Explore congruence. |
| **Assessments** | In class assessments.  End of topic tests. | In class assessments.  End of topic tests. | In class assessments.  End of topic tests. | In class assessments.  End of topic tests. | In class assessments.  End of topic tests. | In class assessments.  End of topic tests. |
| **Enrichment** | * Can you make a model to show different types of line graph? * Collect some data! Then represent it in as many ways as possible. Which were the best ways? Which ways didn’t work out – do you know why? * Can you design a board game which tests your fraction arithmetic? * Learn about the Archimedean spiral and its links to the coordinates we have been learning about. [https://nrich.maths.org/13746](about:blank) | * Looking at a newspaper or magazine, can you count up how many tables are used to present information?  When are they used? | * Go shopping. Look around at the reductions in any shop – can you work out the percentage change? * Can you design a poster to explain the laws of indices and standard form? * Can you find the value of n using your knowledge of indices and algebra? [https://nrich.maths.org/847](about:blank) | * Looking at a magazine or newspaper, how many times do you see the word average? Can you decide which average has been used? * Which of the four examples have the greatest area shaded? [https://nrich.maths.org/809](about:blank) | * Whilst watching TV how many times do you see a money or percentage calculation? * Can you find out what percentage of the integers are square numbers? [https://nrich.maths.org/11657](about:blank) * Create a plan of a games room. * Try drawing an impossible object using these instructions: [https://www.artfulmaths.com/uploads/5/2/0/5/52054835/impossible\_objects\_instructions.pdf](about:blank) | * Enlarge an image of your favourite cartoon character. * Have a look at the exchange rates at your local Bureau de Change. * Try drawing a cardioid. [https://www.artfulmaths.com/uploads/5/2/0/5/52054835/cardioid\_60.pdf](about:blank) |