Sir William Ramsay School

EMPOWERING EVERYONE TO ACHIEVE

Curriculum Map for Foundation Maths Year 9

YEAR 9	Autumn 1	Autumn 2
Topics	**Number**	**Algebra**
Substantive Knowledge – The Knowledge Taught By The Teacher	• Students will learn more about integers, place value, decimals, indices, reciprocals, powers and roots. • Students will learn about surds. • Students will learn about fractional and negative indices. • Students will learn about standard form. • Students will learn more about factors, multiples and primes.	• Students will learn to simplify more complex expressions, expanding and factorising with single brackets and substitute into formulae. • Students will learn to solve more complex linear equations.
Disciplinary Knowledge – Concepts, Investigations, Conjecture, Proof, Problem Modelling and Problem Solving	• Understand number is made up of integers, fractions and powers. • Understand the degrees of accuracy and standard units used for number. • Understand how answers can be accurate by using fractions and surds.	• Understand and use the concepts and vocabulary of expressions, equations, formulae, identities, inequalities, terms and factors. • Solve problems using algebra.
Skills	• Apply the four operations, including formal written methods, to integers, decimals and simple fractions (proper and improper) and mixed numbers – all both positive and negative; understand and use place value (e.g. when working with very large or very small numbers, and when calculating with decimals). • Recognise and use relationships between operations, including inverse operations (e.g. cancellation to simplify calculations and expressions); use conventional notation for priority of operations, including brackets, powers, roots and reciprocals. • How to work with very large and very small numbers.	• Use and interpret algebraic manipulation, including: ab in place of a × b 3y in place of y + y + y and 3 × y a^2 in place of a × a, a^3 in place of a ×a × a, a^2b in place of a × a × b a/b in place of a ÷ b • coefficients written as fractions rather than as decimals.
Links To Prior Learning	• Building on applying operations to calculations including powers, roots and brackets from Year 8.	• Building on algebraic substitution, powers, solving equations and factorising from Year 8.
Literacy/ Numeracy	• Language of number especially powers. • Extension of deconstructing a written question into mathematical form from Year 8 to more complex problems.	• Language of algebra. • Extension of deconstructing a written question into mathematical form from Year 8 to more complex problems.

Cross Curricular	• Any areas which use number or powers. • Link to real life contexts where exact answers or standard form are required e.g. Science and engineering.	• Any areas which use algebra. • Link to real life contexts where algebraic formulae are used.
Assessment	• Learning checks throughout with low stakes questioning and starters. • Summative assessment at the end of topic.	• Learning checks throughout with low stakes questioning and starters. • Summative assessment at the end of topic.

YEAR 9	**Spring 1**	**Spring 2**
Topics	**Graphs, Tables & Charts** **Fractions & Percentages**	**Equations, Inequalities & Sequences**
Substantive Knowledge – The Knowledge Taught By The Teacher	• Students will learn about choosing suitable data techniques given the context. • Students will learn about two-way tables for discrete, continuous and grouped data. • Students will extend their knowledge of fractions and percentages as operators. • Students will extend their knowledge of decimal multipliers. • Students will learn how to express one quantity as a fraction of another, where the fraction is less than 1 or greater than 1.	• Students will learn about equations involving surds and algebraic fractions. • Students will learn how to factorise a quadratic expression where the coefficient of x^2 is equal to 1. • Students will learn about basic inequalities and how to solve them. • Students will learn how to find the nth term of a linear sequence.
Disciplinary Knowledge – Concepts, Investigations, Conjecture, Proof, Problem Modelling and Problem Solving	• Understand the difference between discrete and continuous data. • Understand how the mode can be found from tables. • Understand how to choose the most appropriate graphical/tabular form given the context.	• Understand and use the concepts and vocabulary of expressions, equations, formulae, identities, terms and factors. • Understand and use standard mathematical formulae; rearrange formulae to change the subject. • Understand the concept of inequality. • Understand the concept of an arithmetic sequence.
Skills	• Interpret and construct tables, charts and diagrams, including frequency tables, bar charts, pie charts and pictograms for categorical data, vertical line charts for ungrouped discrete numerical data, tables and line graphs for time series data and know their appropriate use. • Interpret fractions and percentages as operators. • Use standard units of mass, length, time, money and other measures (including standard compound measures) using decimal quantities where appropriate. • Solve worded problems on calculating with fractions and percentages using all	• Substitute numerical values into formulae and expressions, including scientific formulae. • Simplify and manipulate algebraic expressions (including those involving surds and algebraic fractions) by: collecting like terms multiplying a single term over a bracket taking out common factors expanding products of two or more binomials factorising quadratic expressions of the form $x^2 + bx + c$ simplifying expressions involving sums, products and powers, including • using the laws of indices.

	four operations, simple interest and value added tax.	
Links To Prior Learning	• Building on add/subtract fractions with different denominators. Multiply/divide fractions in including mixed numbers and calculating percentage increase/decrease including using the multiplier from Year 8.	• Building on algebra including substitution, powers, solving equations and factorising from Year 8.
Literacy/ Numeracy	• Language of number, percentages, fractions and decimals. • Continued deconstruction of a worded problem to the key mathematical information.	• Language of algebra and sequences. • Continued deconstruction of a worded problem to the key mathematical information.
Cross Curricular	• Any areas which use statistical diagrams, percentages, fractions and decimals. • Link to real life contexts especially in displaying data or finance.	• Any areas which use algebra or sequences. • Link to real life contexts.
Assessment	• Learning checks throughout with low stakes questioning and starters. • Summative assessment at the end of topic.	• Learning checks throughout with low stakes questioning and starters. • Summative assessment at the end of topic.

YEAR 9	**Summer 1**	**Summer 2**
Topics	**Angles** **Averages, Range & Sampling**	**Perimeter, Area & Volume**
Substantive Knowledge – The Knowledge Taught By The Teacher	• Students will learn about the properties of shapes. • Students will learn further about parallel lines and angle facts. • Students will learn about the interior and exterior angles of polygons. • Students will learn about statistical sampling. • Students will learn further about averages and how to select the best one given the context. • Students will learn how to calculate the mean, median and mode from grouped frequency tables and sampling.	• Students will learn further about perimeter and area extending to trapeziums and surface areas of shapes. • Students will learn how to calculate the volumes of shapes. • Students will learn about different 3D forms and their geometrical properties. • Students will learn how to covert between metric measures linked to length, area or volume.
Disciplinary Knowledge – Concepts, Investigations, Conjecture, Proof, Problem Modelling and Problem Solving	• Understand the properties of shapes and angle rules in various contexts. • Understand the definitions of various shapes. • How to solve problems in polygons and similar and congruent shapes. • Understand the differences between the different types of average. • Understand how to estimate averages when using continuous data.	• Understand and use standard mathematical formulae linked to areas and volumes. • Problem solve using areas and volumes. • Understand the process of changing between standard units. • Understand the geometrical properties of shapes.

Skills	• Use conventional terms and notation: points, lines, vertices, edges, planes, parallel lines, perpendicular lines, right angles, polygons, regular polygons and polygons with reflection and/or rotation symmetries; use the standard conventions for labelling and referring to the sides and angles of triangles; draw diagrams from written description. • Infer properties of populations or distributions from a sample, while knowing the limitations of sampling.	• Solve geometrical problems on coordinate axes. • Identify properties of the faces, surfaces, edges and vertices of: cubes, cuboids, prisms, cylinders, pyramids, cones and spheres. • Use standard units of measure and related concepts (length, area, volume/capacity, mass, time, money, etc.).
Links To Prior Learning	• Building on reason and using proofs to solve problems, calculate missing angles on parallel lines and interior and exterior angles of polygons from Year 8. • Building on calculating mean, median and mode of a set of data from Year 8.	• Building on calculating volume of cubes and cuboids and finding area of 2D shapes from Year 8.
Literacy/ Numeracy	• Language of averages, sampling and geometry. • Continued deconstruction of a worded problem to the key mathematical information.	• Language of geometrical shapes, area and volume. • Continued deconstruction of a worded problem to the key mathematical information. •
Cross Curricular	• Any areas which use numerical estimation, areas or volumes. • Link to real life contexts.	• Any areas which use geometrical shapes, areas or volumes. • Link to real life contexts.
Assessment	• Learning checks throughout with low stakes questioning and starters. • Summative assessment at the end of topic.	• Learning checks throughout with low stakes questioning and starters. • Summative assessment at the end of topic.