

St Gabriel's Curriculum Map - Maths

Intent	Mathematics enables our pupils to explore the patterns that make up God's world and the intricate and beautiful ways in which they are constructed and realised. We enable all pupils to excel in their God given talents and reach their full potential. Here at St Gabriel's, we encourage students to develop their resilience and enjoyment of Mathematics. They will achieve success by strengthening their transferable skills of calculation; reasoning logically, algebraically and geometrically; Thinking creatively to solve problems; handling data; making decisions. This will prepare our students to become well serving members of the catholic community.						
KS2	7	8	9	KS3	10	11	KS4
<p>At this stage, pupils should develop their ability to solve a wider range of problems, including increasingly complex properties of numbers and arithmetic, and problems demanding efficient written and mental methods of calculation. With this foundation in arithmetic, pupils are introduced to the language of algebra as a means for solving a variety of problems. Teaching in geometry and measures should consolidate and extend knowledge developed in number. Teaching should also ensure that pupils classify shapes with increasingly complex geometric properties and that they learn the vocabulary they need to describe them. By the end of year 6, pupils should be fluent in written methods for all four operations, including long multiplication and division, and in working with fractions, decimals and percentages. Pupils should read, spell and pronounce mathematical vocabulary correctly</p>	<p>Algebraic Thinking Students develop a deep understanding of the basic algebraic forms. Function machines are used alongside bar models and letter notation. Links to inverse operations before looking at substitution into short abstract expressions.</p> <p>Proportion Students gain a deep understanding of the links between fractions, decimals and percentage looking at the various forms of representations including fractions greater than 1</p> <p>Applications of Number Formal methods are developed from KS2. Students will look at this in context before being developing this further when studying directed number</p> <p>Directed Number Multiple representations and contexts will be used to enable student to appreciate the meaning behind operations with negative integers. Students will use their new knowledge to extend previous topics.</p> <p>Fractional Thinking This block builds on FDP. Providing more experience with equivalence and operations with fractions.</p> <p>Lines and angles Students build on previous skills to use correct mathematical notation and construct complex diagrams. Previous knowledge of FDP is used to accurately draw and interpret pie charts</p> <p>Probability FDP equivalence will be revisited in the study of probability, where students will also learn about sets, set notation and systematic listing strategies</p>	<p>Proportional Reasoning This unit focuses on the meaning of ratio on the various models that can be used to represent ratios students will work on the link between ratio and scaling including the idea of direct proportion. Students will have had little experience of multiplying and dividing fractions, here we seek a deep understanding by looking at multiple representations and understanding them the reciprocal.</p> <p>Representations Students will look formerly at algebraic rules for straight lines starting with lines parallel to axes and moving on to more general form Students will extend their knowledge of graphs and charts to deal with both discrete and continuous data.</p> <p>Algebraic techniques Students will explore expanding over a single bracket and factorising. Students will look at sequences with more complex algebraic rules. They will then explore the ideas behind the addition and subtraction laws of indices using the groundwork is laid by making sure students are comfortable with expressions.</p> <p>Developing Number Students will look at the relationship between FDP including decimal equivalents and using these to workout percentage change. Standard Form is introduced using of context is important to help students make sense and build on the index laws previously covered.</p> <p>Developing geometry An understanding of angle notation and relationships is explored within angles in parallel lines thus solve increasingly complex missing angle problems. Knowledge is then extended for all students to look at the area of trapezia and circles. A key aspect of this unit is choosing and using the correct formula for the correct shape.</p> <p>Reasoning with Data A particular focus in this block is using charts to compare different distributions. We will also explore when graphs may be misleading and important real-life consideration.</p>	<p>Reasoning with Algebra Students will now study the general form of the equation of a straight line, interpreting m and c in abstract and real-life contexts and reducing to this form in simple cases. Students will extend their knowledge of forming and solving equations. They will also explore rearranging formulae, seeing how these links to solving equations.</p> <p>Constructing in 2 and 3 Dimensions Students study 3D shapes formally. Surface area and volume are explored, as well as plans and elevations.</p> <p>Application of Number Students will develop their number knowledge of the number system to include rational and real numbers. Building on their fraction and percentage work, students will practise these skills in various financial contexts. Looking at the language of financial mathematics.</p> <p>Pythagoras Students will explore square and square roots before moving on to investigate the relationship between the sides of a right-angled triangle.</p> <p>Reasoning with Proportion Students develop their knowledge of transformations to include enlargement, learning the mathematical meaning of the word similar.</p> <p>Probability In this, block students build on their learning to calculate the probabilities have simple and combined events. A key focus is the introduction of the idea of independent events and the use of multiplication rule for this.</p>	<p>Aims The national curriculum for mathematics aims to ensure that all pupils:</p> <ul style="list-style-type: none"> - become fluent in the fundamentals of mathematics, including through varied and frequent practice with increasingly complex problems over time, so that pupils develop conceptual understanding and the ability to recall and apply knowledge rapidly and accurately. - reason mathematically by following a line of enquiry, conjecturing relationships and generalisations, and developing an argument, justification or proof using mathematical language - can solve problems by applying their mathematics to a variety of routine and non-routine problems with increasing sophistication, including breaking 	<p>Proportions & Proportional Change This block builds on Ks3 work on ratio and fractions, highlighting similarities and differences and links to all the areas of mathematics including both algebra and geometry. GCSE papers and this block build upon understanding gauged in key stage 3. Use of financial contexts is central to this block, helping students to maintain familiarity with the vocabulary they are likely to use out of outside of school.</p> <p>Geometry As well as the formal introduction of bearings, this block provides a great opportunity to make links across the mathematical curriculum. This block also introduces new content whilst making use of and extending prior knowledge. The formula for arc length and sector area is built up from students understanding of fractions. Prior knowledge of vectors will be used as a basis for looking more formally and discovering the meaning of operations with vectors.</p> <p>Similarity Building on their experience of enlargement and similarity in previous years, this unit extends students' experiences and looks more formally at dealing with topics so just similar triangles. Trigonometry is introduced as a special case of similarity within right-angled triangles.</p> <p>Developing Algebra This unit offers the opportunity to revisit on in reinforce standard techniques and deeper that understanding. Looking at the difference between equations and inequalities, students will establish the difference between a solution under solution set. Students will move on to the solution of simultaneous equations by both algebraic and graphical methods.</p>	<p>Delving into data Existing knowledge is extended upon and particularly in terms of interpretation of results on evaluating and criticising statistical methods and diagrams. There is additional content relating to continuous data.</p> <p>Using Number This block builds on KS3 content, reviewing prime factorisation and associated number content such as HCF and LCM. Sequences is extended for Higher Tier to include surds and finding the formula for a quadratic sequence.</p> <p>This block consolidates the previous two blocks focusing on understanding powers generally, and in particular in standard form. Negative and fractional indices are explored in detail.</p> <p>Graphs This block focuses on the interpretation of graphs. The block starts by looking at gradients of lines before moving onto nonlinear graphs and the manipulation of graphs.</p> <p>Algebra This block focuses on cementing the manipulation of algebra. Understanding is developed before an introduction of formal function notation.</p> <p>Reasoning Students consolidate all they have learned previously to develop that multiplicative, geometric and algebraic reasoning.</p>	<p>Mathematics is an interconnected subject in which pupils need to be able to move fluently between representations of mathematical ideas. The programme of study for key stage 4 is organised into apparently distinct domains, but pupils should develop and consolidate connections across mathematical ideas. They should build on learning from key stage 3 to further develop fluency, mathematical reasoning and competence in solving increasingly sophisticated problems. They should also apply their mathematical knowledge wherever relevant in other subjects and in financial contexts.</p> <p>KS5 A level mathematics builds from GCSE level mathematics and introduces Calculus and its applications. It emphasises how mathematical ideas are interconnected and how mathematics can be applied to model situations mathematically using algebra and other representations, to help make sense of data, to understand the physical world and to solve problems in a variety of contexts, including social sciences and business. It prepares students for further study and Employment in a wide range of disciplines involving the use of mathematics.</p> <p>Careers Actuarial Analyst Actuary Chartered Account Data Analyst Investment Analyst Research Scientist Statistician System Developer Financial manager</p>