

KS3 Curriculum overview: Mathematics

Why do we study Mathematics at The Earls High School?

Mathematics is a powerful tool that has many applications to real life, It is therefore important that students are fluent in the fundamentals of Mathematics and how it can help them in everyday life. (Budgeting, using recipes, understanding nutrient labels on food, reading timetables) The study of Mathematics at The Earls develops students' Mathematical reasoning skills that promote a logical thought process which will enable students to become analytical thinkers. Students will have opportunities to explore Mathematical and non-Mathematical contexts where they are required to develop and apply a strategy to solve a problem using a series of Mathematical processes. At The Earls, the study of Mathematics also reflect the importance of communication skills and students are encouraged to develop their Mathematical vocabulary when participating in discussions, justifying their methods or presenting Mathematical arguments and proofs. Mathematics also provides cross curricular links to subjects such as Science, Geography and Computer Science where a secure knowledge of Mathematics is required.

What skills and knowledge do we anticipate students will have in this subject before they begin at The Earls High School?

There is an expectation that students have a good understanding of the statutory requirements as set out in the programmes of study for Key Stage 2 Mathematics National Curriculum.

What skills and knowledge would we like students to have in this subject at the end of their time at The Earls High School?

By the end of Key Stage 4, students will be confident across the three strands of mathematical fluency, reasoning mathematically and being able to use their mathematical ability to solve problems within mathematical and non-mathematical contexts. Develop Fluency Students will have consolidated their knowledge of the number system extending to standard form, limits of accuracy and powers and roots. (Fractional indices higher tier). Students should be able to select and use an appropriate method to solve a complex problem, including calculations using multiples of pi. Consolidated their understanding of algebraic manipulation and simplification to include quadratics expressions and equations. (Surds and algebraic fractions higher tier). Be fluent with expressions and equations to quadratics equations, simultaneous equations, and inequalities. Students will be able to understand and makes links between numerical, algebraic, graphical and diagrammatic representations including that of linear, quadratic, reciprocal functions (exponential and trigonometric functions Higher tier) Reason Mathematically Be able to make connections on ratio and proportion to include trigonometric ratios working with measures and geometry, understand proportional relations algebraically and graphically. Extend their ability to identify variables and express relationships between variables algebraically and graphically. Make and test conjectures from general patterns and relationships, be able to provide counter examples. Use algebra to support and construct arguments (proofs Higher tier) Reason deductively across geometry, number and algebra including geometric constructions. Explore what can and cannot be inferred in statistical and probabilities settings and express arguments formally. Assess the validity of an argument or the accuracy of a given method. Problem Solving Students will be able to use their knowledge to interpret and solve problems in different contexts including financial contexts. Make connections between different areas of Mathematics and be able to solve a given problem. Students will be able to model situations mathematically and reflect on how their results may have been affected by any assumptions. Students will be confident on selecting an appropriate method and technique and apply this in an unfamiliar concept.

Year 7 Curriculum Map: Mathematics

| Autumn Term | Spring Term | Summer Term |
|--|---|--|
| <p>To learn about: Number operations including using and applying arithmetic with integers and decimals. Working with negative numbers and applying to real life. Understanding Place value, including rounding. Using BIDMAS. Number Properties, understanding the difference between factors and multiples and calculating highest common factors/lowest common multiples both with and without the use of Venn diagrams. Language of Algebra including reading and writing expressions and simplifying expressions through collecting like-terms and writing correct algebraic notation. Substitution into expressions and formulae. Solving equations with unknowns on one side through the balance method and the understanding of inverse operations. Equivalent fractions, including arithmetic with fractions and applying to worded problem questions.</p> <p>Main home learning tasks: There will be one homework each week focusing on consolidating learning through retrieval topics from year 6 and previously taught topics in year 7. There will be revision homework set prior to assessment 1 which will take place after the Christmas break.</p> <p>Key assessments: Students will be assessed on their understanding of topics within lessons through questioning. The first formal assessment will take place just after the Christmas break which will include all the content covered in the Autumn term.</p> <p>Assessment conditions: Non-calculator paper in class in exam conditions.</p> | <p>To learn about: Understanding the connection between Fractions, Decimals and Percentages Using and applying percentages of amounts by linking it to Proportion. Understanding the fundamentals of Ratio and proportion, simplifying ratios, equivalent ratios, sharing into a ratio (using bar modelling). Probability, both single event and two-event, including worded probability and expressing as fractions, decimals and percentages.</p> <p>Main home learning tasks: There will be one homework each week focusing on consolidating learning through retrieval topics previously taught in year 7. There will be revision homework set prior to assessment 1 which will take place after the Easter break.</p> <p>Key assessments: Students will be assessed on their understanding of topics within lessons through questioning. The second formal assessment will take place just after the Easter break during the Summer term which will include all the content covered in the Spring term.</p> <p>Assessment conditions: Assessment to take place in the Summer term.</p> | <p>To learn about: Properties of shape, specifically triangles and quadrilaterals. Understanding 360 degrees around a full turn, and how this can be used to solve questions in relation to angles in triangles, quadrilaterals, polygons and also applied to multistep problem solving questions. Dimensions, including length and area and applying this to problem solving exercises. Averages, including pie charts and bar charts. Also lots of revision in preparation for the summer exams which happen after half term.</p> <p>Main home learning tasks: There will be one homework each week focusing on consolidating learning through retrieval topics previously taught in year 7. There will be revision homework set prior to assessment 1 which will take place after the Easter break.</p> <p>Key assessments: Students will be assessed on their understanding of topics within lessons through questioning. The second formal assessment will take place following the Easter break including all the content covered up to that point. Averages is the only topic which will be covered after the assessment period and will not be covered on the assessment.</p> <p>Assessment conditions: One non-calculator paper and one calculator paper in class in exam conditions.</p> |

Year 8 Curriculum Map: Mathematics

| Autumn Term | Spring Term | Summer Term |
|---|--|---|
| <p>To learn about: Understanding Bills, e.g. gas and electricity and understanding a bank balance (debit and credit). Percentage increase and decrease, using proportion, as well as multipliers. Understanding that what works with number works with algebra and apply this to collecting algebraic terms, algebraic expansion and substitution. Developing knowledge of algebra further, understanding the balance method with relation to both equations and inequalities. Investigating sequences, including linear, quadratic, geometric and the Fibonacci sequence. Finding the nth term of a linear sequence, and applying this understanding to worded problem questions.</p> <p>Main home learning tasks: There will be one homework each week focusing on consolidating learning through retrieval topics from year 7 and previously taught topics in year 8. There will be revision homework set prior to assessment 1 which will take place after the Christmas break.</p> <p>Key assessments: Students will be assessed on their understanding of topics within lessons through questioning. The first formal assessment will take place just after the Christmas break which will include all the content covered in the Autumn term. A big ideas test will take place each half term.</p> <p>Assessment conditions: Non-calculator paper in class in exam conditions.</p> | <p>To learn about: Progressing from fundamental Proportion skills acquired in Year 7 to being able to tackle a variety of problem solving aspects of the ratio topics. Plotting linear, quadratic and cubic graphs, by substituting values of x and completing a table of values. Recap knowledge of dimensions discovered in year 7.</p> <p>Main home learning tasks: There will be one homework each week focusing on consolidating learning through retrieval topics from previously taught topics in year 8. There will be revision homework set prior to assessment 2 which will take place after the Easter break.</p> <p>Key assessments: Students will be assessed on their understanding of topics within lessons through questioning. The second formal assessment will take place just after the Easter break which will include all the content covered in the Spring term. A big ideas test will take place each half term.</p> <p>Assessment conditions: Assessment to take place in the Summer term.</p> | <p>To learn about: Developing knowledge of dimensions to include understanding Pi and finding the area and circumference of circles. Developing previous understanding of 360 degrees in a full turn and applying this to angles in parallel lines. Developing Dimensions knowledge further, including volume, plans, nets and elevations and surface area. All of these skills will be applied to problem solving scenarios. Explore transformations, including translation, reflections, rotations and enlargements.</p> <p>Main home learning tasks: There will be one homework each week focusing on consolidating learning through retrieval topics from previously taught topics in year 8. There will be revision homework set prior to assessment 2 which will take place after the Easter break.</p> <p>Key assessments: Students will be assessed on their understanding of topics within lessons through questioning. The second formal assessment will take place just after the Easter break which will include all the content covered up to that point. Volume and Transformations are the only topics which will be covered after the assessment period and will not be covered on the assessment. A big ideas test will take place each half term.</p> <p>Assessment conditions: One non-calculator paper and one calculator.</p> |

Year 9 Curriculum Map: Mathematics

| Autumn Term | Spring Term | Summer Term |
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| <p>To learn about:</p> <p>Number properties: Factors, multiples, primes, HCF, LCM and indices,</p> <p>Equivalent Fractions: comparing, adding, subtracting, multiplying, dividing, using mixed numbers.</p> <p>Percentages: increases and decreases, interest, reverse percentage and applying percentages.</p> <p>Algebra: Algebra notation, substitution, expanding single brackets, expanding double brackets. Factorising linear expressions with some extending to quadratics.</p> <p>Ratio: Convert between units, real life scales, share in a ratio, best value, bar modelling and problem solving.</p> <p>Balance method: Solving equations including fractional, algebra on both sides, brackets, inequalities, and rearranging.</p> <p>Main home learning tasks:</p> <p>There will be one homework assignment per week. Most of the time this will be retrieval-based homework which is completed using Sparx Maths.</p> <p>Key assessments:</p> <p>Pupils will be practicing GCSE questions in lessons. A Big Ideas test will take place in each half term.</p> <p>A formal assessment will take place at the start of half term 3 (WB 15th January)</p> <p>Assessment conditions:</p> <p>In class – Test conditions</p> | <p>To learn about:</p> <p>Place value and number properties: multiplying with powers of ten, standard form, multiplying and dividing in standard form, upper and lower bounds and mathematical reasoning.</p> <p>360 degrees: Angle properties (right angles, straight lines, full turn) Parallel lines, bearings and angles in polygons.</p> <p>Compound units: speed, distance and time, Mass, volume and density, rates of pay and prices per unit, real life graphs and distance time graphs.</p> <p>Dimensions: recall and use the formulae for the area of a rectangle, triangle, parallelogram, and trapezium calculate the area of compound shapes made from triangles and rectangles L shape or T shape, work out the surface area of nets made up of rectangles and triangles, recall and use the formula for the volume of a: cube or cuboid, cylinder, prisms</p> <p>Main home learning tasks:</p> <p>There will be one homework assignment per week. Most of the time this will be retrieval-based homework which is completed using Sparx Maths.</p> <p>Key assessments:</p> <p>Pupils will be practicing GCSE questions in lessons. A Big Ideas test will take place in this half term. A formal assessment will take place at the start of half term 3 week beginning the 15th of January) and the 3rd of June)</p> <p>Assessment conditions:</p> <p>In class – Test conditions</p> | <p>To learn about:</p> <p>Pythagoras' theorem: calculating lengths and problem-solving Trigonometry: explore right angled triangles and ratios of angles and lengths. Use and understand sine, cosine and tangent ratios and calculate missing lengths and angles.</p> <p>Graph- Plotting a variety of graphs (straight line, quadratic, cubic)</p> <p>Understanding the equation of a straight line ($y=mx+ c$) and simultaneous equations graphically.</p> <p>REVISION: Revise previously covered topics to prepare for the final assessment.</p> <p>Simultaneous Equations: be able to solve a variety of equations including simultaneous. Both algebraically and graphically.</p> <p>Data: averages, scatter graphs, two-way tables, pie charts, estimating mean from grouped data, box plots, cumulative frequency, and histograms.</p> <p>Main home learning tasks:</p> <p>There will be one homework assignment per week. Most of the time this will be retrieval-based homework which is completed using Sparx Maths.</p> <p>Key assessments:</p> <p>Pupils will be practicing GCSE questions in lessons. A Big Ideas test will take place in each half term. A formal assessment will take place at the start of half term week beginning the 3rd of June.</p> <p>Assessment conditions:</p> <p>In class – Test conditions</p> |

