

Department:

Mathematics

Head of Department:

Mr Tunny

5 Year Overview -Departmental Curricular Intent

We will always have STEM with us. Some things will drop out of the public eye and will go away, but there will always be Science, Engineering and Technology and there will always, always be Mathematics.

Katherine Johnson (NASA Mathematician)

In Mathematics at Ellesmere Park High School, we will provide students with an ambitious and engaging curriculum that is accessible to all. We want to provide our students with the skills that they require to become independent learners to prepare them for the world ahead.

Students will be encouraged to take ownership of their own learning and will be taught the skills that they require to solve problems that they may encounter in real life.

Areas of development will be addressed along the journey throughout KS3 and KS4 and students will be given the chance to learn from their misconceptions and improve their work.

Our goal is for students to enjoy Mathematics, see its purpose in the real world and be able to apply their skills and knowledge to solve meaningful problems.

For further information please contact-stuart.tunny@consilium-at.com

| | Autumn 1 | Autumn 2 | Spring 1 | Spring 2 | Summer 1 | Summer 2 |
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| | Learning Cycle 1 | Learning Cycle 2 | Learning Cycle 3 | Learning Cycle 4 | Learning Cycle 4 | Learning Cycle 5 |
| YEAR 7 | Number | Algebra | Geometry, shape and measure | Number | Number | Probability, statistics and shape |
| | <p>Students will:</p> <p>Understand and use the structures that underpin the four operations strategies, using laws and conventions of arithmetic efficiently.</p> <p>Understand the value of digits in decimals, measure and integers.</p> <p>Understand properties of number through integer exponents and roots.</p> | <p>Students will:</p> <p>Understand and use the conventions and vocabulary of algebra including forming and interpreting algebraic expressions and equations.</p> <p>Simplify algebraic expressions by collecting like terms and manipulate expressions, maintaining equivalence.</p> <p>Understand the features of a sequence and investigate the link between these, co-ordinates and graphs.</p> | <p>Students will:</p> <p>Understand the concept of perimeter and area and use it in a range of problem-solving situations.</p> <p>Become familiar with angle notation and rules and use these to find missing angles in 2D shapes.</p> | <p>Students will:</p> <p>Work interchangeably with terminating decimals and their corresponding fractions.</p> <p>Know, understand and use fluently a range of calculation strategies for addition, subtraction, multiplication and division of fractions.</p> | <p>Students will:</p> <p>Understand the multiplicative relationships between fractions and ratios.</p> <p>Understand that fractions and ratio are an example of a multiplicative relationship and apply this to a range of contexts.</p> <p>Use percentages in a variety of contexts and solve problems.</p> | <p>Students will:</p> <p>Understand and calculate accurately central tendencies and spread.</p> <p>Construct accurately statistical representations.</p> <p>Interpret statistical measures and representations.</p> <p>Become familiar with a probability scale and sample spaces. Students will start finding probabilities of events.</p> <p>Explore, describe and analyse the frequency of outcomes in a range of situations.</p> <p>Understand what is meant by the term 'transforming' a shape.</p> <p>Understand and use translations.</p> <p>Understand and use rotations.</p> <p>Understand and use reflections.</p> <p>Understand and use enlargements.</p> <p>Investigate the art of 2D representation of 3D solids through isometric drawing, plans and elevations.</p> |

| | Autumn 1 | Autumn 2 | Spring 1 | Spring 2 | Summer 1 | Summer 2 |
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| | Learning Cycle 1 | Learning Cycle 2 | Learning Cycle 3 | Learning Cycle 4 | Learning Cycle 5 | Learning Cycle 5 |
| YEAR 8 | Number | Algebra | Probability and statistics | Geometry, shape and measure | Geometry, shape and measure | Geometry, shape and measure |
| | <p>Students will:</p> <p>Understand integer exponents and roots and use the unique prime factorisation of a number with Venn Diagrams to determine Highest Common Factors and Lowest Common Multiples.</p> <p>Round numbers to a required number of decimal places or significant figures.</p> <p>Use significant figures and other measures to estimate calculations by rounding.</p> <p>Understand that percentages are an example of a multiplicative relationship and apply this understanding to a range of contexts.</p> <p>Understand proportionality.</p> | <p>Students will:</p> <p>Understand index notation in the context of algebra.</p> <p>Understand what is meant by finding a solution to a linear equation with one unknown.</p> <p>Solve linear equations with:-</p> <p>Single unknowns on one side where obtaining the solution requires one step</p> <p>Single unknowns where the solution requires two steps</p> <p>Understand how to expand brackets</p> <p>Solve efficiently a linear equation with a single unknown involving brackets.</p> <p>Understand how to graph linear functions.</p> | <p>Students will:</p> <p>Understand how to calculate probabilities of independent events.</p> <p>Systematically record outcomes to find theoretical probabilities.</p> <p>Understand sampling methods.</p> <p>Understand how to collect and present data in a frequency table.</p> <p>Students will look at questionnaire design and use one to carry out a small survey.</p> <p>Understand how to interpret charts and tables including Stem and Leaf and Scatter diagrams.</p> | <p>Students will:</p> <p>Understand the laws of geometry when working with parallel lines and use these to solve problems in a variety of contexts.</p> <p>Use the laws of geometry when working with polygons and use these to solve problems in a variety of contexts.</p> <p>Understand the concepts of both line and rotational symmetry.</p> <p>Understand what is meant by the term 'tessellate' and investigate this within the context of 2D shapes.</p> | <p>Students will:</p> <p>Understand the concept of perimeter and area and use them in a range of problem-solving situations.</p> <p>Understand circumference and area when problem solving with circles.</p> <p>Understand the concept of surface area and use it with cubes and cuboids.</p> <p>Understand the concept of volume and use it with prisms.</p> | <p>Students will:</p> <p>Understand bearings, how to calculate them and where they are used in the real world.</p> <p>Understand how to use a protractor and a pair of compasses when performing constructions.</p> <p>Use the properties of a circle in constructions.</p> |

| | Autumn 1 | Autumn 2 | Spring 1 | Spring 2 | Summer 1 | Summer 2 |
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| | Learning Cycle 1 | Learning Cycle 2 | Learning Cycle 3 | Learning Cycle 3 | Learning Cycle 4 | Learning Cycle 5 |
| YEAR 9 | Number | Probability and statistical diagrams | Algebra | Algebra | Geometry, shape and measure | Algebra |
| | <p>Students will:</p> <p>Interpret and compare numbers in standard form.</p> <p>Understand that percentages are an example of a multiplicative relationship and apply this understanding to a range of contexts.</p> <p>Understand both direct and inverse proportion.</p> <p>Understand similarity in the contexts of area and volume.</p> | <p>Students will:</p> <p>Understand how tree diagrams can be used to solve problems in probability.</p> <p>Understand how to plot, interpret and use scatter graphs regarding relationship and correlation.</p> <p>Understand how to calculate averages from frequency tables.</p> <p>Model and interpret a range of situations graphically.</p> | <p>Students will:</p> <p>Understand index notation of all types in the context of algebra.</p> <p>Recognise and describe arithmetic sequences, finding nth terms for both linear and quadratic sequences.</p> <p>Recognise and describe other types of sequences that are non-arithmetic.</p> | <p>Students will:</p> <p>Rearrange formulae to change the subject.</p> <p>Model and interpret a range of situations graphically including regions when described by inequalities.</p> <p>Understand how to solve simultaneous linear equations by a range of methods.</p> | <p>Students will:</p> <p>Understand the use of similarity and congruence.</p> <p>Understand and use Pythagoras' Theorem.</p> <p>Understand the trigonometric functions.</p> <p>Use trigonometry to solve problems in a range of contexts.</p> <p>Understand how to solve problems with circles including arc lengths and sector areas.</p> | <p>Students will:</p> <p>Understand and interpret graphs in a range of situations.</p> <p>Understand the process of factorisation and use it to solve and plot quadratic equations.</p> <p>Simplify and solve equations with fractions.</p> |

| | Autumn 1 | Autumn 2 | Spring 1 | Spring 2 | Summer 1 | Summer 2 |
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| | Number and Algebra | Algebra and Data | Number and Shape | Algebra and Shape | Shape and Algebra | Algebra and probability |
| YEAR 10 | <p>Students will:</p> <p>Explore number problems and reasoning.</p> <p>Estimate answers using place value.</p> <p>Use index laws, powers and roots in calculations.</p> <p>Calculate with numbers in standard form.</p> <p>Understand the difference between rational and irrational numbers.</p> <p>Simplify surds and rationalise denominators.</p> <p>Use the rules of indices to simplify algebraic expressions.</p> <p>Factorise algebraic expressions.</p> | <p>Students will:</p> <p>Understand how to substitute numbers into formulae and build on methods to rearrange formulae.</p> <p>Distinguish between expressions, equations, formulae and identities.</p> <p>Understand how to find the general rule as an nth term for a particular sequence and determine whether a particular number is a term in a given sequence.</p> <p>Understand how to solve problems using geometrical and Fibonacci sequences.</p> <p>Understand how to expand the product of two brackets and use the difference of two squares.</p> <p>Factorise quadratics written in the form $ax^2 + bx + c$</p> <p>Understand how to interpret and present data.</p> | <p>Students will:</p> <p>Understand and be fluent in the four operations with fractions.</p> <p>Use ratio in different contexts to solve problems.</p> <p>Understand the difference between ratio and proportion and solve problems involving them.</p> <p>Solve real life problems using percentages.</p> <p>Derive and use rules in geometry to solve problems.</p> <p>Solve problems using Pythagoras' Theorem.</p> <p>Use trigonometric ratios to solve problems.</p> | <p>Students will:</p> <p>Understand that top athletes and sports teams use graphs to track progress, to show the improvement they have made.</p> <p>Understand that linear graphs are written in the form $y=mx+c$ and be able to rearrange, compare and plot equations in this format.</p> <p>Find equations of lines given gradients and intercepts.</p> <p>Understand how to draw and interpret distance-time graphs.</p> <p>Understand velocity-time graphs and their link to acceleration.</p> <p>Draw and interpret real life linear graphs and make the link between direct proportion and $y=mx+c$</p> <p>Understand how to plot non-linear graphs from real life context.</p> <p>Plot quadratic, cubic and reciprocal graphs, understanding roots and turning points.</p> | <p>Students will:</p> <p>Solve volume problems with frustums.</p> <p>Understand bounds and how they can affect a calculation.</p> <p>Understand the four aspects of transformations and the affect they have upon a shape.</p> <p>Understand how to use constructions with angle and shape.</p> <p>Understand why we use bearings and be able to calculate them from a given point.</p> <p>Understand how to solve simultaneous equations by elimination and substitution.</p> | <p>Students will:</p> <p>Solve quadratic equations by completing the square and the quadratic formula.</p> <p>Solve simultaneous equations graphically and understand how inequalities can be used to define a region.</p> <p>Solve inequalities.</p> <p>Understand how to use Venn diagrams and space diagrams with probability.</p> <p>Use tree diagrams to calculate probabilities for independent and conditional events.</p> |

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| | Solve equations involving brackets and numerical fractions. | Understand how to construct a range of diagrams and plot relevant graphs for a given set of data. | | Solve problems involving circles. Solve area and volume problems with prisms, cones, pyramids and cylinders. | | |
| | Autumn 1 | Autumn 2 | Spring 1 | Spring 2 | Summer 1 | Summer 2 |
| YEAR 11 | Number and Shape | Data and Algebra | Shape and Algebra | Number | Revision and exam preparation | |
| | <p>Students will:</p> <p>Understand how to solve multiplicative reasoning problems in a range of contexts.</p> <p>Understand similarity and congruence in 2D and 3D solids.</p> <p>Understand how to use trigonometry in non-right-angled problems.</p> | <p>Students will:</p> <p>Understand different sampling methods.</p> <p>Understand how to create cumulative frequency tables and draw their respective curves.</p> <p>Understand box plots and histograms.</p> <p>Students will solve harder equations and understand iteration.</p> <p>Students will sketch quadratics and Cubics.</p> | <p>Students will:</p> <p>Understand the rules associated with circle theorems and use them to solve geometry problems.</p> <p>Study harder algebraic concepts including fractions and proof.</p> <p>Understand vector notation and use it to solve vector problems.</p> | <p>Students will:</p> <p>Draw direct and inverse proportion graphs.</p> <p>Understand how to find the area under a curve.</p> <p>Understand the concepts to transform graphs.</p> | <p>Students will:</p> <p>Prepare for their summer exams following individual bespoke learning programs.</p> | |