

## Mathematics Subject Group Overview

| Grade | Unit 1                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | Unit 2                                                                                                                                                                                               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| 6     | <p><b>Number Systems - Civilizations and Human Interactions</b><br/> <b>Key Concept:</b> Relationships<br/> <b>Related Concept:</b> Representation and Systems<br/> Global Context (Exploration): Orientation in Space and Time (Evolution, constraints and adaptation)<br/> SOI: Different systems and forms of representation adapt as civilizations evolve and humans interact<br/> <b>Assessment:</b><br/> 1. Unit Test (Criterion A)<br/> 2. Application (Criteria C &amp; D)<br/> 3. Investigation (Criterion B)<br/> <b>ATL skill:</b> SM3<br/> <b>Self-Management:</b> I can apply organisational strategies to manage time and resources effectively.<br/> <b>Content summary:</b></p> <ul style="list-style-type: none"> <li>Representing and comparing number systems.</li> <li>Reading, writing,</li> </ul> | <p><b>Equivalent Forms of Numbers - Calculating Fairness</b><br/> <b>Key Concept:</b> Form<br/> <b>Related Concept:</b> Equivalence and Quantity<br/> Global Context (Exploration): Fairness and Development (Inequality, difference and inclusion)<br/> SOI: Inequality and difference become clearer through the use of equivalent forms of quantity<br/> <b>Assessment:</b><br/> 1. Unit Test (Criterion A)<br/> 2. Application (Criteria C &amp; D)<br/> 3. Investigation (Criterion B)<br/> <b>ATL skill:</b> SM5<br/> <b>Self-Management:</b> I can reflect on my strengths and areas for development, acting on feedback to grow.<br/> <b>Content summary:</b></p> <ul style="list-style-type: none"> <li>Represent numbers in different forms - fractions, decimals and percentages.</li> <li>Convert between equivalent</li> </ul> | <p><b>Angle Properties and Deductive Reasoning - Mathematical Elements in Art</b><br/> <b>Key Concept:</b> Form<br/> <b>Related Concept:</b> Measurement<br/> Global Context (Exploration): Personal and Cultural Expression (Artistry, craft, creation and beauty)<br/> SOI: Artistic and creative expression are enhanced through an understanding of how measurement defines forms<br/> <b>Assessment:</b><br/> 1. Unit Test (Criterion A)<br/> 2. Investigation (Criterion B)<br/> <b>ATL skill:</b> C5<br/> <b>Communication:</b> I can effectively structure and organise information using an appropriate format.<br/> <b>Content summary:</b></p> <ul style="list-style-type: none"> <li>Naming and classifying different geometric elements (point, ray, line, segment).</li> <li>Naming and classifying the different types of angle pairs.</li> <li>Naming and classifying angles formed by</li> </ul> | <p><b>Operations with Fractions - Cultural Expressions</b><br/> <b>Key Concept:</b> Logic<br/> <b>Related Concept:</b> Quantity and Simplification<br/> Global Context (Exploration): Identities and Relationships (Human Connection)<br/> SOI: Using logic to simplify quantities can help us explore human connections within communities.<br/> <b>Assessment:</b><br/> 1. Unit Test (Criterion A)<br/> 2. Application (Criteria C &amp; D)<br/> 3. Investigation (Criterion B)<br/> <b>ATL skills:</b> C4<br/> <b>Communication:</b> I can give and respond to feedback with awareness of others' feelings and perspectives.<br/> <b>Content summary:</b></p> <ul style="list-style-type: none"> <li>Compare and order fractions in different forms.</li> <li>Find the least common denominator in a set of unlike fractions.</li> <li>Use reciprocals to simplify complex fractions.</li> </ul> | <p><b>Perimeter, Area and Volume - Environmental Impacts</b><br/> <b>Key Concept:</b> Relationships<br/> <b>Related Concept:</b> Generalisation and Measurement<br/> Global Context (Exploration): Globalisation and Sustainability (human impact on the environment)<br/> SOI: Generalising the relationship between measurements can influence decisions that impact the environment.<br/> <b>Assessment:</b><br/> 1. Tiny House Project (Criteria C &amp; D)<br/> 2. Investigation (Criterion B)<br/> <b>ATL skills:</b> S3 Social: I can support others to participate and succeed through inclusive and productive collaboration.<br/> <b>Content summary:</b></p> <ul style="list-style-type: none"> <li>Generalise the relationship between the area and perimeter of a rectangle, and between the areas of a triangle and a rectangle.</li> <li>Find the perimeter and</li> </ul> | <p><b>Data Management - Trends in Communities</b><br/> <b>Key Concept:</b> Relationships<br/> <b>Related Concept:</b> Representation and Justification<br/> Global Context (Exploration): Globalisation and Sustainability (urban planning and infrastructure)<br/> SOI: Being able to represent relationships effectively can help justify the type of infrastructure needed to sustain urban communities.<br/> <b>Assessment:</b><br/> 1. Unit Test (Criterion A)<br/> <b>ATL skills:</b> Creative<br/> <b>Thinking Skills:</b> Create novel solutions to authentic problems<br/> <b>Content summary:</b></p> <ul style="list-style-type: none"> <li>Collect, classify and represent <b>univariate</b> data in different forms</li> <li>Construct (by hand and using technology) and interpret frequency tables, bar graphs and histograms</li> <li>Determine the best type of graph to use to represent given</li> </ul> |

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|  | <p>simplifying and converting between different number systems.</p> <ul style="list-style-type: none"> <li>• Simplifying numerical expressions using the order of operations.</li> <li>• Using appropriate forms of rounding to estimate results.</li> <li>• Defining and using the divisibility rules.</li> <li>• Representing a number as an exponent, a square root, and as a product of its prime factors, in order to solve problems.</li> <li>• Determining the Greatest Common Factor in a set of numbers</li> <li>• Determining the Least Common Multiple of a set of numbers</li> </ul> | <p>forms of numbers - fractions, decimals and percentages.</p> <ul style="list-style-type: none"> <li>• Compare different forms of numbers</li> <li>• Estimate the decimal value of a fraction.</li> <li>• Determine the percent of a number.</li> <li>• Calculate percent increase and decrease.</li> <li>• Applying mathematical strategies to solve problems.</li> </ul> | <p>parallel lines cut by a transversal.</p> <ul style="list-style-type: none"> <li>• Constructing and measuring angles.</li> <li>• Use variables to represent unknown angle measures.</li> <li>• Solving problems using the various angle properties, including the angles in triangles.</li> <li>• Find missing angle measures with simple equations</li> <li>• Naming and classifying the different types of triangles.</li> <li>• Finding missing angles in triangles.</li> </ul> | <ul style="list-style-type: none"> <li>• Using the four number operations (addition, subtraction, multiplication and division) with fractions.</li> </ul> | <p>area of compound 2D shapes.</p> <ul style="list-style-type: none"> <li>• Generalise the relationship between the area of 2D shapes and the volume of their corresponding prisms.</li> <li>• Find the surface area and volume of regular 3D prisms.</li> <li>• Apply mathematical strategies to solve problems involving 2D and 3D geometric shapes.</li> </ul> | <p>data.</p> <ul style="list-style-type: none"> <li>• Read, interpret and draw conclusions from primary and secondary sources of data.</li> <li>• Calculate the Measures of Central Tendency from given sets of data - Mean, Median and Mode</li> <li>• Apply mathematical strategies to solve problems involving statistics.</li> </ul> |
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| 7 | <p><b>Integers(Human Explorations)</b><br/> <b>Key Concept:</b> Form<br/> <b>Related Concepts:</b> Quantity &amp; Representation<br/> <b>Global Context:</b> Orientation in Time and Space<br/> <b>SOI:</b> Different forms of a quality can be used to represent both scales and duration.<br/> <b>Assessment:</b><br/> 1. Unit Test (Criteria A)<br/> 2. Project (Criteria C &amp; D)<br/> 3. Investigation (Criteria B) - To Come Next Year<br/> 4. Poster (Criteria C)<br/> <b>ATL skills:</b><br/> Communication<br/> Take effective notes in class; Organize &amp; depict information logically<br/> <b>Content summary</b> <ul style="list-style-type: none"> <li>Defining, Comparing &amp; Ordering Integers</li> <li>Defining &amp; Evaluating the Absolute Value of a number</li> <li>Using a number line to represent integers.</li> <li>Using a coordinate plane to represent integers</li> <li>Performing the</li> </ul> </p> | <p><b>Algebraic Expressions &amp; Equations</b><br/> <b>Key Concepts:</b> Relationships<br/> <b>Related Concepts:</b> Generalization &amp; Patterns<br/> <b>Global Context:</b> Scientific and technical innovation<br/> <b>SOI:</b> Generalising patterns can establish relationships which exist within puzzles &amp; mysteries.<br/> <b>Assessment:</b><br/> 1. Unit Test (Criteria A)<br/> 2. Project (Criteria C &amp; D)<br/> 3. Investigation (Criteria B)<br/> <b>ATL skills:</b><br/> Self Management:<br/> Affective Skills;<br/> Practice focus &amp; concentration;<br/> Demonstrate Persistence &amp; perseverance<br/> <b>Content summary:</b> <ul style="list-style-type: none"> <li>Understand what a variable is.</li> <li>Understanding what an algebraic expression is and how to create one</li> <li>Using correct terminology when analyzing algebraic patterns and sequences.</li> <li>Translating from words to</li> </ul> </p> | <p><b>2D &amp; 3D Geometry</b><br/> <b>Key Concepts:</b> Form<br/> <b>Related Concepts:</b> Space<br/> <b>Global Context:</b> Globalisation and sustainability<br/> <b>Statement of Inquiry:</b> Form defines space to determine/optimize efficient use of resources<br/> <b>Assessment:</b><br/> 1. Unit Test (Criteria A)<br/> 2. Project (Criteria C &amp; D)<br/> 3. Investigation (Criteria B &amp; C)<br/> <b>ATL skills:</b><br/> Communication:<br/> Understanding and using mathematical notation;<br/> Thinking skills - transfer:<br/> Combine knowledge understanding and skills to create products or solutions<br/> <b>Content summary</b> <ul style="list-style-type: none"> <li>Classifying shapes by interior and exterior angle measures</li> <li>Review area/perimeter and develop formulas for circles and trapezoids</li> <li>Finding the surface area and volume of 3-dimensional shapes, including rectangular prisms, cylinders, pyramids and spheres</li> <li>Solving problems including 2D and 3D shapes (Shaded Regions)</li> </ul> </p> | <p><b>Ratios &amp; Proportions</b><br/> <b>Key Concepts:</b> Relationships<br/> <b>Related Concepts:</b> Equivalence, Quantity and Simplification<br/> <b>Global Context:</b> Orientation in Space and Time - Scale<br/> <b>SOI:</b> Scaling quantities involves relationships represented through equivalence<br/> <b>Assessment:</b><br/> 1. Unit Test (Criteria A)<br/> 2. Project Investigation (Criteria C &amp; D)<br/> 3. Investigation (Criteria B &amp; C)<br/> <b>ATL skills:</b><br/> Communication: use and interpret a range of discipline-specific terms and symbols; make inferences and draw conclusions<br/> <b>Content summary:</b> <ul style="list-style-type: none"> <li>Defining and simplifying ratios.</li> <li>Understand the concept of a ratio and use ratio language (3 ways to represent)</li> <li>Dividing a quantity into a given ratio</li> <li>Defining Proportion and demonstrating Proportional relationships</li> <li>Scale factor and scale models</li> <li>Converting between unit rates (mm, cm, m, km within</li> </ul> </p> | <p><b>Rates</b><br/> <b>Key Concepts:</b> Relationships<br/> <b>Related Concepts:</b> Equivalence &amp; Quantity<br/> <b>Global Context:</b> Science &amp; Technical Innovation - Systems, models &amp; Puzzles<br/> <b>Statement of Inquiry:</b> Establishing relationships of equivalence between quantities illustrates the interconnectedness of human-made systems.<br/> <b>Assessment:</b><br/> 1. Unit Test (Criteria A)<br/> 2. Project Investigation (Criteria C &amp; D)<br/> 3. Investigation (Criteria B &amp; C)<br/> <b>ATL skills:</b><br/> Communication;<br/> Understanding and using mathematical notation;<br/> Organise and depict information logically<br/> <b>Content summary:</b> <ul style="list-style-type: none"> <li>Defining rate and unit rate as a rate of change and is between 2 different quantities</li> <li>Unit rate as a proportional relationship on a graph</li> <li>Defining and recognizing a constant rate of change</li> <li>Each point on the graph of a unit rate is a equivalent ratio</li> <li>Applying mathematical strategies to</li> </ul> </p> |  |
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|  | <p>operations of multiplication, division, addition and subtraction with integers. (Including GEMDAS)</p> <ul style="list-style-type: none"> <li>• Applying mathematical strategies to solve problems involving integers.</li> <li>• Using Integers &amp; Absolute Value with Orders of Operations</li> <li>• Solving Word Problems with Integers</li> </ul> | <p>expressions (one operation)</p> <ul style="list-style-type: none"> <li>• Representing patterns in different forms - diagrams, sequences, tables, words.</li> <li>• Evaluating expressions for different values</li> <li>• Creating and simplifying basic algebraic expressions (collecting like terms, distributing constants over a binomial)</li> <li>• Generalizing a mathematical pattern using algebra, and solving applications involving algebraic patterns.</li> <li>• Knowing that <math>\frac{1}{3}x</math> is the same as <math>x/3</math></li> <li>• The commutative, associative, and identity properties</li> <li>• Solving one-step equations &amp; understanding inverse operations</li> </ul> | <ul style="list-style-type: none"> <li>• Applying mathematical strategies to solve problems involving 3D shapes</li> </ul> | <p>Problems &amp; Warm Ups)</p> <ul style="list-style-type: none"> <li>• Proportions as percents</li> <li>• Applying mathematical strategies to solve problems using proportional reasoning</li> </ul> | <p>solve problems using rates and unit rates.</p> |  |
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| 8 | <p><b>Exponents - Discoveries and Developments</b><br/> <b>Key Concepts:</b> Form<br/> <b>Related Concepts:</b> Representations, Simplification<br/> <b>Global Context:</b> Orientation in Space and Time (Natural landscapes and resources)<br/> <b>SOI:</b> Representing and Simplifying quantities in different forms can help explore natural landscapes and resources<br/> <b>Assessment:</b><br/> 1. Unit Test (Criterion A)<br/> 2. Investigation (Criterion B)<br/> 3. Applications task (Criteria C &amp; D)<br/> <b>ATL skills:</b> C2<br/> <b>Communication:</b> I can express clear, concise, and relevant ideas using subject-specific language.<br/> <b>Content summary:</b></p> <ul style="list-style-type: none"> <li>• Rational and Irrational numbers</li> <li>• Algebraic Expressions with Integer Exponents</li> <li>• Scientific Notation</li> </ul> | <p><b>Algebraic Expressions - The Bottom Line - Algebraic Expressions</b><br/> <b>Key Concepts:</b> Form<br/> <b>Related Concepts:</b> Simplification and Equivalence<br/> <b>Global Context:</b> Identities and Relationships (Competition and Cooperation)<br/> <b>SOI:</b> Producing equivalent forms of expressions through simplification can help identify relationships to make informed decisions.<br/> <b>Assessment:</b><br/> 1. Unit Test (Criterion A)<br/> 2. Investigation (Criterion B)<br/> 3. Application Task (Criteria C &amp; D)<br/> <b>ATL skills:</b> T5<br/> <b>Thinking:</b> I can critically evaluate ideas and decisions with attention to ethics and sustainability.<br/> <b>Content summary:</b></p> <ul style="list-style-type: none"> <li>• Translating and simplifying algebraic expressions</li> <li>• Using the Properties of Real Numbers to simplify algebraic expressions</li> <li>• Evaluating</li> </ul> | <p><b>Equations and Inequalities - A balancing Act</b><br/> <b>Key Concepts:</b> Logic<br/> <b>Related Concepts:</b> Equivalence and Justification<br/> <b>Global Context</b> (Exploration): Scientific and Technical Innovation (processes and models)<br/> <b>SOI:</b> Logic helps us model the processes that justify equivalence.<br/> <b>Assessment:</b><br/> 1. Unit Test (Criterion A)<br/> 2. Investigation (Criterion B)<br/> 3. Application Task (Criteria C &amp; D)<br/> <b>ATL skills:</b> T1 Thinking: I can explore concepts and develop solutions with curiosity and creativity.<br/> <b>Content summary:</b></p> <ul style="list-style-type: none"> <li>• Solve one-step, two-step and multi-step equations in one variable.</li> <li>• Translate equations and inequalities.</li> <li>• Use the Properties of equality to justify solving equations.</li> <li>• Solve one and two-step inequalities and represent the solutions on a number line.</li> <li>• Apply</li> </ul> | <p><b>Coordinate Geometry - Human Impact</b><br/> <b>Key Concepts:</b> Relationships<br/> <b>Related Concepts:</b> Patterns, Change<br/> <b>Global Context:</b> Globalisation and Sustainability (Human Impact on the Environment)<br/> <b>SOI:</b> The relationship of humans' impact on the environment can be represented by patterns and change.<br/> <b>Assessment:</b><br/> 1. Unit Test (Criterion A)<br/> 2. Investigation (Criterion B)<br/> 3. Application Task (Criteria C &amp; D)<br/> <b>ATL skills:</b> T2 Thinking: I can interpret, analyse, and synthesise information to form evidence-based conclusions.<br/> <b>Content summary:</b></p> <ul style="list-style-type: none"> <li>• Solving problems involving right triangles using Pythagoras' Theorem.</li> <li>• Determining whether or not two triangles are similar.</li> <li>• Using the properties of similar triangles to find missing measurements.</li> <li>• Finding the gradient of a line using the slope triangle</li> <li>• Comparing proportional and</li> </ul> |  |  |
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|   |                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | <p>algebraic Expressions with Substitution</p> <ul style="list-style-type: none"> <li>Expanding brackets <math>2(3x-1)</math> and <math>(x-3)(x+4)</math></li> <li>Factoring the GCF from a polynomial (single brackets only)</li> <li>Factoring a trinomial into binomial factors (using area models only)</li> <li>Modelling algebraic expressions</li> <li>Finding the value of a variable in formula</li> </ul>                                                                            | <p>mathematical strategies to solve problems involving algebraic equations and inequalities.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | <p>nonproportional relationships</p> <ul style="list-style-type: none"> <li>Representing Linear Relationships in different ways.</li> <li>Determining the characteristics of linear relationships (gradient, y-intercept)</li> <li>Applying mathematical strategies to solve rate problems using a linear model.</li> </ul>                                                                                                                                                                               |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |  |
| 9 | <p><b>Numerical and Abstract Reasoning</b><br/> <b>Key Concept:</b> Form<br/> <b>Related Concepts:</b> Equivalence, Representation, Simplification, Change<br/> <b>Global Context:</b> Identities and Relationships<br/> <b>SOI:</b> Understanding the representation of mathematics in different forms over time and space, can help us change between equivalent forms and simplify expressions.<br/> <b>Assessment:</b><br/>           1. Investigation (Criterion B)</p> | <p><b>Reasoning with Data</b><br/> <b>Key Concept:</b> Relationships<br/> <b>Related Concepts:</b> Quantity and Representation<br/> <b>Global Context:</b> Globalization and Sustainability<br/> <b>SOI:</b> Representations of relationships between quantities can allow us to visualize trends in populations and consider sustainable solutions to local and global issues.<br/> <b>Assessment:</b><br/>           1. Statistical Report (Criterion C &amp; D)<br/> <b>ATL skills:</b></p> | <p><b>Coordinate Geometry</b><br/> <b>Key Concept:</b> Form<br/> <b>Related Concepts:</b> Change, Model, Space<br/> <b>Global Context:</b> Orientation in Time and Space<br/> <b>SOI:</b> Visualising and analysing forms in space can help us model change and make predictions about the world around us, improving decision making.<br/> <b>Assessment:</b><br/>           1. Investigation (Criteria C &amp; D)<br/>           2. Unit test (Criterion A)<br/> <b>ATL skills:</b><br/> <b>T3 Thinking:</b> I can draw meaningful connections from my learning and</p> | <p><b>Thinking with Models</b><br/> <b>Key Concept:</b> Logic<br/> <b>Related Concepts:</b> Models, Systems, Represent<br/> <b>Global Context:</b> Scientific and Technical Innovation<br/> <b>SOI:</b> Algebraic thinking and logic empower us to design systems with equivalent models, enabling us to represent and uncover the mysteries of the unknown.<br/> <b>Assessment:</b><br/>           1. Investigations (Criterion B)<br/>           2. Unit tests (Criteria A)<br/> <b>ATL skills:</b></p> | <p><b>Spatial Reasoning/2D and 3D Geometry</b><br/> <b>Key Concept:</b> Logic<br/> <b>Related Concepts:</b> Change and Equivalence<br/> <b>Global Context:</b> Globalization and Sustainability<br/> <b>SOI:</b> The generalisation of relationships within shapes can help engineers and architects create and justify new sustainable structures.<br/> <b>Assessment:</b><br/>           1. End of year exam (Criterion A)<br/> <b>ATL skills:</b><br/> <b>SM3 Self-management:</b> I can apply organisational strategies to manage time and resources effectively</p> |  |

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|                                    | <p><b>2. Unit test (Criterion A)</b><br/> <b>ATL skills:</b><br/> <b>SM4</b><br/> <b>Self-management:</b><br/> Set ambitious goals and stay motivated and resilient during setbacks.<br/> <b>S2 Social:</b> Build relationships and work effectively with diverse peers.<br/> <b>Content summary:</b></p> <ul style="list-style-type: none"> <li>• Number types</li> <li>• Rounding (dp. and sf.)</li> <li>• Operating with fractions</li> <li>• Order of operations</li> <li>• Exponent laws (product, quotient &amp; power laws)</li> <li>• Exponent laws (zero, negative and fractional (unit fractions))</li> <li>• Operating with surds</li> <li>• Simplifying surds (extension)</li> </ul> | <p><b>C3 Communication:</b><br/> Engage meaningfully in discussions to explore ideas critically and creatively<br/> <b>T2 Thinking:</b><br/> Interpret, analyse, and synthesise information to form evidence-base<br/> <b>Content summary:</b></p> <ul style="list-style-type: none"> <li>• Measures of centre (mean, median, mode)</li> <li>• GDC to process data (data &amp; spreadsheet)</li> <li>• Measures of Spread (range, quartiles &amp; IQR)</li> <li>• Box-and-whisker plot (5-point number summary)</li> <li>• Frequency tables &amp; bar charts</li> <li>• Grouped frequency tables &amp; histograms</li> <li>• Cumulative graph (extension)</li> <li>• Relative frequency (extension)</li> </ul> | <p>apply them to unfamiliar contexts<br/> <b>Content summary:</b></p> <ul style="list-style-type: none"> <li>• Coordinate points &amp; cartesian plane</li> <li>• Pythagoras' theorem</li> <li>• Distance formula</li> <li>• Midpoint</li> <li>• Gradient</li> <li>• Solutions to linear equations</li> <li>• Graphing equations of lines (from tables and from gradient-intercept form)</li> <li>• X and Y-intercepts</li> <li>• Finding equations of lines (from graphs, a point and gradient and 2 points)</li> <li>• Graphing lines with GDC (extension)</li> <li>• Parallel &amp; perpendicular lines</li> <li>• Proportional change &amp; direct variation</li> </ul> | <p><b>SM5 Self-management:</b> I can reflect on my strengths and areas for development, acting on feedback to grow<br/> <b>Content summary:</b></p> <ul style="list-style-type: none"> <li>• Solving equations</li> <li>• Rearranging equations</li> <li>• Translating mathematical expressions</li> <li>• Translating and solving word problems with one variable (numbers, age problems)</li> <li>• Solving systems of equations (by graphing solutions, GDC, equating y's, substitution)</li> <li>• Solving word problems with systems</li> <li>• Number of solutions to systems (Investigation)</li> </ul> | <p><b>Content summary:</b></p> <ul style="list-style-type: none"> <li>• Perimeter &amp; area</li> <li>• Application of perimeter &amp; area</li> <li>• 3D shapes (surface area and volume)</li> <li>• Volume of standard polyhedra (pyramids, cones, spheres, cylinders and prisms)</li> <li>• Applications of surface area &amp; volume</li> </ul> |  |
| <p><b>9</b><br/> <b>Extend</b></p> | <p><b>The Power of Equivalence</b><br/> <b>Key Concept:</b> Form</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | <p><b>Reasoning with Data</b><br/> <b>Key Concept:</b> Relationships</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | <p><b>Organizing Urban Development:</b><br/> <b>Coordinate Geometry</b><br/> <b>Key Concept:</b> Form</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | <p><b>Thinking with Models</b><br/> <b>Key Concept:</b> Logic<br/> <b>Related Concepts:</b> Models, Patterns, System</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | <p><b>Spatial Reasoning/2D and 3D Geometry</b><br/> <b>Key Concept:</b> Logic</p>                                                                                                                                                                                                                                                                   |  |

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|  | <p><b>Related Concepts:</b><br/>Equivalence,<br/>Simplification<br/><b>Global Context:</b><br/>Scientific and technical innovation<br/><b>SOI:</b> Using mathematical principles, relationships can be expressed or simplified as equivalent forms.</p> <p><b>Assessment:</b><br/>1. Investigation (Criterion B)<br/>2. Unit tests (Criterion A)</p> <p><b>ATL skills:</b><br/>SM4<br/>Self-management: Set ambitious goals and stay motivated and resilient during setbacks.<br/>S2 Social: Build relationships and work effectively with diverse peers.</p> <p><b>ATL skills(from 2025-26: Creative Thinking (Apply existing knowledge to generate new ideas, products or processes))</b></p> <p><b>Content summary:</b></p> <ul style="list-style-type: none"> <li>Revise number skills and basic algebra (simplify, distribution, factor hcf, solve up to 3 step equations)</li> <li>Formula</li> </ul> | <p><b>Related Concepts:</b><br/>Quantity and Representation<br/><b>Global Context:</b><br/>Globalization and Sustainability<br/><b>SOI:</b> How quantities are represented can help to establish underlying relationships and trends in a population allowing us to consider sustainable solutions to local and global issues.</p> <p><b>Assessment:</b><br/>1. Investigations (Criteria B)<br/>2. Unit tests (Criteria A)</p> <p><b>ATL skills:</b><br/>C3 Communication: Engage meaningfully in discussions to explore ideas critically and creatively<br/>T2 Thinking: Interpret, analyse, and synthesise information to form evidence-base</p> <p><b>Content summary:</b></p> <ul style="list-style-type: none"> <li>Review different types of data and basic graphs</li> <li>Determine mean, median, range, IQR and standard deviation of data set</li> <li>Determine statistics based on</li> </ul> | <p><b>Related Concepts:</b><br/>Change, Representation, Space<br/><b>Global Context:</b><br/>Orientation in Time and Space<br/><b>SOI:</b> How does urban planning use mathematical relationships to model and organise urban spaces?</p> <p><b>Assessment:</b><br/>1. Investigations (Criterion B)<br/>2. Unit tests (Criteria A)<br/>3. Applications in Real Life (criteria C and D)</p> <p><b>ATL skills:</b><br/>T3 Thinking: I can draw meaningful connections from my learning and apply them to unfamiliar contexts</p> <p><b>ATL skills (from 2025-26): Transfer (Combine knowledge, understanding and skills to create products or solutions)</b></p> <p><b>Content summary:</b></p> <ul style="list-style-type: none"> <li>Calculate the gradient of a line</li> <li>Write an equations of a line</li> <li>Sketch graphs of lines from equations</li> <li>Identify key features from the graph of a line</li> <li>Move between different forms of equations of lines</li> <li>Equations of parallel and perpendicular lines</li> <li>Calculate distance on a</li> </ul> | <p><b>Global Context:</b> Scientific and Technical Innovation<br/><b>SOI:</b> Algebraic thinking enables us to use logic to design systems that model complex patterns.</p> <p><b>Assessment:</b><br/>1. Investigations (Criterion B)<br/>2. Unit tests (Criteria A)</p> <p><b>ATL skills:</b><br/>T1 Thinking: I can explore concepts and develop solutions with curiosity and creativity</p> <p><b>Content summary:</b></p> <ul style="list-style-type: none"> <li>Linear models</li> <li>Solve systems of linear models.</li> <li>Interpret parameters and solutions of linear models</li> <li>Expand and Factor quadratic expressions</li> <li>Solve quadratic equations by factoring</li> <li>Mathematical model from a table of values (linear and quadratic)</li> </ul> | <p><b>Related Concepts:</b><br/>Change and Equivalence<br/><b>Global Context:</b> Scientific and Technical Innovation<br/><b>SOI:</b> Representing change and equivalence through the logical manipulation of data allows video game developers to create realistic, and fluid movement of geometrical shapes.</p> <p><b>Assessment:</b><br/>1. Real Life Task (Criteria C &amp; D)<br/>2. Unit tests (Criterion A)</p> <p><b>ATL skills:</b> Creative thinking (Create novel solutions to authentic problems)</p> <p><b>Content summary:</b></p> <ul style="list-style-type: none"> <li>Transformations (reflection, translation, dilation) (revise 2D shapes, PL for G10)</li> <li>2D shapes, including special triangles and quadrilaterals.</li> <li>Area, perimeter and volume of objects</li> <li>Right triangles, including right-triangle trigonometry</li> <li>Problem solving using formula and other skills</li> </ul> |  |
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|    | <p>rearrangement</p> <ul style="list-style-type: none"> <li>Revise (integer) laws of exponents.</li> <li>Rational exponents - numeric and algebraic expressions</li> <li>Simplifying Expressions using the Laws of surds</li> <li>Solve exponential equations</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                             | <p>frequency table</p> <p>Apply statistics to real life contexts</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | <p>coordinate plane.</p> <ul style="list-style-type: none"> <li>Calculate midpoint of segment</li> <li>Classify quadrilaterals</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
| 10 | <p><b>Numbers (the evolution over time of mathematical notations)</b></p> <p><b>Key Concept:</b> Form</p> <p><b>Related Concept:</b> Representation, Equivalence, Simplification,</p> <p><b>Global Context:</b> Personal and Cultural Expression</p> <p><b>SOI:</b> The forms and representations of mathematical objects have evolved through History to express new quantities and to respond the specific and ever growing needs of civilisations.</p> <p><b>Assessment:</b></p> <ol style="list-style-type: none"> <li>Investigation (Criterion B)</li> <li>Unit test (Criterion A)</li> </ol> <p><b>ATL skills:</b></p> <p><b>SM1</b> Self-management: I can maintain focus</p> | <p><b>Trigonometry</b></p> <p><b>Key Concept:</b> Relationship</p> <p><b>Related Concept:</b> Patterns, Representation</p> <p><b>Space</b></p> <p><b>Global Context:</b> orientation in space (and time)</p> <p><b>SOI:</b> Patterns and relationships in geometric representations, of place and space, have helped us explore and understand our world.</p> <p><b>Assessment:</b></p> <ol style="list-style-type: none"> <li>Investigation (Criterion B)</li> <li>Evaluating and creating a house design (Criterion C &amp; D)</li> <li>Unit test (Criterion A)</li> </ol> <p><b>ATL skills:</b></p> <p><b>C5</b> Communication: I can effectively structure and organise information</p> | <p><b>Functions</b></p> <p><b>Key Concept:</b> Relationships</p> <p><b>Related Concept:</b> Model, Change.</p> <p><b>Global Context:</b> Scientific and technical innovation</p> <p><b>SOI:</b> Modelling relationships can allow us to predict change and consider opportunities and consequences.</p> <p><b>Assessment:</b></p> <ol style="list-style-type: none"> <li>Report (Criteria C &amp; D)</li> <li>Unit test (Criterion A)</li> </ol> <p><b>ATL skills:</b></p> <p><b>T1</b> Thinking: I can explore concepts and develop solutions with curiosity and creativity</p> <p><b>SM4</b> Self-management: I can set ambitious goals and stay motivated and resilient during setbacks.</p> <p><b>Content summary:</b></p> <ul style="list-style-type: none"> <li>Concept of functions, function notations (review).</li> <li>Domain and range of functions.</li> </ul> | <p><b>Algebra</b></p> <p><b>Key Concept:</b> Relationships</p> <p><b>Related Concept:</b> Representation, Simplification, Models</p> <p><b>Global Context:</b> identities and relationships</p> <p><b>SOI:</b> The abstract symbols that represent and model complex relationships between quantities can be simplified to determine their possible solutions.</p> <p><b>Assessment:</b></p> <ol style="list-style-type: none"> <li>Unit test (Criterion A)</li> </ol> <p><b>ATL skills:</b></p> <p><b>SM5</b> Self-management: I can reflect on my strengths and areas for development, acting on feedback to grow.</p> <p><b>Content summary:</b></p> <ul style="list-style-type: none"> <li>Revision: collecting like terms, expanding single bracket, factorising into single bracket, solving equations</li> </ul> | <p><b>Probability</b></p> <p><b>Key Concept:</b> Logic and relationships</p> <p><b>Related Concept:</b> Representations, Systems</p> <p><b>Global Context:</b> identify and relationships</p> <p><b>SOI:</b> Representing and generalising relationships can help to inform trends among events and individuals.</p> <p><b>Assessment:</b></p> <ol style="list-style-type: none"> <li>Investigation (Criterion B)</li> <li>End of year exam (Criterion A)</li> </ol> <p><b>ATL skills:</b></p> <p><b>C2</b> Communication: I can express clear, concise, and relevant ideas subject-specific language.</p> <p><b>Content summary:</b></p> <ul style="list-style-type: none"> <li>Probability scale (language, percentage, decimals and fractions)</li> <li>Probability of simple events</li> </ul> | <p><b>IDU Data for Change (with Science)</b></p> <p><b>Concepts:</b> Relationships, Energy, Representation.</p> <p><b>Inquiry:</b> Representations of data reveal relationships in energy systems that can inform our understanding of environmental challenges.</p> <p><b>Assessment:</b></p> <ol style="list-style-type: none"> <li>Data report (Ai, Bi)</li> <li>Case study (Cii)</li> <li>Reflection (Aii, Bii, Ci)</li> </ol> <p><b>ATL skills:</b> S3: I can support others to participate and succeed through inclusive and productive collaboration.</p> <p><b>T2:</b> I can interpret, analyse, and synthesise information to form evidence-based conclusions.</p> <p><b>Content summary:</b></p> <ul style="list-style-type: none"> <li>Subject specific content (energy related)</li> <li>Creating correctly</li> </ul> |

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|  | <p>and overcome distractions<br/>S2 Social: I can build relationships and work effectively with diverse peers<br/>Content summary:</p> <ul style="list-style-type: none"> <li>• Number systems</li> <li>• Exponents (including negative and fractional)</li> <li>• Exponential equations &amp; scientific notation</li> <li>• Logarithms (w/o technology)</li> <li>• Laws of logarithms (practice investigation task)</li> <li>• Arithmetic sequences &amp; series</li> <li>• Geometric Sequences</li> <li>• Application of sequences and series</li> <li>• GDC practice (Nsolve &amp; Sheets)</li> <li>• Interval Notation &amp; solving inequalities</li> </ul> | <p>using an appropriate format<br/>SM3<br/>Self-management: I can apply organisational strategies to manage time and resources effectively<br/>Content summary:</p> <ul style="list-style-type: none"> <li>• Properties of triangles</li> <li>• Similarity</li> <li>• Scale factor in area and volume (extension).</li> <li>• Pythagoras' theorem solving in 2D</li> <li>• Pythagoras' theorem solving in 3D (extension)</li> <li>• Length of an arc and the area of a sector</li> <li>• Trigonometric ratios</li> <li>• Problem solving with trigonometric ratios (incl. inverse)</li> <li>• Application of trigonometry</li> <li>• Area of non-right angle triangles</li> <li>• Non-right-angle trigonometry</li> <li>• Trigonometric functions and transformation of trig. functions.</li> </ul> | <ul style="list-style-type: none"> <li>• Linear functions.</li> <li>• Quadratic functions.</li> <li>• Forms of quadratic functions</li> <li>• Application of quadratic functions.</li> <li>• Inverse functions</li> <li>• Composite functions</li> <li>• Transformation of functions (translation, stretch and reflection)</li> <li>• Exponential and logarithmic functions</li> <li>• Higher order polynomials</li> <li>• Reciprocal graphs</li> </ul> | <ul style="list-style-type: none"> <li>• Rearranging formulae</li> <li>• Expanding double brackets</li> <li>• Factorising into double brackets and factorised form of quadratic functions</li> <li>• Standard form and quadratic formula (verifying with Polyroots)</li> <li>• Word problems involving quadratic equations (application)</li> <li>• Completing the square and application of vertex form</li> </ul> | <ul style="list-style-type: none"> <li>• Probability of combined events</li> <li>• Probability with sample spaces, tree diagrams and venn diagrams</li> <li>• Dependent and independent events</li> <li>• Addition rule (Investigation)</li> </ul> | <p>formatted graphs and tables</p> <ul style="list-style-type: none"> <li>• Processing data - calculating means and standard deviation</li> <li>• Drawing conclusions from data</li> <li>• Identifying patterns in data</li> <li>• Applying patterns and data to real life contexts</li> </ul> |
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| 10<br>Extend | <p><b>Numbers (the evolution over time of mathematical notations)</b><br/> <b>Key Concept:</b> Form<br/> <b>Related Concept:</b> Representation, Equivalence, Simplification,<br/> <b>Global Context:</b> Scientific and Technical Innovation<br/> <b>SOI:</b> The equivalent forms and representations of mathematical objects have evolved over time to express new quantities and to respond to the specific and ever growing needs of technical discoveries.<br/> <b>Assessment:</b><br/> 1. Investigation of rules (Criteria B)<br/> 2. Application (Criterion D)<br/> 3.. Unit test (Criteria A)<br/> <b>ATL skills:</b></p> <ul style="list-style-type: none"> <li>• Communication skills: Use and interpret a range of discipline-specific terms and symbols</li> <li>• Organization skills: Create plans to prepare for summative assessments</li> </ul> | <p><b>Geometry and Trigonometry</b><br/> <b>Key Concept:</b> Relationships<br/> <b>Related Concept:</b> Measurement, Representation, Space<br/> <b>Global Context:</b> orientation in space (and time)<br/> <b>SOI:</b> Geometric representations of place and space have helped us explore relationships in the world around us and to draw conclusions about the unmeasurable<br/> <b>Assessment:</b><br/> 1. Double angle formula/proof(Criterion C)<br/> 2. Application (Criterion D)<br/> 2. Unit test (Criteria A)<br/> <b>ATL skills:</b></p> <ul style="list-style-type: none"> <li>• Communication skills: make inferences and draw conclusions, understand and use mathematical notation</li> <li>• Reflection skills: identify strengths and weaknesses of personal learning strategies</li> </ul> | <p><b>Functions</b><br/> <b>Key Concept:</b> Relationships<br/> <b>Related Concept:</b> Representation, Change, Models<br/> <b>Global Context:</b> Scientific and technical innovation<br/> <b>SOI:</b> The functions enable to describe the relationships between quantities, to model their changes and to make informed decisions when designing and developing innovative projects.<br/> <b>Assessment:</b><br/> 1. Investigations (Criteria B, C &amp; D)<br/> 2. Unit tests (Criteria A)<br/> <b>ATL skills:</b></p> <ul style="list-style-type: none"> <li>• Critical thinking skills: propose and evaluate a variety of solutions.</li> <li>• Reflection skills: Identify strengths and weaknesses of personal learning strategies</li> </ul> <p><b>Content summary:</b></p> <ul style="list-style-type: none"> <li>• Concept of functions, function notations (review).</li> <li>• Domain and range of functions.</li> <li>• Linear functions.</li> <li>• Quadratic functions.</li> <li>• Polynomial functions of higher degree</li> <li>• Modelling cycle</li> <li>• Exponential function</li> <li>• Logarithmic functions Graphing</li> </ul> | <p><b>Algebra</b><br/> <b>Key Concept:</b> Relationships<br/> <b>Related Concept:</b> Representation, Simplification, Models<br/> <b>Global Context:</b> identities and relationships<br/> <b>SOI:</b> Algebra enables to represent and model complex relationships between quantities using abstract symbols, to simplify them and to determine their possible solutions.<br/> <b>Assessment:</b> Unit tests (Criteria A)<br/> <b>ATL skills:</b></p> <ul style="list-style-type: none"> <li>• Critical thinking skills: propose and evaluate a variety of solutions.</li> </ul> <p><b>Content summary:</b></p> <ul style="list-style-type: none"> <li>• Products of binomials</li> <li>• Factorizing and solving quadratic equations, including factored form, vertex form, completing the square, sum and product of roots, splitting the middle term and quadratic formula methods. Applications in context.</li> <li>• Representing and solving simple inequalities (w/o technology).</li> <li>• Representing and solving systems of inequalities (w/o</li> </ul> | <p><b>Probability</b><br/> <b>Key Concept:</b> Logic and relationships<br/> <b>Related Concept:</b> Representations, Systems<br/> <b>Global Context:</b> identify and relationships<br/> <b>SOI:</b> Representing and generalizing relationships help to inform trends among events and individuals.<br/> <b>Assessment:</b><br/> 1. Investigations (Criteria B &amp; D)<br/> 2. Unit tests (Criteria A)<br/> <b>ATL skills:</b></p> <ul style="list-style-type: none"> <li>• Critical thinking skills: propose and evaluate a variety of solutions.</li> <li>• Reflection skills: Identify strengths and weaknesses of personal learning strategies</li> </ul> <p><b>Content summary:</b></p> <ul style="list-style-type: none"> <li>• Sample spaces, terminology (review)</li> <li>• Probability of simple events (review)</li> <li>• Theoretical and experimental probability (review)</li> <li>• Probability with venn diagrams tree diagrams and sample spaces</li> <li>• Counting principles,</li> </ul> | <p><b>IDU (with Sciences) - Rising above misrepresentation</b><br/> <b>Key Concept:</b> Systems<br/> <b>Related Concept:</b> Relationships, Evidence, Representation, Validity<br/> <b>Global Context:</b> Fairness and Development - Fair and accurate reporting<br/> <b>SOI:</b> The representation of evidence has the potential to significantly impact the fairness, validity, and accuracy of reporting on relationships between variables.<br/> <b>Assessment:</b><br/> 1. Climate change data report (Ai, Bi)<br/> 2. Presentation to interview panel (Aii, Bii; Ci, Cii)<br/> <b>ATL skills:</b><br/> Communication skills: Negotiate ideas and knowledge with peers and teachers<br/> Media literacy skills: Understand the impact of media representations and modes of presentation</p> <p><b>Content summary from mathematics:</b></p> <ul style="list-style-type: none"> <li>• Selecting appropriate representations depending on data types (histograms, bar charts, box-and-whiskers, scatterplots,</li> </ul> |
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|  | <p>(examinations and performances), Bring necessary equipment and supplies to class</p> <ul style="list-style-type: none"> <li>Information literacy skills: Access information to be informed and inform others</li> <li>Critical-thinking skills: Gather and organize relevant information to formulate an argument</li> </ul> <p>Content summary:</p> <ul style="list-style-type: none"> <li>Number systems notation (review)</li> <li>Exponential notations</li> <li>Laws of exponents</li> <li>Exponential equations</li> <li>Scientific notation</li> <li>Number sequences, arithmetic and geometric sequences (review).</li> </ul> | <p>(self-assessment)</p> <ul style="list-style-type: none"> <li>Critical-thinking skills: propose and evaluate a variety of solutions</li> <li>Transfer skills: use effective learning strategies in subject groups and disciplines</li> </ul> <p>Content summary:</p> <ul style="list-style-type: none"> <li>Congruence and similarity. Enlargement by a rational factor (dilation) including area and volume</li> <li>Pythagoras' theorem, converse of Pythagoras' theorem. Problem solving in 2D and 3D</li> <li>Circle geometry (theorems)</li> <li>Special right-angled triangles</li> <li>Angle measurement in degrees and radians.</li> </ul> | <p>trigonometric functions.</p> <ul style="list-style-type: none"> <li>Absolute value functions<br/>Transformations of graphs (translation, stretch, reflection), including quadratic and <u>trigonometric</u> functions</li> <li>Composite functions</li> <li>Inverse functions (enrich.)</li> <li>Rational functions, <u>including limits and asymptotes</u></li> <li>Power rule for differentiation (investigation)</li> </ul> | <p>technology): linear programming (enrich.)</p> <ul style="list-style-type: none"> <li>Representing and solving double inequalities (w/o technology).</li> <li>Representing and solving inequalities involving absolute values (w/o technology).</li> </ul> | <p>combinatorics, permutations</p> <ul style="list-style-type: none"> <li>Probability calculations.</li> <li>Additional rule.</li> <li>Dependent and independent events.</li> <li>Combined events.</li> <li>Mutually exclusive events.</li> <li>Investigation (S): multiplication rule, conditional probability.</li> <li>Data processing: measure of central tendency (mean, mode, median) (review).</li> <li>Measure of dispersion: standard deviation (review)</li> <li>Random variables</li> <li>Normal distribution</li> </ul> | <p>cumulative graphs)</p> <ul style="list-style-type: none"> <li>Using different measures of centre to describe data</li> <li>Using different measures of spread to describe data</li> <li>Analysing the distribution of data and how it affects the measures of centre (skewness)</li> <li>Outliers</li> <li>Linear regression (application and positive &amp; negative correlations)</li> <li>Extension: standard deviation and error bars</li> <li>Interpretations of different representations of data</li> <li>Using correct vocabulary, terminology and notation to describe data</li> <li>Evaluating whether conclusions drawn from data set are valid or could be misleading</li> </ul> |
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|  | <ul style="list-style-type: none"><li>• Arithmetic and geometric series</li><li>• Logarithms (w/o technology), laws of logarithms.</li><li>• Investigation (S): change of base</li><li>• Absolute values.</li><li>• Measurements and accuracy: interval notations</li></ul> | <ul style="list-style-type: none"><li>• Arc length, sector area.</li><li>• Right-angled trigonometry (ratios).</li><li>• Unit circle</li><li>• Trigonometric identities = Pythagoras' identity, double angle formulae</li><li>• Area of triangle</li><li>• Sine and cosine rule applications.</li></ul> |  |  |  |  |
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