



OTR Mathematics Overview Years MYP 1 UP TO 5

OVERVIEW MATHEMATICS YEAR 1

| Unit title and teaching hours                | Key concept   | Related concepts        | Global context               | Statement of inquiry  | Objectives  | ATL skills   | Content   |
|--|---------------|-------------------------|------------------------------|---|---|--|---|
| <p><b>Numbers</b></p> <p><b>18 hours</b></p> | Form          | Equivalence Systems     | Fairness and development     | Making fair judgments is easier if we understand a variety of numeric systems and forms | <p>A: All strands</p> <p>B: All strands</p> <p>D: All strands</p> | <p>Critical-thinking skills –</p> <p>Creative-thinking skills –</p> <p>Transfer skills</p> <p>Communication skills</p> | <p>Numbers as elements of one or more number systems including natural numbers, whole numbers, integers, rationals, irrationals.</p> <p>Addition/subtraction/multiplication/division with negative numbers</p> <p>Numerical expressions or equations to model real-life problems.</p> <p>Mathematical operations/ BEDMAS</p> <p>Problem solving situations using the four operations with integers, fractions, and decimals.</p> <p>Fractions simplification</p> <p>Common denominators (LCM and HCF)</p> <p>Comparison of fractions</p> <p>Multiplying/dividing fractions</p> <p>Addition/subtraction/multiplication/division of decimals</p> <p><i>Some students could</i></p> <p>Solve problems involving combinations of</p> <p>Explain ‘shortcut’ patterns for negative number operations and proportional conversions.</p> <p>Proportions and how to move from one form to another (ie: convert fractions to decimals or percents, etc.).</p> <p>Apply percentages to real-life problems.</p> |
| <p><b>Algebra</b></p> <p><b>18 hours</b></p> | Relationships | Patterns Simplification | Identities and relationships | Identifying and using patterns and rules is the key to simplifying                      | C, D: All strands   | <p>Creative-thinking skills–</p> <p>Critical-thinking skills</p>   | <p>Algebraic expressions</p> <p>Variables, unknowns, constants, terms and coefficients in algebraic expressions</p>   |



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|--------------------------------------|---------------|---------------------------------|--|--|--|--|---|
|                                      |               |                                 |  | relationships, in life and in algebra.   |  | <p>Communication skills</p> <p>Self-management skills, Affective skills</p> <p>Emotional management</p> <p>Information literacy skills</p> <p>Media literacy skills</p> <p>Transfer skills – Apply</p> <p>Affective skills –</p> | <p>Like terms</p> <p>How to collect like terms</p> <p>Simplifying algebraic expression</p> <p>Simplifying with powers</p> <p>Writing algebraic expressions</p> <p>The use of Commutative property</p> <p>Summarize expressions by simplifying them</p>  |
| <b>Statistics</b><br><b>18 hours</b> | Relationships | Representation<br>Justification | Globalisation<br>and<br>Sustainability | <i>Representing data visually helps to identify relationships that can justify global decisions.</i>                                     | <i>C: All strands</i><br><i>D: All strands</i>     | <p>Communication skills</p> <p>Information literacy skills</p> <p>Reflection skills:</p> <p>Critical thinking skills</p> <p>Transfer skills</p>  | <p>Primary and Secondary data</p> <p>Surveys, census and observations</p> <p>Quantitative and qualitative data</p> <p>Representing quantitative data:<br/>Histograms, line graphs, Scatter plots, Bar graphs, Hybrid graphs and charts</p> <p>Measures of central tendency: Mode, Median, Mean and range.</p> <p>Analyzing data and drawing conclusions</p>   |
| <b>Algebra</b><br><b>18 hours</b>    | Logic         | Change<br>Models                | Personal and<br>cultural<br>expression | Unknowns and variables can be modelled and solved using algebraic logic, which can be expressed in different personal and cultural ways. | D: All strands<br>B: All strands<br>C: All strands | <p>Communication skills</p> <p>Transfer skills</p> <p>Critical-thinking skills</p> <p>Communication skills</p>   | <p>The use of Commutative property in algebraic expressions</p> <p>Algebraic expressions and equations that represent real-life situations.</p> <p>Solve one-step equations.</p> <p>Algebraic models to solve real-life problems</p> <p>Appropriate variables for their models.</p> <p>Methods for solving equations.</p> <p>Verification of equations through substitution.</p> <p>Solving equations with multiple operations, fractions, negative numbers, decimals and brackets.</p> |
| <b>Geometry</b><br><b>18 hours</b>   | Form          | Space<br>Measurement            | Orientation in<br>space and time       | Measurement is expressed in various forms to communicate the space around or within an object.   | B: All strands<br>C: All strands<br>D: All strands | <p>Communication skills</p> <p>Creative-thinking skills</p> <p>Critical-thinking skills</p> <p>Transfer skills</p>   | <p>The metric system and metric conversions</p> <p>Scale drawings: Sketch labels and interpret scale diagrams</p> <p>Angles: Naming and types</p> <p>Measuring lengths using a ruler or compass and angles using a protractor</p>   |



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|---------------------------------------|-------|----------------------------|-------------------------------------|---|--|--|--|
|                                       |       |                            |                                     |   |  | Collaboration skills   | Estimate distances, lengths and angles<br>Select the most appropriate unit for a given measurement<br>Types of triangles, and properties of polygons and circles<br>Area and perimeter<br>Composite figures<br>Area and perimeter of composite figures containing missing shapes |
| <b>Algebra</b><br><br><b>18 hours</b> | Logic | Generalisation<br>Quantity | Scientific and technical innovation | Mathematical logic helps us to find general rules in quantities and relationships and to make exciting, innovative discoveries. | B: All strands<br>C: All strands<br>D: All strands | Communication skills<br>Creative-thinking skills<br>Media literacy skills<br>Critical-thinking skills Transfer skills.<br>Collaboration skills | Order of operations<br>Simplification in mathematics<br>'Best 'method in Multiplication<br>Generalization in Mathematics<br>Measurement and estimation<br>Type of numbers<br>'Shape numbers', Partition numbers<br>Magic squares<br>Venn diagrams                                |

## OVERVIEW MATHEMATICS YEAR 2

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|--|---------------|--------------------------|----------------------------------|--|--|---|---|
| <b>Numbers</b><br><b>18 hours</b>                    | Relationships | Change<br>Simplification | Globalisation and Sustainability | Financial, personal and economic change can be understood and simplified using proportional relationships like ratios and percentages. | A: Knowing and understanding<br>C: Communicating<br>D: Applying mathematics in real-world contexts                             | Communication skills<br>Information literacy skills<br>Creative thinking skills<br>Transfer skills                  | Review: Fractions and decimals<br>Operating and converting between:<br>Percentages ↔ Decimals ↔ Percentages<br>Finding percentage off, increasing and decreasing by a fraction, finding quantities as percentages of another quantity.<br>Percentage change.<br>Ratios – simplifying and finding<br>Dividing quantities into ratios<br>Proportional reasoning and logic |
| <b>Statistics and probability</b><br><b>18 hours</b> | Form          | Patterns<br>Systems      | Fairness and development         | Fair forms of communication help us to reveal patterns and improve our truth-telling systems.  | A: Knowing and understanding<br>B: Investigating patterns<br>C: Communicating<br>D: Applying mathematics in real-life contexts | Communication skills<br>Transfer skills<br>Information literacy skills<br>Critical-thinking skills<br>Social skills | Definition and explaining statistical terms<br>Types of data- review<br>Collecting and organising data<br>Tabulating results<br>Classifying and ordering data<br>Data representation: <ul style="list-style-type: none"> <li>• Histogram</li> <li>• Line graph</li> <li>• Pictogram</li> <li>• Dot and bubble plots</li> </ul>  |



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|  |       |                               |   |   |   |  | <ul style="list-style-type: none"> <li>Scatter plot</li> <li>Stem and Leaf</li> <li>Bar chart</li> <li>Pie chart</li> <li>Creative visualisations.</li> </ul> <p>Grouping and classifying data<br/>Infographics and data visualisations</p> <p>Analysing data</p> <p>Using data to perform text analysis</p> <p>Bias and fairness in data</p> <p>Sampling</p>   |
| <b>Geometry and trigonometry<br/>18 hours</b>  | Logic | Measurement<br>Generalisation | Scientific and<br>technical<br>innovation | The general<br>properties of shapes<br>and our spatial<br>environment can be<br>measured by logic<br>and manipulated and<br>created by<br>technology. | A: Knowing and<br>understanding<br><br>D: Applying<br>mathematics in<br>real life | Creative thinking skills<br><br>Affective skills<br><br>Collaboration skills   | <p>2D Shapes</p> <p>Angles: Complementary, Supplementary<br/>Using a protractor to draw and<br/>measure angles.</p> <p>Diagonals in polygons<br/>Area formula of rectangles, squares and<br/>triangles<br/>Circle, semicircle and ellipses.</p> <p>3D Shapes: Nets and surface area<br/>Construction of physical shapes:</p> <ul style="list-style-type: none"> <li>Using compass to draw circles</li> <li>Using isometric paper to create<br/>shapes</li> </ul> <p>Volume of 3D shapes</p> |
| <b>Statistics and probability<br/>18 hours</b> | Logic | Quantity<br>Patterns          | Identities and<br>relationships           | Relationships<br>between variables<br>form patterns which<br>often justify important<br>logical conclusions.  | C: All strands<br><br>D: All strands  | Critical thinking skills<br><br>Communication skills<br><br>Information literacy skills<br><br>Creativity and innovation | <p>Review: the three measures of central<br/>tendencies (mean, median and mode) and<br/>how to calculate them.</p> <p>Cumulative frequency<br/>Outliers<br/>Quartile data in box-and-whisker plots.<br/>Strength and types of Correlation-Possible<br/>reasons for the outcomes in question.<br/>Appropriate measure of central tendency<br/>based on the context and on the types of<br/>numbers being examined.</p>   |



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|   |               |                              |  |   |  |   | Change of the correlation coefficient as data moves closer to and farther from the LOBF.<br>Patterns present in the data  |
| <b>Geometry and trigonometry<br/>18 hours</b> | Relationships | Equivalence<br>Justification | Personal and<br>cultural<br>expression | In many cultures, arguments about what is perceived as beautiful can be justified by a mathematical relationship between equivalent images.   | A: All strands   | Communication skills<br><br>Critical-thinking skills<br><br>Transfer skills                                 | Review: Points on a number line and algebraic substitutions<br>Table of values-ordered pairs<br>Cartesian plane<br>Points on a Cartesian plane using ordered pairs.<br>Relationships between $x$ - and $y$ -coordinates and equations<br>Polygons on a Cartesian plane.<br>Transformations :reflection, rotation, translation and enlargement |
| <b>Algebra<br/>18 hours</b>                   | Form          | Space<br>Representation      | Orientation<br>in space and<br>time    | Where we are in space and time changes what we know as much as the form by which it is represented.   | C, D: All strands  | Communication skills<br>Media literacy skills<br>Transfer skills<br>Creative thinking skills                | Review: basic concepts studied throughout the year-simplify expressions/solve equations (from last year)<br>Expansion and factorization of an algebraic expression<br>The binary number system.<br>Working in a systematic way.<br>Geometric patterns.<br>The development of numbers  |
| <b>OVERVIEW MATHEMATICS YEAR 3</b>            |               |                              |  |   |  |   |   |
| <b>Numbers<br/>18 hours</b>                   | Form          | Measurement<br>Justification | Identities and<br>relationships        | Firstly, humans observed phenomena and relationships. Then they measured quantities. Soon they could create general rules and formulae which could be justified. All these ways of knowing come together to give us our mathematical body of knowledge. | Criterion A:<br>Knowing and understanding<br><br>Criterion B:<br>Investigating patterns<br><br>Criterion C:<br>Communicating<br><br>Criterion D:<br>Applying mathematics in real-life contexts | Creative-thinking skills<br>Critical-thinking skills<br>Information literacy skills<br>Communication skills | The appearance of mathematics for humans<br><br>The development of numbers: Sumerian-Maya-Romans<br><br>Equals sign, concept of 0, negative numbers, algebra, fractals<br><br>Order of Operations. Multiplication, Division, Powers or exponents, absolute values<br><br>Venn diagrams and sets   |



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|  |               |                               |  |   |  |   | Prime numbers   |
| <b>Algebra Geometry<br/>18 hours</b>           | Form          | Equivalence<br>Representation | Fairness and<br>development            | Real-life problems<br>can be represented<br>by different forms of<br>mathematics which<br>will yield equal<br>results and a fair<br>solution. | Criterion A:<br>Knowing and<br>understanding<br><br>Criterion B:<br>Investigating<br>patterns<br><br>Criterion D:<br>Applying<br>mathematics in<br>real-life contexts                                      | Organization skills<br><br>Creative-thinking skills<br><br>Critical-thinking skills<br><br>Transfer skills<br><br>Communication skills<br><br>Information literacy skills | Review: Substitution, the two –step<br>solving of an equation,<br><br>Linear relations/equations<br><br>Modelling relationships using algebra,<br>tables of values, and graphs<br><br>Straight line: Slope-intercept form<br><br>Graphical/algebraic solution of linear<br>equations<br><br>Graph of constants<br><br>Constraints<br><br>Linear equations and graphs in real-life<br>problems<br><br>Reflection |
| <b>Algebra<br/>18 hours</b>                    | Logic         | Change<br>Models              | Globalisation<br>and<br>Sustainability | Global networks are<br>built on logic and are<br>changing the way we<br>handle data, make<br>decisions and design<br>models.                  | Criterion A:<br>Knowing and<br>understanding<br><br>Criterion B:<br>Investigating<br>patterns<br><br>Criterion C:<br>Communicating<br><br>Criterion D:<br>Applying<br>mathematics in<br>real-life contexts | Critical-thinking skills<br><br>Media literacy skills<br><br>Creative-thinking skills<br><br>Affective skills<br><br>Transfer skills                                      | Games and mathematics<br><br>Games/riddles/puzzles and logic<br><br>Networks<br><br>Decision-making and logic<br><br>Decision trees/algorithms<br><br>Invisible algorithms and our everyday lives   |
| <b>Statistics and probability<br/>18 hours</b> | Relationships | Generalisation<br>Patterns    | Personal and<br>cultural<br>expression | Patterns found in<br>relationships can be<br>generalized to help<br>us make predictions<br>for personal gain.                                 | Criterion A:<br>Knowing and<br>understanding   | Communication skills<br><br>Information literacy skills   | Definitions: Event, outcome, desired<br>outcome, sample space, probability<br><br>Calculation of simple probabilities.  |



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|   |               |                        |                                     |   | <p>Criterion B:<br/>Investigating patterns</p> <p>Criterion C:<br/>Communicating</p> <p>Criterion D:<br/>Applying mathematics in real-life contexts</p>   | <p>Creative-thinking skills</p> <p>Critical-thinking skills</p>  | <p>Independent vs. dependent events</p> <p>Fundamental counting principle</p> <p>Experimental probability</p> <p>Ways to visualize outcomes</p>  |
| <p><b>Geometry and trigonometry</b><br/><b>18 hours</b></p> | Relationships | Simplification Systems | Scientific and technical innovation | Finding relationships in closed systems can help us simplify and solve problems, using technology or otherwise. | <p>Criterion A:<br/>Knowing and understanding</p> <p>Criterion B:<br/>Investigating patterns</p> <p>Criterion C:<br/>Communicating</p> <p>Criterion D:<br/>Applying mathematics in real-life contexts</p> | <p>Communication skills</p> <p>Communication skills</p> <p>Creative-thinking skills</p> <p>Creative-thinking skills</p> <p>Transfer skills</p> <p>Critical-thinking skills</p> | <p>Revision: Angles and lengths, types of triangles</p> <p>Pythagoras' theorem</p> <p>Introduction to trigonometry</p> <p>Trigonometric ratios:<br/>Sine, cosine and tangent</p> <p>The use of the trigonometric ratios</p>                          |
| <p><b>Algebra (Optional)</b><br/><b>18 hours</b></p>        | Logic         | Space Quantity         | Orientation in space and time       | The time, space and situation we are in justifies the type of mathematics we use and how.                       | <p>Criterion B:<br/>Investigating patterns</p> <p>Criterion C:<br/>Communicating</p> <p>Criterion D:<br/>Applying mathematics in real-life contexts</p>   | <p>Affective skills</p> <p>Information literacy skills</p> <p>Transfer skills</p> <p>Reflection skills</p>   | <p>Learning of Mathematics</p> <p>Mathematics in various fields of expertise: Competitors, farmers, cartographers, scientists etc.</p> <p>Key concepts in a variety of mathematical areas</p> <p>Mathematics competition, crowdsourcing research</p> |
| <b>OVERVIEW MATHEMATICS YEAR 4</b>                          |               |                        |                                     |   |   |  |  |
| <p><b>Numbers</b><br/><b>18 hours</b></p>                   | Form          | Patterns               | Globalization and sustainability    | Numbers in different forms give us a variety of ways to predict patterns  | <p>Criterion A:<br/>Knowing and understanding</p>   | <p>Communication skills.</p> <p>Media literacy skills</p>  | <p>Prior knowledge: rounding decimals, natural numbers and integers (directed</p>  |



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|   |               |                |                              | and think about problems of global significance.  | <p>Criterion B: Investigating patterns</p> <p>Criterion C: Communicating</p> <p>Criterion D: Applying mathematics in real-life contexts</p> | <p>Media literacy skills</p> <p>Creative-thinking skills</p>  | <p>numbers) , prime numbers, squares and cubes, square roots (the values of: <math>\sqrt{1}, \sqrt{4}, \sqrt{9}, \sqrt{16}, \sqrt{25}, \sqrt{36}, \sqrt{49}, \sqrt{64}, \sqrt{81}, \sqrt{100}, \sqrt{121}, \sqrt{144}</math>.</p> <p>Number sets</p> <p>Standard form</p> <p>Radicals and exponents-rules</p> <p>Using number set notation.</p> <p>Algebraic products.</p> <p>Rounding to dp and sf.</p> <p>Using standard form or scientific notation.</p> <p>Adding, subtracting, multiplying and dividing surds or radicals.</p> <p>Using fractional exponents.</p> <p>Using negative exponents.</p> <p>Finding logs.</p> |
| <p><b>Algebra</b><br/><b>18 hours</b></p> | Relationships | Simplification | Identities and relationships | Finding and expressing things in common helps us to simplify and improve relationships. | <p>Criterion A: Knowing and understanding</p> <p>Criterion B: Investigating patterns</p> <p>Criterion C: Communicating</p>                  | <p>Communication skills</p> <p>Organization skills:</p> <p>Affective skills</p> <p>Critical-thinking skills:</p> <p>Creative thinking skills;</p> | <p>Prior knowledge: simplify expressions by collecting like terms, multiply algebraic terms, radicals or surds</p> <p>Substitute terms.</p> <p>Evaluating expressions given the substitutions</p> <p>Solving an expression in terms of an unknown</p> <p>Finding <math>x</math> in equations.</p> <p>Expanding brackets</p> <p>Factorization and simplification.</p> <p>Factorizing quadratic expressions.</p>   |



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| <p><b>Algebra</b><br/><b>18 hours</b></p>                   | <p>Logic</p>         | <p>Equivalence</p> | <p>Orientation in space and time</p>       | <p>Mathematical knowledge is built through logical structures, developed over time and transferred to equivalent situations.</p> | <p>Criterion A: Knowing and understanding</p> <p>Criterion B: Investigating patterns</p> <p>Criterion C: Communicating</p> <p>Criterion D: Applying Mathematics in real-life contexts</p> | <p>Communication skills:<br/>Communication skills:<br/>Transfer skills:<br/>Critical-thinking skills<br/>Media literacy skills:</p> | <p>Prior knowledge: simplify, substitute into and solve equations, plot points on an x-y grid (Cartesian plane), constants, coefficients and variables.</p> <p>Equations into lines<br/>Lines on a Cartesian grid.<br/>Linear equations<br/><math>y = mx + c</math>, the gradient, the y-intercept and the x-intercept.<br/>Graph equations using Desmos.<br/>Apply algebra to real-life /problems represented as a linear equation<br/>Pairs of solutions using Venn diagram<br/>Simultaneous equations-Solving by using different methods:</p> <ul style="list-style-type: none"> <li>•Cancelling terms</li> <li>•Equating expressions</li> <li>•Using technology</li> <li>•Graphing manually</li> </ul> |
| <p><b>Geometry and Trigonometry</b><br/><b>18 hours</b></p> | <p>Relationships</p> | <p>Models</p>      | <p>Scientific and technical innovation</p> | <p>Modelling allows us to solve new spatial relationship problems arising from technical innovation.</p>                         | <p>Criterion A: Knowing and understanding</p> <p>Criterion B: Investigating patterns</p> <p>Criterion C: Communicating</p> <p>Criterion D: Applying Mathematics in real-life contexts</p> | <p>Reflection skills:<br/>Information literacy skills:<br/>Critical- thinking skills:</p>   | <p>Prior knowledge: angles in a triangle sum to 180°, Pythagoras' theorem , using Pythagoras' theorem to find missing/unknown sides of right angled triangles, similar triangles ,Pythagorean triples (such as 3, 4, 5 or 5, 12, 13).</p> <p>Revision and development of Pythagoras' Theorem.</p> <p>Investigating 3D shapes.<br/>Using theorem to find lengths in abstract and real-world situations.</p> <p>Trigonometric ratios: <math>\sin\theta</math>, <math>\cos\theta</math> and <math>\tan\theta</math>.</p> <p>Using relationships to find values of angles or sides, including inverses.</p> <p>Finding values on GDC or App.</p>   |



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|   |               |        |                                  |   |   |   | <p>Sine rule and cosine rule</p> <p>Radians: definition / converting radians and degrees.</p>  |
| <p><b>Geometry and trigonometry</b></p> <p><b>18 hours</b></p>  | Logic         | Space  | Personal and cultural expression | Applying mathematical logic to spatial dimensions can open personal, cultural and social entrepreneurship opportunities.  | <p>Criterion A: Knowing and understanding</p> <p>Criterion B: Investigating patterns</p> <p>Criterion C: Communicating</p> <p>Criterion D: Applying Mathematics in real-life contexts</p> | <p>Communication skills:</p> <p>Collaboration skills</p> <p>Transfer skills:</p> <p>Transfer skills</p> <p>Critical-thinking skills:</p> <p>Media literacy skills:</p> <p>Creating-thinking skills:</p> <p>Collaboration skills:</p>  | <p>Prior knowledge: plot and read points on a Cartesian plane, plot linear equations on a Cartesian grid, constructing, labelling and notations of graphs, find the length of the hypotenuse. Length of line segments</p> <p>Describing line segments based on coordinates.</p> <p>Distances on a real-life Cartesian grid</p> <p>Line segment characteristics</p> <p>Midpoints -midpoint formula.</p> <p>Creating curves by drawing line segments.</p> <p>Vertical and horizontal lines (parallel and perpendicular lines)</p> <p>Parallel lines from equations.</p> <p>Parallel lines and bounded regions</p> <p>Vectors</p> <p>3D vectors</p> |
| <p><b>Statistics and Probability</b></p> <p><b>18 hours</b></p> | Relationships | Change | Fairness and development         | We must take care to ask the right questions and to measure the correct data to understand relationships so we can use information to make the world and better and fairer place. | <p>Criterion A: Knowing and understanding</p> <p>Criterion C: Communicating</p> <p>Criterion D: Applying Mathematics in real-life contexts</p>  | <p>Communication skills:</p> <p>Understand and use mathematical notation</p> <p>Communication skills:</p> <p>Transfer skills:</p> <p>Critical-thinking skills</p> <p>Critical-thinking skills:</p> <p>Critical-thinking skills:</p> <p>Media literacy skills:</p> <p>Information literacy skills:</p> | <p>Types of data: discrete, continuous, primary, secondary, quantitative or qualitative.</p> <p>Data collection: collect simple data, individually or in groups, as tally charts and frequency tables</p> <p>Measures of central tendency: Mean, mode and median.</p> <p>Representations and interpretation of data</p> <p>Create, read and interpret bar charts, pictograms, pie charts and line graphs.</p> <p>Cumulative frequency</p>  |



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|  |  |  |  |  |  |  | Measure of spread: range, quartiles $Q_1$ and $Q_3$ and interquartile range IQR, box-and-whisker plot .<br>Correlation<br>Standard deviation |
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## OVERVIEW MATHEMATICS YEAR 5

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| <p><b>Numbers</b></p> <p><b>18 hours</b></p> | <p>Logic</p> | <p>Quantity</p> | <p>Fairness and development</p> | <p>The difference between quantities can be represented by inequalities, which allow us to solve and logically address inequality in Mathematics and life.</p> | <p>Criterion B<br/>Investigating patterns</p> <p>Criterion C:<br/>Communicating</p> <p>Criterion D:<br/>Applying Mathematics in real-life contexts</p> | <p>Communication skills:<br/>Transfer skills</p> <p>Affective skills:</p> <p>Information literacy skills:</p> | <p><u>Prior knowledge:</u> The meaning of, and symbols for, important number sets, N, Z, Q and R. How to represent the concept of greater than, less than in symbols. How to solve equalities and equations to find solutions for lines. How to represent linear equations graphically.</p> <p>Rules in inequalities. Representing and solving -first degree -inequalities</p> <p>Write solution sets and show these solutions on the number line. Strict inequalities. Compound and double inequalities. Linear inequalities and real life problems. Solve geometrically systems of inequalities. Simultaneous inequalities and linear optimisation, apply to problems such as from economics. Extended: Second degree inequalities</p> <p>Sequences/ Series. Finding general rules for sequences. Arithmetic sequence: Common difference, general rule <math>-n^{\text{th}}</math> term, real life problems.</p> <p>Geometric sequence: Common ratio, general rule <math>-n^{\text{th}}</math> term, real life problems.</p> <p>Sum of arithmetic and geometric sequences.</p> <p>Fibonacci sequence.</p> |
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| <p><b>Algebra</b></p> <p><b>18 hours</b></p> | <p>Relationships</p> | <p>Representations</p> | <p>Globalization and sustainability</p> | <p>Representing relationships visually and algebraically can allow us to find and optimize 'best case scenarios' and sustainable solutions.</p>                 | <p>Criterion A: Knowing and understanding</p> <p>Criterion B Investigating patterns</p> <p>Criterion C: Communicating</p> <p>Criterion D: Applying Mathematics in real-life contexts</p> | <p>Reflections skills:</p> <p>Information literacy skills:</p> <p>Information literacy skills</p> <p>Communication skills:</p>  | <p><u>Prior knowledge:</u> Solve equations, linear and quadratic. Recognize and factorize quadratic expressions. Represent equations in a variety of ways. Plot data onto graphs so they can be analysed.</p> <p>Quadratic dependency: 2<sup>nd</sup> degree functions and equations. Recognise problems leading to quadratic expressions: <math>y=ax^2+bx+c</math>. Substitutions in quadratic expressions/ functions. Graphing quadratic functions/ expression: the axis of symmetry, y-intercept, the zeros, the maximum/minimum and the vertex.Changing the parabolas. Solving quadratic equations:</p> <ul style="list-style-type: none"> <li>• By Factorization <math>y=k(x-a)(x-b)</math></li> <li>• By completing the square <math>y=k(x-a)^2+b</math></li> <li>• By using the discriminant <math>\Delta= b^2-4ac</math></li> </ul> <p>Optimization problems using quadratics</p> |
| <p><b>Algebra</b></p> <p><b>18 hours</b></p> | <p>Form</p>          | <p>Generalization</p>  | <p>Identities and relationships</p>     | <p>Relationships can be identified by generalizing data into various models and forms, which allows us to solve and predict these real-world relationships.</p> | <p>Criterion A: Knowing and understanding</p> <p>Criterion B Investigating patterns</p> <p>Criterion C: Communicating</p> <p>Criterion D: Applying Mathematics in real-life contexts</p> | <p>Reflections skills:</p> <p>Communication skills:</p> <p>Organization skills:</p> <p>Information literacy skills</p> <p>Critical-thinking skills:</p> <p>Communication skills</p> <p>Information literacy skills:</p> | <p>Functions and function notation <math>f(x)</math>.</p> <p>Function as a mapping, function machines, functions in algebraic form and graphical representation of functions. Range and domain of a function.</p> <p>Linear, quadratic and cubic functions.</p> <p>Exponential function: Exponential growth and decay.</p> <p>Extended: Inverse and composite functions.</p>  |



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|--|-------|---------------|-----------------------------------|--|---|--|---|
|  |       |               |                                   |  |   |  | The use of functions for predictions and interpretations. Correlation. Finding the line of best fit.  |
| <b>Geometry and trigonometry<br/>18 hours</b>  | Form  | Justification | Orientation in space and time     | Statements about the spaces and shapes around us can be justified to show they are invariant through space and time. | <p>Criterion A: Knowing and understanding</p> <p>Criterion B: Investigating patterns</p> <p>Criterion C: Communicating</p> <p>Criterion D: Applying Mathematics in real-life contexts</p> | <p>Communication skills:</p> <p>Critical-thinking skills</p> <p>Critical-thinking skills:</p> <p>Media literacy skills</p> <p>Transfer skills:</p> <p>Critical-thinking skills</p> | <p>Define a circle from the compass construction.</p> <p>Circle and parts of a circle: centre, diameter, radius, chord, tangent and secant lines, arc, chord.</p> <p>Semicircle, sector, segment of a circle.</p> <p>Right-angled triangles inscribed in a circle.</p> <ul style="list-style-type: none"> <li>Theorem 1: Angles subtended by the same arc are equal.</li> <li>Theorem 2: Central angle theorem</li> </ul> <p>Problem solving situations.</p> <p>Circumference of a circle, area of a circle</p> <p>Extended: Pythagoras theorem used to approximate the length of a circle. Length of an arc and the area of a sector of a circle. Relative position of a straight line and a circle.</p> <p>Cyclic quadrilateral:</p> <ul style="list-style-type: none"> <li>Theorem 3: Angles subtended by a diameter</li> <li>Theorem 4: Opposite angles in a cyclic quadrilateral add to <math>180^\circ</math>.</li> <li>Theorem 5: Angle between a tangent and a radius of a circle is <math>90^\circ</math></li> </ul> <p>Trigonometric functions and circles: Sine, cosine and tangent functions.</p> <p>Trigonometric identities and proofs.</p> |
| <b>Statistics and probability<br/>18 hours</b> | Logic | Measurements  | Personal and cultural expressions | An individual's understanding of risk and chance is highly dependent on both logic and their                         | Criterion A: Knowing and understanding  | <p>Reflections skills: .</p> <p>Critical-thinking skills</p>   | <p>Prior knowledge: The notion of probability and how to estimate simple probabilities.</p> <p>How to convert between various forms of probability - decimal, fractions and</p>   |



|   |               |         |                                     |  |  |  |   |
|---|---------------|---------|-------------------------------------|--|--|--|---|
|   |               |         |                                     | personal experience.   | <p>Criterion C: Communicating</p> <p>Criterion D: Applying Mathematics in real-life contexts</p>   | <p>Critical-thinking skills:<br/>Collaboration skills</p> <p>Critical-thinking skills:<br/>Reflection skills:<br/>Critical-thinking skills<br/>Critical-thinking skills<br/>Information literacy skills:</p> | <p>percentages. What an 'event' is in probability.</p> <p>Probabilities: determine the universal set <math>\Omega</math> of possible outcomes of a random trial. Definition of event A. Definition of the probability of an event.<br/>Using Venn diagrams and sample spaces.<br/>The probability scale. Complementary events.<br/>Experimental and theoretical probability<br/>Calculation of probability with the help of</p> <ul style="list-style-type: none"> <li>• a tree diagram and</li> <li>• a 2-way table</li> </ul> <p>Extended: Dependent and independent events, mutually exclusive events, combined events, and exhaustive events.<br/>The use of tree diagrams for independent and conditional (dependent) probability (limit up to three sets of branches).<br/>Addition and multiplication rule of probabilities.</p> |
| <p><b>Revision Unit / Link with the IB programme</b></p> <p><b>18 hours</b></p> | Relationships | Systems | Scientific and technical innovation | Your future relationship with mathematics will be determined by your understanding of both traditional and innovative systems. | <p>Criterion A: Knowing and understanding</p> <p>Criterion C: Communicating</p> <p>Criterion D: Applying Mathematics in real-life contexts</p> | <p>Critical-thinking skills</p> <p>Self management skills (affective)</p> <p>Transfer skills</p>   | <p>11 revision activities will be studied by topic as follows:</p> <ol style="list-style-type: none"> <li>1. Revision of simultaneous equations.</li> <li>2. Transformation of trigonometric functions.</li> <li>3. Revision of algebraic equations.</li> <li>4. Quadratic functions, vertices and intercepts.</li> <li>5. Numbers and number sets.</li> <li>6. Probability – combinations and permutations.</li> <li>7. Geometry, fractals.</li> <li>8. Data collection and probability.</li> <li>9. Data representation.</li> <li>10. Trigonometric ratios &amp; Pythagoras.</li> <li>11. Angle &amp; polygon construction and measurement.</li> </ol>  |

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