Course Overviews MYP Mathematics, UWC Thailand 2018-2019

All units taught in grades 6 to 10 are continuously being developed and improved to best meet the needs of the students at UWCT. Therefore, the following overview is only a reflection of current plans for the course. Some changes to these course overviews may occur as a result of planning done throughout the academic year.

Grade	Unit Number and Title	Key and Related Concepts	Global Context	Statement of Inquiry	Inquiry Questions	Content (topics / knowledge/ subject specific skills)
6	1: Number Concepts	Logic	Scientific and technical innovation	How do whole numbers facilitate our thinking of quantities? Number fluency and application to real life problems Number facts and developing strategies to become accurate, efficient and flexible with numbers. how can we use factors and multiples to better understand numbers? why do we need special math language?	**Factual:** What do numerals represent? **Conceptual:** Is estimation more appropriate than finding an exact answer? **Debatable:** When is the "correct" answer not the best solution?	**Whole Numbers:** Addition, Subtraction Division Multiplication Two step Problems Index Notation Order of Operations Rounding Numbers **Number Properties:** Square and cubic numbers Divisibility rules Factors Prime Numbers Composite Numbers Multiples
6	2: Number Skills	Relationships	Equivalence	Fraction percentages and decimals are necessary in our everyday lives as not everything fits into a whole number	**Factual:** How can I use fractions in real life? **Conceptual:** How are common and decimal fractions alike and different? **Debatable:** How do I explain how changing the size of the whole affects the size or amount of a fraction?	**Fractions:** Proper and improper fractions Fractions of quantities Fractions on a Number line Equal fractions Comparing fractions **Decimals** Decimals on a number line Rounding decimals Converting decimal to fraction Adding and subtracting decimals Multiplying by powers of 10 Dividing by powers of 10 Multiplying and dividing by whole numbers **Percentage** Converting between percentage, fraction, and decimal. Number lines One quantity as a percentage of another
6	3: Algebra Patterning	Form	Representation / Scientific and technical innovation	Number properties can be expressed in a generalised form whose rules are used to problem solve.	**Factual:** Are patterns important in the world today? **Conceptual:** How can a variable transform itself? **Debatable:** What is the unknown?	**Sign post 7 book** Uses letters to represent numbers and translates between words and algebraic symbols. Creates, records, analyses and generalises number patterns using words and algebraic symbols in a variety of ways.
6	4: Statistics	Relationships	Justification	How can we use Statistical tools to analyse data	**Factual:** How do you collect data? **Conceptual:**What information does a chart or table give? How do charts, tables, and graphs help you interpret data? **Debatable:** Do statistics always lie?	**Statistics:** Samples and populations Categorical Data Graphs of categorical data Number data (Discrete)
6	5: Line Graphs	Relationships	Generalizations	Information can be represented graphically for communication	**Factual:** How are points, lines, line segments, related? **Conceptual:**What is the difference between a point, ray, line, line segment? **Debatable:**	Map references Number grids/number plane Points on a grid/coordinates Direction Graphing x&y intercept Line graphs Travel graphs Conversion graphs

6	6: Points, Lines, and Angles	Form	Generalizations	How do connections between angles and lines relate	**Factual:** How are angles measured? **Conceptual:** **Debatable:**	Points and lines Angles Angles at a point Vertically opposite angles Bisecting angles
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7	1: Number Fluency	Logic Justification, pattern	Scientific & technical innovation	How can we calculate with confidence: recognising special numbers, knowing the order of operations, understanding rounding and building estimation skills	**Factual:**When should you use mental computation? **Conceptual:**Is estimation more appropriate than finding an exact answer?	Rounding and Estimation Order of operations Index notation Square and cube numbers Divisibility Rules Factors and Multiples Prime and composite numbers Roots
7	2: Geometry	Form Justification, space	Orientation in space & time	How can I construct precise angles without using a protractor?	**Factual:** How are points, lines, line segments, rays, and angles related? **Conceptual:** Can I fold an angle of 60 degrees? Can I fold a parallel line?	Angles and lines Points and lines Angle properties Angle pairs Parallel lines Polygons Triangles Angles of triangle Isosceles triangles Quadrilaterals Angles of quadrilaterals.
7	3: Measurement	Relationships Measurement, quantity, representation, space	Globalization & sustainability	Efficient packaging makes best use of our natural resources. Investigate how the volume of a prism can be interpreted as repeated base x area cross section. Investigate structured methods of finding the surface area of a 3D shape	**Factual:** How can patterns be used to determine standard formulas for area and perimeter? **Conceptual:** Where would you find symmetry? **Debatable:** What designs can be developed for a fixed volume? Packaging designs for fixed volumes	Length and Area Perimeter Area of polygons Area of composite shapes Further Measurement Volume Capacity Mass Relationship between volume and capacity Relationship between units AREA OF CIRCLES
7	4: Probability	Logic & relationships Justification, representation	Identities & relationships	How can understanding of probability help us in drawing conclusions about large populations of things? It helps us understand "how likely is.....". This is an important life skill especially for allocating resources.	**Factual:** How is the likelihood of an event determined and communicated? **Conceptual:** How is the probability of an event determined and described?	Discrete probability Assigning numbers to probability Sample space Theoretical probability Complementary events
7	5: Expressions and Equations	Form Change, simplification	Scientific & technical innovation	How can we use algebra to model and understand real life situations?	**Factual:** Why do we use variables? **Conceptual:** What is the unknown?	Writing algebraic expressions Keywords in Algebra Equal expressions Collecting like terms Algebraic products Evaluating algebraic expressions Equations Solving simple equations Maintaining balance Inverse operations Solving equations Equations with repeated unknowns Word problems
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8	1: Number Fluency	Logic Quantity	Scientific and Technical Innovation	Number facts aid us in becoming accurate, fluent and flexible in our daily lives	**Factual:** How can we understand numbers and their properties better by decomposing them? **Conceptual:**How do I demonstrate the relationship between numbers, quantities and place value for whole numbers up to 1,000? **Debatable:**When is the “correct” answer not the best solution?	BIDMAS, factors, prime factors, LCM, HCF, negative numbers, multiplying and dividing by powers of ten, fractions, equivalent fractions, mixed numbers and improper fractions, adding and subtracting fractions, multiplying and dividing fractions, ratio
8	2: Transformations	Aesthetics Pattern	Personal and cultural expression	Geometric transformations are used in world art	**Factual:** What is a transformation? **Conceptual:**How is geometric transformations supporting tribal art forms? **Debatable:**Why are geometric transformations so appealing?	Transformations, rotation, reflection, enlargement, translation
8	3: Coordinate Geometry	Identity Space Change	Identities and relationships	Understanding our place in time and space gives us a base on which to focus	**Factual:** What notation do we use to represent coordinates in 2d and 3d space? **Conceptual:** Why is this useful? **Debatable:** How are position words useful?	Identify points on a cartesian plane, gradient, rate of change, y = mx + c, draw a straight line graph, find the line equation, apply to real world problems
8	4: Pythagoras and Radicals	Form Measurement	Orientation in space and time	Triangles are not always as they seem	**Factual:**Investigate how the lengths of sides in a right angled triangle are always consistently related **Conceptual:**How do you find perimeter, area, and volume of geometric figures? **Debatable:** Was the hypotenuse found or discovered? Who invented the $\sqrt{}$ sign?	Right-angled triangles, square numbers, square roots, Pythagoras, problem solving
8	5: Linear Algebra	Communication Representation	Scientific and technical innovation	Using algebra to model and understand real life situations	**Factual:**What are the tools needed to solve linear equations and inequalities? **Conceptual:**What information and strategies would you use to solve a multi-step word problem? **Debatable:** What is the unknown?	Factorising linear expressions, rearrange simple formula, derive a rule for an arithmetic sequence, solve (two-step) equations, solve linear equations with fractional coefficients, expand brackets Chaps 7, 8 and 19 (includes index laws), simultaneous equations
8	6: Statistics	Measurement Quantity	Identities and relationships	Practice improves performance	**Factual:** How can you collect, organize, and display data? **Conceptual:** How do you interpret the data you have collected? **Debatable:** Do statistics always lie?	Data collection, constructing and interpreting graphs, calculating mean, median and mode, calculating the interquartile range
8	7: Length, Area, Volume	Change Measurement	Scientific and technical innovation	Packaging can be optimised by finding efficient shapes for various products	**Factual:** What tools and units are used to measure the attributes of an object? **Conceptual:** How do you decide which unit of measurement to use? **Debatable:** What makes efficient packaging?	Finding the perimeter and circumference, area and volume of regular and irregular two dimensional and three dimensional shapes. Focus on prisms in 3D. Compound shapes. Nets
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9	1: Number fluency	Form Quantity Perspective	Scientific and technical innovation	Numbers can be written (and applied) in different forms	**Factual:**What number or symbol is needed to make number sentences true? **Conceptual:**How do I demonstrate the relationship between numbers, quantities and place value for whole numbers up to 1,000? **Debatable:**When is the “correct” answer not the best solution?	Basic rules of indices, standard form, operations with numbers in standard form, prime factorisation
9	2: Algebra	Logic Representation	Scientific and technical innovation	Algebraic tools can be used to solve real life problems	**Factual:**What is the unknown? **Conceptual:**What information and strategies would you use to solve a multi-step word problem? **Debatable: C**an the patterns or relationships support your predictions?	Expanding brackets, combining like terms, solving linear equations, solving equations with algebraic fractions, solving and graphing linear inequalities. Factorising linear and quadratic expressions.
9	3: Straight Line Graphs	Logic Representation Model	Scientific and technical innovation	We can visualise and understand relationships by graphing straight lines	**Factual:**Why are graphs helpful? **Conceptual:**Are you able to solve a linear inequality by graphing? **Debatable:** Do mathematical models conceal as much as they reveal?	Parallel and perpendicular lines, the relationship between their gradients, measuring (and calculating) the distance between two points, understanding and using the cartesian plane, finding the midpoint of two points, the linear function f(x) = mx + c, its graph gradient and y-intercept

9	4: Probability	Communication Model	Scientific and technical innovation	We can use theoretical probability to model real (simplified) life situations	**Factual:**How is the probability of an event determined and communicated? **Conceptual:** How is the probability of an event described? **Debatable:** Are probabilities ever accurate?	Calculating probabilities of simple events, with and without replacement. Solving problems using tree diagrams and venn diagrams. Number sets, notation, union and intersection
9	5: Trigonometry	Time, place and space Measurement	Scientific and technical innovation	The understanding of ratios in right-angled triangles help us calculate lengths, distances and angles	**Factual:** What measures of angle are used? **Conceptual:** How can objects be represented and compared using geometric attributes? **Debatable:** Was trigonometry found or invented?	Solving problems using the properties of angles in triangles/angles in intersecting and parallel lines/angles in regular and irregular polygons/angles in circles. Using Pythagoras' theorem. Relating angles and sides of right-angled triangles using sine, cosine and tangent. Solving problems in right-angled triangles using trigonometric ratios
9	6: Quadratics	Logic Representation	Scientific and technical innovation	Our understanding of quadratic functions can help us model in the real world	**Factual:** What is a quadratic? **Conceptual:**Why are they so important? **Debatable:** How can you tell the difference between a catenoid and a parabola?	Factorising quadratic equations, graphing quadratic functions. Using different forms of the quadratic function to sketch graphs (x and y intercepts and vertex). Find the quadratic function from the graph.
9	7: Pot Pourri	Justification	Identity	Financial planning is important	**Debatable:** Planning for the future: what will my future be?	A mixture of mini topics to try and cover the whole Grade 9 textbook which includes • Inequalities • Perimeter, area, volume • Statistics • Financial Maths • Transformations • Congruence and similarity • Exponential and rational functions • Proportion
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10	1: Sequences and Series	Form Generalisation Pattern	Scientific and technical innovation	Understanding form and shape enhances creativity	**Factual:**What are the different ways to represent the patterns or relationships? **Conceptual:**How can you identify a quadratic sequence? **Debatable:** Why do Fibonacci numbers appear in the natural world so often?	Predicting the next term in a number sequence (linear, quadratic, triangular, Fibonacci). Finding and justifying general rules. Finding sums of series (including infinite series)
10	2: Mensuration	Form Model Connections	Globalisation and sustainability	Decision making can be informed by using a model to represent solutions	**Factual:**How do you calculate area and volume? **Conceptual:**How was π initially developed? **Debatable:** Why is dimension theory important?	Finding the perimeter, area (surface area) and volume of 2D and 3D shapes. Including prisms and pyramids. The effects of enlargements on dimensions. Include spheres, pyramids and prisms - and compound shapes.
10	3: Algebra and Equations	Logic Equivalence Justification	Identities and relationships	Decision making can be improved by using a model to represent relationships	**Factual:**Why do we use variables? **Conceptual:**What are the tools needed to solve linear equations and inequalities? **Debatable:**Do mathematical models conceal as much as they reveal?	Solving linear and quadratic equations by a range of methods, solving simultaneous equations. Expanding and simplifying algebraic expressions. Factorising linear and quadratic expressions. Changing the subject of an equation.
10	4: Statistics	Relationships Measurement Quantity	Scientific and technical innovation	Establishing patterns in the natural world can help in understanding relationships	**Factual:** How can you collect, organize, and display data? **Conceptual:** How do you interpret the data you have collected? **Debatable:** Do statistics always lie?	Graphical analysis and representation. Measures of central tendency. Measures of dispersion. Standard deviation.
10	5: Geometry	Form Equivalence	Identities and relationships	Architects and engineers must use resources responsibly	**Factual:**How are angles classified? **Conceptual:**How are points, lines, line segments, rays, and angles related? **Debatable:**How are angles measured?	Congruent triangles. Similarity. Solving problems using the properties of angles in triangles/angles in intersecting and parallel lines/angles in regular and irregular polygons/angles in circles. Use of Pythagoras' Theorem in 2 and 3D. Converting angles between degrees and radians
10	6: Trigonometry	Time, place and space Measurement	Scientific and technical innovation	The understanding of ratios in right-angled triangles help us calculate lengths, distances and angles	**Factual:** What measures of angle are used? **Conceptual:** How can objects be represented and compared using geometric attributes? **Debatable:** Was trigonometry found or invented?	Solving problems in right-angled triangles using trigonometric ratios. Advanced trigonometry using non right-angled triangles.Using radians or degrees when solving problems.
10	7: Head Start	Other	Scientific and technical innovation	How can I be ready for the DP course		