

Ramallah Friends Schools

Friends Boys School

Mathematics department

Mathematics (Subject Over view)

MYP Years (1-5)

	Unit title and teaching hours	Key concept	Related concepts	Global context	Statement of inquiry	Objectives	ATL skills	Content
Year One	Fractions & Decimals (28 hours)	Relationships	Equivalence Representation Pattern	Globalization & Sustainability We use fractions and decimals to accurately measure items every day.	Understanding equivalent relationships between two different units of measurement supports international commerce.	A, B, D	Thinking Apply existing knowledge to generate new ideas, products or processes.	<p>Know: fractions, decimals, and percentages.</p> <p>Understand: how to apply the four operations on fractions and decimals.</p> <p>Do: solve real world problems containing the four operations on fractions and decimals.</p>

	Unit title and teaching hours	Key concept	Related concepts	Global context	Statement of inquiry	Objectives	ATL skills	Content
Year One	Geometry of Polygons (16 hours)	Form	Change Measurement Space	Fairness and Development Mathematics is a powerful tool for engineers when designing features on land.	Engineers and architects must use finite resources responsibly when they design new structures.	A, B, C	Thinking Use brainstorming and visual diagrams to generate new ideas and inquiries	Know: polygons and their properties, areas of triangles. Understand: how to calculate areas of triangles, parallelograms and trapezoids. Do: find the area of triangles, parallelograms trapezoids in both familiar and unfamiliar contexts.

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Year One	Geometry (Perimeter & Areas)(20 hours)	Form	Change Measurement Space	Personal and cultural expression Variety in geometric form allows for personal and cultural expression in artistry and creation.	Mathematical patterns and forms create measurable space used in art, architecture and other modes of personal expression.	A, B, C	Thinking Use brainstorming and visual diagrams to generate new ideas and inquiries	Know: properties of circles, parallelograms, prisms. Understand: how to calculate area, perimeter and circumference of two dimensional shapes and volumes and surface area of 3D- shapes. Do: calculate the area of 2 D shapes, and the surface area, the total area and the volume of 3D shapes.

	Unit title and teaching hours	Key concept	Related concepts	Global context	Statement of inquiry	Objectives	ATL skills	Content
Year One	Integers & Number Theory (16 hours)	Form	Change Quantity Representation	Orientation in space and time Use of negative integers allow graphing from past to future, orienting ourselves on maps.	Quantities are represented in different forms to help us face & understand changes in our natural environment.	A, B, D	Communication use appropriate forms of writing for different purposes and audiences. Understand and use mathematical notation Thinking Practice observing carefully in order to recognize problems Apply existing knowledge to generate new ideas, products or processes.	Know: number line, integers, and four number operations with integers. Understand: how to use the number line to transform the operations and to compare numbers. Do: find the square roots, the cubic roots, factors.

	Unit title and teaching hours	Key concept	Related concepts	Global context	Statement of inquiry	Objectives	ATL skills	Content
Year One	Introduction to Algebra (12 hours)	Relationships	Quantity Representation	Scientific & Technical Innovation Math provides a global language in science and technology that supports human understanding of scientific principles.	Quantities and mathematical relationships can be represented in a globally recognized language.	A, B	Thinking Revise understanding based on new information and evidence	Know: difference between a variable and a constant, form of linear equation. Understand: meaning of algebraic expression, equation. Do: solve linear equations.

	Unit title and teaching hours	Key concept	Related concepts	Global context	Statement of inquiry	Objectives	ATL skills	Content
Year One	Ratios, Rates & Proportions (20 hours)	Relationships	Equivalence Simplification	Globalization & Sustainability We use ratios and proportions in everyday life measurement.	Relationships are proportional if once the simplification is complete and the quantities are equal.	A, D	Thinking Consider ideas from multiple perspectives	Know: properties of ratio and how to compare ratios, how to write a proportion. Understand: how to write a proportion, how to convert fractions to decimals and decimals to percentages. Do: use and analyze proportional relationships and percentages, and use them to solve real world and mathematical problems.

	Unit title and teaching hours	Key concept	Related concepts	Global context	Statement of inquiry	Objectives	ATL skills	Content
Year One	Statistics and probability (12 hours)	Relationships	Representation Pattern	Scientific & Technical Innovations Math provides a global language in science and technology that supports human understanding of scientific principles.	The patterns in data create relationships that can be displayed in a variety of ways	A,B,D	Self-management Consider content What did I learn about today? What don't I yet understand? What questions do I have now? Research Collect, record and verify data.	Know: the concept of statistic and probability, and how to read and understand a frequency table. Understand: how to represent data using columns & circular sector. Do: a randomized trial.

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Year Two	Integers and rational numbers (35 hours)	Logic	change Generalization	Orientation in Space and Time Understanding integers allows us to track positive and negative directions of motion.	Understanding integers allows us to track positive and negative directions of motion.	A, B, C	<p>Communication</p> <p>Use appropriate forms of writing for different purposes and audiences.</p> <p>Self-management Keep an organized and logical system of information files/notebooks</p> <p>Thinking Propose and evaluate a variety of solutions</p>	<p>Know: absolute value, integers and their properties, opposite of a number, mixed numbers, order of operations, representing integers and rational numbers on the number line.</p> <p>Understand: Numbers and mathematical operations on integers and their properties (commutative, associative, closure, inverse, and identity)</p> <p>Do apply operations in real life context through which simplification of rational numbers and numerical expressions are used to solve the problems.</p>

	Unit title and teaching hours	Key concept	Related concepts	Global context	Statement of inquiry	Objectives	ATL skills	Content
Year Two	Ratios and proportions (10 hours)	Relationships	Simplification	Scientific & Technical Innovations Math provides a global language in science and technology that supports human understanding of scientific principles.	Relationships are proportional if once the simplification is complete then the quantities are equal.	A, B, D	Communication Understand and use mathematical notation Organize and depict information logically Thinking Practice observing carefully in order to recognize problems.	Know: ratio, proportion. Understand: the difference between direct and inverse proportions Do: solve problems using ratios and proportions.

	Unit title and teaching hours	Key concept	Related concepts	Global context	Statement of inquiry	Objectives	ATL skills	Content
Year Two	Sets and Venn Diagrams (12 hours)	Relationships	Equivalence Pattern	Scientific & Technical Innovations Math provides a global language in science and technology that supports human understanding of scientific principles.	Sets provide a useful way of representing relationships between different groups.	A, B, C	Communication Understand and use mathematical notation Organize and depict information logically Thinking Practice observing carefully in order to recognize problems.	Know: Set Notation and sets of members, different ways to represent sets, the Universal Set and subsets Understand: the representation of operations on sets using Venn diagrams. Do: Use Venn diagrams to model and solve problems from real life situations.

	Unit title and teaching hours	Key concept	Related concepts	Global context	Statement of inquiry	Objectives	ATL skills	Content
Year Two	Algebraic Expressions and equations (25 hours)	Logic	Representation System	Scientific & Technical Innovations Math provides a global language in science and technology that supports human understanding of scientific principles.	Algebra follows a logical system of reasoning using variables to represent the unknown, supporting science and technical innovation.	A, B, D	Thinking Apply skills and knowledge in unfamiliar situations.	Know: variable, Constant, like and different terms, simplifying and expanding. Understand: Algebra as a set of rules; like only like terms can be added or subtracted Do: Simplify like terms, apply the distributive property and factor expressions

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Year Two	Geometry (10 hours)	Logic	Measurement Change	Fairness and Development The responsibility of sharing finite resources.	Architects and engineers must use finite resources responsibly when they design new structures (GC: Fairness and development)	C,D	Thinking Use brainstorming and visual diagrams to generate new ideas and inquiries	Students should be able to: <ul style="list-style-type: none"> • Understand units of measurement • Convert units of measurement • Read scales • Measure length • Calculate perimeter of shapes • Calculate area of shapes • Calculate area of composite shapes • Find volume of 3D shapes • Find capacity of objects.

Year Three	Unit title and teaching hours	Key concept	Related concepts	Global context	Statement of inquiry	Objectives	ATL skills	Content
	Rational and irrational numbers (16 hours)	Form	Representation	Orientation in time and space.	Mathematics can be represented in different forms as influenced by time and place.	A,B,D	Thinking Apply existing knowledge to generate new ideas, products or processes.	<p>Know: difference between rational and irrational numbers.</p> <p>Understand: Surds and indices and operations on them</p> <p>Do: Solve problems containing operations on surds and indices from real life in both familiar and unfamiliar contexts.</p>

	Unit title and teaching hours	Key concept	Related concepts	Global context	Statement of inquiry	Objectives	ATL skills	Content
Year Three	The set of Real numbers (20 hours)	Logic	Change Generalization	Orientation in space and time (real numbers allow us to track positive and negative movement)	Using logical generalizations about integers, we can track change over space and time.	A,B,C,D	<p>Thinking Propose and evaluate a variety of solutions</p> <p>Use appropriate forms of writing for different purposes and audiences.</p> <p>Communication Keep an organized and logical system of information files/notebooks</p>	<p>Know: Real numbers represent positive and negative quantities.</p> <p>Understand: Real numbers and operations.</p> <p>Do: Solve problems applying the operations on real numbers and their properties.</p>

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Year Three	Geometry of polygons (25 hours)	Form	Measurement Generalization Space	Globalization and Sustainability Human impact on the environment	Discovering properties of shapes can help in the design of new sustainable structures.	A, B, D	Thinking Draw reasonable conclusions and generalizations Use brainstorming and visual diagrams to generate new ideas and inquiries	Know: Theorems of Isosceles Triangles. Properties of the Equilateral Triangles. Interior and Exterior angles of triangles. Pythagoras Theorem, its converse and Pythagorean Triples. Similarity of triangles and other polygons, scale factor, area factor and perimeter factor Triangular Inequalities. Understand: Mid segments in triangles and trapezoids. Quadrilaterals and their properties. Do: Solve problems using the properties and theorems learned.

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Year Three	Algebra (30 hours)	Logic	Representation	<p>Scientific and technical innovation.</p> <p>A research on how algebra helps scientists.</p>	<p>Algebra follows a logical system of reasoning using variables to represent the unknown, supporting science and technical innovation.</p>	A, B, D	<p>Thinking Draw reasonable conclusions and generalizations.</p> <p>Use brainstorming and visual diagrams to generate new ideas and inquiries</p> <p>Research Communicate information and ideas effectively to multiple audiences using a variety of media and formats</p>	<p>Know: Algebraic notation, algebraic equations, like terms, Factorising methods (GCF, difference of two squares, perfect square, and by grouping)</p> <p>Understand: the standard form of the quadratic equations and its factorisation. The null factor law.</p> <p>Do: Solve quadratic equations by factorization, and problem solving when contains quadratic equations.</p>

	Unit title and teaching hours	Key concept	Related concepts	Global context	Statement of inquiry	Objectives	ATL skills	Content
Year Four	Linear Functions (25 hours)	Relationships	Model Representation	Scientific & Technical Innovations The natural world.	There is a need to relate variables that are around us and represent them in different forms.	A, B,C, D	Communication Give and receive meaningful feedback. Negotiate ideas and knowledge with peers and teachers. Collaborate with peers, experts or others, employing a variety of digital environments and media. Thinking Draw reasonable conclusions and generalizations	Components of linear functions. Key terms ---slope, y-intercept, x-intercept, independent and dependent variables Types of equations used to represent linear functions Equations of parallel and perpendicular lines Construction of tables of values Graph straight lines using different forms Write equations from points Use graphs to write an equation

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Year Four	Quadratic Functions (35 hours)	Relationships	Measurement Model Representation	Globalization and sustainability The impact of decision making on human kind and environment.	Quadratic equations give opportunities to maximize and minimize sets of variables in the world around us.	A, D	Self-management Collect and analyze data to identify solutions and make informed decisions Thinking Interpret data Propose and evaluate a variety of solutions Apply skills and knowledge in unfamiliar situations.	Know: y-intercept, x-intercept, parabola, vertex, zeros, roots, discriminant Understand: Forms of equations, graphing parabolas. Do: Solve equations algebraically and graphically. Solve quadratic optimisation problems in real life context.

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Year Four	Solving simultaneous equations. (35 hours)	Relationships	Justification Representation	Fairness and development (financial balance, demand plots, linear programming)	Simultaneous equations inform and give a better understanding of systems and their consequences.	A, C, D	Thinking Make connections between subject groups and disciplines Apply skills and knowledge in unfamiliar situations.	Know: Graphing more than one linear equation. Understand: Solving simultaneous equations graphically and algebraically. Do: Solve Word problems using three methods Choosing best method for different situations.

	Unit title and teaching hours	Key concept	Related concepts	Global context	Statement of inquiry	Objectives	ATL skills	Content
Year Four	Deductive Geometry (15 hours)	Relationships	Space Pattern Measurement	Scientific and technical innovation (what is the best shape of waste containers?)	The study of angle relationships and the properties of geometrical figures can lead to a better understanding of the world around us.	A, D	Communication Make inferences and draw conclusions. Organize and depict information logically. Thinking Make unexpected or unusual connections between objects and/or ideas	Key terms --- theorems, radius, diameter, chord, bisector, cyclic, isosceles, tangent Circle theorems. Solve for sides and angles using theorems Construction a circle and label centre and radius Relate different angles to each other Identify the arc on which an angle at the center or circumference stands.

	Unit title and teaching hours	Key concept	Related concepts	Global context	Statement of inquiry	Objectives	ATL skills	Content
Year Five	Relations and Functions (30 hours)	Relationships	Model Change Measurement	Scientific and technical innovation (stopping and braking distance, car technology).	Mathematical representation and modeling of patterns can be used to inform decisions.	A, B, C, D Modelling stopping distance and braking distance.	Communication Interpret and use effectively modes of non-verbal communication techniques and use them purposefully. Self-management Select and use technology effectively and productively	Know: Solving quadratic equations algebraically and graphically, for discriminant (+ve, -ve, zero). Domain and range of functions. Understand: Composite functions, the inverse of a function. Graphing different types of functions (quadratic, modulus, exponential, logarithmic) and understanding their characteristics. Do: Find the points of intersection of functions. (Using graphs, technology). Use Special functions: Greatest integer, modulus, and identity function in real life problem solving.

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Year Five	Trigonometry and advanced trigonometry. (20 hours)	Relationships	Model Justification Measurement	Scientific and technical innovation Using math to model tides. And Ferris wheels.	Modelling Relationships helps us justify what we discover through measurement and observation.	A, B, D	Communication Use and interpret a range of discipline-specific terms and symbols. Understand and use mathematical notation. Organize and depict information logically. Self-management Develop new skills, techniques and strategies for effective learning Consider content What did I learn about today? What don't I yet understand? What questions do I have now?	Know: Trigonometric ratios, The area of triangle, The radian versus degree measure of an angle. The graph and the properties of trigonometric functions. Understand: The True bearing, 3D models, The sine and cosine rules. The relationship between the sine and the cosine ratios in right angled triangle, and the transformations of the trigonometric functions. Do: Use trigonometric identities and relationship to

							<p>Thinking</p> <p>Draw reasonable conclusions and generalizations</p> <p>Propose and evaluate a variety of solutions</p> <p>Apply existing knowledge to generate new ideas, products or processes.</p> <p>Combine knowledge, understanding and skills to create products or solutions.</p>	<p>model real life situations and solving real life problems.</p>
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Year Five	Health and Fitness (3 weeks =12 hours) IDU- PE	Relationships	Model	Identities and relationships Understanding the factors that will lead to a healthy life style.	By modelling the relationships between Heart rates and body mass index (BMI), statisticians can predict future performance: an inquiry into patterns of class designed training (physical and health education and mathematics). Students will model and predict which BMI yields to normal heart rates, hence designing a circuit training program to achieve this goal.	A, B, C, D	Self-management Plan short- and long-term assignments; meet deadlines	Scatter plots Interpretation of scatter plots Correlation between two variables (BMI and heart rate) Pearson correlation coefficients Mean point and line of best fit Regression line equation is used to predict values (interpolation and extrapolation) Percentage error

