

Stage 3: Course outline MYP 1 - 5 / Mathematics

Term 1	MYP 1	MYP 2	MYP 3
Content	Shape and space area and volume	Statistical Data	Percentages
Unit Question	What makes a good drinks carton?	What is the point of an average?	Why do we have VAT?
Significant Concept	Understanding volume being the space inside a solid	Appreciating the significance and the uses of the different averages	Understanding percentage change
AOI	Human ingenuity	Human ingenuity	Health and Social Education
ATL	Organisation, Communication, Reflection, Thinking, Transfer	Organisation, communication, information literacy, reflection, thinking, transfer	Organisation, communication, reflection, thinking, transfer
Subject content	Surface area, volume of prisms, nets	Collecting, organising, analysing and presenting data. Calculating averages and range	How to increase/decrease amounts by certain percentages and finding original values after increase/decrease
Objectives	<ul style="list-style-type: none"> Knowledge, uses appropriate mathematical skills and concepts to solve problem Communication, a complete project detailed plans and thoughts and demonstrated appropriate mathematical methods. Reflection, a detailed summary of project, addressing short comings of it. 	<ul style="list-style-type: none"> Knowledge, to calculate accurately the averages and range and choose a suitable average that best represents a population. Communication, organise data into a frequency table and illustrate results in a variety of ways. Reflections, analysing results and using answers to make correct interpretations of the data. 	<ul style="list-style-type: none"> Knowledge, to calculate percentage change and original price after change. Communication, to demonstrate a sound method which helps identify their understanding of the steps involved. Reflection checking the validity of their answers.
Formative Assessments	<ul style="list-style-type: none"> Homework questions on Area and Volume, Criteria A 	<ul style="list-style-type: none"> Homework collecting, organising and analysing data. A, C, D 	<ul style="list-style-type: none"> Homework questions on percentage changes. A,C,D
Summative Assessment	<ul style="list-style-type: none"> Project to design and make a drinks carton from an A4 piece of card. Criteria A,C,D 	<ul style="list-style-type: none"> Written test on subject content. A, C and D 	<ul style="list-style-type: none"> Written test on subject content. A, C and D
Links	Science, Humanities, understanding the concept of volume to deal with topics, such as water use and water cycle.	Science, Humanities. Understanding and presenting data is essential knowledge in many topics in these subjects.	Economics, the idea of taxes and their various uses
Term 2			
Content	Sequences	Probability	Area and Volume
Unit Question	Where do you see patterns every day?	A gambler always loses?	What is pi?
Significant Concept	Generating a formula to predict patterns in a sequence.	The meaning of chance and real life applications.	Pi being the ratio of the diameter to the circumference. Area and volume.
AOI	Human ingenuity	Health and social education, Human ingenuity	Human ingenuity
ATL	Organisation, communication, information literacy, reflection, thinking	Organisation, collaboration, communication, information literacy, reflection, thinking, transfer	Organisation, communication, information literacy, reflection, thinking, transfer
Subject content	<ul style="list-style-type: none"> Recognising patterns in numbers. Understanding formulae 	<ul style="list-style-type: none"> The concept of chance Mutually exclusive and independent events Probability of more than one event occurring 	<ul style="list-style-type: none"> Total surface area Volume of prisms
Objectives	<ul style="list-style-type: none"> Knowledge, uses mathematical skills to generate formulae to calculate any term. Patterns, recognise patterns and predict next few numbers in sequence. Generates general term. Communication demonstrates all appropriate steps demonstrating a sound understanding of the 	<ul style="list-style-type: none"> Knowledge, understands concepts of chance, calculates probability of more than one event occurring Communication, shows all steps of working, demonstrating a sound knowledge at every step. Reflection, checks whether answers make sense 	<ul style="list-style-type: none"> Knowledge, calculates areas and volumes accurately. Communication, shows all appropriate steps, demonstrating a clear understanding at each step of the topic. Reflection, checks the validity of the results

	<ul style="list-style-type: none"> process. Reflection, checks whether formulae is valid and makes accurate predictions. 		
Formative Assessments	Homework questions on patterns and sequences. A,B,C,D	Homework questions on probability of single, multiple events occurring, tree diagrams. A,C,D	Homework questions on area, total surface area and volume. A,C,D
Summative Assessment	Written test on subject content. A, B, C and D	With a partner the students will be asked to design a game of chance where the odds are in their favour.	Written test on subject content. A, B, C and D
Links	Science use of formulae in science.	Science how probability is a key factor in medicine distribution.	Science, Humanities. Use of water, rain cycle, oil.
Term 3 Content Unit Question	Algebra equations When am I ever going to use this?	Who on average understands the word average?	Pythagoras' Theorem What are the differences between a theory, theorem and law?
Significant Concept	Formulating an algebra equation from a real world problem	The appropriate average to use? Best form of data presentation.	The sum of the squares of the 2 shorter sides is equal to the squares of the hypotenuse side in a right angled triangle.
AOI	Human ingenuity	Human ingenuity	Human ingenuity
ATL	Organisation, communication, information literacy, reflection, thinking, transfer	Organisation, communication, information literacy, reflection, thinking, transfer	Organisation, communication, reflection, thinking,
Subject content	Recognising patterns, forming generalisations, verifying generalisations	Range, suitability of averages, average calculation from table, data presentation.	Pythagoras' Theorem, proof and application
Objectives	<ul style="list-style-type: none"> Knowledge; uses mathematical skills to solve problems. Patterns; recognises patterns and suggests general rules and provides proof. Communication, all steps demonstrate a sound understanding of sequence generation. Reflection, tests the validity of generalisations 	<ul style="list-style-type: none"> Knowledge, decides which average best represents a population, calculates averages from table. Communication, all appropriate steps are shown and a good understanding is demonstrated at each step. Reflection sees whether results are suitable. 	<ul style="list-style-type: none"> Knowledge, can use Pythagoras to calculate unknown sides in a right angled. Uses Pythagoras to prove whether a triangle is right angled or not. Communication, shows all appropriate steps, demonstrating a clear understanding at each step of the topic. Reflection, checks the validity of the results
Formative Assessments	<ul style="list-style-type: none"> Homework questions on pattern spotting and generalisations. A, B, C, D 	<ul style="list-style-type: none"> Homework questions on averages and range from tables . A,C,D 	<ul style="list-style-type: none"> Homework questions on Pythagoras, A,C,D
Summative Assessment	<ul style="list-style-type: none"> Written test on subject content. A, B, C and D 	<ul style="list-style-type: none"> Written test on subject content. A, C and D 	<ul style="list-style-type: none"> Written test on subject content. A, C and D
Links	Science	Science, Humanities. Understanding and presenting data is essential knowledge in many topics in these subjects.	Humanities, Egypt pyramids

Term 1	MYP 4	MYP 5
Title	Binomial expansion	Quadratics
Guiding Question	What are the uses of Pascal's triangle?	What is a parabola?
Significant Concept	Expanding algebraic brackets	How projectiles travel on a parabola and how this can be applied to many real world. Solving equations with an x^2 Finding a max and a min on a given quadratic function
AOI	Human ingenuity	Human ingenuity it lends itself naturally to this topic in discussion of aeroplanes, sport,

		rockets etc
ATL	Organisation, communication, reflection, thinking,	Organisation, communication, information literacy, reflection, thinking, transfer
Subject content	Bracket expansion using Pascal's triangle to assist.	Plot the graphs of quadratic functions, transformations of quadratic graphs, max and min values of a quadratic graph, solve quadratic equations and factorise quadratic expressions using brackets.
Objectives	<p>Knowledge, Expand and simplify brackets Substitute values into algebraic terms Use the Binomial expansion up to the fourth power Understand the connection between the Binomial coefficients and Pascal's triangle</p> <ul style="list-style-type: none"> • Communication, shows all appropriate steps, demonstrating a clear understanding of the topic at each step. • Reflection, checks the validity of the results 	<p><i>Knowledge,</i> Find the equation of a straight line given two points Solve problems using the coordinate geometry of straight lines Plot the graphs of quadratic functions Understand transformations of quadratic graphs Identify the max and min values of a quadratic graph Factorise quadratic expressions using brackets Complete the square for a quadratic equation Solve quadratic equations Use the "b" formula</p> <p>Communication, shows all appropriate steps, demonstrating a clear understanding of the topic at each step</p> <p>Reflection, checks the validity of the results</p>
Formative Assessments	<ul style="list-style-type: none"> • Homework questions on bracket expansion and Pascal's triangle, A,C,D 	<ul style="list-style-type: none"> • Homework questions on factorising, parabola plotting and equation solving, A,C,D
Summative Assessment	<ul style="list-style-type: none"> • Written test on subject content. A, B, C and D 	<ul style="list-style-type: none"> • Written test on subject content. A, B, C and D
Links	Science	Physics, projectiles
Term 2		
Title	Trigonometry	Simultaneous equations
Unit Question	How can trigonometry help me sail my boat?	How many equations does it take to find 2 unknowns?
Significant Concept	Trigonometric ratios	Two equations can be balanced simultaneously
AOI	Human ingenuity	Human ingenuity
ATL	Organisation, communication, reflection, thinking	Organisation, communication, reflection, thinking
Subject content	Trigonometric ratios to solve problems involving triangles, angles of elevation and depression, bearings	Simultaneous equations, solving algebraically and graphically.
Objectives	<p>Knowledge, Understand the definition of the trigonometric ratios Use the trigonometric ratios to solve problems involving triangles Understand angles of elevation and depression Use bearings to solve problems</p> <ul style="list-style-type: none"> • Communication, shows all appropriate steps, demonstrating a clear understanding of the topic at each step. • Reflection, checks the validity of the results 	<p>Knowledge, Solve harder simultaneous equations Connect the above to the geometry of straight lines Solve non-linear simultaneous equations</p> <ul style="list-style-type: none"> • Communication, shows all appropriate steps, demonstrating a clear understanding of the topic at each step. • Reflection, checks the validity of the results
Formative Assessments	<ul style="list-style-type: none"> • Homework questions on trigonometry and bearings. A,C,D 	<ul style="list-style-type: none"> • Homework on simultaneous equations. A,C, D
Summative Assessment	<ul style="list-style-type: none"> • Written test on subject content. A, C and D 	<ul style="list-style-type: none"> • Written test on subject content. A, C and D

Links		
Term 3		
Title	Quadratics	Truth tables
Unit Question	What is the best way to throw a javelin?	Is logic found outside of maths?
Significant Concept	Understand the connection between the solution of the quadratic and the roots on the graph.	Validity of arguments
AOI	Human ingenuity	Human ingenuity
ATL	Organisation, communication, reflection, thinking, transfer	Organisation, collaboration, communication, information literacy, reflection, thinking, transfer
Subject content	Factorising quadratic expressions, plotting quadratics on a graph	Preposition in logic, compound statements, truth tables
Objectives	<p>Knowledge, Factorise quadratic expressions like $x^2+2x-15$ Plot the graph of a quadratic like $y= x^2+2x-15$ Understand the connection between the solution of the quadratic and the roots on the graph</p> <ul style="list-style-type: none"> • Communication, shows all appropriate steps, demonstrating a clear understanding of the topic at each step. • Reflection, checks the validity of the results • 	<p>Knowledge, Understand the concept of a proposition in logic Understand the notation for compound statements Construct and interpret truth tables</p> <ul style="list-style-type: none"> • Communication, shows all appropriate steps, demonstrating a clear understanding of the topic at each step. • Reflection, checks the validity of the results •
Formative Assessments	<ul style="list-style-type: none"> • Homework questions on factorising and graph drawing. A,C, D 	<ul style="list-style-type: none"> • Homework task to come up with a logical argument A
Summative Assessment	<ul style="list-style-type: none"> • Written test on subject content. A, B, C and D 	<ul style="list-style-type: none"> • A class discussion initiated by a student following a logical nature. A,C,D
Links	Physics, projectiles	English, persuasive essays, speech contests