

St. GEORGE'S SCHOOL IN SWITZERLAND

**MATHEMATICS DEPARTMENT
INFORMATION BOOKLET
MATHEMATICS SL**

Course outline:**Teachers: D. Ward and S. Titus**

This two year course builds on existing knowledge and skills of the IGCSE extended course and introduces new topics such as polynomial functions, series and sequences, exponential and logarithmic functions and binomial and normal distributions.

The course focuses on developing important mathematical concepts in both a coherent and rigorous way.

It is intended to provide a sound mathematical basis for those students planning to pursue further studies in such fields as chemistry, economics, psychology and business administration

Number of Lessons per week: 4 forty minute lessons per week**Assessment:**

Internal school Assessment will take place throughout the course by means of tests, class work and homework assignments.

Official external assessment: Students need to produce two pieces of coursework (one in the summer term of Year 12 and the second in the Autumn term of Year 13) which will count 20% towards their IB grade.

In addition the students will take two papers at the end of their two year course. Paper 1 (2hrs) and Paper 2 (2hrs) are each worth 40% of the final IB grade.

Homework: This is a demanding SL course where it is essential that students study outside of the classroom and students should expect homework most lessons.

Text book: Mathematics: Standard level for the IB Diploma
Oxford University Press

Specialised Equipment: Ti 84 Plus Graphics calculator

The school has Autograph software package for use throughout the school.

Content:

Course will cover topics in the Maths scales level 10 to 12 (see later in this booklet)

The following pages show what is expected for each reporting grade. Obviously during year 12 you will not be able to obtain the highest maths scale level simply because you will not have covered the topics yet.

The higher you climb the maths scale the more demanding the work.

An example: If at the time of the mocks you have reached a maths scale level **11++** you are well on the way to obtaining a good grade in the real exams the following summer.

Step 1: Find the time frame

Step 2: Find the maths scale level you have reached in your assessed piece of work

Step 3: Determine your grade

Standard Level Mathematics			
	Assessment Grade/Reporting Grade		
Maths Level	Year 12 Autumn Term	Year 12 Summer Term	Year 13 (mocks)
12++	7	7	7
12+			6
12			5
11++	6	6	4
11+			3
11			2
10++	5	4	3
10+	4	3	2
10			
9++			
9+	3	2	1
9			
8++			
8+			

The following pages indicate what is expected in each of the maths scale levels – it is an indication of the level of work being tackled.

Please note to gain a particular level you are not expected to have mastered every topic.

Level 10 - students are showing their ability to:

Factorise and solve difficult quadratic equations
Form and solve difficult simultaneous equations
Form and solve difficult Quadratic equations
Use Direct and Inverse Variation: Find constant
Interpret draw and solve complex Linear programming questions
Transform functions: Full IGCSE type, Reflection in the line $y=x$ (inverse functions)
Use Matrices: Use matrices for transformations
Use and understand Set notation and Venn Diagrams
Factorise quadratics by completing the square
Prove two triangles are congruent
Use Coordinate geometry: Parallel and perpendicular lines
Understand and use radians
Find Arc length and area of sector using radians
Use Sine rule (including ambiguous case) and Cosine rule
Know and use the 6 basic Trig ratios
Solve more difficult trig equations
Sketch and know the properties of simple Inverse trig functions
Solve linear and quadratic inequalities
Determine the nature of roots of quadratic equations
Understand basic Functions: composite, inverse, sketching, transformations, range and domain
Construct and interpret more demanding frequency tables, Cumulative frequency curves, as well as box and whisker diagrams and Histograms

For level 11 - students are showing their ability to:

Use Factor/remainder theorem
Solve polynomial equations
Use Algebraic long division
Understand and use properties of Arithmetic sequences
Understand and use properties of Geometric sequences
Use Sigma notation, factorial notation
Use the Binomial theorem
Understand and use the basic trig Identities
Be able to differentiate basic functions
Use differentiation to find: Gradient of curves, Stationary points; equations of tangents/normals to curves etc
Understand and use the Chain rule
Differentiate logarithmic functions

Understand and use the Product rule and Quotient rule in application type questions
: Geometric approach; Understand basic vector work find vector equation of line
Integrate basic expressions: find equations of lines and curves given gradient function, find the constant of integration, find areas between graphs and the x or y axes, find area between two curves
Understand and use the properties of Discrete probability Distributions, calculate values of Expectation and Variance
Solve binomial distribution type questions

For level 12 - students are showing their ability to do:

Draw and understand the properties of exponential functions, log functions
Use the rules of logs
Solve exponential equations
Use Harmonic form (wave form) to solve equations
Determine points of inflexion
Differentiate trig functions
Solve Optimisation problems
Solve rates of change type problems
Use Matrices: Determinants; Inverse, Solving equations with two and three unknowns
Calculate Volumes of revolution
Understand and calculate Standard deviation and Variance
Solve probability type problems: basic, independent, conditional
Understand and use Continuous probability distributions: Continuous random variables, continuous probability density functions, Normal distribution to solve problems