



## Overview

The Math Syllabus at GEMS Wesgreen International Secondary School aims to support students in building competency, confidence and fluency in their use of techniques and mathematical understanding. Throughout the year we recover and extend objectives as the focus is to develop in students their reasoning, problem-solving and analytical skills from a variety of abstract and real-life contexts.

## Learning Outcomes

The aims of all subjects state what a teacher may expect to teach and what a student may expect to experience and learn. These aims suggest how the student may be changed by the learning experience.

The aims of the Math Syllabus are to encourage and enable students to:

- become fluent in the fundamentals of mathematics, including through varied and frequent practice with increasingly complex problems over time, so that pupils develop conceptual understanding and the ability to recall and apply knowledge rapidly and accurately.
- reason mathematically by following a line of enquiry, conjecturing relationships and generalisations, and developing an argument, justification or proof using mathematical language
- can solve problems by applying their mathematics to a variety of routine and non-routine problems with increasing sophistication, including breaking down problems into a series of simpler steps and persevering in seeking solutions.

## Unit Overviews

### Unit 1

#### Number and Number System

Approximate length: 6 week

In this unit the children will learn Decimals, Powers and Roots, Sets and Bounds

#### Specific National Curriculum Objectives Covered:

We are learning to recognise recurring decimal and covert recurring decimals to Fractions.

- I can recognise a recurring decimal.
- I can convert recurring decimals to fractions.
- I can solve problems involving recurring decimals..

We are learning to apply the laws of indices using powers and roots

- I can understand the meaning of surds
- I can manipulate surds including rationalizing our denominator
- I can use index laws to simplify and evaluate numerical expressions involving integer fractional and negative powers
- I can use index notation and index laws for multiplication and division of positive and negative integer powers including zero

We are learning to understand Set notation, surds and Venn Diagrams

- I can understand sets defined in algebraic terms, and understand and use subsets
- I can use Venn diagrams to represent sets and the number of elements in sets
- I can use the notation  $n(A)$  for the number of elements in the set A
- I can use sets in practical situations

We are learning to find lower and upper bounds

- I can find the lower bound and upper bound of given values
- I can solve problems using upper and lower bounds where values are given to a degree of accuracy

**Approximate length: 6 week**

### **Equations, Formulae and Identity**

In this unit the children will learn about Expressions, Equations, Algebraic Fractions and Identities.

#### Specific National Curriculum Objectives Covered:

We are learning to about Equations, solving different equations and Algebraic Equations.

- I can use symbols in Algebra:
- I can use index notation involving fractional, negative and zero powers
- I can understand and apply Algebraic manipulation
- I can expand the product of two or more linear expressions
- I can understand the concept of a quadratic expression and be able to factorise such expressions
- I can manipulate algebraic fractions where the numerator and/or the denominator can be numeric, linear or quadratic

Quadratic equations:

- I can solve quadratic equations by factorization
- I can solve quadratic equations by using the quadratic formula or completing the square
- I can form and solve quadratic equations from data given in a context
- I can complete the square for a given quadratic expression

**Approximate length: 7 week**

### **Sequences, Functions and Graphs**

In these units the children will learn about all the different type of functions, find the gradient of functions, midpoint of functions and equations of linear, parallel and perpendicular lines.

Specific National Curriculum Objectives Covered:

We are learning about the different type of functions and Graphs.

- I can recognise, plot and draw graphs with linear, quadratic, cubic and reciprocal equations.
- I can calculate the gradient of a straight line given the coordinates of two points
- I can find the equation of a straight line parallel to a given line; find the equation of a straight line perpendicular to a given line

### **Shape space and Measure**

In this unit the children will learn about the properties of shapes, find missing sides and angles in right angle triangle using trigonometric ratios.

Specific National Curriculum Objectives Covered:

We are learning about the different properties of shapes and applying trigonometric ration to find missing sides and angles in right angle triangles.

Geometrical reasoning:

- I can provide reasons, using standard geometrical statements, to support numerical values for angles obtained in any geometrical context involving lines, polygons and circles
- I can apply properties of shapes to solve geometric problems.

**Trigonometry and Pythagoras' theorem:**

- I can understand and use sine, cosine and tangent of obtuse angles
- I can understand and use angles of elevation and depression
- I can understand and use the sine and cosine rules for any triangle
- I can use Pythagoras' theorem in three dimensions
- I can understand and use the formula  $\frac{1}{2} ab \sin c$  for the area of a triangle
- I can apply trigonometrical methods to solve problems in three dimensions, including finding the angle between a line and a plane

**Mensuration:**

- I can find perimeters and areas of sectors of circles
- I can determine the probability that two or more independent events will occur
- I can use simple conditional probability when combining events
- I can apply probability to simple problems

**Approximate length: 3 week**

**Statistics and Probability**

In this unit the children will learn how to represent different types of data and calculate measures of central tendency.

Specific National Curriculum Objectives Covered:

We are learning to draw statistical diagrams and probability diagrams and calculate problems using statistics and probability.

## Graphical representation of data:

- I can construct and interpret histograms
- I can draw all statistical diagrams
- I can calculate the measures of central tendency

## Probability:

- I can draw Probability tree diagrams
- I can use tree diagrams to solve problems in probability.

## Learning

Throughout this year we will be using multiple teaching methods in order to help our students learn more effectively. Students will use Phoenix, Sparxmaths, myimaths and GCSE Pod. Each lesson begins with a set of clearly stated objectives and an explanation of its place in the overall IGCSE syllabus. Effective learning is encouraged through frequent activities and self-assessment questions.

Links for solving past papers and links related to concepts covered to reinforce classroom learning followed will be available to students. Students will have access to worksheets with progression of difficulty, online assessments, tasks/open ended questions and fun activities through online platforms.

## Assessment

### Formative:

Throughout the units, the children will complete graded work, quizzes and problem-solving activities which allows the teacher to assess the students' attainment and inform their planning.

For each unit the students complete written quizzes, online quizzes as well as Chapter-wise tests (Topic Tests). Quizzes are taken based on 1-chapter assessment, where Tests are combined as per the requirement i.e., 2 to 3 chapters/topics - sections. This allows us to see progress across the units and align our planning.

### Summative:

At the end of each term, we complete internal and standardized tests. This allows us to measure the students' progress throughout the term and year. Nearing the end of term 1, the students appear for their MOCK EXAMINATIONS. This is to check and gauge their readiness / preparation for their Unit 1 Modular IGCSE examinations. At the end of the 1<sup>st</sup> -year course, students appear for their Unit 1 Modular IGCSE examination for Syllabus - Edexcel IGCSE® Mathematics.

### Hyperlink to the Edexcel IGCSE syllabus:

<https://qualifications.pearson.com/content/dam/pdf/International%20GCSE/Mathematics%20A/2024/specification-and-sample-assessments/int-gcse-mathematics-spec-a-modular.pdf>