



## Course Outline

### Mathematics Year 7

#### Overview

The Mathematics Syllabus at GEMS Wesgreen International Secondary School aims to support students to develop their ability to calculate accurately, to reason and solve problems through application of knowledge and transferable skills. Throughout the year we cover and extend objectives as the focus is on providing a foundation for understanding the world, the ability to reason mathematically, an appreciation of the beauty and power of mathematics, and a sense of enjoyment and curiosity about the subject.

#### 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 Mathematics 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.

#### Chapter Overviews

##### Term 1

##### Chapter 1 - Analysing and Displaying Data

Approximate length: 8 lessons

In this chapter the students will interpret and construct tables, charts and diagrams, including frequency tables, bar charts, pie charts and pictograms for categorical data, vertical line charts for ungrouped discrete numerical data, tables and line graphs for time series data and know their appropriate use.

##### Specific National Curriculum Objectives Covered:

- Find the mode, median and range of a set of data.
- Calculate and interpret the mean of a set of data.
- Compare sets of data using averages and range.
- Solve problems involving mean, mode, median and range

- Group discrete and continuous data.
- Draw and interpret grouped frequency diagrams.
- Use two-way tables.
- Interpret and draw line graphs.
- Recognise when a graph is misleading.
- Analyse and present data using spreadsheets in a computer software program.
- Choose the most appropriate graph to represent data and solve problems.
- Draw, read and interpret tables, bar charts, pie charts, bar-line graphs and line graphs. Positive and negative integers

### Chapter 2 – Number

**Approximate length: 10 lessons**

In this chapter the students will investigate negative and positive numbers on a number line in the context of temperature. Students will also carry out additions, subtractions and multiplications involving negative numbers.

#### Specific National Curriculum Objectives Covered:

- Use rules for divisibility by 2, 3, 4, 5, 9 and 10.
- Understand the difference between multiples, factors and primes.
- Find all the factor pairs of any whole number.
- Find the HCF and LCM of two numbers.
- Compare and order positive and negative numbers.
- Add and subtract positive and negative numbers.
- Calculate and use index notation for squares and square roots.
- Carry out calculations involving squares, cubes, square roots and cube roots.
- Use factorising to work out square roots and cube roots.
- Solve word problems using square roots and cube roots.
- Estimate answers to complex calculations.
- Carry out calculations involving brackets.

### Chapter 3 – Equations, functions, formulae

**Approximate length: 10 lessons**

In this chapter the students will generate terms of a sequence from either a term-to-term or a position-to-term rule, recognise arithmetic sequences simplify, write and expand expressions.

#### Specific National Curriculum Objectives Covered:

- Simplify expressions by collecting like terms.
- Write expressions using four operations.
- Substitute into formulae.
- Write formulae from a description.
- Expand expressions involving brackets.

### Chapter 4 – Fractions

**Approximate length: 10 lessons**

In this chapter the students will use common factors to simplify fractions; use common multiples to express fractions in the same denomination, compare and order fractions, add and subtract fractions with different denominators and mixed numbers, using the concept of equivalent fractions.

#### Specific National Curriculum Objectives Covered:

- Compare and simplify fractions.
- Write one number as a fraction of another.
- Work out simple fractions of amounts.
- Write an improper fraction as a mixed number.
- Add and subtract fractions.
- Work with equivalent fractions, decimals, and percentages.
- Use division to write a fraction as a decimal.
- Multiply a fraction by a whole number and a fraction by a fraction.
- Add and subtract mixed numbers.
- Multiply a mixed number by a fraction.

## Term 2

### Chapter 5 - Angles and Shapes

Approximate length: 8 lessons

In this chapter the students will measure and draw angles using a protractor. Calculate unknown angles in triangles using the properties of triangles. Use evidence to prove that a rule is true. Solve problems involving properties of triangles. Describe lines of symmetry,

Specific National Curriculum Objectives Covered:

- Use a protractor to measure and draw angles.
- Solve problems involving angles.
- Work out unknown angles when two or more lines cross at a point.
- Describe the line and rotational symmetry of triangles.
- Use properties of a triangle to work out unknown angles.
- Understand how to prove that a result is true.
- Use the properties of isosceles and equilateral triangles to solve problems.
- Describe the line and rotational symmetry and the properties of quadrilaterals.
- Understand how to prove that angles of a quadrilateral add up to  $360^\circ$ .
- Solve problems involving quadrilaterals.
- Draw triangles accurately using a ruler and a protractor.
- Draw diagrams to scale.

### Chapter 6 - Decimals and percentages

Approximate length: 10 lessons

In this chapter the students will define percentage as 'number of parts per hundred', interpret percentages and percentage changes as a fraction or a decimal, interpret these multiplicatively, express 1 quantity as a percentage of another and compare 2 quantities using percentages.

Specific National Curriculum Objectives Covered:

- Recognise the place value of each digit in large numbers.
- Round decimals to 1 decimal place.
- Write decimals in ascending and descending order.
- Add and subtract decimals.
- Multiply a decimal by an integer.
- Round decimals to make estimates.

- Divide decimals by a whole number.
- Solve problems by dividing decimals.
- Compare and order decimals, fractions and percentages.
- Convert between percentages, decimals and fractions.
- Write one number as a fraction of another.
- Mentally calculate a percentage of an amount.

**Chapter 7 – Ratio and proportion****Approximate length: 8 lessons**

In this chapter the students will write ratios in simplest form, calculate missing values in equivalent ratios and understand the relationship between ratio and proportion and solve word problems involving ratio and proportion.

Specific National Curriculum Objectives Covered:

- Write and understand ratios.
- Write a ratio in its simplest form.
- Understand the relationship between ratio and proportion.
- Solve simple word problems involving ratio and direct proportion.
- Solve simple word problems involving ratio and inverse proportion.
- Solve problems involving ratio and proportion using the unitary method.
- Solve best buy problems.

**Chapter 8 – Measures and Shapes****Approximate length: 7 lessons**

In this chapter the students will convert between metric units and measures of length, find perimeters of regular polygons and irregular shapes including compound shapes find the area of compound shapes and solve perimeter and area word problems and use 3D shapes to identify properties of solids.

Specific National Curriculum Objectives Covered:

- Convert between metric units of measures of length, mass and capacity.
- Solve problems in everyday contexts involving measures and conversions.
- Find the perimeter of regular polygons with one side given.
- Find the perimeter of irregular polygons including compound shapes.
- Calculate the area of squares and rectangles.
- Calculate the area of compound shapes made from rectangles.
- Solve perimeter and area problems.
- Identify properties of 3D solids, including cubes, cuboid and prisms.
- Identify reflective symmetry in 3D solids.

**Term 3****Chapter 9 – Sequences and graphs****Approximate length: 10 lessons**

In this chapter the students will work out the terms of a sequence and describe the term-to-term rule, work out and use the nth term recognise geometric sequences and describe the rule, identify points using positive and negative co-ordinates and complete table of values for equations.

Specific National Curriculum Objectives Covered:

- Work out the terms of an arithmetic sequence using the term-to-term rule.
- Work out a given term in a simple arithmetic sequence.
- Work out and use expressions for the  $n$ th term in an arithmetic sequence.
- Generate sequences and predict how they will continue.
- Recognise geometric sequences and work out the term-to-term rule.
- Use positive and negative coordinates.
- Work out the midpoint of a line segment.
- Draw straight-line graphs.
- Recognise straight-line graphs parallel to the axes.
- Recognise graphs of  $y = x$  and  $y = -x$
- Draw graphs that represent relationships.
- Solve problems involving coordinates and straight lines.

**Chapter 10 - Transformations****Approximate length: 7 lessons**

In this chapter the students will identify congruent shapes, recognise reflections in a mirror line rotate shapes on a co-ordinate grid, translate, describe and transform 2d shapes.

Specific National Curriculum Objectives Covered:

- Identify congruent shapes.
- Use the language of enlargement.
- Enlarge shapes using given scale factors.
- Work out the scale factor given an object and its image.
- Recognise and carry out reflections in a mirror line.
- Reflect a shape on a coordinate grid.
- Describe a reflection on a coordinate grid.
- Recognise and carry out rotations.
- Describe and carry out rotations on a coordinate grid.
- Translate 2D shapes.
- Transform 2D shapes by combinations of rotations, reflections and translations.

**Chapter 11 - Probability****Approximate length: 5 lessons**

In this chapter the students will use probability scales to describe events. record, describe, and analyse the frequency of outcomes of simple probability experiments involving randomness, fairness, equally and unequally likely outcomes, using appropriate language and the 0-1 probability scale.

Specific National Curriculum Objectives Covered:

- Use and interpret probability scales.
- Calculate and compare probabilities.
- Calculate more complex probabilities.
- Find the probability of an event not happening.

**Textbooks Maths Progress International Year 7**

## Assessment

**Formative:** Throughout the chapters, the students will complete end of chapter assessments, quizzes and problem-solving activities which will allow the teacher to assess the students' progress and inform their planning.

**Summative:** At the end of each term, we will complete internal assessments which will be based on certain chapters. Students will also complete standardized tests such as the *GL*. This allows us to measure the students' attainment throughout the term and year.