



Course Outline

Mathematics Year 8

Inspiring excellence, empowering global minds

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 – Number

Approximate length: 7 hours

In this unit the children will learn to make a connection between positive and negative numbers. Also, how to work with the HCF and LCM of multiple numbers. Write numbers in the form of their prime factors and also be able to identify and explain squares and roots. Be able to use the factor tree method to calculate the prime factors or LCM and HCF using this method. Be able to use BODMAS/ BIDMAS.

Specific National Curriculum Objectives Covered:

- Add, subtract, multiply and divide positive and negative numbers.

- Write the prime factor decomposition of a number.
- Use prime factor decomposition to find the HCF or LCM of two numbers
- Work out the laws of indices for positive powers.
- Show that any number to the power of zero is 1.
- Use the laws of indices for multiplying and dividing.
- Carry out calculations involving powers, roots and brackets following the priority of operations.

Chapter 2 - Equations and Formulae

Approximate length: 7 hours

In this unit, pupils will write formulae and solve problems using these formulae. They will learn to solve two step equations and also with unknown on both sides of an equation.

Specific National Curriculum Objectives Covered:

- I can solve problems that involving writing and using formulae.
- I can solve problems by writing and solving equations.
- Write and solve two-step equations.
- I can solve 2 step linear equations (including those with one set of brackets)
- Write and solve equations with letters on both sides.
- Find numbers that satisfy an equation with two unknowns.
- I can solve problems by writing and using formulae

Chapter 3 - Working with powers.

Approximate length: 8 hours

In this unit, the pupils will have plenty of opportunity to reflect on the use of algebra as generalised number, and to make clear links to the rules they have learnt for number. Discuss the power of algebra or generalisation. Pupils will learn how to multiply all the terms in brackets. Pupils will interpret negative signs in brackets accurately. Pupils will identify what constitutes 'like' when powers are included and simplify expressions. Also will substitute numbers into expressions to evaluate those.

Specific National Curriculum Objectives Covered:

- Simplify expressions involving powers and brackets.
- Use the index laws in algebraic calculations and expressions.
- Factorising algebraic expressions
- Expanding and Factorising expressions
- Write and simplify expressions
- Substitute values into expressions and formulae.

Chapter 4 - 2D shapes and 3D solids.**Approximate length: 11 hours**

In this unit the students will learn to recognize and use properties of the different 2D shapes and 3D solids. They will be able to calculate the area of 2D shapes and volume of 3D solids using the formulae. This will enable them to solve problems with 3D shapes and measures.

Specific National Curriculum Objectives Covered:

- To be able to use the formula for the area of a triangle, parallelogram and trapezium.
- To calculate the area of compound shapes
- To be able to identify properties of 3D Solids
- To be able to calculate the volume of 3D shapes
- To convert between metric measures
- To be able to interpret plans and elevations
- To be able to solve problems with 3D shapes and measures.

Term 2**Chapter 5 - Graphs****Approximate length: 8 hours**

In this unit the students will be able to complete tables using linear equation and using the coordinates to draw a graph for this equation. Students will draw and interpret real life graphs and solve real life problems.

Specific National Curriculum Objectives Covered:

- Recognise when values are in direct proportion
- To interpret graphs from different sources
- To understand distance-time graphs.
- I can draw and interpret non-linear graphs for real life contexts.
- I can solve problems by drawing or interpreting graphs, charts or tables.
- I can draw and interpret line graphs for real life contexts.

Chapter 6 - Fractions, decimals, ratio and proportion**Approximate length: 11 hours**

In this unit, the pupils will convert units in questions involving ratio. They will understand that the units must be the same before they form a relationship-involving ratio and proportion. They will learn to convert decimals to fractions and vice versa. The students will be using all four operations with fractions and mixed numbers.

Specific National Curriculum Objectives Covered:

- Round numbers to two or three decimal places
- Multiply and divide any number by 0.1, 0.01 and 0.001.
- Convert fractions to decimals by dividing the numerator by the denominator.
- Multiply integers and fractions by a fraction
- Write the reciprocal of a number or a fraction.
- Add and subtract fractions with any size denominator.
- Use the four operations with mixed numbers.

Chapter 7 - Probability**Approximate length: 5 hours**

In this unit the children will be able to explain what probability means. Calculate probability using experimental data results, also be able to identify mutually exclusive events. Be able to estimate probability using experimental data.

Specific National Curriculum Objectives Covered:

- Record data from a simple experiment.
- Calculate the relative frequency of a value.
- Estimate probability based on experimental data.
- Make conclusions based on the results of an experiment.
- Solve problems using experimental probability.
- Use experimental probability to model and predict future outcomes.

Chapter 8 - Percentages and ratios.**Approximate length: 9 hours**

In this unit the children will be able to calculate percentage of one unit into another. Students will be able to calculate percentage using a calculator and also using the multiplier method. Learners will learn to work out the percentage increase or change as well as working backward to find the percentage if the new and original amount had been given. Learners will also be taught to calculate with percentages over 100%. They will also simplify ratios and divide a quantity in a given ratio.

Specific National Curriculum Objectives Covered:

- Find equivalent fractions, decimals and percentages, including mixed numbers and percentages over 100%.
- Work out a percentage increase
- Work out percentage decrease.
- Use a multiplier to calculate percentage increase and decrease.
- Calculate compound interest.
- Simplify and use ratios involving decimals.
- Divide a quantity into three parts in a given ratio.

Term 3**Chapter 9 – Shapes and angles.****Approximate length: 6 hours**

In this unit the students will understand and use properties of quadrilaterals and angles in parallel lines to solve problems. They will learn to calculate interior and exterior angles of polygons and solve geometrical problems.

Specific National Curriculum Objectives Covered:

- Identify properties of quadrilaterals
- Identify alternate and corresponding angles and know that they are equal.
- Work out the interior and exterior angles of a polygon.
- Solve geometric problems using side and angle properties of quadrilaterals and other polygons
- Solve problems using properties of angles in intersecting and parallel lines and in polygons.

Chapter 10 – Charts and diagrams.**Approximate length: 8 hours**

In this unit students will learn to calculate mean from a frequency table; draw and interpret different diagrams and charts in statistics like pie charts, scatter graphs and stem and leaf diagrams.

Specific National Curriculum Objectives Covered:

- Calculate the mean from a frequency table.
- Draw stem and leaf diagrams for data.
- Draw and interpret pie charts
- Compare two sets of data using statistics or the shape of the graph.
- Interpret and draw scatter graphs.

Chapter 11 - Straight line graphs**Approximate length: 6 hours**

In this unit the students will learn to write equation of a straight line and find the gradient and Y intercept.

They will also learn to draw the linear graphs.

Specific National Curriculum Objectives Covered:

- Find the y-intercept of a straight-line graph.
- Write the equation of a straight line graph in the form $y = mx + c$.
- Plot straight-line graphs.
- Find the gradient of a straight-line graph.
- Use $y = mx + c$.

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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.