

Key Stage 3 Mathematics Overview

Autumn Term 1

***'Mathematics is not about numbers, equations, computations or algorithms:
it is about understanding.'***

-William Paul Thurston

Mathematics at Noel-Baker

At Noel-Baker Academy, everything we do is underpinned by the belief that our students are entitled to the very best breadth and depth of provision. Our provision ensures that throughout their learning, pupils are given a chance to encounter the very best that has been thought and said. Given the right guidance and support all pupils can achieve and feel successful in mathematics.

Mathematics is a fundamental entitlement to everyone. At Noel-Baker Academy we aim to equip pupils to understand and be leaders in mathematics. Our Provision will support pupils in whatever path they take, due to the wide applications of not only mathematics, but the knowledge and skills it equips us with to understand other areas of life.

Mathematics creates opportunities. It equips us with skills that allow us to tackle problems in a variety of situations, both in mathematical and non-mathematical contexts, by making sensible choices and applying the knowledge we have. The ability to process information and be resilient in the face of an unknown context are both vital skills developed through the study of mathematics.

Year 7 Mathematics

To support the transition of pupils' primary to secondary learning journey we continue to build on representations pupils' find familiar. Year 7 focuses heavily on developing pupils' understanding of number a fundamental building block to allow pupils to successfully access the full breadth of the curriculum.

Block 1 – Place Value

This unit of work focuses on pupils' deepening their understanding of key principles around the place value system including integers and decimals. This is then developed to apply this knowledge to be able to compare and order negative numbers and round values to a given number of decimal places and significant figures.

Block 2 – Addition and Subtraction

This unit of work not only focuses on delving into and understanding the written methods for addition and subtraction of numbers by building on and applying knowledge of the place value system, but also the applications of these skills. Pupils are exposed to a number of mathematical situations in which the need for addition and subtraction is required including: the importance of number bonds for efficient calculations, financial applications, representing data using frequency trees, perimeter and the language of the range.

Block 3 – Multiplication and Division

This unit of work like addition and subtraction uses pupils' knowledge of place value to deepen their understanding of formal written methods. These are carefully chosen to be sustainable for pupils to use across their mathematical journey, at Noel-Baker Academy and beyond, across a wide variety of mathematical topics. Pupils are also exposed to the applications of multiplication and division that underpin and are often required to access other mathematical topics. This includes topics such as: converting units, factors, prime numbers, area, order of operations, estimating calculations and the mean.

Year 8 Mathematics

Due to the disruption to pupils' learning in Year 7 we are continuing to deliver the content that pupils at Noel-Baker Academy are entitled to so that they are fully equipped with the mathematical knowledge they need to access the next steps of their learning.

Block 1 – Fractions

Pupils' understanding of fractions is a fundamental skill for pupils to be successful in mathematics. We use the mathematics of multiples and lowest common multiples to deepen pupils' knowledge of key concepts such as equivalent fractions to allow comparisons not only between fractions but also equivalent values such as decimals. Pupils also begin to apply their previous knowledge of addition and subtraction to the concept of fractions.

Block 2 – Negative Numbers

When looking at place value previously pupils develop an understanding of the concept of negative numbers and how to compare and order them. This unit allow pupils to build on this knowledge to now calculate using negative values and revisit key concepts such as the order of operations that pupils are already familiar with but can now apply to a new context.

Block 3 – Algebra 1

Pupils meet algebra at a primary level but generally informally. This unit focuses on making sure pupils have a deep understanding of key language and concepts need for pupils to be successful with algebraic aspects of the mathematics curriculum. This involves covering key knowledge such as notation, Substitution, collecting like terms, solving equations and beginning to work with sequences, all whilst they apply understanding of number to new contexts.

Block 4 – Fractions 2

Having spent time embedding pupils current knowledge of fractions, this unit now extends pupil's knowledge to allow them to further apply their understanding to a variety of mathematical concepts. Within this unit pupils focus on developing an understanding of the multiplication and division of fractions and applying this to familiar mathematical contexts such as area, fractional increase and decrease, order of operations, calculating the mean and algebraic manipulation.

Block 5 – Percentages 1

This unit allows pupils to start to develop a sense equivalence between fractions, decimals and percentages. Pupils have the opportunity to consider key concepts such as what a percentage represents and then how to apply this to a range of situations including, calculating a percentage of an amount, percentage increase and decrease and reverse percentages. This is an opportunity for pupils to apply their skills of multiplication and division to a new context. This new knowledge can then be applied to familiar contexts such as area, order of operations and financial calculations including simple interest.

Year 9 Mathematics

Due to the disruption to pupils' learning in Year 8 we are continuing to deliver the content that pupils at Noel-Baker Academy are entitled to so that they are fully equipped with the mathematical knowledge they need to access the next steps of their learning.

Block 1 – Algebra 2

Whilst pupils had covered a large portion of this learning within year 8 it was important that they had the opportunity to revisit key concepts and develop new ones. This unit focuses on pupils using their knowledge of powers and algebraic notation to be able to form an understanding of index laws. This is then an opportunity for pupils to revisit their knowledge of solving equations but to deepen this further with the application of index laws and expansion of brackets. This is closely followed by the application of solving equations and prior knowledge of inequality symbols to solve algebraic inequalities.

Block 2 – Algebra 3

This unit introduces pupils to the applications of their current algebraic knowledge. They develop links between algebraic notation, order of operations and substitution to be able to rearrange in an algebraic context. These skills are then used to plot coordinates and develop pupils' knowledge of graphs through, plotting graphs using knowledge of substitution, looking at real life graphs to model direct and inverse proportion, identifying key parts of a graph and noting the difference between an intercept and gradient through real life applications, finding the gradient of a line, finding the equation of a line and solving simultaneous equations graphically.

Block 3 – Sequences

Due to disruption in learning from Covid-19 this unit of work allows pupils the opportunity to revisit key knowledge around linear sequences including how to model them pictorially. Pupils will generate sequences using prior knowledge of substitution and apply this knowledge with key multiplication facts to be able to find the n^{th} term of a sequence. Pupils will also have the opportunity to explore geometric sequences and link this to the previous unit (Block 2) and model their sequences not only numerically but also graphically.