

Key Stage 4 Mathematics Overview

Autumn Term 1

Pure mathematics is, in its way, the poetry of logical ideas.

— *Albert Einstein*

Year 10 Mathematics

Year 10 marks the start of Key Stage 4, and pupils follow two year programme that builds on their Key Stage 3 learning. Given the impact of COVID, the curriculum is comprehensive and designed to locate any gaps in learning quickly and ensure pupils are able to complete their studies with everything they need for Further Education and life after school. In order to check on the understanding in the classroom, teachers will regularly use a variety of methods such as mini-whiteboards or multiple choice questions to gauge progress and, where necessary, reteach content if required.

As in Key Stage 3, Noel-Baker Academy Mathematics teachers are committed to ensuring a depth of understanding rather than simply teaching techniques. Where appropriate, Mathematics teachers will use some of the pictorial representations seen in Key Stage 3, such as the bar model, to provide continuity with earlier years and because they aid the understanding of pupils. The Mathematics team have also spent considerable time exploring the most durable methods for pupils to use in the classroom. For example, we teach long multiplication using the grid method, because this method is useful later with more advanced number and algebra applications such as Quadratics and Surds.

Throughout Key Stage 4, teachers use resources designed to reflect the two tiers of the Edexcel GCSE, Foundation and Higher. Pupils will use booklet written and compiled by the Mathematics team and will be designed for Foundation, Foundation/Higher crossover or Higher pupils. Both the year 10 and 11 curricula have been mapped against the Edexcel GCSE specification to ensure full coverage of the National Curriculum.

Block 1 – Data 1

The curriculum starts with a short unit on Data as pupils return from the holidays. Statistics is one of the most common uses of Mathematics in everyday life and this unit is designed to teach pupils how data can be represented, but also explores the limitations and misuses of data representations.

Block 2 – Number 1

What follows is a unit on Number which will ensure the foundations are in place for all subsequent learning. Starting with Negative numbers, we will develop pupils understanding of key mathematical areas such as powers, order of operations, multiples and factors and approximation.

Block 3 – Algebra 1

Having established pupils numerical understanding, we proceed to Algebra where we explore a variety of algebra techniques many of which depend on a strong understanding of Number areas such as indices or order of operations. Pupils will be able to use techniques such as expanding brackets, factorising, solving equations and inequalities by the end of the unit.

Block 4 – Shape

Block 4 ensures pupils have a strong foundational knowledge in another key area, angles. Pupils will explore angle rules for a number of different shapes but will also develop their problem solving skills as well as applying algebra techniques to more advanced questions.

Year 11 Mathematics

Given the disruption of the previous two years, year 11 will be following an accelerated version of the above curriculum. As a result they will cover the above Blocks in Term 1 as well as two additional blocks below:

Block 5 – Fractions and decimals

A clear understanding of Fractions and Decimals is vital for strong mathematicians and the principles taught will build on areas of Number such as Multiples and Factors as well as exploring how to visualise and understand fractions and solve Fraction and Decimal problems.

Block 6 – Graphs

Any comprehensive understanding of Algebra needs to include graphical representations. Pupils will explore linear, quadratic, cubic and reciprocal graphs. They will learn how to draw them, explore the implications of gradient and intercepts and make connections with algebraic representations already covered.