Subject Curriculum Intent: Mathematics DRAFT

Definition of Subject

"Pure mathematics is, in its way, the poetry of logical ideas." – Albert Einstein

Mathematics has no generally accepted definition. However, mathematics is the **language** of pattern, measurement and logical rules, it is the **art** of interpreting, quantifying and working with error and uncertainty and it is concerned with using imagination, intuition and reasoning to find new ideas and solve puzzling problems. Engaging in mathematical activity is part of what it means to be human. The study, discovery and use of the subject goes back to ancient times.

Nature of Subject

The core aspects of mathematics can be grouped under the headings of Number, Ratio and proportion, Algebra, Geometry and Measure, and Statistics. Although on the surface they seem unconnected, there are many links that connect these different topics.

Mathematical development starts with students learning how to manipulate different types of mathematical object and building fluency with a variety of essential procedures and relationships. Over time, they learn how to combine and use this knowledge to in more complex ways. A widely accepted aim of mathematical development is for students to be able to solve unseen problems by identifying and combining appropriate mathematical skills.

Purpose of Subject

Mathematics has many purposes and none. It is a language used in most areas of human endeavour to model and predict. At the same time, many find an innate beauty in the abstract logic and relationships described by the subject.

There are many reasons for studying mathematics. It is a tool of thought that is essential for evaluating information and making good decisions in many areas of life from the financial to the practical. In addition to this, study of mathematics exposes individual to the beauty of logical reasoning that make it part of our intellectual heritage that has survived through the ages as 'something worth knowing'. Finally, skills and qualifications in mathematics give students access to a wide variety of industries and areas of further study.

Mathematics has been fundamental to human development. It is underneath all modern technical advancement that has improved the living conditions of millions. Without it we would not have defeated diseases or put people on the moon.

Design of Subject

Mathematics contains a small core of declarative knowledge; technical vocabulary, key formulas and definitions. On top of this is built a well defined and extensive area of procedural knowledge. This knowledge is hierarchical in nature in that most of it can only be accessed if earlier knowledge has been learnt sufficiently well. As well as this, the order of content is based on the following principles:

- A strategic KS2 topic overlap ensuring that students receive further teaching in areas that they find challenging. For example, proportion, fractions, ratio and percentage.
- Early introduction of 'challenging' topics to ensure that students have time to become familiar with new or intimidating notation.
- Priority and time given to high impact topics that develop wider mathematical skills and have multiple application.
- A balance of difficulty and type(number, algebra, geometry, or statistics) of mathematics to ensure variety for students and support spaced practice.

The ESW maths curriculum also has the following features:

- Explicit support to ensure that all students can make links between different concepts. For example, students are explicitly taught how to apply their knowledge of forming and solving equations in the different contexts of area, perimeter and angles.
- Learning outcomes that are broken down into small steps to support direct instruction techniques (and teaching resources that support this approach).
- Priority given to key concepts that are essential for good progress.
- Support for regular low stakes assessment
- Strategic assessment which is used by teachers to inform planning and intervention, and leaders to inform monitoring, CPD and curriculum development
- Common teaching objectives for all abilities at KS3 to ensure that where ability grouping is used, students are given a broad diet of mathematics and are not held back.
- Three streams of difficulty at KS4 to support students as they work towards the foundation or higher tier level at GCSE.
- Features to build students capacity and ability for independent study.

Home learning is an important part of the maths curriculum. Students get a personalised homework every week that has a proportion of new topics and prior learning topics. Detailed data enables teachers and school leaders to monitor engagement and intervene where needed.

Extension of Subject

The extension of our maths curriculum varies by school and the different specialisms and interests that our teaching staff bring. For example, by supporting the annual UKMT Maths Challenge or the use of strategy and logic in board games and puzzles.

Mathematics opens the doors for many opportunities at university. Many courses will require a passing grade (or higher) at GCSE before viewing an application. For students taking Mathematics at A-Level their options at university include: Mathematics, Engineering, Computer Science, Medicine, Economics, Physics, Statistics, Dentistry, and Sports Science amongst many others.

When it comes to careers, it is hard to be specific as mathematics qualifications are valued in a huge number of different sectors (mathscareers.org.uk). In addition to this, numerous studies have shown that people with higher Mathematics qualifications benefit from a significant wage premium.