TYWFORD TRUST MATHEMATICS CURRICULUM OVERVIEW

Intent

In Mathematics, we aim to develop students to become curious, numerate and independent problem solvers who can understand Mathematics in the world around them. To ensure students see the relevance of this whilst in school it is vital that the intent of a mathematics curriculum is clear to all staff and can be communicated effectively to students in order to help them understand the importance of what they are learning.

The TCEAT Mathematics curriculum aims to develop three main skills throughout Y7-Y11, which are drawn from the core assessment principles of the 2013 KS3 National Curriculum for Mathematics and the current AQA GCSE Mathematics specification (8300). These are:

AO1: Use and apply standard techniques

This skill requires students to follow and recall standard routines that have been taught explicitly by their class teacher(s), either in a relatable or abstract setting. This ability to follow a set of instructions and carry them out independently at a later date is an essential skill that will set students up for future learning and employment. It is also vital that students learn and fully understand various techniques fluently to help them solve more complicated problems.

AO2: Reason, interpret and communicate mathematically

We live in a world that is often described using mathematics. When we communicate with each other, we regularly use numbers and statistics to support our arguments. It is therefore vital that students are taught how to interpret the various ways in which data can be presented. They should also be able to communicate their thoughts and findings in a logical manner. We aim to help students develop this skill through

- use of accurate mathematical notation in order to construct chains of reasoning
- exposure to various ways of representing data
- evaluating mathematical arguments logically

AO3: Solve problems within mathematics and in other contexts

Our curriculum places a heavy focus on problem solving as this is a skill that helps develop logic, creativity, resilience, imagination and lateral thinking. These are all attributes that are highly valued by employers and will also support students if they choose to continue in their studies. We aim to offer regular opportunities for students to tackle problems within our lessons and assessments.

Implementation

Ofsted's 2021 research review in to Mathematics classifies its curriculum content into three types of knowledge:

- declarative knowledge: consisting of facts, formulae, concepts, principles and rules – "I know that" **(AO1)**
- procedural knowledge: methods, algorithms, procedures – "I know how" **(AO1)**
- conditional knowledge: ability to reason and problem solve – "I know when" **(AO2/AO3)**

It also places a heavy emphasis on the importance of sequencing the curriculum intelligently in order to ensure students are equipped with core declarative knowledge, efficient, systematic and accurate procedural knowledge, and topic specific strategies for problem solving.

At the Twyford Trust our curriculum has been planned carefully to ensure students acquire essential declarative knowledge early on. We then build on this knowledge by interleaving the different content areas (algebra, geometry, number, probability, ratio and proportion, and statistics) in a spiral fashion throughout KS3 and KS4. This gives students the opportunities to embed understanding over time as well as make links across the curriculum.

The sequencing of each school's content can be seen in the relevant set of curriculum maps below.

Ada Lovelace Ealing Fields Twyford William Perkin

Across the Trust, the lessons within any given unit have been designed with some core principles in mind. These are

- A starter that either promotes retrieval practice of previous content or assesses prior learning required to further a concept.
- A development phase that introduces new concepts gradually, makes links to prior learning, and defines key facts/formulae, principles and rules.
- Opportunities for modelling methods, algorithms, and procedures in a systematic way.
- Independent tasks to allow time for consolidation of understanding.
- Mathematical questioning and discussion that enables students to develop their reasoning skills.
- Assessment for learning points that allow the teacher to gauge the understanding of the class and adapt their teaching accordingly.
- Opportunities for students to practice problem solving.
- A lesson prep task that further consolidates understanding of the content taught and/or allows retrieval practice of previous content.

Our curriculum is split into three tiers – Advanced, Higher and Core; each of which have their own set of differentiated Bronze, Silver and Gold outcomes for every lesson. Throughout Y7-Y9, the majority of the content is identical and taught in the same order to allow for movement between tiers, with the outcomes and/or activities differentiated at each tier to allow for appropriate stretch and support. From Y10 onwards, the Advanced and Higher tier continue studying content towards the Higher GCSE paper, whilst the Core tier work through the remaining Foundation content at a slower pace, and consolidate key topics from Y7-Y9 along the way.

At key points throughout the year we set standardised in-class assessments that provide students with the opportunity to reflect on their understanding of the most recent content taught. These assessments are marked by teachers who then provide feedback to their classes and use this information to inform future planning. These assessments are informal and feed into our major quarterly assessments. Students also complete their own self-evaluation of these assessments and carry out self-improvement tasks during/following the feedback lesson.

In order to support student literacy in Maths, we make use of Frayer models at key points to enable students to acquire a sound understanding of key tier 3 mathematical vocabulary. We also teach students the meaning of the various tier 2 mathematical command words, e.g. “solve”, “evaluate”, “expand”, “factorise”. To ensure students have the opportunity to recall these definitions, teachers regularly assess the understanding of this key vocabulary in later lessons.

Our curriculum is also supported by a set of Knowledge Organisers that define the core declarative knowledge and key vocabulary for each unit, including formulae, key words/definitions and mathematical notation. Students are provided with these in a booklet and are expected to review these on a regular basis. This is facilitated through low-stakes tests in lessons, use in lessons prep tasks and during revision for assessments.

Impact

We have two main systems in place to assess the impact of our curriculum:

Quarterly Assessments

In Maths, our students sit a formal, formative assessment four times a year. These assessments are uniform across the Trust and have been carefully designed to assess a range of the skills mentioned in the intent section. The table below details the proportion of marks attributed to each skill within each year group/tier.

	Year 7	Year 8	Year 9	Year 10	Year 11
Advanced	AO1: 50% AO2/AO3: 50%	AO1: 50% AO2/AO3: 50%	AO1: 40% AO2/AO3: 60%	AO1: 40% AO2/AO3: 60%	AO1: 40% AO2/AO3: 60%
Higher	AO1: 60% AO2/AO3: 40%	AO1: 60% AO2/AO3: 40%	AO1: 50% AO2/AO3: 50%	AO1: 40% AO2/AO3: 60%	AO1: 40% AO2/AO3: 60%
Core	AO1: 70% AO2/AO3: 30%	AO1: 70% AO2/AO3: 30%	AO1: 60% AO2/AO3: 40%	AO1: 50% AO2/AO3: 50%	AO1: 50% AO2/AO3: 50%

The content covered in each assessment is cumulative, selected from a range of the units covered to date. The outcomes of these assessments are analysed and discussed with the team to identify any areas of the curriculum that could be improved further. This process is also carried out on a larger scale following Y11 and Y13 external assessments.

Assessment for Learning

There are regular assessment for learning opportunities built in to our lessons that enable the teacher to reflect on the progress of their students. The main assessment for learning strategies used across the Trust include mini-whiteboards, self-assessment, circulation and live marking, and questioning. These strategies also help teachers to reflect on the effectiveness of the curriculum, providing feedback that enables improvements to be made.