

Curriculum Rationale

Mathematics



William Hulme's Grammar School
The best in everyone™
Part of United Learning

Intent

As mathematicians, we appreciate the beauty of mathematical reasoning and its elegant forms. We don't lose sight of this when applying maths to the world around us. The purpose of the Maths curriculum is to equip students with uniquely powerful ways to describe, analyse and solve problems and to make them more prepared for the real world. We do this by providing a secure understanding of mathematical concepts, from basic principles of mathematics to complex topics that combine several areas of study into a single question. We concentrate on retention of knowledge and depth of learning. In doing this, all our students have the opportunity to master key skills that might be required in their future.

We are very aware that Mathematical skills are a key foundation in a number of other subjects in the curriculum and in the reality of responsibilities in the real world. To address this, we ensure that where possible in the teaching, these relationships are stressed so that students understand not only how to do a specific topic but why this might be important in their future. We aim to produce students who numerate, financially capable, are able to think independently in applied and abstract ways and can reason and solve problems while assessing the risks.

We aim to facilitate all levels of abilities and for those who want to stretch and develop their problem solving skills we offer opportunities for individual and team competition through the United Kingdom Maths Trust at Leeds University (UKMT), trips organised through the Manchester University and internally developed activities.

We aim to create pupils who are confident and have the opportunity to take their studies further into sixth form, university and beyond. We have an extremely strong KS5 offering, where we are not only able to offer A Level Maths but Core Maths (at Level 3) which supports other A Level studies, and Further Maths for the more advanced mathematician.

Implementation

Lessons are sequenced to enable learners to build strong foundations and move logically between different topics and see their linkages.

At William Hulme's our curriculum promotes a consistent approach to lesson delivery by linking lesson structure to the Rosenshine Principles, in line with United Learning's centralised teaching and learning approach. We use these principles because cognitive research suggests that students need a large amount of subject knowledge in their long-term memory to become competent in any subject.

In maths, pupils will be far better equipped to apply mathematical thinking to a problem if their working memory is not overloaded with basic calculations. Therefore, our curriculum always emphasises secure content knowledge before moving onto problem-solving tasks. For our students to become 'experts' in a topic taught, it is essential that the fundamentals of numerical fluency are first mastered.

The development of long-term memory and mastery starts as soon as our pupils walk through the door. Every lesson, in Year 7 and 8 students will start with 'Numeracy Ninja's', 30 low-stakes fluency questions (multiplication tables and basic mathematical calculations) that are designed to improve student's mental mathematics over time. When reaching Year 9, 10 and 11 students will all complete 5 low-stakes GCSE style questions which concentrate on reaffirming required skills that have previously been covered and have been identified as weaknesses for each individual class, these are slowly increased in complexity as each lesson goes on – the idea being mastery must be achieved before a new set of questions is introduced.

Throughout KS3, 4 and 5 our assessment's form an extremely important part of our future lessons. From these assessments pupil's data is analysed and areas of weakness, for each individual class, are addressed in form of our 6 – Question Grids. These grids are weekly and are 6 questions that from assessment have been identified, for each individual class, as topics students most struggled. Consistent review of key content is integral to the structure and order of the curriculum itself. Over the course of each half term, questions will be amended with the aim of mastery being achieved in the six chosen questions. Students record their score each week and aim to improve their score with a target of mastering all topics and achieving full marks by the end of the half term.

We use intuitive online technology for homework's which permit us to study individual students' levels of learning and tailor the practice directly to each student. The two platforms we use are Sparx for years 7 to 10 and Hegarty for year 11 which facilitate students to review this content as homework.

Our curriculum is designed to provide a challenge for all learners. Teachers adapt resources for the needs of their students. We use carefully constructed resources that exemplify accessible methods for students and teachers. Our teachers use variation theory in their lessons, so the questions students are being asked to complete have a logical starting and finishing point. We provide an opportunity for challenge by depth in all years, not accelerating learning for more able students until they reach year 9, when a higher accelerated scheme of work is implemented. In Key Stage 4 and 5, exam questions focusing on the specification objectives AO1/2/3 are used, when appropriate, to assess understanding of core fluency and application of it in context.

Impact

Students undertake common United Learning end of year assessments in KS3 and 4. This allows us to compare student performance across a large cohort of students. This improves the accuracy of predictions in KS4 and allows for improved targeting and support for students by identifying knowledge and skills gaps. Students should be accomplished in algebra, number, geometrical reasoning and analysing and interpreting data in a range of forms and context.

The foundations built at Key Stage 4 will serve students well in whatever pathway they chose to take in the onward learning journey. Our aim is to ensure as many students as possible have the opportunity to go on to study mathematics further. For the highest achieving students, to promote our subject, we also offer Level 2 Further Maths to 'bridge the gap' between GCSE Mathematics and A-Level Mathematics. Sixth Form students at our school will have an understanding of the real-world applications of mathematics including financial mathematics and engineering.

Many students choose to continue studying Maths and Further Maths at A Level here at WHGS. Studying Maths at Key Stage 5 opens a huge range of possible degree choices. The UCAS website is a good source of information on the different destinations for Key Stage 5 mathematicians and can be used as a reference point for both teachers and students.