

Intent

What you are teaching?

At Oswaldtwistle School we have 3 different spiralling schemes of work to support student's ability during their different stages of progression in Mathematics. Each SOW spans different levels of ability by topic to allow teachers to decrease or increase the difficulty in order to cater for all the varying abilities in one class.

The Schemes of Work are delivered by a determined, hardworking and passionate team of teachers and TA's who strive to share their excitement for mathematics with all students. The mathematics curriculum at Oswaldtwistle School is designed to deepen students' understanding of core mathematical principles through a fluency/mastery approach. The curriculum focuses on developing students in three strands of mathematical thinking – fluency, reasoning and problem-solving – so that the key skills and processes learnt in the classroom can be applied to practical, real-world scenarios.

The sequencing of our curriculum has been designed to allow all our students, irrelevant of ability, to progress successfully through the content. The sequence helps students recall prior knowledge and understanding from the National Curriculum, allowing them to apply and extend further. It is our aim that through the sequencing of the curriculum we will be encouraging students to develop and use their long-term memory more thus freeing up their short-term memory to allow them to interact with new material more productively.

Why you are teaching it?

As a core subject, mathematics is important as it has the capacity to enable us to think more deeply and intuitively about the wider world. The study of mathematics is not just about learning the core content, but also about training students' to think logically and approach problems with resilience and the tools to unpick the problem and find a solution. Students who are comfortable and confident with mathematics are able to develop critical thinking skills, enabling them to effectively problem-solve and solution-find. Young people who are able to leave school with these skills are better equipped to be numerate in multiple settings across society and are able to flourish in a variety of fields.

End points

Topic end points have been mapped out on academic trackers from grade 1 through to grade 9. All objectives are laid out in a systematic way to make them simple and easy to follow. They also clearly define each learning target for students. Objectives are shared with classes every lesson to give students a clear target to achieve. Students, for example, with a target of a grade 1 will be assigned end points for grades 1 and 2, this encourages them to progress further. At KS3, students work towards end points related to their year group. These can all be found in the KS3 curriculum plans.

Literacy and Key Words

Literacy in Maths sits mainly within key words and student oracy. Our students are encouraged to use the Mathematical dictionaries to define key words and command words, and then use them when discussing their work or learning. These can be set as a literacy target as per the school literacy policy or as a starter in a lesson. Students are asked to explain Mathematical methods throughout lessons to promote oracy. Discussion tasks are also used on 'no pen days'. The intent here is to promote mathematical language and in doing so helps to show students understanding of the different topics.

Careers and the Wider Curriculum

Maths and Careers go hand in hand as maths qualifications are a requirement for the majority of jobs and apprenticeships. Careers and Cultural Capital are included in lessons in a variety of ways and as a team, we are working with other subject leads to create and use cross curricular links. As a lot of Maths and symbols come from ancient Greece, Cultural Capital can be inputted by looking into the history of these. Pythagoras Theorem, Circles and Polygons lend themselves to these lessons nicely. The Greek calendar and recognising the link between months and numbers, along with their prefixes and how they are used across Maths and other subjects e.g. October (Oct – 8 – Octagon - Octopus) December (Dec – 10 – Decagon - Decade). Careers lessons will be embedded within the curriculum and delivered during drop down days or as part of the Personal Development, looking at Maths in different careers and how it lends itself to day to day living. Our Maths classroom promotes the use of Mathematics across time, subjects and in real life situations.

Research – Growth Mindset

Students at Oswaldtwistle school arrive with many different experiences towards Mathematics and education. It is paramount that from the outset students are made to feel that they are achieving and making progress. We have found that this approach allows our students to develop a growth mindset towards all new learning experiences. Following a nurturing and positive approach has helped to develop strong, professional relationships between staff and students, leading to trust and confidence. Students are rewarded for showing a growth mindset by being given Green Points during their lessons.

Implementation

How are you going to teach your subject?

Our approach to teaching and learning supports our curriculum by ensuring that lessons build on prior knowledge and provide sufficient opportunity for guided and independent practice. As a department we aim to achieve this by following Barak Rosenshine's 'Principles of Instruction' to develop our teaching practice. At the heart of Rosenshine's principles is a simple instructional core:

Demonstration: Teacher presents new information in small steps

Guided practice with models, prompts and scaffolds

Independent practice with monitoring and feedback from the teacher

When introducing new topics/skills, teachers present all new materials in small steps with students given sufficient time to practice those new steps. As a department and after reading many articles about the 'working memory' we felt that this approach to learning was very appropriate for our students. Teachers model, demonstrate, scaffold and use many examples to aid the students in acquiring new pieces of information. Moving individual students on at their own pace, allowing for all students to secure their own end points and achieve their own potential.

During the main body of the lesson questions given to students are differentiated and students are always encouraged to choose their own learning pathway as well as move themselves on when they are feeling comfortable and confident with their level of understanding. This allows students to build on their confidence and understanding at their own pace whilst giving the teacher the chance to monitor and feedback at an individual level thus encouraging independent practice. Promotion of Mathematical discussion between pupils is encouraged as studies show that understanding is furthered by discussion between peers.

In addition to this, we use many different questioning techniques to assess understanding along the way. This is vitally important as it allows teachers to identify any misconceptions or errors from the outset and probably, but more importantly, it allows our students to verbalise what they have learnt and vastly increases their vocabulary skills in Mathematics. This strategy also develops reasoning skills within the subject and allows students to develop their problem-solving skills. Student evaluation against the lesson objectives at the end of lessons is used in books to support teacher assessments, and allows students to reflect upon their own learning.

Sequencing of Lessons

Schemes of work are sequenced in such a way that basic topics are interleaved and revised throughout the year as well as throughout the key stages. Fluency or recall starters, weekly reviews, and impact assessments are all used to frequently review previous learning and further utilise the long term memory, freeing up the working memory for new content.

Rosenshines 10 Principles

Students will begin every lesson with a variety of different retrieval tasks, for example: short review based fluency skills, weekly/monthly review's, thinking skills, etc (R1 and R10). They will then progress onto learning new skills. This will be taught in small steps where students will be guided through the work with the teacher using different models and asking a series of questions to assess understanding. Students will then complete a similar set of questions themselves using the model introduced by the teacher with some students looking to apply their understanding and further their learning (R2, R3, R4 and R5). At this point, teachers will ask questions to the whole group to assess understanding of all. Misconceptions will be addressed and questions that were not understood will be remodelled (R3 and R6). Students should now be ready to participate in independent practice and be in a position to obtain a high success rate for their individual ability. Scaffolding will be provided for more difficult tasks to challenge students further or for students who need extra support with earlier steps. Work set will be differentiated to allow all students to access the topic at their own level of understanding, and build upon it at their own pace. Answers will be shared with students and discussions will be encouraged between student/teacher or student/student (R7, R8 and R9).

What support is available for non-specialist teachers in your subject area?

CPD plays an important part in maths and all staff are being encouraged to raise any issues they have within Mathematics in order to ensure everyone is confident in what they teach. Non-specialists are supported by the Lead Maths teacher with regular meetings and discussions about their needs. In addition to this, good practice is always shared between staff and all CPD is used to inform teaching and learning across the department. A large part of the Maths CPD has been developing the new scheme of work, allowing teaching staff to delve deeper into the implementation of Maths at Oswaldtwistle. Non-specialists are encouraged to develop current resources to suit the needs of their classes and their own personal teaching styles. New thinking techniques are being expanded upon to get students to engage further with the application of their mathematical skills. Regular meetings are held with staff in the department to share good practice and non-specialists are invited to attend lessons of the specialist staff.

How are end points achieved?

Due to the implementation of Impact assessments, students are able to self assess their learning against their personal endpoints, at KS4 these are based upon a target grade, and at KS3, based upon their year group. Students are encouraged to track their understanding by RAG rating themselves after completing an assessment, this informs the students and teacher of progress and gaps in their learning to be plugged during intervention lessons or recapped during the starter of the lesson.

Impact

How do you measure impact?

Impact of learning is measured in many ways. Firstly, it is self-assessed by students within the lesson and also peer marked. Purple pen plays a large part in this with students identifying their mistakes and correcting them, showing misconceptions that they have addressed. This is then teacher assessed throughout the lesson and in teacher marking. Staff use the school marking policy to identify areas to celebrate and areas to work on for each individual pupil. Teachers provide Impact Assessments to determine the success of their classes learning. As per school policy, staff input data into BehaviourWatch during Data Capture. At KS4, students sit mock exams to determine an accurate GCSE grade at different points throughout the year. At KS3, students have individual curriculum maps which are highlighted each time a student completes a topic. This determines if a student is 'Emerging', 'Developing', 'Securing' or 'Excelling' in the subject.

Results and outcomes from data analysis

Student grades are used to mark progress and parents are provided with either a GCSE Grade, or 'Emerging', 'Developing', 'Securing' or 'Excelling' for each subject. Students are also given a grade for 'Attitude to Learning' and 'Presentation'. The finite grades are then compared to student's individual target grades at KS4 to determine whether they are on track to achieve or not. Staff are then able to identify students that are underachieving and start to analyse reasons for this. All grades are recorded in the front of student's books, so they can track their own progress. We are looking to introduce a 'pupil reflection' to promote student interaction with their grading, target, attitude to learning and presentation.

What are you trying to achieve from your teaching?

The impact of our mathematics curriculum is that students understand the relevance of what they are learning in relation to real world concepts. We have fostered an environment where it is OK to be 'wrong' because the journey of finding an answer is more important. Where a student gets a question wrong, they are encouraged to try it again and look at where they went wrong, building their own resilience with the subject. Oswaldtwistle students are encouraged at all time to have a growth mindset and this is measured by reviewing each student's current working grade against their target grade or curriculum map. As a department we promote the mindset that students always strive to reach the end points set for them each year. Students are also encouraged to 'have a go' and choose the correct method they think they need to help them to learn along with different strategies they feel are best suited to each problem. In Maths, students are shown different methods and asked to share any methods that they may have used in previous learning, showing the diversity of Mathematics and the depth of each student's understanding.