Maths Curriculum Overview

AIMS AND PHILOSOPHY

The vision is for the Maths department to be outstanding; where students are challenged, engaged and successful and teaching is relevant, exciting, innovative and transformational. A beacon of good practise and a leader in raising standards, attainment and innovation.

Our key aims are:

- To develop proficiency in all areas of numeracy including problem solving, verbal reasoning, reading and communicating mathematically, functional and creative skills.
- To provide a varied and stimulating curriculum which responds to the needs of students and develops their knowledge of the world in which we live.
- To encourage creativity and experimentation with mathematical language and confidence in communication of ideas.
- To develop a culture whereby students are able and willing to tackle mathematical problems in unfamiliar contexts

CURRICULUM INTENT

Mathematics is an interconnected subject in which students need to be able to move fluently between representations of mathematical ideas. The programmes of study are, by necessity, organised into apparent distinct domains, but pupils make rich connections across mathematical ideas to develop fluency, mathematical reasoning and competence in solving increasingly sophisticated problems.

The curriculum aims to ensure that all pupils become fluent and confident in maths by:

- Developing skills and understanding processes through bread-and-butter practise
- Building on prior knowledge to make explicit links between topics
- Scaffolding students' understanding of increasingly challenging concepts

- Consolidating the core skills which underpin good progress in maths, improving students' ability to recall and apply knowledge rapidly and accurately

- Using mathematics as a toolkit to solve problems by

    - ✓ Decoding a problem to identify the mathematics within it
    - ✓ Working methodically and logically, adjusting approaches to improve and refine solutions where necessary
    - ✓ Estimating answers to ensure the accuracy of calculations
    - ✓ Making reasoned arguments using calculations to justify conclusions
    - ✓ Developing resilience to attempt unfamiliar problems and concepts, by using the building blocks of known facts, without necessarily knowing the final answer

We want our pupils to be successful not only in their schooling career, but throughout their adult lives. Through carefully designed lessons, our teachers can make meaningful connections between content with a high emphasis placed on problem solving. The White Rose programme has been designed on principles to provide learners with a deep conceptual understanding of mathematical principles, the ability to confidently communicate in precise mathematical language, while becoming mathematical thinkers. The programme can be delivered with confidence in the knowledge that if a student understands the core principles, they will be able to remember more and do more maths, in whatever context they encounter it.

This structure allows the flexibility for students to move between the Higher and Foundation tiers, based on their performance in class, summative and formative assessments. However, once students reach the end of half term 4 in Y10, moves are kept to a minimum through carefully streamed sets and rigorous assessment.

IMPLEMENTATION

To ensure whole-school consistency and progression, Mathematics at Netherwood is fully aligned with the National Curriculum, through the implementation of the Astrea Core Curriculum for Maths, and the school's ongoing engagement with the Central Maths Team at the Trust continues to ensure that staff at all levels understand the pedagogy of the approach.

New concepts are shared within the context of an initial related problem or 'Big Picture', which students are encouraged to discuss.

The department uses a learning cycle format designed to test conceptual and procedural knowledge and students regularly to identify those requiring intervention, so that all children keep up.

Lessons are scaffolded to support students in making progress towards the core objectives of the lesson, so that every student, regardless of their starting point, can make progress.

“I do, We do, You do” is a feature of all lessons to allow for clear modelling, and scaffold opportunities for students to practise skills before the independent practise

Mini whiteboards are used throughout the lesson to

- Recall the learning from the previous lesson
- Check prior learning to ensure that students have the prerequisite skills to access the lesson
- Identify misconceptions accurately and provide clear, direct feedback
- Support the use of “I do, We do, You do”

Students are given the opportunity to practise the skills independently through bread-and-butter practise with changing values to increase the intrinsic level of challenge of the skill, before being given the opportunity to apply the knowledge to either a real-life problem, or a twisted version.

Each lesson phase provides the means to achieve greater depth. Independent work provides the means for all children to develop their fluency further, before progressing to more complex related problems.
Most of the students' progress through the curriculum content at the same pace. However, the curriculum is broken into three tiers at Key Stage 3 to offer support guidance to the weakest learners, and challenge to the highest ability of students. Differentiation is achieved by emphasising deep knowledge and through individual support and intervention.

Mathematical topics are taught in blocks, to enable the achievement of ‘mastery’ over time. Practice and consolidation play a vital role. Carefully designed variation within this builds fluency and understanding of underlying mathematical concepts.

The scheme of learning supports students making clear links between topics, explicitly developing understanding of how topics are linked together.

IMPACT

The school has a supportive ethos, and our approach supports the students in developing their collaborative and independent skills, as well as empathy and the need to recognise the achievement of others.

Students can underperform in Mathematics because they think they cannot do it or are not naturally good at it. The scheme of learning addresses these preconceptions by ensuring that all children experience challenge and success in Mathematics by developing a growth mindset. It is imperative that the children have a secure understanding of each mathematical concept before moving on.

At Netherwood Academy, we ensure that students have mastered the maths in every lesson, by ensuring that teachers are expertly using assessment for learning, identifying and addressing any misconceptions as and when they arise. As well as assessment for learning during lessons, regular and ongoing assessment of the pupils' outcomes informs teaching, as well as intervention, to support and enable the success of each child.
We use a variety of strategies to evaluate the knowledge, skills and understanding that our children gain as they progress Y7 to Y11

- Regular live marking and pupil voice feedback
- Subject monitoring, including planning scrutinies, book looks and learning walks
- Regular low stakes knowledge assessments, using the Progress Ladders to inform the next steps around recovery and intervention.
- Termly assessments
- Biannual GL Assessments to support our teachers' assessment

These factors help us to maintain high expectations and ambitious standards in Mathematics, with achievement at the end of KS2 in line with the national average and an increasingly higher proportion of children demonstrating greater depth, at the end of each phase.

Assessments in Y11 are based heavily around practise papers. Students cover shadow papers in revision after school, and then sit the official paper in class.

After the formal mocks, a question level analysis is completed for every student to determine areas of strength and for development, which shapes future teaching, and the revision focus.

Students complete revision sheets regularly: this assessment is based around key skills which are vital to securing a grade 1 or 3 on the Foundation Tier, or a 5 plus on the Higher Tier.

These are designed by the class teacher, based on the QLA of the mock exam papers.

CULTURAL CAPITAL

With our firm belief that knowledge is transferable, our pupils are given every opportunity to participate in a wide range of learning experiences beyond their classroom.

They are given regular opportunities to participate in school and national competitions to encourage more positive attitudes towards Mathematics. Cultural Capital is the essential knowledge that students need to prepare them for their future success – in the world of work, in relationships forged throughout life and as a valued contributor to society. When beginning their secondary school journey, many students arrive to school with different and sometimes more limited experiences than others. Therefore, our aim is to give students the knowledge and skills to prepare them for what comes next in their lives. This includes the relevant vocabulary needed throughout their education and the opportunity to link maths to real-world problem solving.

SUBJECT LINKS

Maths can support pupils in many subjects:

- **Science**: *Estimations; Working with graphs; Using standard form; Negative numbers; Handling data; Fractions, decimals and percentages; Indices; Ratios and proportions; Relationships between metric units; Formulae and graphs; Manipulation of algebraic expressions and solutions of equations.*
- **PE**: *Working with speed, distance and time; Using compasses for map skills; Pattern, movement and symmetry; Estimates of distances travelled.*
- **DT**: *Working with measurements, including estimation; constructions and transformations; Angles.*
- **Music**: *Understanding patterns and rhythm; Equivalent fractions for the relative values of notes.*
- **Geography and History**: *Working with graphs and handling data.*
- **Art**: *Working with geometry; Measurements and angles; Ratio and proportion; Similarity and scale; Patterns, shape and tessellations.*

CURRICULUM LEARNING TIME

Schemes of work are living documents, intended to be updated with notes and ideas throughout the year of teaching.

Lessons are 60-minutes long and all lessons (which the exception of assessment lessons), must include

- Do now starter: retrieval practise
- Learning Objective, with the scaffolded outcomes
- Learning Links
- Prior learning check
- Scaffolded bread and butter examples in purple pen: I do, we do, you do
- Independent practise
- Self/peer/teacher marking and feedback
- Problem Solving application
- Diagnostic assessment to inform next lesson

Lessons offer repeated independent, intelligent practise to consolidate a skill before building on this with variation theory to help students better understand key ideas.

HOMEWORK

Homework is essential for success in Maths and should be set regularly. In Maths our main aim for students is that they develop the confidence to tackle problems without the need to seek constant reassurance from their teacher. Towards this end homework set is weekly on SPARX.

Teachers are to regularly remind students of the expectations.

Students who don't achieve 100% in their Sparx homework by their deadline are offered a Sparx Support session to help them fully understand the concepts covered. If students choose not to attend that session, they are expected to attend a detention the following day.

ASSESSMENT

Assessment provides regular opportunities for responsive teaching, feedback and informs necessary adaptations.

Assessment opportunities include:

- Weekly recall quizzes.
- Low stakes assessments.
- AFL during the lesson through whiteboards, questioning, diagnostic questions.
- Summative assessments.

Assessments in Y11 are based heavily around practise papers. Students cover shadow papers in revision after school, and then sit the official paper in class every two-week cycle of the timetable. A question level analysis is completed for every student to determine areas of strength and for development, which shapes future teaching, and the revision focus.

Key Assessments Each year group will complete a termly assessment linked to the scheme of work they are following.

End of Year/baseline assessments will be outlined on the Academy Calendar in the form of GL Assessments for that year for Year 7, 8, 9, 10 and 11.

GCSE Exam Board:

Pearson Edexcel Level 1/Level 2 GCSE (9-1) in Mathematics (1MA1)

GCSE mathematics is 100% exam.

It consists of three exam papers: Paper 1 Non-calculator and Papers 2/3 Calculator.

EXTRA-CURRICULAR OPPORTUNITIES	**RESOURCES AND FACILITIES**
• UKMT Maths Challenge. • Curriculum Catch-up. • University Workshops. • Regional Competitions. • Maths Inspiration Events. • Homework Support.	The faculty has 9 classrooms each with an interactive whiteboard and visualiser. The department also has a number of dedicated computer rooms with access to subject specific software. Textbooks: • Foundation Pearson Edexcel GCSE (9 – 1) Mathematics Purposeful practice book ISBN 978-1-292-27371-6 • Higher Pearson Edexcel GCSE (9 – 1) Mathematics Purposeful practice book ISBN 978-1-292-27370-9

STAFF LIST

Staff Code	Name	Responsibility
LJE	Luke Jenkinson	Curriculum Leader: Maths
GHO	Gemma Hoy	Lead Practitioner
MHR	Matt Harvey	Lead Practitioner
BGR	Ben Grayson	Assistant Curriculum Leader
FGW	Fiona Gwynnette	Assistant Principal
DFE	Daniel Feather	Teacher
JLI	Joe Lindley	Teacher
LKI	Laura Kirby	Teacher
AMA	Adam Mackie	Teacher 0.4FTE
JCA	Jane Caborn	Teacher
ECH	Eddie Child	Vice Principal
DBE	Dan Bennett	Vice Principal
JDU	Jessica Durrans	Teacher