CURRICULUM OVERVIEW – Mathematics

INTENT

The aim of the Mathematics Department is to enable all pupils to recognise mathematics as an essential tool to everyday life, critical to science, technology and engineering, financial literacy and most forms of employment. We deliver a high-quality mathematics education, so all our students understand the place within it. Our curriculum nurtures an appreciation of the beauty of mathematics and its logical thinking power to solve problems and transform lives. We want students to enjoy doing maths and to be curious and have a "can-do" attitude to problem solving.

We understand that our young people come to us under very challenging circumstances and can be traumatised in many areas of their life including education. There may be large gaps in their schooling which impact their knowledge and skills, or they could have extremely high expectations of themselves and attempt to project 'perfection' through their education. Their mental health issues can also impact their ability to approach mathematical problem or to analyse word problem.

IMPLEMENTATION

We firstly aim to re-engage pupils with Maths in our school classroom by developing confidence; identify the needs in their learning, through communication with parents or through informal assessment. We then individualise their Maths curriculum dependent on their individual circumstances. We provide a wide and varied Mathematics curriculum across all key stages and deliver the national curriculum strands to all pupils.

IMPACT

- become fluent in the fundamentals of mathematics, building basic skills and mathematical knowledge
- reason mathematically by following a line of enquiry, conjecture relationships and generalisations, and developing an argument, justification or proof using mathematical language
- solve problems by applying their mathematics to a variety of problems with increasing sophistication
- create a catch-up program if gaps are identified in their learning

These links extend beyond mathematics to support other areas of the school.
We endeavour to inspire and motivate pupils, providing appropriate stretch and challenge with the highest expectations for all. We aim to fill the gaps in their learning to thrive in the subject, and effectively equip them with the knowledge, skills and understanding that they need be able to pass their exams.

CURRICULUM

We provide a wide and varied Mathematics curriculum across all key stages, introducing pupils to quality learning which covers all areas of the maths curriculum (Number, Algebra, Ratio, proportion and rates of change, Geometry and measures, Probability and Statistics) and make connections across the curriculum's pupils can move fluently between different representations of mathematical ideas. We try to make the subject enjoyable and accessible.

We ensure that every individual works to the best of their ability and make optimal progression.

Our aim is to inspire and motivate pupils, providing appropriate stretch and challenge, and all Maths staff have high expectations whilst meeting the students' individual needs. We aim to provide pupils with a solid foundation on which to build their futures, and effectively equip them with the knowledge, skills and understanding that they need in order to be successful in an increasingly demanding world.

KS3

Students are taught Mathematics in mixed ability key stage groups and have 3 x 50-minute lessons per week. When possible, we meet individual needs of the students who usually work on different levels of attainment, occasionally we provide opportunity for them to work in pairs to support pupils continuing with their class experience of learning, benefiting from group work, peer discussion and prevent them from being 'isolated' within the classroom. As well as the content of mathematics we support students with mathematical processes: developing analytical skills, using maths in real life contexts, problem solving, using ICT effectively, being creative, and working effectively individually and in teams.

How do we assess progress in Maths at KS3?
Students in Yr7, 8 and 9 will be given half termly topic assessments. (**GEMs)**

PROGRESSION:

- GCSE Mathematics at Higher or Foundation Level
- Edexcel Number and Measure Awards Level 1 or Level 2
- Skills for progression to Key Stage 4: Developing analytical and problem-solving skills, understanding inference, building tools of generalising and verifying solutions. (Gatsby benchmark 4)
- STEM (how skills in topic link to the world of work): Programmer, Engineering, ICT Technician and business analysis

KS4

In Years 10 and 11, students are taught in ability groups for Maths and will have 4 x 50 minutes lessons per week.
We follow the Edexcel Maths syllabus (1MA1) which is examined at the end of the course. The GCSE is assessed using 3 exams:

Paper 1 - Non-Calculator 80 marks (1 hour and 30 minutes)
Paper 2 – Calculator 80 marks (1 hour and 30 minutes)
Paper 3 - Calculator 80 marks (1 hour and 30 minutes)

The assessments will cover the following content headings:

- Number
- Algebra
- Ratio, proportion and rates of change
- Geometry and measures
- Probability
- Statistics

There is a foundation tier covering grades 1-5 and a higher tier covering grades 5-9. All exams include functional maths which we believe will support the quality of mathematical thinking of our students now and in the future.
Mathematics is also tested for the accuracy and rigour of mathematical communication. Throughout the course we provide a revision programme, practice of exam style questions and mock exams.

We aim for all students to have a qualification in Maths but for those who may not be on track for a Grade 4 in the GCSE by the end of Yr11 we also follow the Edexcel Level 1 and Level 2 Awards for Proficiency in Number and Measure (ANM10/ANM20) that sits just below and compliments the GCSE curriculum.
Students are entered at either Level 1 or Level 2 decided by the Maths department based on trial papers and knowledge of students.

Each assessment consists of two sections
Section A – Calculator and Section B – Non-Calculator

- The award is assessed through a 1 hour 30 minutes examination set and marked by Edexcel.
- The total number of marks for the paper is 80.
- The award is pass or fail.
- The paper is split into two sections: Section A, which lasts for 1 hour and has 50 marks and Section B, which lasts for 30 minutes and has 30 marks.

KS5

Retake GCSE Mathematics (1MA1)

Edexcel Level 1 and Level 2 Awards for Proficiency in Number and Measure (ANM10/ANM20)

PROGRESSION

- Skills for progression onto education employment or training: the intention of the maths curriculum is to provide students with the necessary thinking skills and content to be successful in their next stage of life or education.

CULTURAL CAPITAL

- Research and presentations about famous mathematicians
- Real life examples of maths in nature and Science
- STEM activities
- History of maths and mathematicians
- Art and Design experience

LITERACY:

Within all classes, literacy is promoted and there is a consistency across the school. All subjects have the same word of the week so that developing vocabulary is a whole school approach. Vocabulary selected are used across the curriculum to introduce, recap knowledge and further develop understanding of these terms. Teachers all use a yellow highlighter to highlight literacy errors in students work and a target is written in their exercise books or discussed. All classrooms have dictionaries and thesauruses to support with developing reading and writing skills.

Our focus has been divided into three main areas:

- **spelling key terms correctly**
- **promoting the use of mathematical precise language during lessons**
- **developing literacy through discussion**

BRITISH VALUES:

Behaviour in class

Effective learning takes place in class where there is tolerance and mutual respect as set out in the Equality Act and where those with the protected characteristics receive fair treatment, so that all are treated equally. All providers should have a code of conduct which requires all students to behave with tolerance and mutual respect of others.

By maintaining these standards of behaviour in class, teachers and trainers will be promoting British values.

The Law and Democracy

Maths provides many opportunities to explore democracy and the rule of law. This may take the form of studying general or local election results which might include a chart showing the number of MPs elected for each party after an election.

Individual liberty

Students can explore individual liberty through a study of numerical constraints on behaviour such as speed limits in cars. Students can also explore individual freedom by discussing their options after completing their courses. This provides an opportunity to refer to individual liberty to make choices in terms of progressing in education or future careers.

Maths can be used to challenge extremism using statistics. This might include use of government migration figures to challenge inaccurate claims made about immigration levels in the UK.

Within Maths there are opportunities to study areas where numerical data is part of the rule of law. This can include a study of speed limits in the UK and limits on the amount of alcohol drivers can drink. Statistics can also be used to identify the impact of legislative change. This might include reviewing the level of smoking after the introduction of the limitations on smoking by law. Students could study simple charts or graphs or lists of data to show how the number of people smoking has changed over time.

LINKS TO SMSC:

In Maths lessons pupils are encouraged to delve deeply into their understanding of Mathematics and how it relates to the world around them. Our Maths teaching actively encourages risk taking which enables pupils to explore and try new ideas without the fear of failure. This is fundamental to building pupils' self-esteem within Mathematics.

Throughout history, the study of Mathematics stems from intrigue and curiosity, with people's desire to pose and solve problems relating to the real world or purely within mathematics itself. We aim for our students to appreciate this and use their own Maths to explore and question the way the world works and to apply their reasoning to puzzles for their personal satisfaction.

Spiritual

- Developing deep thinking and questioning the way in which the world works promotes the spiritual growth of our students.
- We are sensitive to students' individual needs, backgrounds and experience.
- We aim to give all students an appreciation of the richness and power of maths.

• Maths in Nature is embedded in Sequences, Patterns and Symmetry in Key Stage 3
• We promote a sense of wonder in the exactness of mathematics in the exploration of infinity, pie, topology, complex numbers and real-world examples.
• We encourage the students to appreciate the enormity of the world of mathematics as it has developed through time.

Moral
• Within the classroom, we encourage respect and reward good behaviour. We value listening to others' views and opinions on problem solving.
• We promote discussion about mathematical understanding and challenge assumptions, supporting students to question information and data that they are presented with.
• We show the students that we are on a quest for truth by rigorous and logical argument whilst discouraging jumping to conclusions.
• We explore and evaluate the use of Statistics to inform or mislead us in our current data obsessed society.
• Percentage work across Key Stage 3 and 4 is clearly linked to current financial topics such as loans, debts and investment returns.
• It is acceptable to make mistakes if the correct methodology to obtain the otherwise correct answers is then learned and remembered.

Social
• In classrooms, we look for opportunities for pupils to use mini whiteboards to promote self-esteem and build self-confidence.
• We encourage collaborative learning in the classroom – in the form of listening and learning from each other as well as paired discussion / working partners.
• We help pupils develop their mathematical voice and powers of logic, reasoning and explanation by offering explanations to each other.
• We exhibit pupils work in maths classrooms - to share their good practice and celebrate achievement through creating informative displays.

Cultural
• We share the appreciation with the pupils that mathematics, its language and symbols have developed from many different cultures around the world: e.g. Egyptian, Indian, Islamic, Greek and Russian roots.
• We look to make explicit reference to Mathematicians contribution to progression of the subject as we teach topics throughout our Schemes of Work.

IT
Students will have good access to technology in the mathematics classroom via electronic classroom displays such as digital projectors and smartboards and developing skills in using scientific calculators to find statistical data, use trigonometric functions and key numerical applications. We use on line platforms to support learning and interventions as well demonstrations and modelling mathematical methods..