Rationale for Year 7 Mathematics

Mathematics is a creative and highly inter-connected discipline that has been developed over centuries, providing the solution to some of history's most intriguing problems. It is essential to everyday life, critical to science, technology and engineering, and necessary for financial literacy and most forms of employment. A high-quality mathematics education therefore provides a foundation for understanding the world, the ability to reason mathematically, an appreciation of the beauty and power of mathematics, and a sense of enjoyment and curiosity about the subject. Our aim is to develop learners that: - Have a love of maths. Acquire maths mastery skills. Can further develop students Maths skills gained in KS1 and 2. Are able to problem solve. Can make connections between topics, in order to deepen their understanding of Mathematics. Are confident and able to take risks in their learning. Are fluent in the fundamentals of Mathematics. Can apply the skills learnt in their wider life experience. Can reason mathematically.

What will students learn and why?

Students will follow the Mathematics Mastery syllabus, which follows the National Curriculum, as well as being a well-established course. Mathematics Mastery is based on coherent curriculum model. It is underpinned by well-grounded learning theory and theory regarding subject- specific content. It also has a clear delineation of its content, as well as a precise focus on key concepts and knowledge and coherent learning progression within the subject. As a department team, we are all committed to delivering a course with: high expectations for all pupils, regardless of their prior attainment. It plans for progression using carefully structured schemes of work to plan a sequence of lessons that build on prior learning. It aims to provide inclusive, quality first teaching, including lessons designed with clear learning intentions, high demands of pupil involvement and engagement, appropriate use of teacher questioning, modelling and explaining, and regular opportunities for pupils to talk both individually and in groups. It also aims to invest in continuing professional development, with staff working collaboratively to support each other, take risks and be innovative.

Students will learn new concepts and develop their mathematical language, in line with the National Curriculum. New topics and concepts will be introduced, such as: highest common factor, lowest common multiple, equations, arithmetic sequences, triangular numbers, significant figures, accuracy, integer, allied angle, corresponding angle, alternate angle, formulae, term-to-term rule, multiplier, compound measures, congruence, vectors and frequency polygons. Students will learn how to use scientific calculator with a high degree of confidence as this is needed for GCSE. Misconceptions will be identified and addressed using Eedi quizzes that Mathematics Mastery have developed in collaboration with Mr Barton.

How will students learn?

Mastery group together topics from the same areas of Mathematics to be taught across a half term, helping students make connection between the topics. Where appropriate, new concepts being taught are preceded by a review week to recap prior leaning. The cumulative nature of the curriculum also provides students with opportunities to apply previously learnt concepts in a different area of mathematics. The Mathematics Mastery Curriculum has units that usually take 1-3 weeks and up to 6 weeks per half term based on 4 lessons per week. Students will learn through a range of techniques, including visualising using bar models, Dienes blocks, linking cubes and coloured paper and modelling, (I do, we do, you do), in order to develop maths mastery. Each lesson is divided into six parts: - Do now (to access prior knowledge), New Learning with new concepts presented in small steps and scaffolded as required, Talk Task, Develop Learning, Independent Task and Plenary. Teachers will go through examples systematically, gradually taking away the scaffolding with each example, to model these new ideas. Students will learn to become independent learners as teachers engineer success by making each step achievable with ambitious end goals. Dual coding is a key part of successful learning in maths, particularly within topics of statistics, and geometry and measure.

Resources are selective with information and aim to avoid any unnecessary distractions on them, in order that students can focus on what is required. The regular use of retrieval practice will also help inform teaching (see below for more detail). A Glossary is used (in the middle of exercise books) as a tool for the recall of facts, for example students asked to memorise certain facts that will be tested in the first part of the next lesson e.g. prime factorisation topics will require students to recall prime numbers at least up to 50. At the end of lessons, there will be a plenary on the topic, which students need to solve independently to check learning that has taken place. The first term of Year 7 focusses on developing understanding of the axioms and structures of number that are fundamental to Mathematics. This underpins understanding of the algebraic notation developed in this term and in subsequent years. The Mathematics scheme of work is sequenced to provide spacing between topics, for example, in the autumn term students will learn about factors and multiples but will then revisit and build on this further in summer term, learning prime factor decomposition. This ensures that the topic is secure before a further revisit and development in Year 8. Topics are interleaved where possible, with students being shown the links between various topics, for example: students' understanding of fractions, decimals and percentages from KS2 is built upon throughout the year. This is developed more formally in the summer term where time is spent linking different interpretations of fractions and introducing ratio. Students' understanding of fractions, decimals and percentages from KS2 is built upon throughout the year. The spring term of year 7 focusses on geometry, an important area of mathematics for students to engage with. The cumulative nature of the curriculum means that students apply algebraic reasoning in new contexts. Mathematics Mastery also offers Intervention for students finding Year 7 more challenging.

How will students be assessed?

The framework for assessment in Mathematics Mastery is based on Daisy Christodoulou "Making Good Progress?" 2017. This will happen through use of in the lesson resources that are embedded throughout the curriculum and weekly multiple choice Eedi quizzes for regular retrieval practice and revision sessions, termly Eedi assessments and termly and end of year assessments. Students will receive feedback through exit tickets, regular low stakes testing, and individual review of termly formal assessments, regular self-assessment. This will happen approximately once per week and will vary in form; including quizzes, paired quizzes, silent quizzes or the use of knowledge organisers. Retrieval practices are 'closed book', as it is important that teachers find out what students do not know in order to inform their teaching. These tasks will only take up 10 minutes of the lesson and the answers will be displayed, with the teacher targeting specific questions that have caused difficulty or where misconceptions have been identified. Throughout every mathematics lesson, teachers will regularly check for understanding for example through questioning techniques such as no hands up, 'say it again better', no opting out and whole class response (use of mini whiteboards). After every topic, students will sit an open book test, the purpose of which is to give students experience of tackling exam style questions independently as well as to build up confidence. We also aim for these tests to train students to use their exercise books effectively, both in terms of motivating students to make high quality written notes in the lesson as well as create a useful resource for revision. The test will not last the whole lesson and the teacher will go through the test using the visualiser while students mark their answers. The test will be collected by the teacher to identify any common misconceptions that need to be addressed before progressing to the next topic. There will also be several independent closed book assessments spread across the year. Pupils will finish year 7 with a 2 hour end of year assessment.

What is the aim for learners by the end of the year in comparison to the previous year?

Students will have built on learning from Key Stage 2 further developing fluency, mathematical reasoning and competence in solving increasingly sophisticated problems across the NC areas of number, algebra, ratio, proportion and rates of change, geometry and measures, probability and statistics. The amount of time dedicated to studying each area reflects the weightings recommended by Mathematics Mastery experts in line with national curriculum. Across Year 7, there will have been significantly greater emphasis on building independent mathematicians. **Visualising** will have helped students develop their depth knowledge of Mathematics needed for Year 8. For example, students will know how to use **bar models** for Ratio and Proportion, which will help them solve worded questions in year 8 and reverse percentages in KS4. These coherent representations using bar models are embedded throughout the curriculum to develop **conceptual understanding.** Students will be able to make connections and apply their mathematical knowledge wherever relevant in other subjects and in financial contexts.