Mathematics

Curriculum Principles

By the end of their education, a student of mathematics at Dixons Brooklands Academy will:

- know the fundamental skills in mathematics which allow students to understand how to use this knowledge in future learning and employment. These include money management; reading timetables; discovering and understanding patterns in data and being able to solve problems.
- recognise the beauty in sophisticated mathematical methods; be analytical thinkers and have a thirst for mathematical reasoning. On leaving Dixons Brooklands Academy, students will have developed fluency in procedures and be keen problem solvers.

It is the vision of the Mathematics Department at Dixons Brooklands Academy to equip all young people with basic numeracy, problem-solving and logic skills, in stimulating learning environments. These fundamental skills should be both intrinsically mathematical, and essential for everyday life.

In order to achieve a true understanding of mathematics, topics have been intelligently sequenced based on the following rationale:

- the overall aim of the mathematics curriculum is to provide students with the knowledge they need to increase their cultural capital and be successful in their lives beyond the academy. With this in mind, the schemes of work sequence topics in an order closely following that set out by the 'mathematics Mastery Programme'. Adopting a spiral curriculum, in which topic areas are revisited and extended on a yearly basis, this sequence of learning promotes a deeper understanding of the mathematical concepts being taught, both in-line with the National Curriculum and in the wider domain.

- within the classroom, all through, lessons roughly follow a similar lesson format: Do Now, New Learning, Develop Learning, Independent Task, Plenary. In key stage 3, there is more emphasis to develop deeper understanding whilst key stage 4 spend more time on practice and application to promote resilience and independence. Key stage 3 synthesise knowledge learned in a lesson with an exam question and there is a greater emphasis on this in key stage 4 to provide students with applied practice, underpinned by real life contexts. In accordance with the curriculum overview, each key stage promotes a slight variation in pedagogy suitable to the students' developmental stage, whilst continuing to promote ambitious expectations for all pupils and educational equality throughout.

- the concept of interrupting the forgetting process permeates the mathematics long term plan (LTP) and schemes of work (SOW). Interleaving and spaced learning are utilised in several ways. Across each year, new learning is split into units of work, each beginning with quick revision, then focussing on extension and application of similar learning the year before. As a result, students will consistently revisit topics (spaced learning) and interleave concepts throughout their mathematics career. All lessons begin with a 'Do Now', which promotes recall of integral knowledge, along with applied practice, from topics in the previous unit of work, allowing for spaced practice of up to six weeks. In addition, each topic taught has a mini-test and consolidation or extension re-test attached to assess understanding. Staff mark all re-tests and gaps in learning are addressed through global feedback, with opportunity for targeted additional practice. These tests ensure learning is visited repeatedly. Spaced learning through retrieval practice and brain dumps in morning meetings and homework set through the Sparx system, are supplementary ways in which the forgetting process is interrupted, leading to true mastery of the mathematical curriculum.

The mathematics curriculum will address social disadvantage by addressing gaps in students' knowledge and skills:

- the spiral nature of the mathematics curriculum is designed with the most vulnerable student in mind, assuming a basic mathematical understanding from previous learning, each peak builds the students' knowledge. Key stage 3 in particular is used to ensure fluency in fundamental mathematics by closing any knowledge gaps evidenced in assessment, whilst also providing suitable extension.
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- Students in Y7 working below the nationally expected level are immediately targeted for one-to-one, small group or in-class interventions from our subject specialist tutors. Priority is given to students recognised as disadvantaged and topics covered in these sessions are identified to align with our Long Term Plan. Throughout the year, attendance and topics covered in intervention sessions are altered according to mini-test scores, Question Level Analysis from cycle assessments and in-class effective formative assessment. In order to meet the needs of all students, additional staff intervention tutors, are employed to deliver additional small group tutoring to address knowledge gaps. Again, priority is given to disadvantaged students for this additional intervention.

- students with special educational needs or disabilities have additional support. Flexible grouping is used where available to target this cohort to help close any gaps. Such students receive further intervention courtesy of our subject tutors. The topics and students selected for this are reviewed regularly to ensure we reach as many students as possible whilst still providing meaningful support. All students at KS3 access the same curriculum and we have the highest expectations of all. We teach to the top with scaffolding and support for those who need it in order to allow all students to achieve and experience the very best of what has been thought and said.

We fully believe mathematics can contribute to the personal development of students at Dixons Brooklands Academy:

- students are encouraged to develop socially in mathematics lessons through the celebration of making mistakes and setting high expectations helps students to develop listening and speaking skills. Students use peer assessment in lessons to take their work from "good to great." All students are encouraged to develop a high level of oracy by justifying answers, "say it again, better" techniques and choral response for key vocabulary and definitions. Self-awareness is developed through self-assessment, which enables students to have an accurate understanding of their strengths and weaknesses through DIRT tasks, to accept them and the understand how to learn from them.

- developing morality is evident in much of the mathematics curriculum where there is reference to real life contexts and students are encouraged to make decisions thus developing an understanding that certain choices may have different consequences and outcomes. One example where this applies is in percentages where comparing interest rates occurs and the role of 'loan sharks' can be discussed. Additionally, topics such as tracking and how the media use misleading statistical diagrams are also addressed.
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- encouraging students to question how mathematics impacts the way the world works promotes the spiritual growth of our students. Referring to 'big issues' such as the gender pay gap, birth and death rates, gambling through probability and global warming within contextual questions allows students to have a concrete understanding of where mathematics fits into the bigger picture. Teaching a variety of strategies that allow creativity to blossom (i.e. construction and symmetry). PDS lessons take place twice per cycle to help develop students into well-rounded and culturally aware citizens.
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- being a universal language, and having phenomena developed all over the world, lends mathematics to promoting cultural capital. Discussion when introducing many topics, such as place value, time, Fibonacci sequences, Pythagoras and Trigonometry to name a few, allows cultural influences to be explored.

At KS3 and KS4, our belief is that homework should be interleaved-revision of powerful knowledge that has been modelled and taught in lessons. This knowledge is recalled and applied through a range of low-stakes quizzing and practice.

Opportunities are built in to make links to the world of work to enhance the careers, advice and guidance that students are exposed to:

- the mathematics curriculum provides students with opportunities to consider the world of work and how mathematics leads to successful careers. Each Learning Intention has a purpose attached for all students to see and, where relevant, the SoW refers to how the skill in question relates to specific careers or a future life context. For example, when teaching constructions, reference can be made to any form of design work or navigational career. Every unit of work also contains a careers spotlight where students are introduced to a variety of careers, which utilise the learning of the unit. Information about qualifications needed, salaries and career progression are also referenced. Additionally, Careers in the Spotlight slides are a regular feature of maths lessons; indicating a large but not exhaustive list of the many careers mathematics lends itself to.