



Excellence “Bonitas”, Knowledge “Scientia” and Discipline “Disciplina” through mathematics

Mathematics as a subject provides a system for creating abstract models of reality. Systematic examination of the structure of these models helps in beginning to understand the relationships present in our world.

The design of our maths curriculum focuses on number, algebra, geometry and statistics as these are fundamental prerequisites for advanced mathematics studies. To this end, the faculty of the maths department strives to assist every student become fluent in the language of maths; develop competence and confidence in performing arithmetic, algebraic and geometric procedures; achieve a lasting understanding of basics.

Aims

The national curriculum for mathematics aims to ensure that all pupils:

- become **fluent** in the fundamentals of mathematics, including through varied and frequent practice with increasingly complex problems over time, so that pupils have conceptual understanding and are able to recall and apply their knowledge rapidly and accurately to problems
- reason mathematically** by following a line of enquiry, conjecturing relationships and generalisations, and developing an argument, justification or proof using mathematical language
- can **solve problems** by applying their mathematics to a variety of routine and non-routine problems with increasing sophistication, including breaking down problems into a series of simpler steps and persevering in seeking solutions.

Mathematics is an interconnected subject in which pupils need to be able to move fluently between representations of mathematical ideas. The programmes of study are, by necessity, organised into apparently distinct domains, but pupils should make rich connections across mathematical ideas to develop fluency, mathematical reasoning and competence in solving increasingly sophisticated problems. They should also apply their mathematical knowledge to science and other subjects.

The expectation is that the majority of students will move through the programmes of study at broadly the same pace. However, decisions about when to progress should always be based on the security of students' understanding and their readiness to progress to the next stage. Pupils who grasp concepts rapidly should be challenged through being offered rich and sophisticated problems before any acceleration through new content. Those who are not sufficiently fluent with earlier material should consolidate their understanding, including through additional practice, before moving on.

Use of IT tools

In Maths Department we believe that calculators should not be used as a substitute for good written and mental arithmetic. We also believe that this generation is in need of IT tools since they support students' conceptual understanding and exploration of more complex number problems, if written and mental arithmetic are secure. In our department, teachers use their judgement about when IT tools should be used. We are lucky to have I-Pads to use in our classrooms. We have the allocated time to use our I-Pads by school. We encourage students to turn I-Pads into educational tool not just to update their status in Facebook or add a new photo on Instagram!

For key stage 3 we have our innovative online learning platform: **Collins Connect**. It is designed to enable our students by providing a wealth of content and interactive activities which works beautifully across all devices including their tablets. It will support independent learning and home/school links.

Spoken Language of Mathematics

The national curriculum for mathematics reflects the importance of spoken language in pupils' development across the whole curriculum – cognitively, socially and linguistically. The quality and variety of language that pupils hear and speak are key factors in developing their mathematical vocabulary and presenting a mathematical justification, argument or proof. They must be assisted in making their thinking clear to themselves as well as others and teachers should ensure that pupils build secure foundations by using discussion to probe and remedy their misconceptions. Knowledge is not enough for success; you need to be able to present your thought and ideas in life. With the help of spoken language skills, our students will be ready to tackle the difficulties in life.

Please click on the download icon to download the **Long Term Plan (LTP)** and **Medium Term Plan (MTP)**. Please note that Key Stage 3 includes Year 7 and 8 whilst Key Stage 4 includes Year 9, 10 and 11.



Key Stage 3 Mathematics LTP



Key Stage 3 Mathematics MTP



Key Stage 4 Mathematics LTP



Key Stage 4 Mathematics MTP

CURRICULUM

The programmes of study for mathematics are **not** set out year-by-year for key stages 3, 4 and 5. Within each key stage, our department have the flexibility to introduce content of a topic of Mathematics earlier or later than set out in the programme of study by government. In addition, we introduce key stage content during an earlier key stage, if appropriate.

In our department we experience that students are all different and they learn at their own pace. At the end of year 7, the Mathematics Department does an assessment to embark the sets. There are usually two tiers for each year group. Students will be allowed to move to a more appropriate Maths class during the term. We have a continual assessment programme which allows us to closely monitor the progress of all students as they progress through their courses. Attendance, effort and attitude are the three key ingredients to success.

We would kindly like to remind our parents that good test results give students a greater choice of study in subsequent years and improve their employment prospects. The parents get the letter informing the transition between the sets and if necessary student is placed in a class appropriate to their ability. The class teacher identifies one or more of the following reason(s) for changing the Maths class of the student:

-  Not achieving minimum competence in assessments
-  Pupil will benefit from a slower pace of learning
-  Pupil is not completing homework regularly
-  Pupil does not bring basic equipment to class
-  Poor attendance
-  Pupil is not making the required effort
-  Pupil is disruptive in class

The class teacher has identified the following reason(s) for changing the maths section of this student:

-  Achieving maximum grade in assessments
-  Student will benefit from a faster pace of learning
-  Student is completing homework regularly as well as doing the extension work
-  Excellent attendance
-  Student is above his/her targets and making the required effort for the next set

In Mathematics, we believe in cross curricular teaching. Here are some examples.

-  the pleasures and rhythms of counting – “Music is the pleasure the human soul experiences from counting without being aware it is counting.” Leibniz
-  history of early beginnings of angle, number, coordinates... the recognition of other powerful cultures through the medium of mathematics
-  transformations through multicultural themes – buildings, carpet design...

- 🍷 stories about pi, Pythagoras, life of mathematicians who achieved what our students can one day...
- 🍷 encouragement of the wonder and awe of the beauty of mathematics, the simplicity of mathematics, the complexities of mathematics, the particular qualities of mathematics...
- 🍷 activities emphasising other cultures eg Bengali numbers, Rangoli patterns...
- 🍷 making sense of the world around us...
- 🍷 the dangers of money, the Lottery, the ethics behind advertising...

This is how we teach Mathematics in NLGS

- 🍷 exploration, investigation...
- 🍷 enjoyment of success → achievement → coping with short term failure and a longer term realisation of each student's strengths and weaknesses
- 🍷 encouragement of self-discipline
- 🍷 problem solving approach – seeking systematic order to solve a problem, breaking a task down into more manageable parts which we have weekly functional maths lesson through whole curriculum.
- 🍷 critical thinking – skills of analysis, evaluation and reflection
- 🍷 our students get the equal opportunity to prove themselves to achieve higher targets; we encourage them to take UKMT individual maths challenges, team challenges, and British Mathematical Olympiad
- 🍷 in individual, pair, group, whole class work and the importance of participation in these

This is how we work as a department

The teacher as a good role model will:

- 🍷 value each contribution – insist students listen and respect each other
- 🍷 prepare lessons well to meet student needs – if they feel valued, they are more likely to value us
- 🍷 get to know each student well
- 🍷 create the atmosphere and the opportunity for them to ask questions
- 🍷 answer their questions – or students will not ask any and their education will be that much poorer
- 🍷 praise and encourage
- 🍷 build their confidence
- 🍷 have high expectations of tolerance, behaviour, work output...
- 🍷 promote the school's Shared Values

Our department offers our students many opportunities

- 🍷 extracurricular activities e.g. UK Schools Mathematics Challenges
- 🍷 In our Mathematics curriculum, we have scheduled non-verbal reasoning, mathematical reasoning and problem solving sessions.

- 📌 **Maths Week** for the whole school
- 📌 **Mathematics Surgery Sessions** for students who are finding some topics difficult
- 📌 **Maths intervention classes** for each key stage
- 📌 **GCSE to A Level bridge course.** As some students will be taking Mathematics GCSE exams at the end of Year 10 we are introducing a bridge course between GCSE and A-Levels if students are planning to study A-Level Mathematics. Our aim is to ensure students are fully prepared for A Level Maths with practice in essential and tricky topics before they start their A level studies. This will give them a chance to prepare students for some of the skills required at A Level with a focus on applications of mathematics. We will be following Bridging GCSE and A Level Mathematics which is an ideal resource to be used in the classroom and for independent study.
- 📌 lively but minimalist mathematics classrooms with interesting wall displays, library areas, mathematical magazines for students...
- 📌 student/parent to teacher suggestion box where our students can make suggestions