Maths Curriculum Plan

Intent: We aim to provide opportunities for students to develop their mathematical knowledge, skills and understanding so that they can be confident in solving problems and communicating logical arguments. We need to help students understand that what motivates maths is the problem to be solved, and that the way in which they do this, including how they work towards certainty themselves and also convince others, is the key habit of mind that a mathematical education brings. This can be rewarding in its own right; maths for the sake of maths. But it is also what makes it crucial in supporting further study, from physics to psychology. It helps students to make good decisions in their professional and personal lives, so that they develop the financial literacy and mathematical common sense to take well informed decisions. This mathematical education should give the tools to evaluate arguments, avoid big mistakes and identify misleading information.

Year	What will students learn?	Rationale	How will students be assessed?	Disciplinary knowledge, enrichment and links to the real world
7	Students will study a number of topics from the four main areas of maths (see the schedule below). We concentrate mainly on the topics already met in primary school (place value, four operations of addition/subtraction/ multiplication/division, negative numbers, fractions) and introduce new ideas which will be central to secondary maths, such as algebraic simplification.	We know that students come to secondary maths with a range of experiences from primary school. Students achieving the 'expected standard' in their SATS in the last set of exams needed to score 51%. This means that there is a lot on the primary curriculum that might have been covered, but is not secure. Our year 7 curriculum therefore revisits the key ideas that were covered at primary school to ensure that students do not have gaps in their knowledge. We are alert to the fact that students might already have a good understanding of a topic and they might need moving on more quickly. Where this happens, we are keen to stress to students that they have always got more to learn on any topic. For example, area of a rectangle is quite a simple topic on one level, yet there are problems on it	Diagnostic test at the start of year 7, to see what has been remembered from primary school Monthly PowerPoint tests to get into the habit of revising previous topics. End of year exams in number (similar to the start of year test, so that we can look at progress) and a second paper with questions on the topics	Rich tasks are identified for each topic, so that students have experienced of the processes used by practicing mathematicians. Including, posing questions, making conjectures, building an argument to convince yourself and others. The introduction of key representations (negative number counters and algebra tiles) supports the development of reasoning

		that would make a mathematician have to think very hard. This is a common theme of our hierarchical curriculum and the way we explain it to students; many topics have the same name as ones you have done before, but the ideas are more complicated and advanced. The other area of focus for year 7 is helping students to develop their reasoning, in order that they can achieve the level of certainty that a mathematical approach provides. This is done through introducing new models (for example, two sided counters) and by explicitly modelling and practicing the process of giving precise reasons.	studied throughout the year.	which is the key aim of the subject. Students work on problem solving as they prepare for the UK junior maths challenge and team challenges. Students discuss links to careers in lessons.
8	Students continue to follow a schedule with a particular focus on equations, negative numbers and fractions.	The topics of; negative numbers, fraction arithmetic, equations and algebraic manipulation are key to success with higher level maths. We find that students are better prepared for GCSE and beyond if they are confident with these areas. Fluency with these also helps students to apply their knowledge to real world applications (such as financial maths) and to other subjects. Those with deep understanding can focus on the complexities of the applications without being overloaded. Those with weaknesses in the underlying maths are not able to do this. We also find that many students think that certain bits of maths (algebra particularly) are too difficult for them. By really focusing on these topics in year 8, we show them that they can achieve a level of understanding they didn't think possible. Their confidence increases further when they can tackle higher level topics with fewer difficulties, from more complex algebra to harder graphs work in GCSE.	Monthly PowerPoint tests to get into the habit of revising previous topics. End of year exams in number (similar to the end of year 7 test) so that we can look at progress) and a second paper with questions on the topics studied throughout the year.	As for year 7, above.

| 9 | Students follow a schedule of a more varied set of topics compared with Year 8. Each week is a new topic, with sequencing to promote connections and development of key mathematical concepts. Some themes (e.g. angles) may appear multiple times with time and space between them. | With a more secure foundation of number and algebra from Year 7 and Year 8, students are well placed to be successful on a wide range of topic areas.
The rationale for the one-week topic block is 3-fold:
- It allows time and space for students to develop their understanding between topics that link closely or where basic skills are needed to solve more difficult problems (for example, students working with the equation of tangents to circles need to fluently find equations of lines; these skills can often take 1-2 years to mature) This development will ultimately be achieved through regular quizzing (and activities that teachers plan in response to areas of weakness noticed in the quizzes)
- It minimizes the disruption to learning for student that miss a lesson.
- It can help students engage because there are more 'fresh starts' in their learning (if for example a s student finds a topic difficult, they can become demotivated by week 2 or week 3 if blocks of learning are too long)

For each topic, examples of questions students should be able to solve are given along with a 'pre-test' that staff can use formatively. | Ongoing teacher assessment from retention quizzes

Written assessments in:
October
February
So that teachers and the Head of Department can monitor progress and retention

Summative assessment at the end Year 9 to support curriculum planning for Year 10 | Students discuss links to careers in lessons.

Students work on problem solving as they prepare for the UK intermediate maths challenge and team challenges. |
| 10 | Students continue to study a wide-ranging schedule of topics, which begin to explore key concepts and problem-solving techniques assessed at GCSE.
There are less topics names on the schedule to allow for staff to have time to respond | Through the regular quizzes, gaps in prior knowledge and skills might be identified. For example, the class may be about to work on the $y = mx + c$ topic but the teacher discovers through a quiz that their understanding of basic graphs is not secure. The 'blanks' in the schedule allow the staff to respond to the needs of the class whilst keeping up with the overall curriculum plan. | Ongoing teacher assessment from retention quizzes

Mid-year assessment to give students experience of GCSE style assessment. | As for year 9, above. |

	to the needs of the class, which could include reteaching ideas that students are yet to grasp.		Summative assessment at the end Year 10 to support curriculum planning for Year 11 *when timetabling consistency of teachers from Year 10 to Year 11 is the number one priority.	
11	During the Autumn Term, students in Year 11 complete the majority of new content in lessons with a focus on application to problem solving and reasoning. The final sequencing of topics is formed by the teacher, based on their knowledge of progress to the end of Year 10. From mid-January (and not before) students begin a weekly activity of working on a past exam paper – this is supervised for 40 minutes in lesson, in test conditions.	After 4 years of study, the intent is to give students the best experience in developing their ability to problem solve and communicate to the standard required at GCSE. We delay the use of practice papers for two reasons: 1 – Too long a run in may lead to dwindling engagement 2 – An over focus on 'exam technique' may hamper a richer understanding of the content. The rationale for the using lesson time to work on practice papers is: - Due to the wide-ranging circumstances of students from such a diverse background. For example, some students travel for over 2 hours and may not have the same level of support at home. - To give teachers (who will assess the work) assurance that it's under test conditions	Ongoing teacher assessment from retention quizzes Year 11 mock exam (December) March mock Weekly practice paper work (this may only be part of an exam paper, or some selected questions)	As for year 9, above.
12	During the first half term, students have an in-depth study of key concepts: - Quadratics - Simultaneous Equations - Indices	The three key concepts are so critical to the success of A Level study and we appreciate that some students have a starting point from which their GCSE knowledge, skills and understanding is not 100% secure. This initial focus helps the weakest students have the best chance of successfully transitioning whilst the most able can be stretched using UKMT material.	Weekly algebra tests (10 mins) in term 1 so that staff can monitor the fluency of key skills October assessment – this helps us as a department	Students work on problem solving as they prepare for the UK senior maths challenge and team challenges.

	We use our own developed 'key concepts' materials that go into more depth than the A Level textbook. Students also study the other areas from the AS level course in pure, statistics and mechanics. Input and support is given to develop study skills including best ways in which to use the 'solution banks' and seek support when struggling	The latter helps to reinforce what is needed for the top grades. It is not enough simply to carry out techniques; these often need to be applied in subtle ways and in unfamiliar contexts. The sequencing does not always match the textbook. Rationale for this is: - Considerations of levels of engagement (e.g. Binomial expansion in first half term, so that students have something brand new that is accessible) - Certain larger topics (e.g. trig and calculus) may need space and time for consolidation mid-way through the textbook chapter. This can support intervention, assessment and consolidation.	to identify students that need early support. December assessment – all pure content covered so far. Weekly Trig and Calculus Tests (10 mins) during Spring Term End of Spring 2 term: Calculus assessment and Statistics Assessment Year 12 Mock – June To give a measure of progress towards all of AS Level work. This can inform summer intervention to help students prepare for Year 13.	
13	Students continue their study of A Level topics in Pure Maths, Statistics and Mechanics. The textbook is used for sources of practice questions, but sequencing of topics is done by the team.	Similar to in Year 12, some topics are sequenced in a way that creates time and space to support long-term retention of key concepts (for example, the long and detailed chapter on differentiation) Use of homework and starter activities supports the students in preparation for the exam (long-term memory)	Key topic tests throughout the year (one per half term) Year 13 Mock – February Give a measure of performance and highlights revision needs for students April mock	