Richard Lander School

Statement of Intent

Every subject maximises the potential of each student, enabling them to become successful learners, confident learners and responsible citizens. We will ensure that all students are well prepared for life and work and are keen to make a positive difference to the world they live in.

Mathematics

Intent *Explain what is distinct about Maths and why it is important for our students to study it.*

We believe that our students deserve a vibrant, ambitious and engaging mathematics curriculum; rich in skills, concepts and knowledge that challenge and support all learners to fulfil their potential and be the best they can be. The maths curriculum aims to stimulate the curiosity of students by setting increasingly complex problems, helping them to become confident in solving all manner of mathematical problems systematically, logically and in differing contexts. In doing so, students will develop independence and be able to apply their thinking skills across the wider curriculum.

Skills *Detail the wider skills that Maths can deliver to our students, helping to prepare them for leaving RLS.*

Maths is more than arithmetic, algebra or memorising formulae; it's about being inquisitive, problem solving, deducing truth, working logically, creating theories, exploring puzzles, questioning, forming hypotheses and conjectures, structuring arguments, discussing methods and exploring alternative ways of working. Developing these skills in maths enables our students to apply them to all their other subjects. In addition, practising and honing these techniques throughout their time at RLS will help our students grow in confidence, self-esteem and maturity. Acquiring these skills in maths helps to produce well-rounded young adults who are capable of making an active contribution to the world around them.

Purpose of Study *Look at the Maths programmes of study in the National Curriculum and define what this means for our students and their future*

Mathematics is a creative and highly interconnected 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.

Aims *Look at the Maths programmes of study in the National Curriculum and define what this means for our students and their future*

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

- become fluent in the fundamentals of mathematics, including through varied and frequent practice with increasingly complex problems over time, so that students develop conceptual understanding and the ability to recall and apply knowledge rapidly and accurately
- 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

Rationale *Explain Maths' rationale for the sequencing of the Maths curriculum. Why are KS3 and KS4 taught in the order that they are eg use of interleaving etc*

A single mathematical phenomenon interlinks with many others.
Consider the rectangle. The concept of perimeter and area spring immediately to mind, then there are units of length and area, converting between these units and the relationship between square units and linear units. The metric system, the imperial system and their origins. Or perhaps instead of taking that route, you could simply cut the rectangle in half through its diagonal and explore the world of mathematics associated with triangles. All of this can be connected back to the rectangle. We want our students to be able to see these sort of links and will explore these throughout the 5 years at Richard Lander School.

However, in order for our students to become fluent, reason mathematically and solve problems, we believe that mathematics needs to be loosely broken into topic areas that are cyclically revisited over the course of the 5 years. During the 5 years, students will access increasingly complex material and concepts, become fluent in its associated skills and procedures and learn how to solve related problems that connect maths to real life problems and other maths topics.

Through thoughtful pedagogy and careful planning towards individuals' needs, students will experience those Eureka moments in maths lessons upon learning new skills. Unfortunately, the sieve-like nature of the human brain means that what is understood in one lesson may not be remembered later on. Through planning engaging lessons, carefully sequenced topics, planning realistic and useful homework tasks, summative assessments and using formative assessment techniques, we believe we have systems in place that will maximise all students' chances of success in Maths at Richard Lander School.

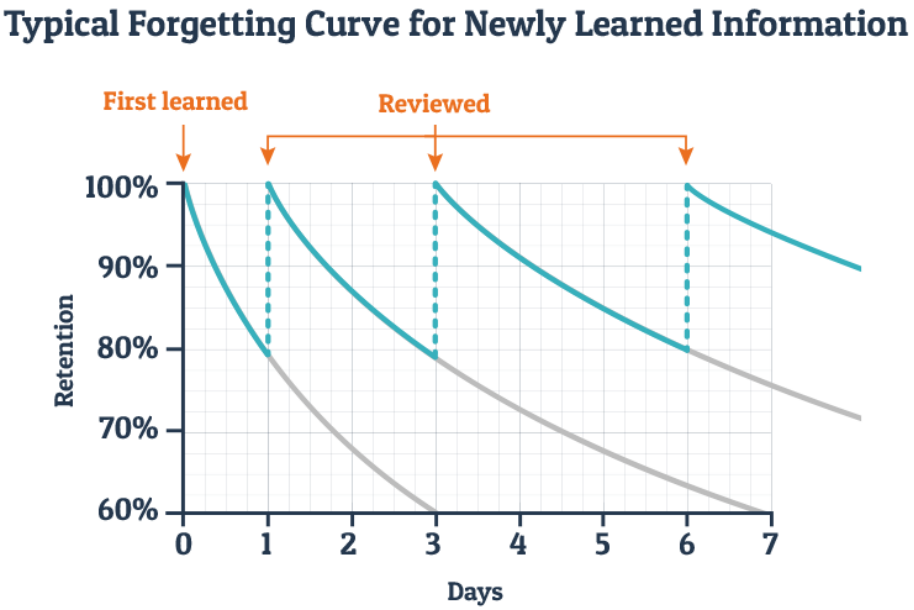
<u>The key principals of our 5-year plan,</u>

High Quality teaching and learning
A classroom teacher must prioritise the most impactful elements of their role. Matched only by creating positive working relationships with our classes, planning is critical to the success of a lesson. Whilst we subscribe to several excellent resources, the most important resources we have are our maths teachers.

Creating time to plan:
No teacher here is isolated. Whilst a lot of collaboration occurs through the friendships within the department and the time we spend together during PPA and non-contact periods, we also ensure that directed time is spent planning collaboratively with teachers of similar sets sharing resources and co-planning.

Sharing good practice:
During department meetings we will often discuss the pedagogy associated with an upcoming topic. For example, how should we go about teaching solving equations with the unknown on both sides? How do we go about teaching standard form to a mid-ability set compared to a high ability set?

Recalling skills and procedures
The ability to remember work hugely increases students' confidence in maths and is therefore an important focus for our continuing development as a department.
The Ebbinghaus forgetting curve is at the centre of our strategy for helping students to recall what they successfully understood as a result of a well-planned and well-delivered lesson.



Like it or not, our students' success at secondary level Maths will come down to their performance in 3 high stakes GCSE exams at the end of their 5 years at Richard Lander School. With a huge amount of content to remember, it is therefore crucial that students are helped to remember what they have learned.
The Ebbinghaus forgetting curve shows how strategically placed reviews of learning can help strengthen students recall. We put this idea into practice in the following ways:

- Starter booklets. Almost every maths lesson begins with students answering up to 5 questions in their starter booklet. This booklet contains questions from the topics studied during the last half-term. These questions will be similar from lesson to lesson with slight changes being made or the difficulty level increased. A maximum of 10 minutes should be spent at the beginning of every lesson, although this may be more at the start of a term as students reacquaint themselves with work students some 6-8 weeks ago. These starter booklets also ensure that all lessons start at a purposeful pace.
- Day to day planning. Students will be quizzed on their recall of the work covered in the previous lesson. This may take place after the start booklet.
- Unit assessments. Unit assessments take place approximately every 3-4 weeks and is the first review point of all the skills learnt in that topic.

Parallel Schemes of work

As a cohesive department team, we are always talking about our subject. Conversations flow over lunch, at break and of course in more formal settings such as meetings and inset sessions. The need for this cannot be overstated and with this in mind, we wanted to make sure that for each individual year group, each class learns about the same topic at the same time. Our more-able students will learn this topic at a greater depth whilst students in need of support will become more fluent with the basic concepts.
Not only does this principle facilitate the sharing of resources and ideas between teachers, it also creates corridor conversations between students of different classes.

Pearson's KS3 and GCSE programmes of study ties in very nicely with our principles. The Key Stage 2 curriculum is revisited but not re-taught. There is continuity between techniques used at Key Stage 2 such as bar models. Topics are revisited periodically during the three KS3 years and then again in the two GCSE years. The sequencing of topics in both the KS3 and GCSE programmes, carefully considers prerequisite skills. For example, Pythagoras' theorem is covered in the Spring term of year 9. The prerequisite skills to this topic include solving equations and working with indices, both of which are covered and revisited in year 7 and 8. At KS3, the Maths progress programme is in keeping with our principle of teaching the same unit to all students in a

year group at the same time and in KS4 we have achieved the same goal albeit with a slight alteration to the order of the topics.

The KS3 and 4 textbook resources, whilst mainly used as a guide, provide an excellent variety of questions testing students' ability to answer questions requiring them to recall knowledge, reason mathematically and solve problems in a variety of contexts.

Making links and enrichment

Carefully teaching students new skills and using assessment information to inform planning are important elements of all classes' weekly routines. Another crucial element to teachers' planning is ensuring that we build in problems that show links between the topic being studied and other areas of both the maths curriculum and the outside world. For example: Teaching proportion can be easily linked to ratio problems and equations of straight line graphs but you could also look at the global dimension and look at proportions of ethnicity in the world and the distribution of global wealth. Maths can be a tool to explore equality and inequality.

Summative assessments

Students in all year groups are assessed at the end of each unit. In years 7-9, students termly progress reports are based on their average performance on the unit assessments covered up to that point. In years 7-9, students also have an end of year test, assessing them on the 9 units covered to that point. This along with their performance in the unit tests will determine how well they have progressed. We will use the same assessments year after year, making it possible to compare year groups. All unit tests are taken from the Pearson Maths progress programme but the end of year tests are created using the assessment builder tool for the KS3 Pearson Maths progress programme as the assessments provided by Pearson do not fit with the school's reporting structure and do not fully take in to consideration the abilities of our most and least able whose assessments provide appropriate challenge and scaffolding respectively. The bespoke nature of these assessments also ensures a healthy balance of skills-based, reasoning and problem solving questions.

As of 2021, the Maths department are using the Pearson Step system to measure attainment and progress at KS3. This is a criteria based system relating to the students' ability to perform a task or demonstrate a skill. Students will learn of which 'Step' they are on and more importantly, by how many steps they have progressed since the start of year 7. From our early observations, this acts as a motivator to our students. This system also seamlessly links with the way in which progress is reported home.

At Key stage 4, Our termly assessments take the form of past exam papers, with students being able to see their understanding grow over the two years whilst honing their exam technique and familiarising themselves with the exam format which we believe will remove some of the anxiety associated with the pressure of exams.

Following each termly assessment, teachers identify collective and individual areas of strength and weakness and plan an initial DIT (Directed Improvement Time) lesson whereby students improve on the questions they did not successfully answer in the assessment. Whilst this goes some of the way to 'closing the loop' these common areas of misconception will be revisited in subsequent lessons. This of course links in with our *recalling skills and procedures* principles outlined earlier. In addition to this, year 11 students are set homework tasks relating to quick fix topics identified from their PPEs.