



Curriculum Statement

Mathematics Department
Ranelagh School

For the Spirit that God has given us does not make us timid; instead, his Spirit fills us with power, love and self-control

2 Timothy 1:7

The Mathematics Department at Ranelagh School challenges students to be the best they can be at mathematics by embedding the core values of the Ranelagh School Learner Profile:

- **Confidence** – Students who are self-assured are more likely to take mathematical risks, see mistakes as learning opportunities and be open to new learning experiences. They have self-belief so that even when learning is difficult they are willing to tackle complex problems.
- **Resilience** – Students are able to keep learning even when they find mathematics difficult. They show stamina when they need to work for long periods on challenging problems, knowing that their perseverance will aid success.
- **Curiosity** – Students who are keen to enquire will ask mathematical questions and have a genuine interest to learn more. They are inquisitive, so work hard on further developing their skills and knowledge. They are more likely to understand their own mathematical abilities, interests and future aspirations.
- **Creativity** – Students use inventive, resourceful and original ways to learn mathematics. Mathematical projects such as “ping pong packaging” and “curve stitching” produce outcomes that demonstrate their ingenuity and imagination.
- **Empathy** – Students listen, understand and learn mathematics from others as well as their teacher. Team work is valued; they show warmth, humour and positivity when collaborating effectively with others.
- **Independence** – Students are self-motivated, they understand how to learn mathematics and can develop a plan to master a topic. They have self-belief, can access resources and know how to learn successfully beyond Ranelagh.

“It is better to understand a little than to misunderstand a lot”

“The power of mathematics lies in its universality and the framework it provides to interact with the world”

We believe that students deserve a mathematics curriculum that:

- Is taught by specialists through carefully crafted lessons
- Is challenging while being accessible through carefully pitched activities
- Is aspirational while attainable through structure and high expectations for all
- Is rich in depth and breadth while appropriate through our knowledge of their prior understanding
- Ignites curiosity through our passion for mathematics and our intelligently planned questioning
- underpins everyday life and future employment through application
- graduates in depth appropriately through Year 7 to 11

Our mathematics curriculum will give students opportunities to:

- develop resilience through problems that are a ‘manageable challenge’
- develop confidence and independence through careful scaffolding of learning and a safe learning environment
- become fluent in the fundamentals of mathematics, that is not “just for Christmas” but for life
- develop the ability to recall and apply knowledge rapidly and accurately with conceptual understanding
- have the time to think deeply, discuss and argue about mathematical ideas
- reason mathematically by following a line of enquiry, conjecturing relationships and generalisations
- develop an argument, justification or proof using mathematical language
- develop problem solving skills by applying known mathematics to a variety of routine and non-routine problems with increasing sophistication when they are ready
- take risks in a safe learning environment with no fear of failure
- build knowledge and skills year on year
- understand what they have mastered and how they need to improve, through formative assessment and teacher verbal feedback

*We have a responsibility to teach mathematics well ... “**mathematics is the language in which god wrote the universe**” ... Galileo Galilei*

Implementation of the curriculum is through a pedagogy underpinned by:

- A spiral curriculum basing future teaching on the building blocks previously learned
For example the topic of Mensuration:
Year 7, 2-D mensuration → Year 8, 3-D Mensuration → Year 10, complex and compound shapes in both 2-D and 3-D → Year 11, multi topic problems including mass, density, cost or bounds in mensuration problems
- Specialist teachers delivering a subject they love, continuing their own CPD through sharing good practice within the department, amsp courses and our own Maths Knowledge Network
- Setting based on current mathematical ability. Students are placed in sets after half term in year 7 with placement reviewed at least once per year as deemed necessary
- A two-year KS3 course that follows the National curriculum with a SoW adapted by specialist teachers to serve the needs of students with varying prior attainment. HPA students are given opportunities for enrichment within topics and entry in UKMT Challenges. LPA students concentrate on securing the essential building blocks within topics. SEND and PP students are supported through quality first wave scaffolding in lessons, 1-to-1 and small group support
- A three-year GCSE course that re-visits previously learned topics to fix in long term memory whilst layering increasingly complex topics.
The course finishes its first learning during the Autumn term of year 11 leaving time for revision, remediation and enrichment for A level as appropriate to the set
- A mastery approach allowing time for topics to marinate
In increasing depth through KS3 to KS5 every topic is tested 'in isolation' at the end of the topic, allowing students to identify misconceptions and celebrate understanding
Topic testing involves:
"pre-test topic practice" → "post-test repair" using resources that support and enhance independent learning
- Exchanging questions and ideas, which we consider to be a valuable aspect of working mathematically
Good questioning should be at the heart of mathematics lessons and oral participation is encouraged
- Variation to develop both holistic understanding and procedural fluency through repetition of key facts to free up working memory
If students do not understand a concept, there is no guarantee they will understand it any better the second or third time if it is delivered in the same way. The use of games, murder mysteries, tarsia jigsaws and projects bring variety to learning mathematics
- Feedback that addresses misconceptions promptly
We learn by studying our mistakes and misconceptions, and distinguishing between the two
Oral questioning and remediation of classwork errors within the lesson, together with formal end of topic tests and multi topic exams provide opportunities for developing skills and understanding

Year	Autumn Term	Spring Term	Summer Term
7	<ul style="list-style-type: none"> ☞ Multiples factors and primes ☞ Angles and Properties of Shapes ☞ Construction ☞ Negative Numbers – Add and subtract ☞ Ratio and proportion ☞ Perimeter and Area 2-D only 	<ul style="list-style-type: none"> ☞ Introducing Algebra - substitution ☞ Sequences ☞ Straight Line graphs; horizontal & vertical ☞ Statistics –including project ☞ Mental Calculations ☞ Written Calculations 	<ul style="list-style-type: none"> ☞ Decimal calculations ☞ Using a Calculator – more buttons! ☞ 3-D drawings, Plans and elevations ☞ Set Theory and Venn Diagrams ☞ This term includes projects to enhance problem solving.
8	<ul style="list-style-type: none"> ☞ Number work - Problem solving ☞ Fractions, Decimals ☞ Angles and polygons ☞ Probability ☞ Percentages ☞ Transformations 	<ul style="list-style-type: none"> ☞ Negative Numbers – multiply and divide ☞ Equations ☞ Formulae ☞ Statistics – including project ☞ Area and Volume 3-D 	<ul style="list-style-type: none"> ☞ Straight Line graphs – $y=mx+c$ ☞ Area and Volume project ☞ Growth and Decay ☞ Vectors ☞ Curve stitching project ☞ Similar triangles ☞ This term includes projects to enhance problem solving
9	<ul style="list-style-type: none"> ☞ Compound measures ☞ Probability ☞ Angles ☞ Algebraic expressions 	<ul style="list-style-type: none"> ☞ Calculator use ☞ Sequences ☞ Coordinates and Graphs ☞ Linear equations (Including simultaneous) 	<ul style="list-style-type: none"> ☞ Formulae ☞ Multiples, factors, primes and roots ☞ Standard form ☞ Maps Scale drawing and Bearings ☞ Plans and elevations ☞ Compass constructions
10	<ul style="list-style-type: none"> ☞ Pythagoras' theorem ☞ Trigonometry ☞ Fractions, Decimals and Percentages ☞ Perimeter Area and Volume ☞ Inequalities 	<ul style="list-style-type: none"> ☞ Transformations Vectors ☞ Number operations ☞ Ratio and Proportion ☞ Estimation and Bounds ☞ Numerical methods 	<ul style="list-style-type: none"> ☞ Statistics ☞ Non-linear graphs
11	<ul style="list-style-type: none"> ☞ Topics in bold are Higher tier extension topics ☞ Solving Quadratic Equations ☞ Simultaneous Equations with Quadratics ☞ Transformation of graphs ☞ Proportion ☞ Revision and Enhancement of Year 9 topics 	<ul style="list-style-type: none"> ☞ Revision and Enhancement of Year 10 topics 	<ul style="list-style-type: none"> ☞ Final exam preparation

A level Mathematics

We understand that we cater for two camps within the same classroom- Students choose A level Mathematics because they enjoy it and excel at it or because they need it to support a future career.

We expect at least a Grade 6 at GCSE with strong skills in algebra or we are setting them up for failure.

Before the start of the course students are provided with resources to enable them to begin the course confidently, a basic skills entry test is given within the first week to ensure suitability and where there is doubt after school support is put in place.

For all KS5 courses topic assessments made from past paper questions ensure students know what they must work on and indicate the likely grade outcome. Review sheets for each topic enable students to remediate and strive for mastery

Students receive 9 hours of teaching fortnightly, split between two teachers covering both areas of applied mathematics

A level Mathematics programme of study- KS3 and KS4

Year	Autumn Term	Spring Term	Summer Term
12	<ul style="list-style-type: none"> Indices and Surds Proof Equations and Inequalities Quadratic functions Coordinate geometry – straight lines Coordinate geometry – circles Binomial expansion Algebraic fractions Factor and remainder theorem 	<ul style="list-style-type: none"> Curve sketching Transformations of graphs Trigonometry Differentiation Integration Exponentials and Logarithms Vectors Mechanics – Kinematics, SUVAT Statistics – Collecting Data Statistics – Representing data Statistics - Interpreting data 	<ul style="list-style-type: none"> Mechanics – Forces Mechanics – Dynamics Mechanics - Moments Statistics – Probability Statistics – Hypothesis testing
13	<ul style="list-style-type: none"> Further Algebraic manipulation Sequences Trigonometric Identities Radians Further Differentiation techniques 	<ul style="list-style-type: none"> Further Integration techniques Differential equations Numerical methods 	Final exam preparation

Further Mathematics

This course is taught separately with the A level exam taken at the end of Year 12. Students receive 18 hours of teaching fortnightly