MATHEMATICS DEPARTMENT CURRICULUM STATEMENT – 2024-5

INTENT:

Our aim in the Mathematics Department at GWA is to guide and support the growth of confident and competent mathematicians. A firm basis of our development of confident and competent mathematicians is routed in providing students with good procedural skills, conceptual understanding and providing them with opportunities to develop outstanding mathematical vocabulary. Providing pupils with a high-quality maths education not only allows proficient development of skills and language development, but also giving pupils the opportunity to make the links between content they are studying and other areas of the subject and, where appropriate, to content in other subjects.

We strive to ensure pupils are equipped with the skills to be numerate in their everyday lives while also having a love of the algorithmic nature of mathematics and solving abstract problems that will ultimately lead to the further study of the subject. In our lessons we emphasise the importance of how and why we reach an answer, rather than simply just the answer itself.

We are passionate in our support of the school's overarching vision; for students to be ACE. We focus on Achievement, supporting students to make rapid progress from every starting point and we develop this through showing that getting things incorrect ultimately leads to learning; on Care, encouraging students to lead happy, safe and successful lives – particularly through supporting them to deal with situations where they do not know to approach or answer a problem; and on Excellence, supporting students to be truly aspirational and explore the enjoyment of mathematics that comes not from finding maths easy but enjoying how difficult it can be.

Key Stage 3

Our Key Stage 3 provision is allied to the National Curriculum in England in its aims to promote the fluency of procedural mathematics, making generalisations through reasoning mathematically and solving non-routine problems.

This means that they will be able to:

Develop fluency

♣ consolidate their numerical and mathematical capability from key stage 2 and extend their understanding of the number system and place value to include decimals, fractions, powers and roots

♣ select and use appropriate calculation strategies to solve increasingly complex problems

♣ use algebra to generalise the structure of arithmetic, including to formulate mathematical relationships

♣ substitute values in expressions, rearrange and simplify expressions, and solve equations

♣ move freely between different numerical, algebraic, graphical and diagrammatic representations [for example, equivalent fractions, fractions and decimals, and equations and graphs]

♣ develop algebraic and graphical fluency, including understanding linear and simple quadratic functions

♣ use language and properties precisely to analyse numbers, algebraic expressions, 2-D and 3-D shapes, probability and statistics.

Reason mathematically

♣ extend their understanding of the number system; make connections between number relationships, and their algebraic and graphical representations

♣ extend and formalise their knowledge of ratio and proportion in working with measures and geometry, and in formulating proportional relations algebraically

♣ identify variables and express relations between variables algebraically and graphically

♣ make and test conjectures about patterns and relationships; look for proofs or counterexamples

♣ begin to reason deductively in geometry, number and algebra, including using geometrical constructions

♣ interpret when the structure of a numerical problem requires additive, multiplicative or proportional reasoning

♣ explore what can and cannot be inferred in statistical and probabilistic settings, and begin to express their arguments formally.

Solve problems

♣ develop their mathematical knowledge, in part through solving problems and evaluating the outcomes, including multi-step problems

♣ develop their use of formal mathematical knowledge to interpret and solve problems, including in financial mathematics

♣ begin to model situations mathematically and express the results using a range of formal mathematical representations

♣ select appropriate concepts, methods and techniques to apply to unfamiliar and nonroutine problems

We aim also to prepare students for success at GCSE and beyond. As such, students are challenged to respond to GCSE style questions from the very beginning of KS3 and will receive advice and guidance about how to improve their answers in line with GCSE success criteria.

In addition, the Mathematics department is committed to supporting whole school Enterprise Skills. We have planned into our schemes of learning explicit teaching of 'Skillsbuilder' steps across years 7-11 in all six skills – Teamwork, Leadership, Creativity, Problem Solving, Listening and Presenting. Mathematical thinking most aligns with the Problem Solving aspect of the Skillsbuilder, this can be explicitly seen within maths lessons through use of carefully selected and planned Problem Solving tasks at least once per topic. These skills are generally further developed in KS3 and Year 10 through a specific careers project that takes place during half-term 6, allowing students to apply their knowledge of mathematics to problems that arise in various careers settings.

Skill	Year 7	Year 8	Year 9	Year 10	Year 11
Teamwork	Careers project	Careers project	Careers project	Careers project	
Leadership	Careers project	Careers project	Careers project	Careers project	
Creativity	Careers project	Careers project	Careers project	Careers project	
Problem Solving	Throughout	Throughout	Throughout	Throughout	Throughout
Listening					
Presenting	Careers project	Careers project	Careers project	Careers project	

Key Stage 4

Key stage 4 will follow the Edexcel GCSE Syllabus;

1 Number

2 Algebra

3 Ratio, proportion and rates of change

4 Geometry and measures

5 Probability

6 Statistics

There are two tiers of entry – Higher tier and Foundation tier. It will be decided which tier is most appropriate for each student based on their prior attainment and progress during KS3 and 4. This decision is made for each student on an individual level and is flexible up to the mid-point of Year 11. This ensures that students are not limited in the mathematics that they learn whilst also maintaining a high level of attainment at the end of their time with us.

This new content alongside a revisiting and deepening of knowledge of content and skills studied previously. The GCSE provides clear progression to A Level through provision of similar approaches to assessment to better ensure a clear, coherent approach from KS3 to KS5.

Where necessary, the implementation of the curriculum may involve extra bespoke intervention sessions for students who are not making expected progress and/ or to provide further challenge where this is applicable.

Key Stage 5

Studies at KS5 are through the Pearson Edexcel A Level Mathematics, Further Mathematics and AQA Mathematical Studies for Core Mathematics. Mathematics and Further Mathematics challenges students to connect abstract and algebraic techniques together including on using these skills for modelling, while Core Maths aims to support students who wish to further develop their numerical skills for further study in subjects which have some mathematical elements (primarily Science, Geography, Psychology, Sociology, Economics, Business) or to support them in the work place.

A Level Mathematics

Pure Mathematics: Topic 1 – Proof ● Topic 2 – Algebra and functions ● Topic 3 – Coordinate geometry in the (x, y) plane ● Topic 4 – Sequences and series ● Topic 5 – Trigonometry ● Topic 6 – Exponentials and logarithms ● Topic 7 – Differentiation ● Topic 8 – Integration ● Topic 9 – Numerical methods ● Topic 10 – Vectors

Applied Mathematics: Section A: Statistics ● Topic 1 – Statistical sampling ● Topic 2 – Data presentation and interpretation ● Topic 3 – Probability ● Topic 4 – Statistical distributions ● Topic 5 – Statistical hypothesis testing Section B: Mechanics ● Topic 6 – Quantities and units in mechanics ● Topic 7 – Kinematics ● Topic 8 – Forces and Newton's laws ● Topic 9 – Moments

A Level Further Mathematics

To date we have catered the course for each cohort to ensure they are studying the most relevant applied modules to best support them.

- Pure Core Mathematics

Plus, two out of:

- Further Mechanics
- Decision Mathematics
- Further Statistics

Level 3 Core Mathematics (AQA Mathematical Studies)

In order to best support our students studying the subjects listed above we have opted to teach the Mathematical Studies course with the Statistical element (Paper 2A).

Paper 1 – GCSE subject content, 3.1 Analysis of Data, 3.2 Maths for personal finance, 3.3 Estimation

Paper 2 – 3.4 Critical analysis of given data and models, 3.5 The normal distribution, 3.6 Probabilities and estimation, 3.7 Correlation and regression.

IMPLEMENTATION:

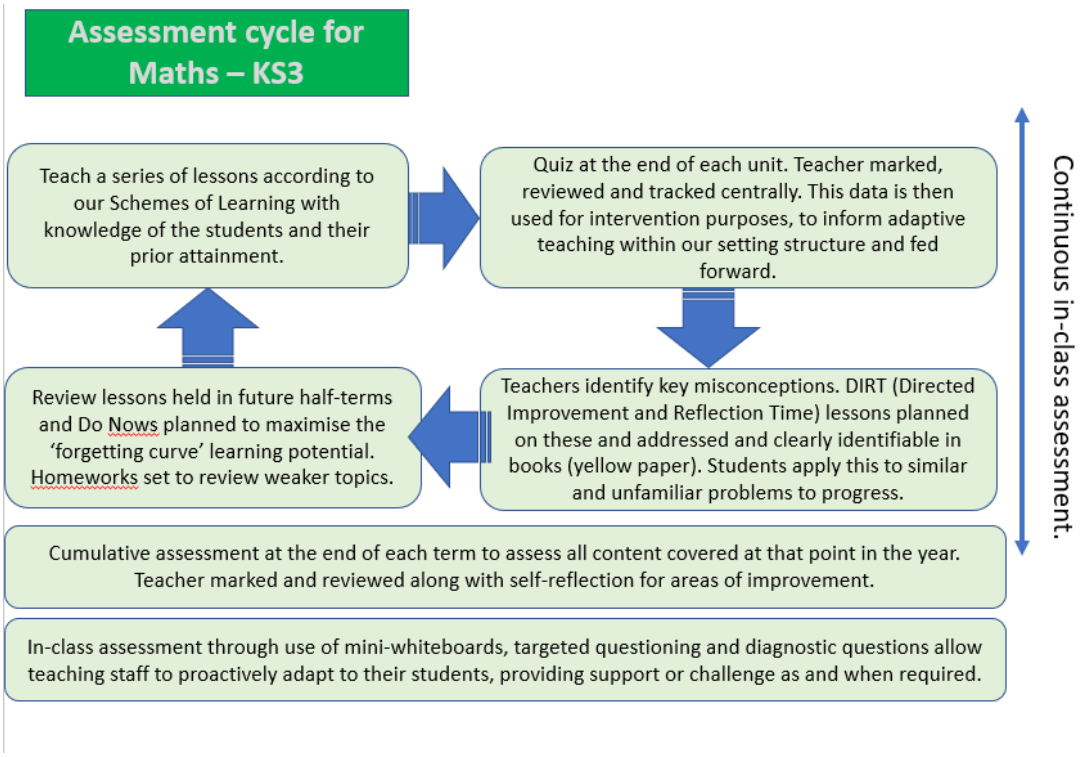
Please see links to the right to our medium-term schemes of learning.
These schemes are designed to outline what we teach to ensure the intent of our curriculum is delivered across each key stage. We have a spiral curriculum which allows all students to see the same content building on previous knowledge through KS3 and then we see every topic once more to the highest level throughout years 10 and 11. Meaning students will have seen the same subjects but at a different level four times from when they join us until the GCSE exam.

Our schemes of learning include:

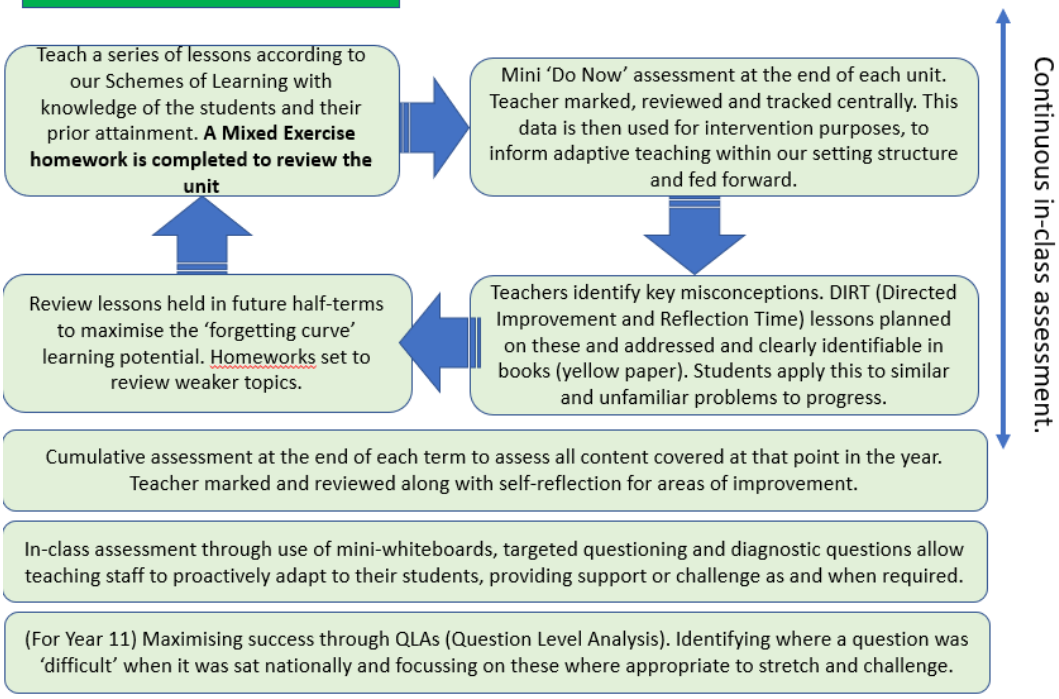
Medium term plans:
- Root enquiry and key enquiry questions
- Key Knowledge, Skills and Understanding (delivered through know, apply, extend learning objectives/outcomes)
- Duration
- Planned assessment of student progress and impact of taught curriculum
- Assessment and improvement opportunities (DIRT) – through topic quizzes
- Literacy and Numeracy
- Opportunities to extend learning
- Enterprise skills in the form of careers projects
- Appropriate challenge and differentiation opportunities
- Common misconceptions and how to address these

MEDIUM TERM
Click on the links below:
Year 7
Year 8
Year 9
Year 10
Year 11
Year 12
Year 13
Core Maths

Assessment Cycle
Students' progress is tracked in each and every lesson at GWA through live-marking, however, a formal Assessment Cycle is implemented throughout the departement to ensure that students receive high-quality, coherent feedback on their success and identification of topics which they can improve. This is also fed forward into future lessons to ensure that topics are reviewed to secure a deeper understanding of the content to then apply to unfamiliar situations and problems.
The Assessment Cycles are, at their core, similar for each Key Stage, though do change slightly depending on the demands of those year groups.



Assessment cycle for Maths – KS4

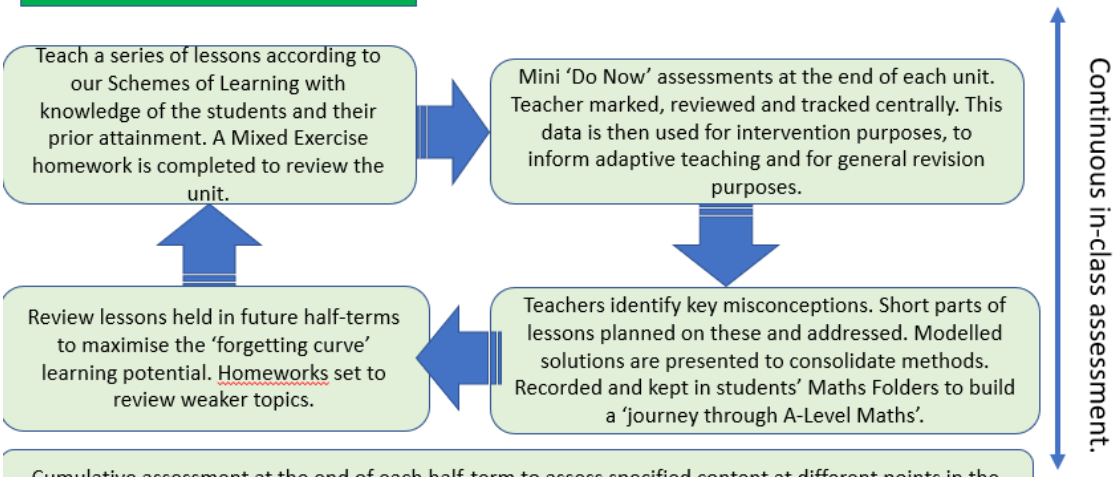


Cumulative assessment at the end of each term to assess all content covered at that point in the year. Teacher marked and reviewed along with self-reflection for areas of improvement.

In-class assessment through use of mini-whiteboards, targeted questioning and diagnostic questions allow teaching staff to proactively adapt to their students, providing support or challenge as and when required.

(For Year 11) Maximising success through QLAs (Question Level Analysis). Identifying where a question was 'difficult' when it was sat nationally and focussing on these where appropriate to stretch and challenge.

Assessment cycle for Maths – KS5



Cumulative assessment at the end of each half-term to assess specified content at different points in the year. Teacher marked and reviewed along with self-reflection for areas of improvement.

In-class assessment through use of mini-whiteboards, targeted questioning and diagnostic questions allow teaching staff to proactively adapt to their students, providing support or challenge as and when required.

Maximising success through QLAs (Question Level Analysis). Identifying where a question was 'difficult' when it was sat nationally and focussing on these to stretch and challenge the most-able.

IMPACT:

INTERNAL EXAMINATION RESULTS

Students undertake a minimum of three key assessments using a combination of fluency, reasoning and problem solving questions. On each occasion, teaching staff evaluate the impact of the curriculum by assessing student progress against stated learning objectives. Formal exams are conducted at the end of each year, offering a further opportunity to assess student progress and make judgements about the impact of the taught curriculum.

EXTERNAL EXAMINATION RESULTS

At KS4 and 5, our results in national examinations will be a clear measure of the impact of the curriculum. These results will be the culmination of a data trail tracking from a student's first term at GWA as part of the school's annual data collection and reporting of progress cycle.

ONGOING TEACHER ASSESSMENT

Our lessons focus on timely and regular feedback to all students. Often in mathematics this takes the form of AfL through Mini-whiteboard questions, no-hands up questioning and live-marking. We also mark quizzes at the end of each topic to provide students with explicit feedback.

IMPACT

FACULTY REVIEWS

We learn from the annual faculty reviews and conduct our own moderation of exercise books and assessments. This also includes student voice to best support development of our curriculum to best fit student needs.

HOME LEARNING

Students at KS3 complete regular homework on the online platform 'Eedi' where students receive immediate feedback on questions that are pitched based on their prior attainment on the system. At KS4, students are given the opportunity to complete exam-style questions and compare with official solutions, tracking their progress through various GCSE topics. This is then built upon further at A-Level.

STUDENT SURVEYS

The Mathematics department surveys students in all year groups as a minimum annually, seeking student feedback on the effectiveness of the taught units form a learner point of view and harvesting student voice to ensure the curriculum is kept lively, engaging and relative.

DESTINATIONS

The eventual destinations of students, and the extent to which they can lead happy, successful lives, will be the ultimate measure of curriculum impact.