St Ives School - Mathematics Curriculum Statement

"Mathematics is not about numbers, equations, computations, or algorithms: it is about understanding." William Paul Thurston

Curriculum Intent

The St Ives School Curriculum ensures that all our students have the opportunity for academic and personal development across a broad range of subjects and experiences. It combines equality of opportunity to our core learning with opportunities for students to make individual choices regarding their learning experiences. Acquisition of knowledge and transferable skills are the cornerstones of our student's progress and we place a high value on building their understanding of community, place and social justice. Lessons and other learning experiences are sequenced to build on students' prior knowledge, and to ensure that students deepen their understanding of each subject, and the interconnection between subjects and their global context.

Our Curriculum is the foundation to achieving our Core Principles:

- Students leave St Ives with high value achievements and the life skills and resilience that provide a platform for future success and happiness.
- We are inspired to work together to research, design and implement highly effective and sustainable solutions to develop and maintain our thriving school community.
- Continuous improvement is achieved through a whole school culture of, and commitment to, creativity, engagement and professionalism.

What is unique to the study of Mathematics?

Mathematics is essential for everyday life and understanding our world. It is also essential to science, technology and engineering, and the advances in these fields on which our economic future depends.

It is therefore fundamentally important to ensure that all students have the best possible mathematics education. They need to understand the mathematics they learn so they can be creative in solving problems, as well as being confident and fluent in developing and using the mathematical skills so valued in the world of industry and higher education, as well as those needed for everyday life.

The Mathematics Department aims to provide all students with a rewarding and enjoyable experience of mathematics. Through the development of students' mathematical knowledge, we prepare students to become confident, numerate individuals who are able to deal with all aspects of

mathematics in their chosen career and in all aspects of their adult life. This will be accomplished through our commitment to excellent teaching, a well-designed curriculum with an interesting variety of lessons to motivate and engage all students.

We have high expectations of all students so that they will recognise and achieve their full potential. We encourage students to develop their own skills in analysis, reasoning, creativity, collaboration and self-evaluation so that they can meet the mathematical problems they face with thoughtfulness and enthusiasm.

We provide all students with a challenging and enjoyable mathematics curriculum in a supportive and motivating environment. As part of our extended curriculum, we encourage our students to take part in a variety of maths challenges and we have been particularly successful in the UKMT Team Challenge and students have the opportunity to sit extra qualifications including the Level 2 Certificate in Further Maths and Entry Level Mathematics, if appropriate for that student.

Literacy in mathematics is developed via the teaching and discussion of Tier 2 and 3 vocabularies in lessons. Students are encouraged to explore Mathematical language particularly when studying statistics and where this language is used in the wider context. Guided reading texts are being used throughout the curriculum to provide students with tools to make sense of the history of mathematics as well as develop their literacy skills and recognise the cross-curricular links attributed to reading and interpreting text.

In maths, our pedagogy is underpinned by a mastery approach to the teaching of mathematics for understanding. This is organised as a spiral curriculum basing future teaching on the building blocks of previously taught content. Key concepts are broken down into small connected and structured steps enabling application of a range of contexts to be interleaved throughout the curriculum. Our intention is to continue to develop procedural fluency and repetition of key facts to free up working memory through our retrieval starter activity. The high proportion of disadvantaged students, low literacy on entry and SEND students means we use manipulatives and representations to build and scaffold learning.

Curriculum Implementation

General principles

- Maths is sequenced based on the statutory programmes of study from the national curriculum.
- Fluency in the fundamentals of mathematics is taught 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.
- Students will reason mathematically by following a line of enquiry, conjecture relationships and generalisations, and develop an argument, justification or proof using mathematical language.
- Topics are assessed using low stakes end of topic assessments covering key skills as well as a summative assessment each term to review the content taught.

Student organisation

- Students across all five year groups are split into one of five groups. Classes are grouped by ability with KS4 students having a higher and foundation split. All classes receive the same curriculum but teaching and learning activities will vary to suit each individual class with challenges added to lessons to stretch the students.
- Staff make decisions with clear knowledge of who the disadvantaged students are and which class they would be best suited to. This follows our Class Setting Protocol.

Accumulation of knowledge

- Maths is taught as part of a spiral curriculum to allow students to develop their complexity of understanding in each strand further as they mature. This enables a deepening of understanding, with each successive encounter building further knowledge and confidence.
- Each year covers a broad and diverse representation of all areas of mathematics to allow for revisiting and further development of topics when students are academically ready.
- Within each year, topics are carefully sequenced to allow for transfer learning between mathematical ideas, through a period of several units. Topics that are related in mathematical structure are taught in an order which allows students to make deep connections between linked truisms in mathematics. The ordering of topics also allows for prerequisite knowledge to be obtained before encountering novel concepts. Diligence in teaching foundation concepts in strategically sequenced units allows for rapid progress through advanced topics later in the learning journey.
- In order to promote retention of these foundational concepts, our scheme of learning explicitly plans topics to interleave or revisit mathematical concepts whilst teaching new more complex concepts. These interleaving topics are sequenced not only to allow for spaced practice and retention, but to further promote transfer learning between linked mathematical ideas.

Time allocation

Each year group will have the following allocation for hours where that are taught the Mathematics Curriculum across a two-week cycle:

Year Group	Year 7	Year 8	Year 9	Year 10	Year 11
Hours allocated	7.5	7.5	7.5	7.5	7.5
Percentage of curriculum time	15%	15%	15%	15%	15%

Teaching and learning provision

- Lessons start with a 4 question retrieval practice in the form, last lesson, last week, last month, last year - a spaced retrieval based activity.
- Checking for understanding points are used in lessons to review previously learned key skills that are relevant to the lesson taught. It highlights misconceptions and prevents barriers to learning throughout the lessons by reminding students of these skills.
- Modelling of worked examples is present in lessons using a format of 'I do, We do, You do' to ensure students meet the high expectations we have of them with communicating their work mathematically (both written and verbal) using tier 2 and tier 3 vocabulary. This is especially important when introducing new concepts.
- Faculty agreed representations in the form of bar models, function machines etc are used to ensure consistency in approaches across the team.
- Feedback is provided to students 'live' throughout the lessons to ensure students make rapid progress through activities. Whole class feedback is provided regularly to students using topic reviews and is low stakes.
- Hinge questions are being developed to allow transition periods within the lesson to be more formally assessed. This is used as a tool that the teacher employs when students reach the "hinge" points. Students' responses provide the teacher with valuable evidence about what the students know, don't know and need to do next.
- Repeat concepts are being developed to link curriculum ideas together.

Adapted provision

- Explicit instruction for SEND and LPA students focused on teacher demonstration followed by guided practice and independent practice.
- Cognitive strategies like memorisation techniques and metacognitive strategies to help students plan, monitor and evaluate their learning. Chunking the task at each stage will support students with SEND to make the information easier to process.

Enrichment provision

- Students participate in UKMT challenges to develop problem solving skills and enhance mathematical thinking skills as well as to provide opportunities for regional and national competitions.
- Opportunity for students to study Further Maths after school to enhance their understanding of GCSE and prepare them for A-level.
- Opportunities to bring learning to life and give some context through visits to institutions e.g. Plymouth University and the Exeter Maths School

Curriculum impact

Formative assessment

- Formative assessment is more of a diagnostic tool with some elements of our formative and summative assessments based on knowledge retrieval to enhance knowledge retention.
- Formative assessment strategies include:
    - Impromptu quizzes and low stakes testing
    - Short comparative assessments to see how pupils are performing against their peers
    - Goalless problems
    - Lesson exit tickets to summarise what pupils have learnt
    - Silent classroom polls
- Formative assessment is used to monitor student learning style and ability (metacognition) and to provide on-going feedback for student development.
- Planning and teaching methods are adapted to aid students to improve their learning rapidly.

Progress

- Progress is monitored through shared internal tracking sheets where data from the end of unit tests and summative tests is entered and compared.
- This allows for comparison from group to group and across focus groups e.g. PP and SEND.
- This is evaluated by the HOF and, where necessary, actions are agreed and implemented.
- The quality of teaching and learning is monitored through lesson visits by the faculty lead and by senior leaders.
- Visits are recorded using Sisra Observe, where follow up action points are actioned as necessary.
- In link meetings between the faculty lead and senior leaders, teaching and learning is a standard agenda item and where any necessary action is discussed and agreed.
- Work scrutiny is also completed and recorded on Sisra Observe by the faculty lead and senior leaders. HOF work scrutiny has a strong focus on tier 2/3 vocabulary being used and student productivity.
- Assessments are moderated and standardisation takes place for the marking of GCSE papers by a maths exam marker to ensure consistency and understanding in applying the mark scheme.
- Peer book reviews are also completed in faculty meetings as a form of moderation and to ensure all faculty staff are consistent in their approaches and monitoring progress.

Summative Assessment

- Assessment during whole school assessment weeks are used to systematically check against set criteria in a given time frame (usually termly).

- Our summative structures are to evaluate student learning and academic achievement at the end of each term and/or unit. This is to give opportunities to aid retrieval of prior knowledge and for interleaving.
- Exam style questions are used to give students an opportunity to evaluate their own strengths and developments.
- Results are reported back to students in the form of a raw mark and percentage and this is recorded on internal tracking sheets for comparisons and analysis between focus groups and classes.
- During the summer term of Yr 10, GCSE past papers are used and students are given a 9 – 1 grade alongside their score/percentage using grade boundaries for that exam series.

Student Feedback

- Student voice is completed to monitor student's understanding and building knowledge of the strategies used in maths. Results from this are used to inform future planning.
- Students have the opportunity to communicate with teachers during the school day and by using Show My Homework and Google Classroom.