



St Ives School - Science Curriculum Statement



“I have not failed. I've just found 10,000 ways that won't work” – Thomas Edison

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 Science?

Science is so important within the curriculum because it is the story of the Earth. 13.5 billion years ago, matter, time, energy and space came into being in the Big Bang. Physics is the story of these fundamental features of the universe and how they came into existence; chemistry deals with the formation of atoms and molecules and their interactions that occurred around 300 000 years after they first appeared; finally, biology is the study of how some of these molecules combined into more and more complex and elaborate organisms around 3.8 billion years ago. It would be impossible to contemplate a curriculum devoid of science!

Everyone is affected by science which is why we believe that a high quality education in science provides the foundations for understanding the world and is vital for its future prosperity. It is through science that we can help the next generation fight against some of the damage that humans are inflicting; science therefore has a vital role to play in ensuring that we develop a sustainable future - the scientists of tomorrow will be face by challenges both known and unknown, and we will all be reliant on their successful resolution.

Science combines both the theoretical and practical study of the structure and nature of the physical and natural world through thought, observation and experimentation. We want our students to develop the essential skills of observation, communication, classification, measuring, recording, inferring and predicting. We want to encourage our students to be inquisitive, to challenge accepted 'truths' and to learn the skills of analysis and investigation. We want them to see science not just as a set of separate facts but as a complex and beautiful web that literally tells us the story of the world around them.

Literacy in science is developed via the teaching and discussion of Tier 2 and 3 vocabulary in lessons. Students are challenged with reading science material and extracting key information and concepts for the literature. Pupils are also supported in developing their written communication skills in topics where complex science concepts need to be explained in detail. Use of scaffolding materials and role modelling from staff in science allow pupils to develop the literacy skills in the context of science.

Numeracy in science forms a significant part of the skills needed to be successful. Numeracy is used in science investigations to support the data analysis and reveal the trends within the numbers. It is also a powerful tool to use data to back up statements and confirm or denounce hypotheses. Through the 5 year journey, pupils will have ample opportunities to build their confidence in using numeracy skills in science and increase the breadth of their data analysis abilities.

The numerous and diverse range of scientific careers are both rewarding and challenging, and await a successful scientist. Scientific careers range from medical professionals through to technology engineers and everything in-between. Our students' success in science doesn't just lead onto scientific pathways, the skills of investigation, critical thinking and inquiry are transferable to many professions in our ever changing and advancing world.

We believe it is our duty to develop our students culturally, emotionally, intellectually and spiritually and empower them to become truly global citizens: we want them to move forward with confidence, in an increasingly complex world.

Curriculum Implementation

General principles

- Science is sequenced based on the statutory programmes of study from the national curriculum.
- Fluency in the fundamentals of science 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 develop the understanding and ability to apply the basic scientific investigation method where a hypothesis is developed, a method constructed to test this, the investigation is safely carried out, data collected, analysis and conclusions drawn.
- Topics are assessed using low stakes formative assessments covering key scientific skills, assignments set on Seneca Learning for home learning 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

- Science is taught as part of a spiral curriculum to allow students to develop their complexity of understanding in each strand further as they mature. The repeat concepts interleave throughout the curriculum to ensure links are made between the different aspects of science and the real world. This enables a deepening of understanding, with each successive encounter building further knowledge and confidence.
- Within each year, topics are carefully sequenced to allow for explicit links with a subject and between subjects to be formed. The sequencing allows for the repeat concepts to be presented in different contexts further deepening pupil understanding and skill.
- An enthusiasm for learning is promoted through ensuring or schemes of learning are engaging and thought provoking. Assessment is used to drive learning and provide key information for teachers and science leaders to identify intervention areas, refine and strengthen the curriculum. The curriculum provides a high pace of learning to maximise progress and tasks that provide little additional knowledge or develop additional skills are removed from schemes of learning.

Time allocation

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

Year Group	Year 7	Year 8	Year 9	Year 10	Year 11
Hours allocated	7.5	7.5	8.75	8.75	8.75
Percentage of curriculum time	15%	15%	17.5%	17.5%	17.5%

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.
- Teachers introduce new concepts and skills modelling the correct use of tier 2 and 3 literacy. Pupils are given opportunities to practice apply the new concept and teachers can check understanding through skilled and effective questioning.
- 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.
- 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.
- Practical investigations are used so pupils can apply their theory to a new context. It is also an opportunity for pupils to develop their practical skills in a safe scaffolded manner and further their understanding of how science works.
- Repeat concepts are being developed to link curriculum ideas together

Adapted provision

- Lessons follow the strategy of "teaching to the top " and differentiate down, this ensures all students regardless of ability within class receive challenging lessons in science.
- Class settings aim to have PP pupils as equally distributed in science sets to give PP better learning opportunities and become more aspirational in their learning and outcomes.
- More teacher led 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.
- Teachers work and communicate very closely with SEND support staff and have a detailed understanding of a pupil's Pupils Passport to remove barriers to learning for SEND pupils.

Enrichment provision

- The majority of pupils start KS4 on the separate sciences pathway, giving them the opportunity to achieve 3 GCSE's at the end of year 11 compared to the majority of pupils in the country achieving 2. Pupils get to experience a wider range of topics in their learning and can be better prepared to study science at KS5.
- Eco Club is offered to pupils as an extracurricular activity open to pupils of all ages to take part in practical science investigations around the school and increase depth of knowledge in zoology and ecology.
- Opportunities to broaden pupils' science experience and cultural capital with potential trips to Exeter University, The Big Bang Event and possible trips to CERN in Switzerland.

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:
 - Low stakes testing, examples of these include, key word definitions, science numeracy quizzes
 - Short comparative assessments to see how pupils are performing against their peers
 - Plenary activities to summarise and apply learning from the lesson.
- Formative assessment is used to track pupils' progress 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.
- Data sheets are also produced from Seneca Learning to track progress through home learning
- 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 Sistra 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 upon.
- Work scrutiny is also completed and recorded on Sistra 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 the department and across other science faculties in the MAT.
- 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.