

Science at ICC

Our primary goal is to encourage students to enjoy and engage with science and to develop their curiosity and enthusiasm for the world around them. We aim to promote an understanding of science amongst students, equipping them with the skills to allow them to be scientifically literate; investigating scientific problems for themselves and making decisions centred around scientific issues as well as acquiring knowledge of the fundamental scientific principles that underpin life as we know it.

It is our departmental ethos that excellence is habitual and through full commitment to this, we strive for excellence from ourselves, our learners and wider community, with all of us continuously striving to improve. In light of this we have adapted, designed and developed a curriculum that is broad, balanced and ambitious for all; supporting our belief that all students have the ability to achieve and exceed their potential.

What do we teach?

KS3 Science

The KS3 National Curriculum requires students to understand 140 scientific concepts. Often this can lead to a new theme being taught almost every lesson resulting in many students completing KS3 with knowledge of individual concepts but lacking the understanding needed to apply this to unfamiliar contexts. Using AQA's big ideas principle, the generalisations, principles and models which connect concepts are at the heart of our science curriculum at ICC. We believe this is how students learn to see the world analytically, to explain phenomena and make predictions – all skills they need for their next stage of scientific learning. Content across KS3 is under 10 big idea headings with each idea containing four smaller topics: the building blocks for the big ideas.

Earth	Ecosystem	Organisms	Reactions	Forces	Waves	Matter	Genes	Electromagnets	Energy
Universe Earth Structure Climate Earth Resources	Interdependence Plant Reproduction Respiration Photosynthesis	Movement Cells Breathing Digestion	Acids and Alkalis Metals & Non-metals Types of Reaction Chemical Energy	Speed Gravity Contact Forces Pressure	Sound Light Wave Effects Wave Properties	Particle Model Separating Mixtures Periodic Table Elements	Variation Human Reproduction Evolution Inheritance	Potential difference Current Magnetism Electromagnetism	Energy Costs Energy Transfers Work Heating and Cooling

By the end of Year 8, pupils will have visited all the big ideas of science, and had regular opportunities to develop their skills in working scientifically and reflect on them as they go along. The aim is that the transition to GCSE will be unrecognisable to pupils as they will have already become accomplished in the necessary skills and have developed their ability to apply these to unfamiliar or new scenarios.

We continue to build on our KS3 approach in KS4 and 5 by mapping content of our learning journeys against the big idea principles so that students can clearly recognize the progression in their learning and as a result are more confident in applying the transferable skills that they have developed in their prior learning to new and unfamiliar ideas in their studies.

KS4 foundation year

Following the AQA ELC in Science, our KS4 foundation year focuses on the development of disciplinary literacy, specialist subject knowledge and working Scientifically skills, before transitioning to the AQA combined or separate Science courses. During this year, students build on and deepen their knowledge from KS3 to become increasingly independent in their ability to “think like a Scientist.”

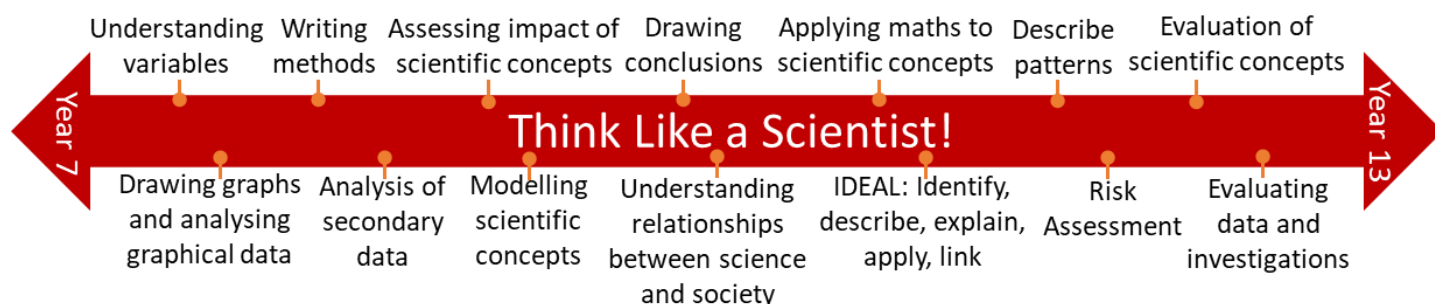
GCSE Sciences

At GCSE, our pupils follow the AQA schemes of learning. The timetable provides us with enough time to teach the GCSE Combined Science: Trilogy specification to all pupils, who are taught the higher specification in Year 9 before tiering decisions are made, to ensure every pupil has the opportunity to achieve a level 5+. We value the importance of practical work, and regular practicals are carefully scheduled into our long-term plans along with time to practise specific key skills. We also undertake practical afternoons in Year 11 so that pupils have extended opportunities to practise their practical skills outside of the constraints of a 60-minute lesson. A small group of pupils have opted to complete the extra learning required to take examinations in the separate sciences by selecting to take Triple Science in one of their option blocks.

Although we aim for all students to achieve their full potential at the end of Key Stage 4 so that they can progress on to their chosen route of further study, our curriculum is not just focused on exams; ultimately we strive to achieve our primary goal of instilling a love of science in our learners so that the knowledge and understanding of gained over the course of their studies at ICC will forever evoke curiosity and support their perception of the world around them.

A-Level Sciences

Science continues to be a popular subject as our pupils enter our Sixth Form and A-level courses are available in Biology, Chemistry and Physics with progression for students who wish to follow a more vocational route being available in the form of a BTEC level 3 in Applied Science and a BTEC level 3 in Forensics and Criminal Investigation. We follow the AQA schemes of learning for Biology and Physics, OCR A for Chemistry and Pearson for the BTEC qualifications.



Intent: Why do we teach what we teach?

Science is about looking for answers to big questions and at ICC we strive to develop students who look to answer some bigger questions related to their future and the future of their planet. The curriculum has been written with the aim of developing lifelong learners; building on the scientific success, and failure, of the past, how it informs science now in our everyday lives and its scope for developments in the future. It has been designed to be cross-curricular, link to our local community, and continue to develop our links with other educational establishments beyond ICC.

We strive to enable students to acquire and apply skills, knowledge and understanding of how science works and its essential role in society. Promoting creative thinking amongst our learners allows them to take their learning from within the classroom into their everyday lives, promoting the development of transferable skills such as problem solving, critical thinking and effective decision making.

Implementation: How do we teach what we teach?

	Y7	Y8	Y9	Y10	Y11	Y12	Y13
Curriculum hours (per fortnight)	7	7	8	8	8	9	9
Evidence	Student books, Microsoft Teams and Assessment folders					Student notes, Lab Books & Folders	
Assessment	End of big idea tests Mastery quizzes (homework) In lesson formative assessment		Cumulative end of unit assessments Retrieval mastery quizzes and tasks (homework) In lesson formative assessment				
Extra-curricular	STEM club, Intervention and Homework support			STEM club, Intervention, Homework support and Revision Sessions			

The science curriculum is driven by the passion and knowledge of the leaders of the school. Over the past three years the science curriculum has constantly been reviewed and adapted based on lesson observations, unit outcomes, planning reviews and exam results. Unit orders have been changed based on feedback from subject audits, and collaboration has been the driving force behind the resourcing of the curriculum. We are now at a stage where the order of units has been established across all Key Stages and overviews for each unit are in place. The delivery of our curriculum is centred around the Big Idea Principle and divides the learning of knowledge and skills into three areas to support this at KS3 and 4, specifically:

Know: Demonstrate knowledge and understanding of: scientific ideas; scientific techniques and procedures.

Apply: Apply knowledge and understanding of: scientific ideas; scientific enquiry, techniques and procedures.

Extend: Analyse information and ideas to: interpret and evaluate; make judgments and draw conclusions; develop and improve experimental procedures.

This framework is designed to support students in their journey to scientific mastery by the end of KS4 while also ensuring challenge for all. It directly reflects AO1, AO2 and AO3 at GCSE and aids the transition to KS5 where learning is divided by the various assessment objectives assessed across our level 3 qualifications (see subject overviews for specific assessment objectives relating to each subject).

Impact: how do we know what pupils have learnt and how well they have learnt it?

In KS3, pupils complete formative homework quizzes and practical skills assessments for every unit of study as well as mastery end of unit tests for each big idea. At KS4 and 5, end-of-unit summative assessments utilise past exam paper questions and are marked by the teacher. We also formatively assess recall and application of the big ideas cumulatively via retrieval homework activities across all key stages. Data for all of these assessment methods is collated and reviewed to identify areas that require re-teaching and students that require extra support via our intervention programme. After an assessment, students are given individualised feedback and targets, and a DIRT lesson is planned to fix any whole class misconceptions and allow students time to improve. All data from end-of-unit assessment is recorded to build a picture of the learning journey. This is then used during the revision period to target any weak topics. The outcome of these assessments can trigger a review of the long-term plan, and discussion about this is conducted in subject meetings.

In line with the school policy, summative assessment takes place three times in the year, in addition to the more regular formative assessment. These assessments are cumulative in nature and form the basis of grades reported to parents and students at each Data Entry Point, although the results of formative assessment are factored in where relevant.