



## Curriculum Overview

### Year 10 – Science 2021-2022

#### Rationale for Year 10 Science

A high-quality Science education provides the foundations for understanding the world through the specific disciplines of Biology, Chemistry and Physics. Science always changes our lives and is vital to the world's future prosperity. All students will be taught essential aspects of the knowledge, methods, processes and uses of Science. Through building up a body of key foundational knowledge and concepts, students will be encouraged to recognise the power of rational explanation and develop a sense of excitement and curiosity about natural phenomena. They will be encouraged to understand how Science can be used to explain what is occurring, predict how things will behave, and analyse causes.

#### What will students learn and why?

Year 10 sees the continuation of the GCSE journey for students at St Joseph's Catholic College. Students, along with their teachers, will now have decided which pathway they are following, either the AQA GCSE Combined Science (Trilogy) course, culminating in two GCSEs or the AQA GCSE Biology, Chemistry and Physics (three GCSEs). Students completing the Combined Science course will still study the three disciplines but not in as great a depth. Both courses are linear, with clear progression in complexity and demand. Students continue to build on their knowledge and understanding of the fundamentals of the three disciplines and apply it to different contexts. Units covered in Year 10 include: B3 Infection and response, in which students will be able to apply their knowledge of the recent pandemic; B4 Bioenergetics; B5 Homeostasis and response; C3 Quantitative chemistry; C4 Chemical changes; C5 Energy changes; C6 The rate and extent of chemical change; P2 Electricity and P4 Atomic structure.

#### How will students learn?

Science is a set of ideas about the material world and at GCSE level students have the opportunity to develop their practical and written communication skills allowing them to demonstrate their developing scientific knowledge and understanding: this includes, but is not restricted to, investigating, observing, experimenting and testing out ideas. During Year 10, students will become more independent when planning procedures to make observations and test hypotheses. The suite of GCSEs we offer are planned to develop students' mathematical skills. These skills are covered in context and practised regularly, for example, plotting scatter graphs with lines of best fit appear in GCSE Biology, Chemistry, Physics and the Combined Science scheme of learning.

Due to the content included in GCSE Science, it is imperative that students recap and recall their knowledge regularly. Students will be given many opportunities for retrieving information using retrieval tasks and spaced practice in lessons, and at least one homework per week will be based on recalling previous units. The design of the pathway through the Year 10 curriculum means that there is plenty of interleaving between topics and opportunities for recall.

Students are expected to be familiar with a number of core practical's (Required Practical's) and these build on the skills developed at KS3. Practical work serves three purposes: to support and consolidate scientific concepts; to develop investigative skills; to build and master practical skills such as handling and manipulating specialist equipment with confidence and skill.

Importantly, students are introduced to several careers in the Science industry as they journey through the units, ensuring they realise that Science underpins much of their future. Careers in fields such as radioactivity, cancer treatment, chemical analysis, electricity and careers in different departments of the NHS are discussed

along with many others. Never more has the Year 10 Science curriculum been more relevant to everyday life as students study the B3 unit, 'Infection and Response'. In this unit, students explore the Science behind the causes, transmission and treatment of a range of diseases. There are cross-curricular links with other subjects which are made explicit, as well as a general thread of literacy skills weaving through the curriculum. Students will receive regular feedback in different forms and are expected to respond to this feedback. Time will be available for them to do this.

How will students be assessed?

Students will be assessed in a range of different ways, using both summative and formative assessment. Regularly, in lessons, students will be assessed by the teacher to check for understanding. Retrieval practice is a key element of the lesson, with students completing low-stakes quizzes on material covered within a lesson, topic, or material covered previously. Students are also encouraged to self-quiz and quiz each other in order to build schema, helping them solve problems in the future. Teachers will provide plenty of exam question practice for students, both to assess content but also to develop students' exam technique and application of exam-specific terminology. AQA examiners reports are used in conjunction with these to highlight common errors and misconceptions. Alongside this, students will have assessments that are more formal, averaging once a term, for which they will receive feedback and time to respond to that feedback. It has been the practice of the Science Department for some time to ensure the assessments do not just relate to the current or most recent topic studied but could include material on any topic covered up to the date of the assessment. This means that students are actively encouraged to revisit and revise content more often, again, building schema. Students will also be given experience of actual papers, including the low, standard and high demand questions, building their confidence with the levels of demand.

What is the aim for learners by the end of the year in comparison to the previous year?

The aim for learners studying Year 10 Science is that they will: continue to be enthusiastic about their Science learning; attempt to find solutions to problems arising from their own experiences and develop confidence when debating. There is considerable emphasis on the development of experimental skills through the numerous Required Practical tasks and several of these are structured to enable students to consolidate and develop their numerical literacy and data analysis skills. E.g. through the application of graphing skills in B5, C4, C6 and P2 and the use of mathematical formulae in P2 and C6. The Year 10 curriculum continues to introduce new scientific concepts but also builds upon those core concepts introduced in Year 9. This provides students with the knowledge and skills to support their transition to Year 11 where there is increasing emphasis on application of scientific knowledge and topics become more synoptic in nature. Students are also given guidance and multiple opportunities for developing effective study habits, practising what they have learnt in order to develop schema over time.