Curriculum Overview

Year 7 – Science 2021-2022

Rationale for Year 7 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?

The Year 7 journey starts with Matter as it underpins the whole of the Science curriculum. It also gives students a chance to cover many different scientific skills in context, for example safety in a scientific laboratory. Knowledge of cells is fundamental to all aspects of Biology and this leads on logically from matter and behaviour of particles. Most students would have covered forces in primary school so this is an important topic to teach in Year 7 to address misconceptions and ensure all students have the same base from which to progress. It also gives a good opportunity to include plenty of scientific numeracy. The Periodic Table introduces students to the role of specific scientists and their work in the development of scientific theories, the importance of trial and error and how Science is constantly evolving. Students usually find the Solar System topic fascinating and this is covered in the winter months so that students have an opportunity to look up and say 'wow!' on a clear night. Reproduction purposely comes later in the year, building on the cells topic, so that teachers have a chance to build a trustworthy relationship with their classes which will support and enrich the topical discussions. It is important for students to embed the skills they have learnt throughout the year by having an opportunity to carry out full experimental investigations at the end of the year. Here, students will be able to showcase the skills they have learnt by selecting appropriate equipment in order to gain valid results, collecting, presenting and analysing their data in the most appropriate formats. Students are then encouraged, using scaffolds, to discuss the limitations of their experimental procedure and results and suggest improvements for future investigations.

How will students learn?

Given above is the rationale for the sequence of topics. Students will be given many opportunities for retrieving information using retrieval tasks and spaced practice in lessons, and at least one homework per topic will be based on a previous topic(s). The design of the pathway through the Year 7 curriculum means that there is plenty of interleaving between topics and opportunities for recall. For example, diffusion in the Organisms 1 topic relies on students understanding and being able to apply their knowledge of the behaviour of gas particles.

Given the practical nature of Science, students will use carefully chosen experiments to practise their investigative skills. One 'Key' practical or investigation has been chosen per topic, students will focus on three core skills within each investigation. There will be different skills practised in each key practical so that when students come to completing required practical's at Key Stage 4 they will have a secure foundation in the skills necessary to succeed.

Cross-curricular links with other subjects will be made explicit, for example, students will learn to draw scatter graphs with a line of best fit very early in the Year 7 curriculum and will begin to practise rearranging equations. Whilst Maths is an obvious cross-curricular link for all topics covered in Science, there are close links to be made explicit in Year 7 Science with RE (Reproduction and Space), Food technology (nutrients and healthy diet) and History (development of the Periodic Table). Students will receive regular feedback in different forms and will be expected to respond to this feedback. Time will be available for them to do this. Importantly, students will also be introduced to several careers in the Science industry as they journey through the topics, ensuring they realise that Science underpins much of their future.

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 course, 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 different contexts. 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.

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

Transitioning from KS2 to KS3, students build on the knowledge they gained in primary school through an interleaved curriculum that introduces them to fundamental concepts of Biology, Chemistry and Physics (specific topics mentioned above). Students are introduced to key scientific vocabulary, greatly improving their scientific literacy skills, for example, using word etymology to find the origin of words. We also incorporate numeracy skills that focus on scientific applications to bridge the gap between Maths and Science, for example, using and rearranging formulae, converting units and graphing. By the end of the year, students learn how to plan scientific investigations, identify variables and carry out risk assessments, in order to work safely and independently in a laboratory. We focus on building upon the more abstract ideas taught at KS2 by introducing the theories behind these ideas and models to illustrate them. We relate these theories and models to real-life applications, further improving students' cultural capital. By doing this we encourage students to become scientifically curious and start to consider the numerous careers that Science encompasses.