

## **KS3 Science Curriculum**

### Y7 Biology

Year 7 science begins by introducing key concepts that support learning throughout secondary school. In Biology, the way living bodies are organised is explored, from multi-organ systems to microscopic organisms. Students will enter the microscopic world and learn how to appropriately prepare slides for examination and create scientific drawings of their observations.

Understanding how different cells are specialised helps to contextualise how different tissues come together for a specific function, such as muscles for movement. Year 7 will start to understand their own bodies like never before, particularly at a time when so much is changing. Learning about reproductive systems allows for a safe space to be curious and ask questions whilst learning about their development into adulthood.

With an appreciation of the randomness and uniqueness of their existence, students start to recognise and collect data on variation between themselves and their peers. This supports their learning of adaptations and predator-prey relationships and how animals have evolved to fit into their niche and environment. A new perspective is introduced in term six looking at plant organisation instead, to help retrieve and embed knowledge from the rest of the year in terms of organ systems, variation & adaptation and reproduction.

### Y7 Chemistry

From microscopic to nanoscopic, in Chemistry, students will delve into what makes up materials, and how particle arrangement determines what we see and feel. Crucially, particle movement links with ideas about diffusion in cells and students will start to make links between science principles autonomously. Later, ideas about particles become crucial in identifying mixtures and how to best separate them, as well as understanding the difference between simple mixtures and complex compounds.

Students will start to appreciate how combinations of different materials make completely new substances with individual properties. They will discover how acids are used and handled safely and perform their very first reactions investigating neutralisation and salts.

At the end of the year the key concept of Earth & Space is introduced. Whilst space is taught as a physics topic, Earth is taught in Chemistry to help hone observational skills and deepen understanding about natural materials and the cyclical nature of matter.

### Y7 Physics

Early in year 7 Physics, students will discover the currency for doing anything and everything! Energy is the building block that the universe is made with, and students will get a taste of how important energy is for all that they see and do, including fuelling our bodies and vehicles, or applying forces to put objects into motion. They will appreciate how terms like 'weight' and 'wasted energy' are misused and apply new knowledge about energy and motion in a variety of familiar contexts.

This year in Physics is so important for building a strong base in core concepts and a breadth of topics are covered in comparison to biology and chemistry. Students will be secure in introductory content about waves, exploring the behaviour of sound waves and later comparing this to light. They will also start to address misconceptions they have about electricity, partially through investigating with circuits and learning about components.

Term six's sole physics topic is space; whilst core ideas about the solar system, the Sun and satellites must be taught the students' questions and curiosity drive this topic and give them a chance to explore their biggest questions about the universe.

## Year 8 Biology

Plants end biology content in year 7 and begin the course in year 8 with photosynthesis, where cells and organisation content is retrieved through looking at leaf structure and specialised plant cells. Students will discover just like our bodies, plants are also highly organised, and through deficiencies can also become unwell.

Looking at our own digestive systems and nutrient requirements, links can be made from the photosynthesis topic and students can at times guide their own learning by drawing parallels. Similarly with the respiration topic, the symbiotic relationship between plants and animals in terms of gas exchange is immediately obvious and helps to embed learning across multiple topics.

The final terms explore the delicate nature of life, by looking at the effects of smoking and drugs on the body, as well as genetic disorders by looking at inheritance of alleles. Through mutations and changes to environment, animals can thrive and evolve, or decline and go extinct.

## Year 8 Chemistry

Whilst year 7 Chemistry focuses on matter, year 8 Chemistry looks at how matter interacts through reactions, building upon introductory knowledge from acids and alkalis. Students revisit acids again, but this time metals are the focus and determining orders of reactivity through observations. More trends are explored in the periodic table topic; discussion and practise of the scientific theory encourages students to think critically and use evidence when explaining ideas.

Students then explore a range of different chemical reactions such as combustion and thermal decomposition, making observations and conclusions as well as constructing equations for these changes. Combustion specifically is discussed again during the climate and resources topic, where students think on the negative impacts of fossil fuels and how to live sustainably.

Finally, students again practise honing their observation skills through investigative reactions, this time linking ideas about energy changes and transfers into a chemistry setting.

## Year 8 Physics

Energy is the core idea in the topics explored this year in Physics, with links being made to many concepts in Biology and Chemistry too. Students start by revisiting particles again but looking at how energy of particles can change properties like density, state, and temperature. Transfers of energy are then introduced, focusing on thermal energy transfers via particles and via radiation; students will investigate how to best insulate materials to all of them!

Concepts in waves and electricity and revisited, embedded and recapped in year 8. For example, sound waves from year 7 are built upon by looking at applications of ultrasound technology, and ideas about current and charge are challenged when learning about static electricity and parallel circuits.

Finally, students apply ideas about forces and link it with energy using the formula  $\text{work} = \text{force} \times \text{distance}$ . Students will investigate with pulleys and levers to discover how effort can be reduced but work remains constant. Electromagnets round off KS3 science by drawing on energy stores, forces, fields and scientific inquiry skills to fully prepare students for GCSE content.

For year 9 see the KS4 Curriculum Descriptor document.