Blatchington Mill School
Involvement, Achievement & Care

Science - Year 7

Autumn Term

Year 7s will start by learning the **founding principles** that are required to access science as an academic subject and as a life skill. They will also be introduced to three **grand ideas** that link the principles together in an engaging context. The overarching theme in year 7 is '**origins'**, which serves as the foundation that we build upon in years 8 and 9 and GCSE. These are the starting points of scientific journeys across the three disciplines.

In year 7 **biology** we will consider life and survival as a theme, where we question what is life and what sustains it. Biology, being the study of life processes, deals with the composition of life and how it interacts with its environment in order to continue living. Their journey begins with **the cell** as it is the fundamental building block of life that allows us to define what it means to be alive. This topic will give students access to biology's most important evidence-collecting tool; the **microscope** for their first practical experience as young biologists. They will then learn how **cells** group to make more sophisticated structures (**organs** and **organ systems**) that result in complex life forms such as us.

In **chemistry**, we still consider the fundamental building block theme but reduce it to an atomic level in the topic: **particles**. Chemistry is the study of matter so we begin by considering how **particles,** in the form of **atoms** and **molecules arrange** themselves to form different **states of matter** and explore the fascinating link between how *particle arrangement affects the behaviour of matter* – this is the very essence of what it means to be a chemist.

In **physics** we explore two founding principles that set up a secure understanding for the journey ahead: **forces** and **energy**. Both are highly abstract concepts in the sense that we cannot touch or see either but understand the principles through the effects they have on **matter** and **living organisms.**

Understanding the basics of forces and energy allows students to relate to some of the most engaging ideas in science such as the big bang theory, gravity and space travel. A secure understanding of energy will help year 7s understand the issues around the current **climate change** crisis – an issue our students have expressed a passion for.

Spring Term

Our understanding of life and survival continues with **interdependence**. In the previous topic we started with the microscopic world but now we turn to the other founding principle in biology which

we must examine on a macroscopic scale. This is **interdependence** - how organisms depend on each other and the environment for survival. In topic one, we learned how cells amass to produce complex

living organisms. Now we examine how the environment affects these living organisms and how they respond through adaptation.

In chemistry, having understood how matter can physically change state depending on the energy stored within particles, we now turn to **chemical reactions**. This a highly engaging practical topic where students get their first real taste of using a science lab in all its glory, from Bunsen burner's to hazardous chemicals, we teach students about practical technique and practical safety. They further develop their understanding of particles here by learning how, through chemical reactions, atoms **bond** to form new **compounds** while obeying the law of **conservation of mass.** Students will also develop an understanding of how to identify a chemical process compared to a physical process. They will be able to link the concept of **energy transfer** in physics to exciting chemical reactions.

In physics, students continue to develop their understanding of energy through **electricity**. Our command of electricity defines our modern lifestyle and, having had some experience at KS2, this topic is familiar to them yet we open up a new level of challenge. They will learn about the origins of electricity and how to problem solve and experiment with simple mathematical relationships that they can practically test. Electricity also serves as an excellent topic to reinforce **energy transfer**, further embedding last term's learning.

The next biology topic is one of the **grand ideas** in our science curriculum - we bring together the microscopic and macroscopic world by teaching **evolution**. Here we learn how **single-celled life forms** have developed over time to become complex **multicellular organisms** under the direct influence of their **environment**. It is an accessible and highly engaging idea for students to sink their teeth into. It also allows students to consider the popular year 7 **reproduction** topic in a more scientific light – how does nature solve the reproductive puzzle where microscopic amounts of genetic material carried in **cells** by two parent organisms needs to fuse to make life possible. Evolution asks students to deeply consider how **multicellular organisms** interact with their **environment** in order to survive and reproduce so life may propagate.

Summer Term

In chemistry students learn about **acids and alkalis.** This topic allows students to engage in colourful practical investigations that highlight a fundamental role of a chemist – using practical techniques to identify substances – a nod to science in the work place. Acids and bases, as well as being accessible due to students having prior knowledge of acids, builds upon their knowledge of **particles** and **chemical reactions** as acid and base reactions involve the production of **chemical**

compounds through **particle** collisions. Students can also relate this topic to **food and digestion** due to links with stomach acid and indigestion.

In biology we learn about **nutrition**. While it links to the theme of life and survival in terms of what nutrients do living organisms need to sustain themselves and how they are **adapted** to eat specific

foods, there are strong links to chemistry as we look at how the rate of **chemical reactions** are affected by **enzymes** and how **acids and alkalis** play an important role in digestion. Food also links to

particles and **chemical reactions** as digestion is the breaking down of chemical **compounds** in order to make new ones.

In physics students learn another **grand idea** – **the big bang**. This is a highly engaging idea that asks students to consider, where did matter come from? Was there a beginning? The big bang unites the ideas of **forces** and **energy** while also making links to chemistry, in the form of **conservation of mass,** and the **environment** as we consider our planet and the physics involved in governing its environmental conditions, such as its day and night cycle and seasonal changes. The big bang also introduces the concept of **gravity** as a **force** and **energy** transmitted by **waves** that are present everywhere in space.

The final **grand idea**, linked to chemistry, is **climate change**. Our students are passionate about this issue so we want to ensure they are well-informed early on in their academic development. Our climate change topic does not limit itself to global warming but rather considers the impact of industrial chemical processes on the environment, such as the amount of plastic in the oceans. We start by understanding the composition of one of our planet's chemical spheres: **the atmosphere**. The climate change unit links **particles**, **chemical reactions** and **acids** strongly as we consider how chemical reactions give rise to acidic polluting compounds. It also makes links with the **energy** unit as students consider how the sun's energy is affected by **particles** in the atmosphere. Finally climate change links to **interdependence** and **evolution** as the dramatic change in environmental conditions, due to chemical processes carried out by humans, threatens the survival of life on Earth.