Science — Key Stage 3 Curriculum Plan — Year 8

Department Information:
Science is popular and successful subjects at Furze Platt. The Department aims to provide a supportive, stimulating, dynamic and academically challenging experience for all students. Over recent years, the Department has gone from strength to strength, and standards and students' results are high. In Year 8, students will receive 6 hours of science each fortnight. This will provide the foundations for understanding the world through the specific disciplines of biology, chemistry and physics. The FP curriculum programme is based on a 2-year key stage 3 scheme of work separated into separate science topics as detailed below. Through building up a body of key foundational knowledge and concepts, pupils are encouraged to recognise the power of rational explanation and develop a sense of excitement and curiosity about natural phenomena. In FP all students are encouraged to understand how science can be used to explain what is occurring, predict how things will behave, and analyse causes.

ACHIEVE in the curriculum:
The curriculum has been designed with the ACHIEVE values at its core. Lessons have been written to encourage ambition through careers links and highlighting historic role models and pioneers in science. They have also been written with the intent of being enjoyable and giving opportunities for students to celebrate their own successes. Collaboration is a key aspect of the scientific method and students will develop this and their versatility using class practical activities, as well as through paired and group theory work. Students will develop integrity through their completion of independent home learning and through self-marking and peer-marking their work.

Curriculum Aims & Intent:
The content is rooted in academic subject material as it is developed by subject specialists with the view to ensure progression from key stage 2 to 3 to 4 to 5. As many of our students study at least 1 science at A Level and many proceed to science related careers, all schemes of work have academic rigour to support, stretch and extend all students.

The course is designed to ensure that all pupils:

- *develop **scientific knowledge and conceptual understanding** through the specific disciplines of biology, chemistry and physics*
- *develop understanding of the **nature, processes and methods of science** through different types of science enquiries that help them to answer scientific questions about the world around them*
- *are equipped with the scientific knowledge required to understand the **uses and implications** of science, today and for the future.*

All topics are separate science specific, except the very first Year 8 Introduction to Science topic (4 lessons). This unit recalls scientific attitudes, experimental skills, analysis and evaluation as well as measurement. The Topic order and Delivery supports Technician workload. We have split the topic order in groups of three with one Biology, one Chemistry and one

Resources:
Textbooks: Oxford University Press Smart Activate 1 &2, Teacher and Student book (available online via Kerboodle),
Websites: BBC Bitesize, Educake (online assessments platform) Developing experts (useful for carriers in STEM), Focus eLearning (useful for practical work)

How The Work Is Assessed
Assessment materials are built into the schemes of work. Lesson plans and PowerPoints have assessment interwoven in them including starters to check what students already know, and plenaries/quizzes to check during and at the end of the lesson, what they have learnt to inform teacher's future planning of lessons and give the opportunity to address misconceptions immediately. Additional quizzes and activities are often available in the lesson plan folders for optional use with whole class or individual students to support or extend as appropriate and assess their understanding. The PowerPoints can be adapted by individuals, but the theory contained is designed to be used with all students to ensure all students cover this core knowledge. Model answers are given for some work and mark schemes are shared when appropriate to aid understanding and exam technique.
Possible questions are often included on PowerPoints and teachers notes to check and develop understanding and the application of the knowledge to different situations. Recent school training on questioning techniques including use of waiting time, cold

Physics topic in each group. Each group of three topics lasts approximately 10 weeks. The sets of three topics should be taught in the order given to ensure appropriate sequencing of concepts within Biology, Chemistry and Physics topics, but within each set, the order is decided by the Head of KS3 in liaison with the technicians. This ensures conceptual order but avoids all teachers doing the same topic/practical at the same time to aid technician workload and access to practical equipment. For example, the first group could start with biology, the secondary with chemistry, etc. FP often has two teachers per group so they will teach two of the topics within this group of three topics. This maximises the hands-on practical experience each student experiences.	*calling, thumbs up/down, use of individual whiteboards, etc are interwoven into lessons to check the understanding of all students within the lesson. End of topic tests and mark schemes are available for all topics.*

How we keep parents informed: *Year 8 - Progress reports are published 4 times per year, in October, December, March and July, with a face-to-face parents' evening in March.*	**How parents can help their child:** *Regularly check Class Charts to keep track of homework that has been set and make sure that test dates are noted.* *Assist with homework where possible and make sure that students are revising for tests using revision guides, Kerboodle and BBC Bitesize.* *Liaise with teachers and attend Parents' evening.* *Secure copies of the Oxford University Press Smart Activate 1 &2, Teacher and Student books.* *Encourage students to create and use revision resources for their current and previous learning, such as flash cards, and to source notes and attempt exam style questions via the Developing experts website.*

What we study and when:

Unit, Topic Or Summary Of Work Covered	Knowledge, Understanding & Skills Developed	ACHIEVE / Personal Development Focus	Careers Links
CA: This unit explores the fundamental concepts of elements, compounds, and chemical reactions, focusing on the physical and chemical properties of metals and nonmetals, and their interactions as part of the broader understanding of matter and its transformations.	The major aims of this unit are for students to: • Understand the distinctions between metals, non-metals, and metalloids, including their physical and chemical properties. • Comprehend how elements are organized in the Periodic Table and the significance of their placement. • Identify and describe different types of chemical reactions, including decomposition, neutralisation, and displacement reactions.	This topic's pioneer is **Dmitri Mendeleev**. His contributions extend beyond the Periodic Table. He also made significant advancements in metrology and was a pioneer in the oil industry, studying the nature and uses of petroleum. His broad scientific work and particularly his development of the Periodic Table have left a legacy, making him one of the key figures in the history of science.	**Materials Science:** This field involves studying the properties of materials to invent new products or enhance existing ones. Understanding the properties of metals and non-metals can lead to innovations in everything from aerospace to electronics.

	• Explain the principles of conservation of mass in chemical reactions and the concepts of endothermic and exothermic reactions. • Write and balance chemical equations and develop chemical formulae for compounds.		
ES: This unit aims to explore the dynamic processes and interactions within Earth's geosphere and atmosphere, examining the types and transformations of rocks, the impact of human activities on global systems, and strategies for sustainable resource management.	The major aims of this unit are for students to: • Understand the formation and classification of igneous, sedimentary, and metamorphic rocks and explain the rock cycle as a system of processes that recycle rocks. • Evaluate the uses and impacts of finite and renewable resources, understanding the environmental and economic implications of their extraction and use. • Analyse the environmental effects of burning fossil fuels, including contributions to global warming, acid rain, and their impacts on ecosystems and human health. • Discuss the formation and environmental impact of ozone, and the role of human activity in the creation and mitigation of ozone depletion. • Identify global health issues related to environmental change, including the effects of invasive species, river pollution, microplastics, and the principles behind ecological restoration efforts.	This topic's pioneer is **Rachel Carson.** An American marine biologist, author, and conservationist whose work revolutionized the global environmental movement. Her legacy is evident in the ongoing discussions and policies on environmental stewardship and sustainable practices, directly tying into the themes discussed in the chapter on finite and renewable resources, impacts of human activity on global systems, and strategies for sustainable management.	**Environmental Scientist:** Studies the effects of human activities on ecosystems, develops strategies to address environmental problems, and works on policies to protect natural resources.
BA: This unit aims to deepen students' understanding of the fundamental principles of nutrition, digestion, gas exchange systems, and health, illustrating how these elements are crucial to the functioning of living	The major aims of this unit are for students to: • Understand the components and functions of the digestive system. • Describe the process of gas exchange in humans and its significance. • Recognize the relationship between diet, lifestyle choices, and health.	This topic's pioneer is **Dr. Patricia Bath**. She was an African American physician, inventor, and advocate for blindness prevention and treatment. Her pioneering contributions to medical technology and her commitment to equality in health care access have left a lasting legacy in the fields of ophthalmology and public health.	**Dietitians and Nutritionists:** Knowledge of nutrition and digestion is essential for advising on diets that promote health, manage

organisms and their environments.	• Explain how the respiratory system is structured and how it functions. • Assess the impact of diseases on the digestive and respiratory systems.		diseases, and support recovery from illnesses.
BB: The purpose of this unit is to explore fundamental biological processes and phenomena, such as photosynthesis and cell functions, alongside an introduction to microbes and disease, providing students with a comprehensive understanding of both plant and human biology.	The major aims of this unit are for students to: • Understand the process of photosynthesis and its importance to life on Earth. • Describe the structure and function of various cell types and organelles. • Identify different types of microbes and their roles in both beneficial and harmful contexts. • Explain how diseases are caused, how they spread, and the body's defences against them. • Evaluate the impact of scientific discoveries on the understanding and treatment of diseases.	This topic's pioneer is **Dr. Tu Youyou**. Despite facing the challenges of living through wartime and suffering from tuberculosis during her teenage years, Tu pursued a career in pharmaceutical sciences. Her work is a stellar example of how integrating traditional knowledge with modern scientific research can lead to significant medical breakthroughs, emphasizing her role as a pioneering figure in pharmacology and global health.	**Public Health Official:** Utilizing knowledge of disease and microbes to create strategies for disease prevention and health promotion in communities.
PA: This unit aims to explore how energy is stored, transferred, and transformed in different systems, and how these principles can be applied to calculate fuel uses and costs in domestic settings.	The major aims of this unit are for students to: • Understand the different forms of energy and how energy is conserved in closed systems. • Analyse energy transfer methods (e.g., conduction, convection, radiation) and their efficiency. • Calculate the energy used in domestic settings and the cost implications of various fuel types. • Explore the impact of energy use on the environment and ways to reduce carbon footprint. • Apply scientific principles to solve real-life problems related to energy conservation and cost-efficiency.	This topic's pioneer is **Lewis Howard Latimer.** He was a pioneering African American inventor, engineer, and draftsman who made significant contributions to the development of the electric light bulb (in collaboration with Graham Bell) and early telephone technology. He also invented the first toilet that could be used in trains and an air-cooling system (forerunner to the modern air conditioner).	**Electrical Engineer:** Developing and improving electrical devices and systems, including those used in energy generation, distribution, and optimisation.
PB: This unit explores the properties and behaviours of	The major aims of this unit are for students to:	This topic's pioneer is **Abu Ali al Hasan ibn al-Haytham,** known in the west as Alhacen or	**Lighting Technician:** Lighting technicians

different types of waves, including sound and light, and illustrates how energy is transferred through these waves, enhancing understanding of both natural phenomena and technological applications.	• Understand the characteristics and classifications of waves and identify examples of each. • Explain how sound waves are generated, transmitted, and received, including the effects of different mediums on sound propagation. • Describe the wave model of light and how it explains reflection, refraction, and colour. • Investigate the principles of optics and how lenses and mirrors affect light. • Analyse how energy is transferred and transformed in wave phenomena.	Alhazen. His contributions were not only foundational in the development of optics but also had a profound influence on European scientists like Johannes Kepler, Roger Bacon, and Leonardo da Vinci, helping bridge classical science to the Renaissance. His insistence on empirical evidence and his development of early scientific methods also laid crucial groundwork for the later scientific revolution in Europe.	apply this knowledge to manage lighting in theatre, film, television, and live events, ensuring the visual aspects meet the artistic requirements.