Science Key Stage 3 Curriculum Plan Year 7

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 7, 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 7 Introduction to Science topic (8 lessons). This unit introduces the student to scientific attitudes, experimental skills, analysis and evaluation as well as

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. There are three possible baseline tests available in the first 'Introduction to science' topic to find out what the students have covered/understood in their previous schools so teachers can plan future lessons taking this into account.
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

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 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.

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 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 7 - Progress reports are published 4 times per year, in October, December, March and July, with a face-to-face parents' evening in May.

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: In this unit, we explore the different states of matter: solids, liquids, and gases. We investigate their properties, how they change from one state to another, and the particle theory that explains these changes. We also learn about concepts such as density, Brownian motion, diffusion, and	The major aims of this unit are for students to: • Describe the particle theory and how it explains the properties of solids, liquids, and gases. • Explain the processes of melting, boiling, condensation, freezing, and sublimation in terms of particle behaviour. • Compare and contrast the properties of solids, liquids, and gases.	This topic's pioneer is **Robert Boyle**. Boyle studied the work of Richard Towneley and Henry Power, whose work first suggested a relationship between pressure and volume. Boyle was the first however to apply the scientific method to this and experimentally verify his findings. They were then published R. Boyle, A Defence of the Doctrine Touching the Spring and Weight of the Air, … (London: Thomas Robinson,	**Meteorologist:** Meteorologists study the atmosphere and weather patterns, which are influenced by the behaviour of gases, pressure systems, and diffusion processes. The movement of gases,

air pressure. Practical work contains experimenting with melting and boiling points, model building to represent particles and cross curricula disciplinary experiment by creating a digital simulation of particle movement.	• Understand the concepts of diffusion and gas pressure in various contexts. • Identify and explain the significance of melting points and boiling points for different substances.	1662). His apparatus was constructed by famous scientist and architect, Robert Hooke.	changes in air pressure, and humidity (liquid-gas transition) are key concepts in weather forecasting.
CB: This unit aims to explore the fundamental properties and behaviours of matter across different states, emphasizing practical applications and theoretical understanding through experimental investigations and problem-solving. Practical work contains experimenting with melting and boiling points, model building to represent particles, using separation techniques to separate mixtures.	The major aims of this unit are for students to: • Understand the basic particle theory and how it explains the properties and behaviours of solids, liquids, and gases. • Describe and interpret heating and cooling curves, recognizing phase changes and their implications on temperature and energy. • Explain the processes and principles behind diffusion, gas pressure, and how temperature and volume affect gases. • Demonstrate knowledge of separation techniques including filtration, distillation, and chromatography, and understand their practical applications. • Analyse the effects of factors influencing evaporation, condensation, and solubility in the formation of solutions and mixtures.	This topic's pioneer is **Ludwig Boltzmann**. His groundbreaking work is directly connected to modern understanding of the states of matter, particle behaviour, and the statistical nature of physical systems, all of which are critical to the concepts explored in this unit.	**Analytical Chemist**: Analytical chemists rely on separation techniques (such as chromatography and distillation) to analyse substances in labs. They measure physical properties like melting/boiling points to identify and quantify components in mixtures.
BA: This unit aims to explore the complexities of reproductive systems, cell division, and developmental processes in both plants and animals, highlighting the biological mechanisms that sustain life and ensure species continuity. Practical work includes microscopy of cells, modelling cell division, dissection of flowers and investigation of plant germination,	The major aims of this unit are for students to: • Understand the structure and function of different organ systems in animals and plants, and how these systems contribute to the organisms' survival and reproduction. • Describe the processes and significance of cell division and the roles in growth, reproduction, and genetic diversity. • Explain the stages of human development from fertilisation through	This topic's pioneer is **Barbara McClintock**. Won the Nobel Prize for physiology or Medicine in 1983, the first woman to be the sole winner of the award. Barbara McClintock's discoveries are fundamental to the study of reproductive systems, cell division, and developmental processes in plants and animals, making her a key figure in the understanding of genetic mechanisms that sustain life and ensure species continuity.	**Horticulturist**: Horticulturists work with plant breeding, cultivation, and reproduction, often focusing on improving plant species through controlled breeding programs and genetic selection. Their work involves understanding plant reproductive

simulations of population genetics.	to adolescence, including key changes during puberty. • Compare and contrast reproductive strategies and processes in plants and animals, emphasizing adaptations to environment and species survival. • Analyse the menstrual cycle and its role in human reproduction, understanding hormonal regulation and its effects on the body.		systems and developmental processes.
BB: This unit aims to explore the complex interactions between organisms and their environments, emphasizing the principles of adaptation, survival, and genetic variation. BB unit contains 14 lessons including mid topic marking point, revision, test and feedback. Practical work includes observing and identifying organisms, investigating food chains, examining plant and animal adaptations.	The major aims of this unit are for students to: • Students will understand the various factors that define different habitats, and the adaptations organisms have developed to survive in them. • Students will be able to describe and analyse food chains and webs, understanding the flow of energy between organisms. • Students will explore how environmental changes impact ecosystems and the importance of biodiversity. • Students will learn about genetic principles, including inheritance and variation among species. • Students will classify and differentiate between vertebrates and invertebrates, recognizing their roles within ecosystems.	This topic's pioneer is **Jeanne Altmann.** Altmann created and developed the Amboseli Baboon Research Project (ABRP), looking at the behavioural ecology of baboons that range in and near Amboseli National Park, Kenya. She was one of the first researchers to study primate mothers and studies the effects of genes on parenting and mating.	**Conservation Biologist**: Conservation biologists focus on protecting endangered species and habitats. They use their knowledge of genetic variation, adaptation, and food webs to develop strategies to prevent extinction and preserve biodiversity.
PA: This unit aims to the fundamental principles of electricity and magnetism, focusing on understanding and applying concepts of circuits, current, resistance, and magnetism in practical and theoretical contexts.	The major aims of this unit are for students to: • Describe the components and functions of simple electrical circuits, including series and parallel configurations. • Explain the relationship between voltage, current, and resistance in a circuit using Ohm's Law. • Understand the generation and implications of magnetic fields, and how	This topic's pioneer is **Nicola Tesla**. Tesla's contributions are closely tied to concepts like **circuits, current, resistance, and electromagnetism**, and his work has had a lasting impact on the practical applications of electricity, such as power generation and transmission, which are central to this unit. His pioneering efforts are critical to the electrical systems we use today.	**Magnetic Resonance Imaging (MRI) Technician:** MRI technicians operate MRI machines, which rely on strong magnets and the principles of electromagnetism to produce images of the

Practical work contains building simple circuits, investigating Ohm's Law, building an electromagnet, testing materials for electrical conductivity and exploring magnetic fields.	they interact with electrical currents and materials. • Investigate the properties and applications of electromagnets and their difference from permanent magnets. • Demonstrate practical skills in constructing circuits, creating electromagnets, and exploring magnetic effects in lab activities.		human body. They need to understand how magnetism and electrical fields interact.
PB: This Unit explores the fundamental principles of forces and the solar system, enabling students to understand the interactions and effects of different forces, as well as the celestial mechanics that govern our universe. Practical work contains mass vs weight experiments, friction investigation, density column and modelling the solar system.	The major aims of this unit are for students to: • Understand the difference between mass and weight and how gravity influences both. • Explain the effects of different forces, such as thrust and friction, on the motion of objects. • Describe the structure of the solar system, including the roles and relative motions of its celestial bodies. • Understand and describe the phenomena of seasons, day and night, and moon phases. • Calculate density and understand its practical implications in real-world scenarios.	This topic's pioneer is **Sir Isaac Newton**. Newton's work is foundational to understanding the **forces** that govern everyday life on Earth, such as **friction**, **mass vs weight**, and the effects of force and motion. It also explains the **celestial mechanics** that govern the movements of planets and other bodies in the **solar system**. His contributions are critical to both practical experiments and theoretical understanding in this unit.	**Planetary Geologist:** Specialists in this field study the composition, structure, and history of planets and moons in the solar system, often analysing data from space missions.