

Science Phase One (KS3) Curriculum



Overview:

By the end of KS3, we aim for students to have a broad and balanced knowledge of key topics that encourage the exploration and understanding of the world around them. The curriculum aims to encompass the national curriculum and follow a spiral structure, constantly building upon prior knowledge in order to reinforce understanding at a deeper level. We aim for our students to develop into confident, resilient, and reflective learners who enjoy science and move on and up to be successful at GCSE, of which we begin in year 9.

We ensure that we also prepare students in both practical and mathematical skills, for them to fully access the curriculum and explore investigations scientifically. Additionally, we begin to expose all learners to ambitious career pathways and develop their confidence in making informed decisions regarding financial, social, ethical, and political issues through the discussion of 'THINK Big Questions'.

Content:

	Term 1	Term 2	Term 3	Term 4	Term 5	Term 6
Year 7	<p>Biology - The differences between species, how cells build up to organisms and how to use a microscope</p> <p>Chemistry – How we experience different states of matter and how matter is composed of atoms, compounds and mixtures.</p> <p>Physics – How we experience forces, moments and how to measure them.</p>	<p>Biology – Our digestive system, the effects of a healthy diet, and how poor diet can impact health.</p> <p>Chemistry – Introduction to the periodic table of elements, and the chemical and physical properties of those elements.</p> <p>Physics – How we experience speed, motion and how to measure and record the speed of objects.</p>	<p>Biology – The role of diffusion in the body. gas exchange in the lungs and the effects of smoking and lung damage.</p> <p>Chemistry – An introduction to basic chemical reactions, including how we represent them and the different types.</p> <p>Physics – How we experience gravity. Measuring weight as a force, mass and the effect of mass on different planets.</p>	<p>Biology – The structure and function of the skeleton, including joints and looking at the heart.</p> <p>Chemistry – In this topic we look in depth at acids, alkali and neutralisation.</p> <p>Physics – In this topic we take a look at magnets and their effects. We also look into space and the structure of our solar system.</p>	<p>Biology – We look at flowers, plants and their importance to us.</p> <p>Chemistry –We discover what the Earth is made out of and we look at the rock cycle.</p> <p>Physics – We look at waves and their effects in mechanical situations, such as light, water and other vibrations.</p>	<p>Biology – In this topic, we look at the different transport systems in both animals and plants. This includes the circulatory system.</p> <p>Chemistry – We look at word equations in more detail focusing on displacement reactions and thermal decomposition</p> <p>Physics – We continue with the theme of waves and now look in more detail at sound waves and how echoes work</p>
	<p>Year 7 sees the introduction of a variety of aspirational careers such as chemists, aeronautical engineers, zoologists and dieticians. Students are also given the opportunity to discuss the Think Big Questions, 'should cloning become legalised?', and, 'who really benefits from the increase on cigarette tax?'</p> <p>Disciplinary knowledge is developed throughout the curriculum, with students being given the opportunity to plan and carry out investigations using microscopes, Bunsen burners and Newton meters.</p>					

<p style="text-align: center;">Year 8</p>	<p>Biology – In this topic we look at reproduction, including the menstrual cycle, gestation and birth. Chemistry – We recap and build upon our work with the periodic table further investigating properties. Physics – In this topic we continue with the theme of waves and now compare them to electromagnetic waves.</p>	<p>Biology – In this topic we look at the leaves and how they are adapted for photosynthesis. Chemistry – Here we look at elements, compounds and mixtures in greater detail, as well as a variety of separation techniques. Physics – We look at the particle model including its limitations, as well as chemical and physical changes.</p>	<p>Biology – In this topic we focus on photosynthesis and how the leaf is adapted to help this process Chemistry – We look in depth at different method of separating mixtures including filtration and chromatography Physics – In physics this term we look at the states of matter, chemical and physical changes and density.</p>	<p>Biology – In this term we look at enzymes and how they function in both plants and animals Chemistry – We look in depth at the composition of the atmosphere and the carbon cycle. Physics – In physics this term we look at the transfer of thermal energy as well as the different types of energy stores.</p>	<p>Biology – We look at food chains, webs and the interdependence of organisms. Chemistry – at this point we look at the reactivity series and the use of carbon to refine metals. We also look at recycling Physics – In physics we look at series and parallel circuits, and the relationship between current, voltage and resistance.</p>	<p>Biology – We look at the work of Watson, Crick and Franklin. DNA mutations, and the importance of gene banks. Chemistry – In this topic we discover the properties of gases and their application. Physics – We look at the mechanics of the eye and the interactions of light, colour and reflection. We also look at the ear and how ultrasound is used</p>
<p>Year 8 sees the introduction of a variety of aspirational careers such as chemists, opticians, pharmacists, medical engineers, and forensic scientists. Students are also given the opportunity to discuss the Think Big Questions, ‘At what point in a pregnancy is a foetus considered as a human life?’, and ‘Do schools have a responsibility to ensure that students partake at least two hours of exercise per week?’</p> <p style="text-align: center;">Disciplinary knowledge is developed throughout the curriculum, with students being given the opportunity to plan and carry out investigations using prisms, ray boxes and limewater.</p>						
<p style="text-align: center;">Year 9</p>	<p>Biology – In this topic we learn about Evolution. Building on students’ knowledge of DNA, we will explore how mutations lead to genetic variation within a species Chemistry – Here we recap on reactions between acids and alkalis. Students learn how the salt formed depends on the acid and alkali Physics – In this topic students will explore the behaviour of light when it encounters a range of different mediums with different properties.</p>	<p>Biology – Students will develop their understanding of body systems by examining the nervous system and how it responds to stimulus. Chemistry – Students will bring all their knowledge on chemical reaction together and are introduced to balancing symbol equations. Physics – Electricity units will be revisited here. Students will construct series and parallel circuits, the advantages and disadvantages of each will be explored.</p>	<p>At this stage we start GCSE content with the students building on their knowledge from KS3.</p> <p style="text-align: center;">Unit B1</p> <p>The golden thread of organ systems built in KS3 continues and is explored more deeply as we start to look at the structure of animal, plant, and bacterial cells. We look at different types of microscopes and how they are used before looking deeply at the structure of DNA. The first Biology unit finishes with building on from KS3 topics on enzymes, respiration and photosynthesis. This unit</p>	<p style="text-align: center;">Unit C1</p> <p>In the first chemistry unit we build on the golden thread of chemical reactions explored in KS3. This unit focuses on atomic structure, the history of the atom and explaining what isotopes and ions are.</p> <p>This unit allows students to develop their maths skills by using standard form when discussing the size of atoms.</p>	<p style="text-align: center;">Unit P1</p> <p>In the first physics unit we explore the golden thread of energy and forces in more detail, building from their knowledge in KS3.</p> <p>The unit focuses on density and how this can be calculated before looking at energy changes and pressure in detail.</p> <p>This unit allows students to develop their maths skills by calculating density and using appropriate equipment to record accurate data for a</p>	<p style="text-align: center;">Unit B2</p> <p>continues with the golden thread of organ systems. Content from KS3 is explored more deeply here, ranging from cell structures to gas exchange. Students are introduced to the specific blood vessels in the circulatory system, looking at how each one is adapted for its function. The components of the blood are also explored, alongside the structure of the heart.</p> <p>This unit allows students to develop their maths skills when calculating surface area to volume ration in multicellular structures such as the alveoli and intestines.</p>

			allows students to develop their maths skills by calculating magnification and converting between units		range of experiments including specific heat capacity.	
	<p>During the unit 1s of GCSE content, students are re-introduced to the aspirational careers of pharmacist and chemists, whilst additionally exploring the roles of veterinarians and electricians. They are given opportunities to develop their cultural capital with the THINK Big Question “Should cloning become legalised”, “Why is it vital that scientific research and data is peer reviewed before publication?” and “Should we be worried about the effects of climate change on our atmosphere?”.</p> <p>During B2, students are introduced to the aspirational career of cardiologist, and given opportunities to develop their cultural capital with the THINK Big Question ‘is it ethical to use embryonic stem cells if it enables millions of lives to be saved?’</p> <p>Disciplinary knowledge is developed throughout the curriculum, with students being given the opportunity to plan and carry out investigations using microscopes, immersion heaters, voltmeters and ammeters.</p>					

Who to contact about KS3 Science:

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