

Science Curriculum Plan Overview

It is our intention at KS3 is to enthuse students with an appreciation of science learning and allow them to discover how things work. We aim to provide a grounding in Biology, Chemistry and Physics as well as looking at scientific problem solving and use of evidence to develop theories and explanations.

The emphasis on investigation skills is important as not only is this an essential skill for scientists as this is how the scientific model has allowed humans to develop as a society, it is also a great transferrable skill that will help the students in other areas of their education.

The curriculum intends to make students more aware of their own place in the world and universe; also, how their bodies work and the role of science in society and how science is critical to our modern world. The impact and measure of our science curriculum is to ensure students not only acquire the appropriate age-related knowledge linked to the curriculum, but also skills which equip them to progress from their starting points, and within their everyday lives. To maximise opportunities for practical work and to keep students engaged, topics are rotated on a termly basis.

Our science curriculum aims to equip students with:

- A wider variety of skills linked to both scientific knowledge and understanding, and scientific enquiry/investigative skills;
- A richer vocabulary which will enable them to articulate their understanding of taught concepts; and
- High aspirations, which will see them through to further study, work and a successful adult life

Year 1	1 Biology	2 Chemistry	3 Physics	4 Biology	5 Chemistry	6 Physics
	<p><u>The skeletal and muscular systems and gas exchange systems.</u></p> <p>This unit begins with describing the structure and function of our skeleton. The unit then moves towards the relationship between bones and muscles, concluding with opportunities to explain the function of muscles and how they work in pairs. Following on from this, students will go on to explore gas exchange systems in both humans</p>	<p><u>Atoms and Particles</u></p> <p>This unit will cover the fundamentals of chemistry. Using the particle model, students will describe states of matter and explain changes of state. Later in this topic students will explore how mass is conserved in chemical reactions. Areas of focus will include:</p> <ul style="list-style-type: none"> - The states of matter using the particle model 	<p><u>Electricity and magnetism</u></p> <p>This unit is a solid introduction to electricity and magnetism. Although a lot of these ideas are covered in the primary curriculum, there is likely to be a large disparity in knowledge between learners. Areas of focus will include:</p> <ul style="list-style-type: none"> - How objects become charged - Describe an electric field 	<p><u>Nutrition, health and digestion</u></p> <p>This unit begins by exploring different food groups, and the role they play within a balanced diet. The importance of diet linked to the function of our digestive system is the next focus, with students being able to name digestive processes. Within the unit, there is also an emphasis on plants, to consider the importance of plants to our health. Finally, learners can identify the issue of drug-taking, and</p>	<p><u>Chemical reactions</u></p> <p>In this unit students will learn about chemical reactions such as combustion: thermal decomposition; oxidation; displacement; acid and metals; neutralisation. Ensuring learners are confident with identifying specific reactions is a key element of this topic. Areas of focus will include:</p> <ul style="list-style-type: none"> - Chemical reactions as the rearrangement of atoms 	<p><u>Energy and heat</u></p> <p>In this unit, the first lesson, the law of conservation of energy, is very important and will be referred to throughout. Students must understand this concept as all the other energy lessons are based on this physical law. Areas of focus will include:</p> <ul style="list-style-type: none"> - The law of conservation of energy

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and plants. They will focus on the human lungs, helping them understand the function of the lungs and also undertaking a task to measure their own lung capacity. Areas of focus will include:

- The structure and four functions of the human skeleton
- The four main types of joints.
- What type of movement each type of joint offers
- What antagonistic muscle pairs are
- To calculate how much force muscles use to lift different masses
- The structure and function of the respiratory system
- The structure and functions of the gas exchange system in humans, including

- Changes of state using particle model
- Gas pressure using a particle model
- Discuss how ideas about the atom have changed
- Analyse the difference between atoms, elements and compounds
- Represent chemicals with symbols and formulae
- Explain how mass is conserved in chemical reactions

- Electric circuits
- Series and parallel circuits
- The role of voltage
- The causes and effects of electrical resistance
- Electrical conductors, insulators and semi-conductors
- Properties of a magnet
- The shape of a magnetic field
- How to build an electromagnet

the effects it has on our body and others. Areas of focus will include:

- The seven nutrient groups
- Food tests
- The contents of a healthy diet
- The effects of an unhealthy diet
- The digestive system
- The role of gut bacteria
- Differences between medicinal and recreational drugs
- The impact recreational drugs have on health

- Oxidation
- Chemical reactions using equations
- Outline the combustion reaction
- Outline thermal decomposition
- The conditions required for a displacement reaction
- The PH scale and how PH is measured
- The reactions of acids with metals
- The role of catalysts in chemical reactions

- Energy transfers and transformations
- Renewable and non-renewable energy resources
- Calculate the cost of electricity
- How heat is transferred through, solids, fluids and as light
- How heat can be controlled with insulators

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	<p>adaptations to function</p> <ul style="list-style-type: none"> - Factors that affect lung capacity 					
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Year 2	1 Biology	2 Chemistry	3 Physics	4 Biology	5 Chemistry	6 Physics
	<p><u>Ecosystems and Evolution</u></p> <p>This unit covers complex concepts and relates the fundamentals of cell biology to the complexity and intricacy of ecosystems. Some complex concepts include evolution by natural selection, bio-accumulation, food webs, genetic structures, interdependence, biodiversity, data handling, and the impact changes can have on an ecosystem. Areas of focus will include:</p> <ul style="list-style-type: none"> - Competition between species - Interdependent species 	<p><u>Earth and Space</u></p> <p>This unit is a broad introduction to the structure of the Earth and its atmosphere. The unit also looks at our place within the universe, the features in our solar system, and beyond. Areas of focus will include:</p> <ul style="list-style-type: none"> - The internal structure of the Earth - The rock cycle - The composition of the atmosphere - Human activities which produce carbon dioxide - The impact carbon dioxide has on our climate 	<p><u>Matter</u></p> <p>This unit focuses on the particles model of matter, which is a very key and important concept in chemistry and physics. This unit looks at particles' physical behaviour, not chemical behaviour. Areas of focus will include:</p> <ul style="list-style-type: none"> - The difference between solids, liquids and gases. - What occurs during changes of state - How mass is conserved during a physical change - How fluids diffuse 	<p><u>Reproduction</u></p> <p>This unit explores the reproductive processes in humans and plants. Beginning with humans, learners will identify the male and female reproductive organs, using scientific vocabulary. The journey from fertilisation to birth is also studied, as well as the care required for healthy foetal development. The focus then shifts to plants, giving learners the chance to compare reproductive systems. Areas of focus will include:</p> <ul style="list-style-type: none"> - Changes during adolescence - The structures of the human reproductive system 	<p><u>Pure substances</u></p> <p>This unit is about equipping learners with chemical techniques. These centre around physical processes (i.e. distillation, filtration, chromatography), that help to separate mixtures and purify substances. Areas of focus will include:</p> <ul style="list-style-type: none"> - Substances and mixtures - How a solution is made - Diffusion in terms of the particle model - How mixtures can be separated using filtration - How mixtures can be separated using 	<p><u>Forces and Motion</u></p> <p>Forces and motion are rooted in applied problem solving, particularly quantitative problem solving. The introduction to using mathematics to solve science problems begins here. Areas of focus will include:</p> <ul style="list-style-type: none"> - Calculate speed - Distance time graphs - The effects of relative motion - The forces between 2 objects - Force arrows in diagrams

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- Ecosystems using food webs
- How toxic material accumulates in ecosystems
- Factors that affect human food security
- The importance of maintaining biodiversity
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- How genetic information is inherited
- Genetic structures
- How variation drives natural selection
- How scientists developed the DNA model
- Continuous and discontinuous variation data

- What causes acid rain and its impact on our environment
- Gravity and its role within the environment
- The orbit of the earth
- The orbit of the moon
- What stars and galaxies are
- The scale of the universe

- Compare chemical and physical changes
- How objects can be deformed
- Hooke's law
- Elastic potential energy
- Comparing pressure in liquids and gases
- Calculating surface pressure
- How density affects buoyancy

- The stages of the menstrual cycle
- Development from fertilisation to birth
- How maternal lifestyle affects foetal development
- The structure of a flower
- How plants are fertilised and seeds are formed
- Different seed dispersal techniques
- Investigating seed dispersal

- evaporation and distillation
- How mixtures can be separated using chromatography
- Separating a mixture into its component parts

- Balanced and unbalanced forces
- How a resultant force affects motion
- Describing and calculating a turning force
- Friction and how you overcome it
- What air resistance is