THE Lodge AP

— At Sandbach House —

## Year 9 Science Curriculum Sequence

## Intent

The KS3 Science curriculum is built to inspire and support every student; helping them explore science in a way that feels safe, relevant, and empowering. Our year 9 curriculum sequence focuses on developing a strong understanding of key scientific concepts across biology, chemistry, and physics, while also making connections to students' lives both locally and globally. The curriculum nurtures curiosity and confidence through hands-on investigations and real-world applications, encouraging students to think critically and engage with the natural world around them. As they progress, students build the skills needed for scientific enquiry, preparing them not only for further study but also to navigate life as informed, thoughtful individuals. By making science meaningful and accessible, we aim to open future opportunities and support students in becoming active, scientifically literate members of society.

# Year 9 Science Curriculum Sequence

| Autumn HT1 | Autumn HT2 | Spring HT1 | Spring HT2 | Summer HT1 | Summer HT2 |
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| **Forces, Speed and Gravity** | **Particles, Atoms and Rocks** | **Digestion, Breathing and Respiration** | **Heating and Cooling, Energy Costs and Work** | **Wave Effects and Properties, Earth Resources and Climate** | **Inheritance, Evolution and Photosynthesis** |
| **Intent:** Students explore the key principles of forces, including how objects interact through contact and non-contact forces such as gravity. They learn how gravity acts between Earth and objects, and how it affects weight. The topic also covers the relationship between distance, time, and speed, helping students to understand how motion is measured and represented. Through practical investigations and mathematical calculations, students develop a deeper understanding of how forces influence movement in everyday life. | **Intent:** Students develop an understanding of matter and Earth processes by exploring how substances behave and how the Earth is structured and shaped over time. They learn how the particle model explains states of matter, changes of state, and properties such as density, while also studying the rock cycle, Earth's structure, and the formation and use of natural resources. | **Intent:** Here students explore digestion, learning how food is broken down mechanically and chemically in the human body to release nutrients. In the breathing topic, they study the structure and function of the respiratory system, including gas exchange in the lungs. Respiration introduces students to the process by which energy is released from food, comparing aerobic and anaerobic respiration and their roles in everyday activities. | **Intent:** Students learn about heating and cooling by exploring how thermal energy is transferred through conduction, convection, and radiation, and how insulation can reduce energy loss. In energy costs, they examine how energy is used in the home, how to calculate power and energy usage, and the importance of energy efficiency. The work topic helps students understand how forces do work when they cause movement, and how to calculate work done and energy transferred. | **Intent:** Students study wave effects and properties by exploring how waves transfer energy, including the behaviour of light and sound waves, reflection, refraction, and how waves are used in communication. The Earth resources topic looks at the finite nature of natural resources, the importance of recycling, and sustainable use of materials. In climate, students examine how human activities impact the Earth's atmosphere, the science behind climate change, and the importance of reducing our environmental footprint. | **Intent:** Aligned with the Key Stage 3 National Curriculum for Science, students explore inheritance by learning how genetic information is passed from parents to offspring, including variation and the role of DNA. In evolution, they examine how species change over time through natural selection and the evidence that supports evolutionary theory. The photosynthesis topic focuses on how plants use sunlight to produce food, the importance of this process for life on Earth, and how it links to ecosystems |
| **Intended Skills and Outcomes:** The below 'I can' statements clarify what students will be able to do by the end of this unit.<br>• I can explain what a resultant force is.<br>• I can explain what equilibrium is.<br>• I can describe how a force can change the shape of an object.<br>• I can explain what happens when an object is stretched or compressed.<br>• I can explain the difference between mass and weight.<br>• I can describe how weight depends on both mass and gravitational field strength.<br>• I can calculate weight using gravitational field strength.<br>• I can compare the gravitational field strength on Earth (10 N/kg) and the Moon (1.6 N/kg). | **Intended Skills and Outcomes:** The below 'I can' statements clarify what students will be able to do by the end of this unit.<br>• I can explain that all matter is made of tiny particles.<br>• I can describe the differences between solids, liquids and gases.<br>• I can explain changes of state: melting, freezing, boiling, condensing and evaporating.<br>• I can define density.<br>• I can explain the idea of conservation of mass during changes of state.<br>• I can use the particle model to explain everyday phenomena (for example, diffusion, dissolving, or why gases can be compressed).<br>• I can name the layers of the Earth & describe their properties.<br>• I can explain how scientists know about the structure of the Earth.<br>• I can name the three main types of rock & describe how they are formed.<br>• I can explain how rocks change over time in the rock cycle.<br>• I can describe what weathering and erosion are and explain the difference.<br>• I can give examples of physical, chemical and biological weathering. | **Intended Skills and Outcomes:** The below 'I can' statements clarify what students will be able to do by the end of this unit.<br>• I can describe what a balanced diet is.<br>• I can name the main nutrients and explain why the body needs these nutrients.<br>• I can name the main organs of the digestive system.<br>• I can explain how the digestive system breaks large food molecules into small, soluble molecules.<br>• I can describe how digested molecules are absorbed into the blood and transported to cells.<br>• I can describe what happens during gas exchange in the lungs.<br>• I can explain how oxygen enters the blood and carbon dioxide leaves it.<br>• I can explain why oxygen is needed for respiration.<br>• I can describe how the rib muscles and diaphragm cause breathing in and breathing out.<br>• I can explain why breathing rate increases during exercise.<br>• I can explain how the amount of oxygen needed by cells affects breathing rate.<br>• I can describe respiration as a chemical reaction in cells.<br>• I can state the word equation for aerobic respiration.<br>• I can explain why cells need energy for life processes. | **Intended Skills and Outcomes:** The below 'I can' statements clarify what students will be able to do by the end of this unit.<br>• I can explain that the thermal energy of an object depends on its mass, temperature and the material it is made from.<br>• I can describe how energy transfers from a hotter object to a cooler one.<br>• I can explain that energy transfer continues until both objects reach the same temperature.<br>• I can name the three ways thermal energy is transferred.<br>• I can explain how conduction transfers energy through particles.<br>• I can explain how convection transfers energy in liquids and gases.<br>• I can describe how radiation transfers energy without particles.<br>• I can state how electrical energy is measured.<br>• I can calculate the energy transferred using power and time.<br>• I can name different energy resources used to generate electricity.<br>• I can describe the advantages and disadvantages of renewable and non-renewable resources.<br>• I can explain why a mix of energy resources is used.<br>• I can explain that work is done when a force moves an object.<br>• I can explain how machines make work easier by reducing the force needed.<br>• I can describe how levers, pulleys and wheels help by increasing distance or reducing friction. | **Intended Skills and Outcomes:** The below 'I can' statements clarify what students will be able to do by the end of this unit.<br>• I can explain that waves transfer energy without transferring matter.<br>• I can describe how particles move back and forth as a wave passes.<br>• I can explain that waves with a higher amplitude or frequency transfer more energy.<br>• I can describe how a transverse wave moves.<br>• I can explain that the material the wave travels through does not move along with the wave.<br>• I can define wavelength, frequency and wave speed.<br>• I can describe what happens when a wave is reflected.<br>• I can explain that Earth has a limited supply of natural resources.<br>• I can describe why recycling reduces the need to extract new resources.<br>• I can explain the benefits of recycling for the environment.<br>• I can explain how burning fuels releases carbon dioxide into the atmosphere.<br>• I can explain how greenhouse gases reduce energy loss from Earth.<br>• I can describe why increasing greenhouse gases leads to rising global temperatures. | **Intended Skills and Outcomes:** The below 'I can' statements clarify what students will be able to do by the end of this unit.<br>• I can explain that inherited characteristics are passed from parents to offspring through genes.<br>• I can describe genes as sections of DNA that carry genetic information.<br>• I can explain that chromosomes are long strands of DNA containing many genes.<br>• I can describe how gametes carry half the chromosomes and combine during fertilisation.<br>• I can explain the theory of natural selection.<br>• I can describe how variation within a species can lead to survival advantages.<br>• I can explain how species evolve over time.<br>• I can describe why extinction can occur.<br>• I can explain what biodiversity means.<br>• I can describe why variation within a species helps prevent extinction.<br>• I can explain why ecosystems with many different species are more stable.<br>• I can describe why biodiversity is important for human populations. |

**Feeds from:** We recognise that students come to us with varying educational experiences. At the start of Year 9, we dedicate time to building strong foundational knowledge, using appropriate adaptations and teaching approaches to ensure all students are supported and able to progress.
**Feeds into:** The units are sequences to reinforce concepts and progressively build and deepen scientific understandings, for example particles underpin energy transfer and respiration links to energy. This sequence of learning will provide a solid base of knowledge and skills for whichever pathway students' progress to within KS4 (Functional Skills or GCSE)