

# Long Term Plan KS3 Science

Year 9

	Autumn 1	Autumn 2	Spring 1	Spring 2	Summer 1	Summer 2
<b>Unit</b>	<b>Physics:</b> Matter	<b>Chemistry:</b> Materials	<b>Biology:</b> Respiration and Photosynthesis	<b>Physics:</b> Space Physics	<b>Chemistry:</b> Earth and Atmosphere	<b>Biology:</b> Inheritance and Evolution
<b>NC/Qualification Objectives</b>	-Physics changes -Particle model -Energy in matter	-Chemical reactions -Materials	-Cellular respiration -Photosynthesis	-Space Physics	-Elements -Earth & atmosphere	Inheritance, chromosomes, DNA and genes
<b>Enrichment/Experiences</b>		Making concrete, slime	Botanical Gardens		Walk on nature reserve looking at rock formation	Extracting DNA from peas.
<b>Keystone Vocabulary</b>			Aerobic respiration; Anaerobic respiration; fermentation Fertilisers; Photosynthesis; Chlorophyll; Stoma	Weight; Non-contact force; Mass; Gravitational field strength; Field		
<b>Curriculum End Point / Goal</b>	Pupils will use <b>modelling</b> and <b>abstract ideas</b> to <b>develop and evaluate explanations</b> . They should have a deepening understanding that science is about working objectively, <b>modifying explanations</b> to take account of new evidence and ideas and subjecting results to <b>peer review</b> . Pupils will develop their use of scientific vocabulary, including the use of scientific nomenclature and units and <b>mathematical representations</b> .					
<b>Scientific Enquiry/skills</b>	Disciplinary knowledge in science is cumulative. Knowledge is revisited and refined throughout the curriculum.					
	Pupils will have the opportunity to: Select, plan and carry out the most appropriate types of scientific enquiries to test predictions, Apply mathematical concepts and calculate results. Use and derive simple equations and carry out appropriate calculations.	Pupils will have the opportunity to: Interpret observations and data, use appropriate techniques, apparatus, and materials during fieldwork and laboratory work, paying attention to health and safety, where appropriate, make predictions using scientific knowledge and understanding, present	Pupils will have the opportunity to: Use word equations to describe aerobic and anaerobic respiration.  Ask questions based on observations of the real world related to plants and conditions require for growth.	Pupils will have the opportunity to:  Make deductions from observation data of planets, stars and galaxies.	Pupils will have the opportunity to:  Explain the properties of rocks using a cooling model.	Pupils will have the opportunity to:  Find out why scientists Watson, Crick and Franklin were so important.

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		observations and data using appropriate methods, including tables and graphs.				
<b>Knowledge and Learning</b>	<p><b>Know:</b> <i>Pupils will explore the common characteristics of each state of matter and use the particle model studied in chemistry as a way in to understand density. The evidence for the movement of particles in gases will also be studied. Pupils will then go on to expand their understanding of states of matter, changes of state and reversible and non-reversible changes. They will develop ideas from the particle model studied in chemistry, by relating changes of state to the particle model, and exploring how this model explains conservation of mass in physical changes.</i></p> <p>Building on the core learning pupils will relate changes of state to the transfer of energy to particles, and develop the concept that heating increases the internal energy of a material. Ideas about the particle model and energy transfer are also used to explain why solids and liquids expand and</p>	<p><b>Know:</b> <i>Pupils will build on their understanding of properties of materials from KS2. Pupils will relate the properties of metals to their uses. They will then use information from observations to produce an order of reactivity for metals and carbon. Core learning will be completed by relating the properties of ceramics and composites to their uses.</i></p> <p>The core learning in this unit is further extended by pupils exploring uses of the reactivity series in using carbon to extract metals from metal oxides, then also leading to an examination of the properties of polymers.</p>	<p><b>Know:</b> <i>Respiration</i> Respiration is a series of chemical reactions, in cells, that breaks down glucose to provide energy and form new molecules. Most living things use aerobic respiration but switch to anaerobic respiration, which provides less energy, when oxygen is unavailable.</p> <p><i>Photosynthesis</i> Plants and algae do not eat, but use energy from light, together with carbon dioxide and water to make glucose (food) through photosynthesis. They either use the glucose as an energy source, to build new tissue, or store it for later use. Plants have specially adapted organs that allow them to obtain resources needed for photosynthesis.</p>	<p><b>Know:</b> <i>Pupils will build on prior learning around the explanation for day and night, using ideas about the earth's tilt. This then builds into looking at how weight varies under different gravities.</i></p> <p>Pupils will describe how the Earth's tilt and movement around the sun leads to changes in day length and seasons. Leading on from this Pupils will explore gravity and weight. Looking at how gravity changes on different planets and how this affects weight. They will then go on to explore how gravitational forces exist between the Earth and the Sun and the Earth and the Moon. Finally in this topic pupils will extend their perspective beyond the solar system and place the Sun in the context of other stars. Before developing their understanding of distance and scale.</p>	<p><b>Know:</b> In this unit pupils will develop a deeper understanding of the structure of the Earth and that it is made up of layers. They will then retrieve knowledge about the different types of rocks and build a deeper understanding of how they are formed. Using this knowledge pupils will recognise that fossil fuels and ores are finite resources for which humans must find alternatives, which will also help reduce the impact on the Earth. Moving on to the atmosphere pupils will build on the knowledge of the requirements of plants, animals and humans for life, and developing a deeper understanding of the composition of air. This will allow them to look at the processes involved in the release and removal of carbon dioxide in the atmosphere. Linking together respiration, combustion, photosynthesis and decomposition.</p>	<p><b>Know:</b> This unit begins by exploring the variation between individuals within a species, identifying variation as being continuous or discontinuous before measuring and graphically representing variation and exploring the differences between species. Moving on from variation, pupils will progress from Key Stage 2, where pupils recognised that living things have changed over time and that animals and plants are adapted to suit their environment, to exploring how organisms change through natural selection, driven by competition and evolution.</p> <p>Inheritance is then explored through looking at a simple model of chromosomes, genes and DNA in heredity, including the part played by Watson, Crick, Wilkins and Franklin in the development of the DNA model. Leading on to the exploration of heredity as the process by which genetic information is</p>

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	become less dense when heated.					transmitted from one generation to the next.
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