

Progression of Skills, Understanding and Knowledge in Science

Unit	Year 7	Year 8	Year 9
	Stage 5		
Life Processes and organisation	<p>Describe the process of reproduction in humans.</p> <p>Describe the consequences of imbalances in the diet, including obesity, starvation and deficiency diseases</p> <p>Describe the effects of recreational drugs (including substance misuse) on behaviour, health and life processes</p> <p>Describe the structure and functions of the gas exchange system in humans, including adaptations to function</p> <p>Outline and explain the mechanism of breathing to move air in and out of the lungs</p> <p>Outline and explain the impact of exercise, asthma and smoking on the human gas exchange system</p>		<p>The structure and functions of the human skeleton: support, protection, movement and making blood cells</p> <p>Biomechanics – the interaction between skeleton and muscles, including the measurement of force exerted by different muscles the function of muscles and examples of antagonistic muscles</p> <p>The reactants in, and products of, photosynthesis, and a word summary for photosynthesis</p> <p>The dependence of almost all life on Earth on the ability of photosynthetic organisms, such as plants and algae, to use sunlight in photosynthesis to build organic molecules that are an essential energy store and to maintain levels of oxygen and carbon dioxide in the atmosphere</p> <p>The adaptations of leaves for photosynthesis</p> <p>Aerobic and anaerobic respiration in living organisms, including the breakdown of organic molecules to enable all the other chemical processes necessary for life</p> <p>A word summary for aerobic respiration</p> <p>The process of anaerobic respiration in humans and micro-organisms, including fermentation, and a word summary for anaerobic respiration</p> <p>The differences between aerobic and anaerobic respiration in terms of the reactants, the products formed and the implications for the organism</p>

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Living things in their environment	<p>Recognise the interdependence of organisms in an ecosystem, including food webs and insect pollinated crops</p> <p>Understand the importance of plant reproduction through insect pollination in human food security</p> <p>Describe how organisms affect, and are affected by, their environment, including the accumulation of toxic materials</p>	<p>The dependence of almost all life on Earth on the ability of photosynthetic organisms, such as plants and algae, to use sunlight in photosynthesis to build organic molecules that are an essential energy store and to maintain levels of oxygen and carbon dioxide in the atmosphere</p>	



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Inheritance and Evolution	<p>Describe how the variation between species and between individuals of the same species means some organisms compete more successfully, which can drive natural selection.</p> <p>Explain extinction in terms of changes in the environment may leave individuals within a species, and some entire species, less well adapted to compete successfully and reproduce</p>		<p>Heredity as the process by which genetic information is transmitted from one generation to the next.</p> <p>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.</p>



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Materials and matter (Chemical reactions)	<p>Explain the properties of the different states of matter (solid, liquid and gas) in terms of the particle model, including gas pressure</p> <p>Explain changes of state in terms of the particle model</p>		<p>Chemical reactions as the rearrangement of atoms representing chemical reactions using formulae and using equations</p> <p>Combustion, thermal decomposition, oxidation and displacement reactions</p> <p>Defining acids and alkalis in terms of neutralisation reactions</p> <p>The pH scale for measuring acidity/alkalinity; and indicators</p> <p>Reactions of acids with metals to produce a salt plus hydrogen</p> <p>Reactions of acids with alkalis to produce a salt plus water</p> <p>What catalysts do</p> <p>Energy changes on changes of state (qualitative) exothermic and endothermic chemical reactions (qualitative)</p>

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Materials and Matter (Environmental Chemistry)	<p>Explain the properties of the different states of matter (solid, liquid and gas) in terms of the particle model, including gas pressure</p> <p>Explain changes of state in terms of the particle model</p>		<p>Earth as a source of limited resources and the efficacy of recycling</p> <p>the composition of the atmosphere</p> <p>the production of carbon dioxide by human activity and the impact on climate</p>



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Forces	<p>Sketch a magnetic field around a bar magnet</p> <p>Know that forces are measured in Newtons</p> <p>Explain that unsupported objects fall towards the Earth because of the force of gravity acting between the Earth and the falling object.</p> <p>Identify the effects of air resistance, water resistance and friction, that act between moving surfaces.</p> <p>Describe processes that involve energy transfer: changing motion, dropping an object, completing an electrical circuit, stretching a spring, metabolism of food, burning fuels.</p> <p>Identify different energy stores</p> <p>Identify fuels as energy resources.</p> <p>Describe processes that produce carbon dioxide by human activity and the impact on climate.</p>		<p>Force-extension linear relation; Hooke's Law as a special case</p> <p>work done and energy changes on deformation</p> <p>non-contact forces: gravity forces acting at a distance on Earth and in space, forces between magnets, and forces due to static electricity</p> <p>Atmospheric pressure, decreases with increase of height as weight of air above decreases with height</p> <p>pressure in liquids, increasing with depth; upthrust effects, floating and sinking</p> <p>Pressure measured by ratio of force over area – acting normal to any surface</p>