



## Science



### Curriculum Overview Key Stage 3&4

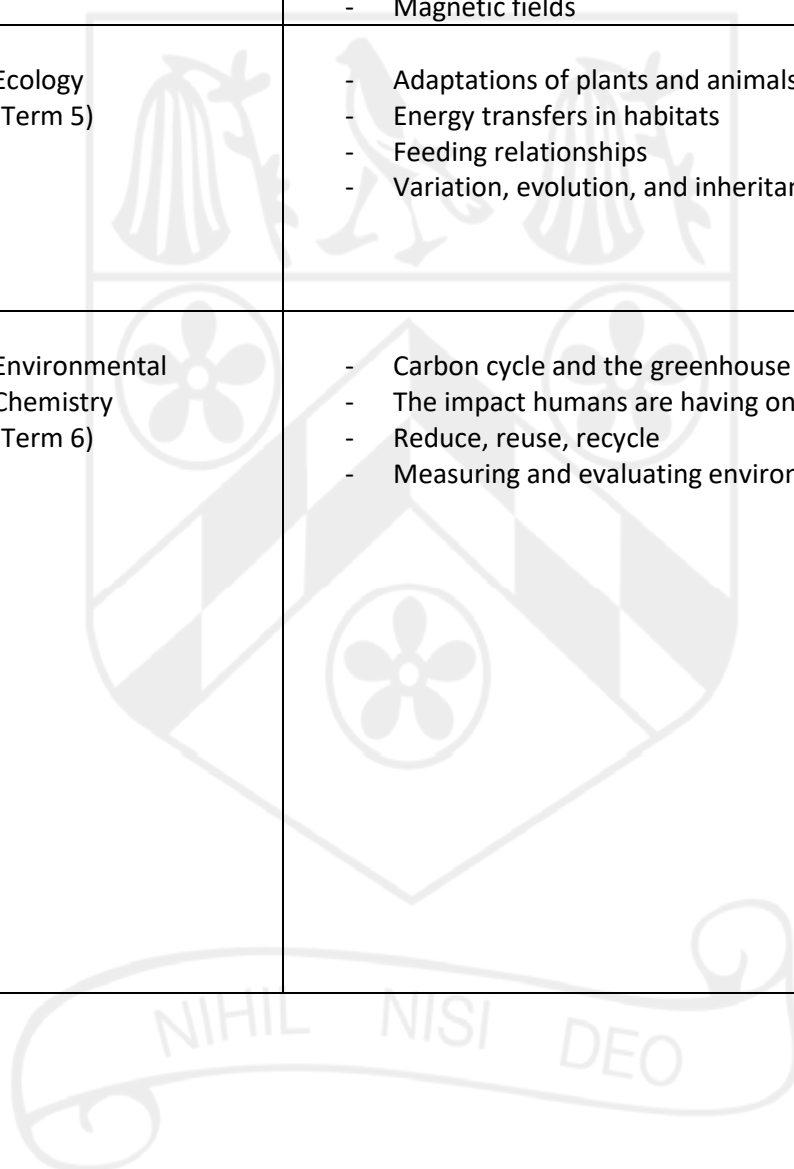
KEY STAGE 3		
	Topic	Key Themes
YEAR 7	Particles and separation (and introduction to Science) (Term 1)	<ul style="list-style-type: none"><li>- Introduction to the laboratory</li><li>- Scientific equipment</li><li>- Using equipment safely</li><li>- The particle model of matter</li><li>- Changes of state</li><li>- Separating mixtures</li><li>- Solubility</li><li>- Chemical and Physical changes</li></ul>
	Forces and Space (Term 2)	<ul style="list-style-type: none"><li>- The solar system</li><li>- Days, nights, seasons and orbits</li><li>- Travel in space</li><li>- Contact and non-contact forces</li><li>- Forces and their effects</li></ul>



	Cells and Systems (Term 3)	<ul style="list-style-type: none"> <li>- Life processes</li> <li>- Cells, tissues, organs and organ systems</li> <li>- Uni and multi-cellular organisms</li> <li>- Levels of organisation</li> <li>- Skeletal and muscular systems</li> </ul>
	Acids, metals and rocks (Term 4)	<ul style="list-style-type: none"> <li>- The rock cycle.</li> <li>- Structure of the Earth</li> <li>- Weathering and erosion</li> <li>- Acids, alkalis and the pH scale</li> <li>- Reactions of acids</li> <li>- Metals and non-metals</li> </ul>
	Light and sound (Term 5)	<ul style="list-style-type: none"> <li>- Types of waves and their uses</li> <li>- How waves interact with different materials</li> <li>- The human body and waves.</li> </ul>
	Plants and reproduction (Term 6)	<ul style="list-style-type: none"> <li>- Reproduction in plants and animals</li> <li>- The menstrual cycle</li> <li>- Contraception, fertilisation, pregnancy and birth</li> </ul>
	<b>Topic</b>	<b>Key Themes</b>
<b>YEAR 8</b>	Energy (Term 1)	<ul style="list-style-type: none"> <li>- Energy stores and transfers</li> <li>- Useful and wasted energy</li> <li>- Methods of energy transfer</li> <li>- Saving energy at home</li> <li>- Energy generation</li> <li>- Renewable and non-renewable energy sources</li> </ul>



<p>Health (Term 2)</p>	<ul style="list-style-type: none"> <li>- Essential nutrients for life</li> <li>- Balanced diets and health implications</li> <li>- The digestive system and enzymes</li> <li>- Food tests and investigative skills</li> <li>- Respiratory and circulatory systems</li> <li>- Drugs, alcohol and their effect on the body</li> </ul>
<p>Matter and reactions (Term 3)</p>	<ul style="list-style-type: none"> <li>- Elements, compounds and mixtures</li> <li>- Chemical formulae</li> <li>- Structure of the periodic table</li> <li>- Chemical reactions</li> <li>- Mass and energy changes in reactions</li> <li>- Representing reactions</li> </ul>
<p>Electricity and magnetism (Term 4)</p>	<ul style="list-style-type: none"> <li>- Circuit diagrams and symbols</li> <li>- Measuring current, resistance and voltage</li> <li>- Electrical safety in the home</li> <li>- Series and parallel circuits</li> <li>- Basic principles of magnets</li> <li>- Electromagnets and their uses</li> <li>- Magnetic fields</li> </ul>
<p>Ecology (Term 5)</p>	<ul style="list-style-type: none"> <li>- Adaptations of plants and animals</li> <li>- Energy transfers in habitats</li> <li>- Feeding relationships</li> <li>- Variation, evolution, and inheritance</li> </ul>
<p>Environmental Chemistry (Term 6)</p>	<ul style="list-style-type: none"> <li>- Carbon cycle and the greenhouse effect</li> <li>- The impact humans are having on the environment</li> <li>- Reduce, reuse, recycle</li> <li>- Measuring and evaluating environmental impact</li> </ul>



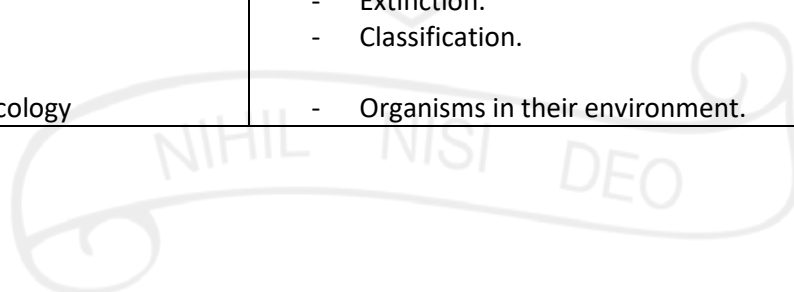
	<b>Topic</b>	<b>Key Themes</b>
<b>YEAR 9</b>	Atomic structure and the periodic table	<ul style="list-style-type: none"> <li>- Structure of the atom and links to the periodic tables</li> <li>- Groups in the periodic table</li> <li>- Trends and patterns in reactivity</li> <li>- Representing and interpreting chemical reactions</li> </ul>
	Cell Biology	<ul style="list-style-type: none"> <li>- Looking at cells.</li> <li>- Eukaryotic and prokaryotic cells.</li> <li>- Cell specialisation.</li> <li>- Transport of substances in and out of cells.</li> <li>- Cell division.</li> <li>- Stem cells and the dilemmas of using them.</li> </ul>
	Particle model of matter	<ul style="list-style-type: none"> <li>- Changes of state and internal energy changes</li> <li>- Density of objects</li> <li>- Gas pressure and the factors that affect it.</li> </ul>
	Bonding, structure and the properties of matter	<ul style="list-style-type: none"> <li>- Ionic, covalent and metallic bonding.</li> <li>- Properties associated with each type of bonding.</li> <li>- Nanoscience, nanoparticles, their uses and implications.</li> </ul>
	Organisation	<ul style="list-style-type: none"> <li>- The digestive system in detail</li> <li>- The chemistry of food.</li> <li>- Enzymes and the factors that affect them.</li> <li>- Making digestion efficient.</li> <li>- Circulatory system, blood vessels and the heart.</li> <li>- Respiratory system – breathing and gas exchange.</li> <li>- Tissues and organs in plants.</li> <li>- Transport systems in plants.</li> </ul>
	Energy part 1: Energy transfers	<ul style="list-style-type: none"> <li>- Changes in energy stores.</li> <li>- Energy dissipation and energy efficiency.</li> <li>- Electrical appliances, energy, and power.</li> </ul>
	Energy part 2: Heat transfers and resources	<ul style="list-style-type: none"> <li>- Methods of heat transfer and how to reduce them.</li> <li>- Specific heat capacity and how to determine it.</li> <li>- Heating and insulation</li> <li>- Electricity and meeting demand</li> <li>- Renewable and non-renewable sources of energy</li> </ul>



**KEY STAGE 4****Examination Specification: AQA Separate Science (Pathway 1) and AQA Trilogy Combined Science (Pathway 2)**

	<b>Topic</b>	<b>Key Themes</b>
<b>YEAR 10</b>	Biology	
	Infection and response	<ul style="list-style-type: none"><li>- Pathogens and the spread of disease.</li><li>- Types of pathogens.</li><li>- How the human body defends against disease.</li><li>- Vaccines and antibiotics.</li><li>- Development of new drugs.</li><li>- Non-communicable diseases and lifestyle choices.</li></ul>
	Bioenergetics and respiration	<ul style="list-style-type: none"><li>- Photosynthesis and the factors that affect it.</li><li>- Aerobic and anaerobic respiration.</li><li>- Metabolism and the liver.</li></ul>
	Homeostasis and response	<ul style="list-style-type: none"><li>- Principle of homeostasis.</li><li>- The nervous system and reflex actions.</li><li>- <i>The brain, eye and common problems (Separate Science only).</i></li><li>- Hormonal control.</li><li>- Diabetes and negative feedback.</li><li>- Human reproduction and the role of hormones.</li><li>- Hormones as a method of controlling fertility.</li><li>- <i>Plant hormones and responses (Separate Science only).</i></li><li>- <i>Controlling body temperature (Separate Science only).</i></li><li>- <i>Controlling water content, associated issues and treatment. (Separate Biology only).</i></li></ul>
	Chemistry	
	Bonding, structure and the properties of matter	<ul style="list-style-type: none"><li>- Ionic, covalent and metallic bonding.</li><li>- Properties associated with each type of bonding.</li><li>- Nanoscience, nanoparticles, their uses and implications.</li></ul>
	Quantitative Chemistry	<ul style="list-style-type: none"><li>- Relative formula mass and the mole.</li><li>- Reacting masses and conservation of mass.</li><li>- Yield and atom economy in industrial reactions.</li><li>- Analytical techniques (Separate Science only).</li></ul>
	Chemical changes part 1: Reactions of metals	<ul style="list-style-type: none"><li>- The reactivity series and determining how to extract useful resources.</li><li>- Reactions of metals and scientific technique.</li><li>- Neutralisation, acids and alkalis, and the pH scale.</li></ul>

	Chemical changes part 2: Electrolysis	<ul style="list-style-type: none"> <li>- Principles of electrolysis</li> <li>- Determining the products of electrolysis</li> <li>- Industrial applications of electrolysis</li> </ul>
	Energy changes	<ul style="list-style-type: none"> <li>- Energy transfers in reactions.</li> <li>- Energy profile diagrams.</li> <li>- Calculating energy changes in reactions</li> <li>- Fuel cells and their use as an alternative to fossil fuels.</li> </ul>
	Physics	
	Electricity	<ul style="list-style-type: none"> <li>- Current, charge, potential difference, and resistance.</li> <li>- Component characteristics.</li> <li>- Series and parallel circuits.</li> <li>- Alternating and direct current.</li> <li>- Cables, plugs and electrical safety.</li> <li>- Appliances and efficiency.</li> </ul>
	Forces part 1: Forces and motion	<ul style="list-style-type: none"> <li>- Vector and scalar quantities.</li> <li>- Resultant forces</li> <li>- <i>Moments, levers and gears (Separate Science only).</i></li> <li>- Centre of mass.</li> <li>- <i>Moments and equilibrium (Separate Science only).</i></li> <li>- Resolution of forces.</li> </ul>
	Waves part 1: Waves	<ul style="list-style-type: none"> <li>- The nature and properties of waves.</li> <li>- Reflection and refraction.</li> <li>- <i>Sound waves and the use of ultrasound (Separate Science only).</i></li> </ul>
	<b>Topic</b>	<b>Key Themes</b>
<b>YEAR 11</b>	Biology	
	Inheritance, variation and evolution	<ul style="list-style-type: none"> <li>- Types of reproduction and cell division.</li> <li>- Inheritance in action.</li> <li>- Inherited diseases and screening for disease.</li> <li>- Variation and evolution.</li> <li>- Natural selection and selective breeding.</li> <li>- Genetic engineering and cloning.</li> <li>- The history of genetics.</li> <li>- Evolution and speciation, including the evidence for each.</li> <li>- Extinction.</li> <li>- Classification.</li> </ul>
	Ecology	<ul style="list-style-type: none"> <li>- Organisms in their environment.</li> </ul>



		<ul style="list-style-type: none"> <li>- Distribution and abundance of organisms.</li> <li>- Competition in plants and animals.</li> <li>- Adaptations in plants and animals.</li> <li>- Feeding relationships, material cycling and the carbon cycle.</li> <li>- Land, water, and air pollution.</li> <li>- Destruction of habitats.</li> <li>- Biodiversity, and maintaining it.</li> <li>- Sustainable food production.</li> </ul>
	<p>Chemistry</p> <p>Rate and extent of chemical change part 2: Le Chatelier's principle and dynamic equilibrium</p> <p><i>Organic Chemistry part 2: Organic reactions (Separate Science only)</i></p> <p><i>Organic Chemistry part 3: Polymers (Separate Science only)</i></p> <p>Chemical analysis</p> <p>Using resources</p>	<ul style="list-style-type: none"> <li>- Dynamic equilibrium and how it relates to reversible reactions.</li> <li>- The effect of changing conditions on the position of equilibrium, yield and rate.</li> <li>- The economics of industrial reactions and compromises.</li> <li>- <i>Reactions of alkenes to make further useful products.</i></li> <li>- <i>Alcohols, carboxylic acids and esters – The production, use and properties of each.</i></li> <li>- <i>Types of polymers, the conditions under which they are made uses.</i></li> <li>- <i>Natural polymers, linking to D.N.A. structure</i></li> <li>- Chromatography and it's use as an analytical technique.</li> <li>- Testing for gases.</li> <li>- <i>Laboratory and Industrial analytical techniques, and their advantages and disadvantages (Separate Science only).</i></li> <li>- Finite and renewable sources, sustainability and carbon footprints.</li> <li>- Treatment of water as a resource.</li> <li>- Alternative methods for extracting metals</li> <li>- Life cycle assessments</li> <li>- Reducing, reusing, and recycling resources.</li> <li>- <i>Bespoke materials and their properties (Separate Science only).</i></li> </ul>



	<p>Physics</p> <p>Forces part 2: Motion and acceleration</p> <p><i>Forces part 3: Impacts and pressures (Separate Science only)</i></p> <p>Energy part 2: Energy and heat transfers</p> <p><i>Waves part 2: Light and lenses (Separate Science only)</i></p> <p>Magnetism and electromagnetism</p> <p>Space Physics (Separate Science only)</p>	<ul style="list-style-type: none"> <li>- Distance-time and velocity-time graphs.</li> <li>- Analysing motion graphs.</li> <li>- Force and acceleration.</li> <li>- Weight and terminal velocity.</li> <li>- Momentum and conservation.</li> <li>- <i>Impact forces and safety (Separate Science only).</i></li>   <li>- <i>Pressure in gases and liquids.</i></li> <li>- <i>Upthrust and flotation.</i></li>   <li>- Thermal energy transfer by conduction, convection and radiation.</li> <li>- Specific heat capacity.</li> <li>- Heating and insulating buildings.</li> <li>- Energy generation and meeting demands.</li> <li>- Energy and the environment.</li>   <li>- <i>The electromagnetic spectrum.</i></li> <li>- <i>Uses and dangers of the electromagnetic spectrum.</i></li> <li>- <i>Reflection and refraction.</i></li> <li>- <i>Light and colour.</i></li> <li>- <i>Using lenses.</i></li>   <li>- Magnetic fields and current.</li> <li>- Electromagnets in devices.</li> <li>- The motor effect and <i>generator effect (Separate Science only).</i></li> <li>- <i>A.C. generators. (Separate Science only).</i></li> <li>- <i>Transformers (Separate Science only).</i></li>   <li>- <i>Formation of the solar system.</i></li> <li>- Life cycle of stars.</li> <li>- The beginning and the future of the Universe.</li> </ul>
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