



The curriculum for this stage of students' education has been designed to build upon their prior knowledge from key stage 3 Science. This course provides a worthwhile background for students who intend to go on to study Biology beyond GCSE. The course enables students to acquire a body of scientific knowledge and develop an understanding of the ideas and applications of Biology e.g. how diseases are spread and treated, the functioning of our digestive system and the importance of a balance diet. This is set in the context of knowing and understanding a body of scientific facts. Students acquire an understanding and experience of the methods used in science and of the application of experimental techniques in everyday life.

<p><b>HALF TERM 1: <u>Cell Biology- Cell structure &amp; Division</u></b></p> <p><b>STUDENTS MUST KNOW:</b></p> <ul style="list-style-type: none"> <li>• Cells are the basic unit of all forms of life.</li> <li>• Eukaryote and prokaryote cell structures.</li> <li>• Animal and plant cells structure.</li> <li>• How cell specialisation occurs and why?</li> <li>• Cell differentiation processes.</li> <li>• Microscopy required practical.</li> <li>• How we culture microbes.</li> <li>• Cell Division by mitosis.</li> </ul> <p><b>HOW THIS WILL BE ASSESSED:</b> Assessments will be completed at the end of each topic and one main assessment will occur during each term to assess progress</p>	<p><b>HALF TERM 2: <u>Cell Biology – Transport in Cells</u></b></p> <p><b>STUDENTS MUST KNOW:</b></p> <ul style="list-style-type: none"> <li>• The role of stem cells and stem cell technology.</li> <li>• The process of diffusion.</li> <li>• How osmosis occurs in cells and how it affects cells.</li> <li>• How active transport occurs in cells.</li> <li>• Required practical upon investigating the effects of salt or sugar solutions upon plant cells.</li> </ul> <p><b>HOW THIS WILL BE ASSESSED:</b> Assessments will be completed at the end of each topic and one main assessment will occur during each term to assess progress.</p>	<p><b>HALF TERM 3: <u>Organisation 1</u></b></p> <p><b>STUDENTS MUST KNOW:</b></p> <ul style="list-style-type: none"> <li>• The principles of cellular organisation: cells, tissues, organs, organ systems, organism.</li> <li>• How the human digestive system works.</li> <li>• Required practical on how to test for food constituents.</li> <li>• How enzymes work.</li> <li>• Required practical upon the effects of pH upon enzyme activity.</li> <li>• The function of the heart and blood vessels.</li> <li>• The constituents and functions of blood.</li> <li>• The causes and effects of coronary heart disease.</li> </ul> <p><b>HOW THIS WILL BE ASSESSED:</b> Assessments will be completed at the end of each topic and one main assessment will occur during each term to assess progress.</p>
<p><b>HALF TERM 4: <u>Organisation 2</u></b></p> <p><b>STUDENTS MUST KNOW:</b></p> <ul style="list-style-type: none"> <li>• A range of lifestyle disease causes and effects.</li> <li>• The effects of lifestyle upon health.</li> <li>• How cancer is caused and treated.</li> <li>• How plant tissues and organs are arranged and function.</li> </ul> <p><b>HOW THIS WILL BE ASSESSED:</b> Assessments will be completed at the end of each topic and one main assessment will occur during each term to assess progress.</p>	<p><b>HALF TERM 5: <u>Infection and Response</u></b></p> <p><b>STUDENTS MUST KNOW:</b></p> <ul style="list-style-type: none"> <li>• How Communicable (infectious) diseases are caused and spread.</li> <li>• Examples of diseases caused by the 4 types of pathogen: viruses, bacteria, fungi &amp; protists.</li> <li>• How human defence mechanisms work.</li> <li>• How we become immune to diseases.</li> <li>• Required practical investigating effects of antiseptics / antibiotics upon bacterial growth.</li> </ul> <p><b>HOW THIS WILL BE ASSESSED:</b> Assessments will be completed at the end of each topic and one main assessment will occur during each term to assess progress.</p>	<p><b>HALF TERM 6: <u>Infection and Response</u></b></p> <p><b>STUDENTS MUST KNOW:</b></p> <ul style="list-style-type: none"> <li>• How vaccinations work and what they contain.</li> <li>• The discovery of antibiotics and what they do.</li> <li>• How we use painkillers.</li> <li>• How new drugs are developed and tested for use.</li> <li>• How we produce and use monoclonal antibodies.</li> <li>• The causes and effects of plant diseases upon plants and how they defend themselves.</li> </ul> <p><b>HOW THIS WILL BE ASSESSED:</b> Assessments will be completed at the end of each topic and one main assessment will occur during each term to assess progress.</p>

**Embedding this knowledge can be supported at home by** using the AQA website, BBC Bitesize and GCSEPOD in conjunction with suitable revision guides.



**The curriculum for this stage of students' education has been designed to** ensure students understand how scientific methods and theories develop over time. Building on work done in KS3, they will use representational, spatial, descriptive, computational and mathematical models to solve problems, make predictions and to develop scientific explanations and understanding. Students will appreciate the power and limitations of science and be able to consider ethical issues which may arise. They will be able to explain the technological applications of science; evaluate associated personal, social, economic and environmental implications; and make decisions based on the evaluation of evidence and arguments. Students will evaluate risks both in practical science and the wider societal context, while recognising the importance of peer review of results and of communicating results to a range of audiences.

<p><b>HALF TERM 1:</b> ATOMIC STRUCTURE</p> <p><b>STUDENTS MUST KNOW:</b></p> <ul style="list-style-type: none"> <li>The structure of the Atom, the subatomic particles, The History of scientific models of the Atom, Writing electron configurations, Writing balanced equations, The formation of ions, Methods of separating mixtures.</li> </ul> <p><b>Required Practical - How paper chromatography can be used to separate substances, calculation of R<sub>f</sub></b></p> <p><b>HOW THIS WILL BE ASSESSED:</b> Regular mini assessments will be done during the course of the topic. One main end of topic test will occur at the end to assess progress.</p>	<p><b>HALF TERM 2:</b> THE PERIODIC TABLE</p> <p><b>STUDENTS MUST KNOW:</b></p> <ul style="list-style-type: none"> <li>The organisation and development of the Periodic Table, Properties, Trends and Uses of elements in Groups I, VII and 0, Properties and uses of Transition Metals.</li> </ul> <p><b>HOW THIS WILL BE ASSESSED:</b> Regular mini assessments will be done during the course of the topic. One main end of topic test will occur at the end to assess progress.</p>	<p><b>HALF TERM 3:</b> CHEMISTRY OF THE ATMOSPHERE</p> <p><b>STUDENTS MUST KNOW:</b></p> <ul style="list-style-type: none"> <li>The development of the Earth's Atmosphere, How and why changes in the Atmosphere occurred (decrease in CO<sub>2</sub> and increase in O<sub>2</sub>).</li> </ul> <p><b>RP3 -Investigation of electrolysis of aqueous solutions using inert electrodes</b></p> <p><b>HOW THIS WILL BE ASSESSED:</b> Regular mini assessments will be done during the course of the topic. One main end of topic test will occur at the end to assess progress.</p>
<p><b>HALF TERM 4:</b> CHEMISTRY OF THE ATMOSPHERE</p> <p><b>STUDENTS MUST KNOW:</b></p> <ul style="list-style-type: none"> <li>The Greenhouse Gases and their effect on Global warming and Climate change, Reducing Carbon footprints, Atmospheric pollutants and their effects.</li> </ul> <p><b>HOW THIS WILL BE ASSESSED:</b> Regular mini assessments will be done during the course of the topic. One main end of topic test will occur at the end to assess progress.</p>	<p><b>HALF TERM 5:</b> USING RESOURCES</p> <p><b>STUDENTS MUST KNOW:</b></p> <ul style="list-style-type: none"> <li>The properties of Metals, Metal extraction by Reduction and Electrolysis, writing half-equations, Alternative Methods of metal extraction, Metal Alloys, Preventing corrosion, Recycling metals, Life cycle assessments, Potable water and wastewater treatment.</li> </ul> <p><b>RP8- Analysis and purification of water samples from different sources (including pH, dissolved solids and distillation)</b></p> <p><b>HOW THIS WILL BE ASSESSED:</b> Regular mini assessments will be done during the course of the topic. One main end of topic test will occur at the end to assess progress.</p>	<p><b>HALF TERM 6:</b> ORGANIC CHEMISTRY I</p> <p><b>STUDENTS MUST KNOW:</b></p> <ul style="list-style-type: none"> <li>The development of Crude Oil, Separation, Properties and uses of Crude oil fractions, Alkanes and Alkenes, Complete and Incomplete combustion, Cracking, Cells, Batteries and Hydrogen Fuel cells, Nanoparticles and their uses.</li> </ul> <p><b>HOW THIS WILL BE ASSESSED:</b> Regular mini assessments will be done during the course of the topic. One main end of topic test will occur at the end to assess progress.</p>

**Embedding this knowledge can be supported at home by completion of homework, reviewing topics found on BBC Bitesize (AQA Chemistry), GCSE pod and reading scientific articles in newspapers, magazines, periodicals and journals.**



The curriculum for this stage of students' education has been designed to build upon their prior knowledge from year 9 GCSE Physics. This course provides a worthwhile background for all students, whether or not they intend to go on to study Physics beyond GCSE. The course enables students to acquire a body of scientific knowledge and develop an understanding of the ideas and applications of Physics e.g. Circuits and Domestic Electricity, Matter and Atomic Structure. This is set in the context of knowing and understanding a body of scientific facts. Students acquire an understanding and experience of the methods used in science and of the application of experimental techniques in everyday life.

<p><b>HALF TERM 1:</b> <u>Circuits Part</u> <b>STUDENTS MUST KNOW:</b></p> <ul style="list-style-type: none"> <li>Electrical Charges and Fields. To understand how two charged particles interact with one another (T).</li> <li>Current and Charge. How to read a circuit diagram and calculate the current in a circuit.</li> <li>Potential Difference and Resistance. To understand the relationship between current and voltage.</li> <li>Resistance in a Circuit Investigation. To understand how resistance changes with length of a wire.</li> <li>Component Characteristics. To understand why resistance doesn't stay constant in all components in a circuit.</li> </ul> <p><b>HOW THIS WILL BE ASSESSED:</b> Assessments will be completed at the end of each topic and one main assessment will occur during each term to assess progress. In addition, required practicals are carried out.</p>	<p><b>HALF TERM 2:</b> <u>Circuits Part Cont. and Domestic Electricity</u> <b>STUDENTS MUST KNOW:</b></p> <ul style="list-style-type: none"> <li>Component Characteristics Investigation. To measure and plot the Current and Potential Difference characteristics of components in a circuit.</li> <li>Series Circuits. To understand how resistors combine and current flows with in a series circuit.</li> <li>Parallel Circuits. To understand how resistors combine and current flows with in a parallel circuit.</li> <li>Alternating Current. To understand alternating current and how it is utilised in providing electricity to homes and offices.</li> <li>Cables and Plugs. To understand the key features of the UK 3-pin plug.</li> </ul> <p><b>HOW THIS WILL BE ASSESSED:</b> Assessments will be completed at the end of each topic and one main assessment will occur during each term to assess progress. In addition, required practicals are carried out.</p>	<p><b>HALF TERM 3:</b> <u>Domestic Electricity Cont.</u> <b>STUDENTS MUST KNOW:</b></p> <ul style="list-style-type: none"> <li>Electrical Power and Potential Difference. To establish an appliances power and select the correct fuse.</li> <li>Electrical Currents and Energy Transfer. To understand how a power supply provides energy to a current and a resistor transfers energy to the surroundings.</li> <li>Appliances and Efficiency. To understand how a power supply provides energy to a current and a resistor transfers energy to the surroundings.</li> <li>The National Grid and Transformers. To understand how the National Grid transports electricity.</li> </ul> <p><b>HOW THIS WILL BE ASSESSED:</b> Assessments will be completed at the end of each topic and one main assessment will occur during each term to assess progress. In addition, required practicals are carried out.</p>
<p><b>HALF TERM 4:</b> <u>Matter</u> <b>STUDENTS MUST KNOW:</b></p> <ul style="list-style-type: none"> <li>Density. To understand the relationship between mass and volume in calculating density.</li> <li>Density Investigation. To calculate the density of regular objects, irregular objects and Liquids.</li> <li>States of Matter. To understand the property differences as a substance changes state.</li> <li>Changes of State. To understand what happens to temperature as a material melts and boils.</li> <li>Internal Energy. To explain how the kinematic model applies to the state of matter.</li> <li>Specific Latent Heat. To understand how to calculate latent heat of fusion and vapourisation.</li> </ul> <p><b>HOW THIS WILL BE ASSESSED:</b> Assessments will be completed at the end of each topic and one main assessment will occur during each term to assess progress. In addition, required practicals are carried out.</p>	<p><b>HALF TERM 5:</b> <u>Matter Cont. and Atomic Structure,</u> <b>STUDENTS MUST KNOW:</b></p> <ul style="list-style-type: none"> <li>Specific Heat Capacity. To understand for different material the amount of energy required to raise 1 kg of the material by 1 °C.</li> <li>Specific Heat Capacity Investigation. To determine the specific heat capacity of one or more materials</li> <li>Gas Pressure and Temperature. To understand how pressure in a container increases as the temperature of the gas in the container increases.</li> <li>Gas Pressure and Volume. To understand how pressure in a container increases as the volume of the gas in the container decreases (T).</li> <li>Atoms and Radiation. How can we identify a radioactive source.</li> </ul> <p><b>HOW THIS WILL BE ASSESSED:</b> Assessments will be completed at the end of each topic and one main assessment will occur during each term to assess progress. In addition, required practicals are carried out.</p>	<p><b>HALF TERM 6:</b> <u>Atomic Structure Cont.</u> <b>STUDENTS MUST KNOW:</b></p> <ul style="list-style-type: none"> <li>The Discovery of the Nucleus. How can we establish the structure of an atom.</li> <li>Changes in the Nucleus. How can we identify changes to a nucleus.</li> <li>Activity and Half Life. To understand how long does a radioactive source remain active.</li> <li>Nuclear Radiation in Medicine. How can radioactivity can be used for medical treatment (T).</li> <li>Nuclear Fission and Fusion. To understand how a radioactive source and fusion can be used to generate electricity (T).</li> <li>Nuclear Issues. How much nuclear radiations affect the way we live (T).</li> </ul> <p><b>HOW THIS WILL BE ASSESSED:</b> Assessments will be completed at the end of each topic and one main assessment will occur during each term to assess progress. In addition, required practicals are carried out.</p>

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