



**Subject: Science**

**Curriculum Intent Document: KS3**

	Year 7	Year 8	Year 9
Autumn 1	<p>C1: Working Scientifically: Equipment, measurements, variables, graphs</p> <p>B1: Microscopes, cells, organs, muscles and movement</p>	<p>C3: Separating mixtures, chromatography, pH and indicators</p> <p>P4: Speed distance and time, Conduction, convection and radiation</p>	<p>P1: Energy, renewable energy and the National Grid</p> <p>B1: Cells, digestive and circulatory system, homeostasis</p>
Autumn 2	<p>P1: Energy stores and transfers; energy sources and power</p>	<p>C4: Compounds, reactions and Group 1 metals Reactions with oxygen, neutralisation</p>	<p>C1: Atoms, elements and the Periodic table</p> <p>B2: Respiration, photosynthesis, cycles, food webs and biodiversity</p>
Spring 1	<p>B2: Diet, digestion and health risk factors</p>	<p>B4: Plant cells and photosynthesis; plant reproduction</p> <p>P5: Waves, sound and light</p>	<p>P2: Waves, reflection, refraction, electricity</p> <p>C2: Polymers, ceramics and composites, quantitative chemistry</p>
Spring 2	<p>C2: Atoms, elements, changes of state and diffusion</p>	<p>C5: Composition and structure of the earth. Materials, resources and recycling</p>	<p>B3: DNA, inheritance and punnet squares</p> <p>C3: Chemical reactions- combustion, displacement and neutralisation</p>



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	P2: States of matter and pressure. Temperature and heat energy.		
Summer 1	B3: Circulatory system, blood and respiration	B5: Digestion, respiration and human reproduction	P3: Forces, acceleration, terminal velocity, stopping distances, graphs and turning forces B4: Species, mutation, selective breeding, extinction
Summer 2	P3: Forces and Hooke's Law, work done, moments, gravity and weight.	C6: Chemical reactions and conservation of mass, reaction of metals.	C4 : Structure of the earth, rock cycle, carbon cycle, earth's atmosphere and pollution P4: Universe and the Big Bang; lifecycle of stars, half life, nuclear disasters.

**Curriculum Intent Document: KS4**

		Year 10	Year 11
Autumn Term	Biology	Cells and Organisation	Homeostasis and Response



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		- The fundamentals of cell Biology and different systems including the digestive system and circulatory system	
	Chemistry	Atomic Structure and the Periodic Table Chemical changes: Acid reactions	Chemical Analysis  Organic Chemistry  Chemistry of the atmosphere
	Physics	Particle Model of Matter  Atomic structure and radioactivity	Forces
Spring Term	Biology	Organisation  Infection and Response	Inheritance and Variation  Evolution and Ecology
	Chemistry	Bonding  Energy changes	Using Earths resources  Rate and extent of chemical change
	Physics	Electricity  Energy	Waves  Electromagnetism



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Summer Term	Biology	Bioenergetics – Photosynthesis and Respiration Cell transport	Revision Plan and EXAMS
	Chemistry	Chemical changes: Electrolysis Quantitative chemistry	Revision Plan and EXAMS
	Physics	Energy continued Space (Triple Science only)	Revision Plan and EXAMS

**Curriculum Intent Document: KS5 AAQ Applied Science**

	Year 12	Year 13
Autumn 1	<p><b>F180 Fundamentals of Science:</b> B1 Cell structure and microscopy B2: Bioenergetics B3: Biological molecules</p> <p><b>F182 Investigating Science:</b> Preparing for a scientific investigation Researching and creating hypothesis from a scientific question.</p>	<p><b>F181 Science in Society</b> Handling scientific data Presenting scientific data Interpreting scientific data</p>



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Autumn 2	<p><b>F180 Fundamentals of Science:</b> B4: Biodiversity and ecosystems C1: Atomic structure and the Periodic Table C2: Quantitative chemistry</p> <p><b>F182 Investigating Science:</b> Planning a scientific investigation Carrying out risk assessments Conducting preliminary experiments</p>	<p><b>F181 Science in Society</b> Scientific Developments Hypothesis and theory Using new technologies</p>
Spring 1	<p><b>F180 Fundamentals of Science:</b> C3: Structure and bonding C4: Rates of reaction and enthalpy changes P1: Electricity</p> <p><b>F180 Fundamentals of Science:</b> Practical techniques Collecting and recording data</p>	<p><b>F181 Science in Society</b> Scientific Developments Implications and limitations of scientific development</p>
Spring 2	<p><b>F180 Fundamentals of Science:</b> P2: Motion and energy P3: Medical Physics</p> <p><b>F180 Fundamentals of Science:</b> Processing data Graphs and spreadsheets Types of error</p>	<p><b>F181 Science in Society</b> Communicating science Methods of communication Plagiarism Using science to inform decision making</p>



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Summer 1	<b>F180 Fundamentals of Science</b> Revision to prepare for exam <b>F180 Fundamentals of Science:</b> Presenting and reviewing the investigation Evaluating methods and sources Writing the scientific report Final coursework due	<b>F181 Science in Society</b> Communicating science Problems with communicating science <b>Preparation for exam</b>
Summer 2	<b>F181 Science in Society</b> Skills of scientists and the scientific method The role of scientists	

**Key Stage 5: Biology Curriculum Intent (BRIEF):**

	Year 12	Year 13
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<p>Autumn 1</p>	<p><b>Topic:</b></p> <p>Topic: Module 2 - Foundations in Biology Cells and their structure – microscopes , Enzymes</p> <p>Learners have the opportunity to study microscopy and understand a variety of different organelles and their structures.</p> <p>Module 3 – Exchange and Transport Gas exchange and transport in animals</p> <p>Learners study a range of different animals and plants. They will study their ventilation systems and their transport systems. They will also be comparing multicellular organisms to single celled organisms. Learners will be expected to apply this knowledge to new situations and related problems.</p>	<p><b>Topic:</b></p> <p>Topic: Module 5 – Communication, homeostasis and energy Communication and Homeostasis, Neuronal communication &amp; Respiration</p> <p>Learners will be able to identify the structure and function of the different types of neurons. They will also be learning about the synapse and neuronal communication. Learners will also be learning about the principals of homeostasis and the physiological control and behavioural responses involved. Learners will be studying the need for cellular respiration and the structure of the mitochondria. They will learn where respiration takes place and the process involved.</p> <p>Module 6 – Genetics. Evolution and Ecosystems Ecosystems</p> <p>Learners will be able to demonstrate and apply their knowledge of understanding different ecosystems and how abiotic and biotic factors influence the types of animals living there.</p>
<p>Autumn 2</p>	<p>Topic: Module 2 - Foundations in Biology Cell division, stem cells and the plasma membrane</p> <p>Learners will have the opportunity to understand how cells divide. They will study in details mitosis and meiosis. Learners will also understand the different types of stem cells and their uses in medical Science. Alongside this, learners will be investigating the plasma membrane and will conduct a</p>	<p>Topic: Module 5 – Communication, homeostasis and energy Communication and Homeostasis, Neuronal communication &amp; Respiration &amp; Photosynthesis</p> <p>Learners will continue to learn about homeostasis and the role in which the kidney plays in terms of regulating water levels. The structure and function of the human liver will also be studied. Module 6 - Genetics. Evolution and Ecosystems Population and sustainability</p>



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	<p>practical to test its permeability. Module 3 – Exchange and Transport Gas exchange</p>	<p>Learners will study the factors that determine size of population and the interactions</p>
	<p>and transport in plants Learners study a range of different animals and plants. They will study their ventilation systems and their transport systems. They will also be comparing multicellular organisms to single celled organisms. Learners will be expected to apply this knowledge to new situations and related problems.</p>	<p>between populations. The management of ecosystems and the effects of human activities will also be studied.</p>
Spring 1	<p>Topic: Module 2 – Foundations in Biology Biological molecules</p> <p>Learners will be studying the different types of biological molecules important for A-level biology for example Water. They will need to use their knowledge and apply this to a variety of new situations. Module 4 – Biodiversity, evolution &amp; Disease Communicable diseases, prevention and the immune system In this module learners will study the biodiversity of organisms and how they are classified. Learners also gain a greater</p>	<p>Module 6 - Genetics. Evolution and Ecosystems Population and sustainability continued Module 5 – Communication, homeostasis and energy Hormonal communication</p> <p>Learners will be studying the endocrine system and how hormones are used to communicate. They will learn the histology of the pancreas and how blood glucose concentration is regulated. They will also learn the potential treatments of diabetes mellitus.</p>



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Spring 2	<p>Topic: Module 2 – Foundations in Biology Biological molecules</p> <p>Learners will be studying the different types of biological molecules important for A-level biology for example Water. They will need to use their knowledge and apply this to a variety of new situations. Module 4 – Biodiversity, evolution &amp; Disease The immune system Learners will look in depth at the immune system and learn about difference defence mechanism. Learners will learn the structure and function of phagocytes and B/T lymphocytes. They will learn the difference between the primary and secondary immune system. Learners will also learn the function of the antibody and the important of antigens.</p>	<p>Topic: Module 6 – Genetics, evolution and ecosystems Genetics and evolution , Manipulating the genome</p> <p>Learners will be learning about genome sequencing and genetic engineering. They will learn the basic principles behind DNA sequencing and techniques. They will understand the principles behind genetic engineering and the techniques which have been used. Module 5 - Communication, homeostasis and energy Plants and animal responses Learners will study the role of plant hormones and how plants respond to different stimuli. Practical investigations into the effects of plant hormones will also be studied.</p>
Summer 1	<p>Topic: Module 2 – Foundations in Biology Biological molecules – Revision and introduce last few molecules.</p>	<p>Topic: Topic: Module 6 – Genetics, evolution and ecosystems Cloning and Biotechnology, patterns of inheritance</p>
	<p>Learners will be studying the different types of biological molecules important for A-level biology for example Water. They will need to use their knowledge and apply this to a variety of new situations. Module 4 – Biodiversity, evolution &amp; Disease Biodiversity Learners will be researching different sampling techniques and using practical investigations to collect random and non-random samples in the school field. Learners will also be interrupting Simpson’s index of Diversity to calculate biodiversity of a habitat.</p>	<p>Learners should be able to explain the use of cloning and how to make clones. They should also be able to explain the arguments for and against cloning. Biotechnology is an industrial use of living organisms and learners will explore common themes associated with biotechnology. Module 5 - Communication, homeostasis and energy The structure of the human brain and diseases affecting the brain will be studied. The coordination of responses by the nervous system and endocrine system will also feature during this unit.</p>



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Summer 2	<p>Module 4 – Biodiversity, evolution &amp; Disease Classification and Evolution</p> <p>Learners will be able to understand why classification is so important. They will be using the binomial system of naming species and the advantages of the system. The theory of evolution by natural selection will also be studied to include the contributions made by Darwin &amp; Wallace. Any other revision or recapping of topics of mock examinations will be completed during this period.</p>	External examinations & Revision

### Key Stage 5: Chemistry Curriculum Intent (BRIEF):

	Year 12	Year 13
Autumn 1	<p><b>Topic: Module 2 – Foundations in chemistry</b></p> <ul style="list-style-type: none"><li>••Atoms, compounds, molecules and equations</li><li>••Amount of substance</li></ul> <p>This section builds directly from GCSE Science, starting with basic atomic structure and isotopes. Important basic chemical skills are developed: writing chemical formulae, constructing equations and calculating chemical quantities</p>	<p><b>Topic: Module 5 – Physical chemistry and transition elements</b></p> <ul style="list-style-type: none"><li>••Reaction rates and equilibrium (quantitative)</li><li>••pH and buffers</li></ul> <p>This module provides a context for synoptic assessment and the subject content links strongly with the content encountered in Module 2: Foundations in chemistry and Module 3: Periodic table and energy. There are many opportunities for developing mathematical skills, including use of logarithms and exponents, when studying the content of this section and when carrying out quantitative practical work.</p>



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Autumn 2	<p><b>Topic: Module 2 – Foundations in chemistry</b></p> <p>Acid–base and redox reactions ••Electrons, bonding and structure</p> <p>The role of acids, bases and salts in chemistry is developed in the context of neutralisation reactions. Finally, redox reactions are studied within the context of oxidation number and electron transfer.</p>	<p><b>Topic: Module 5 – Physical chemistry and transition elements</b></p> <p>••Enthalpy, entropy and free energy ••Redox and electrode potentials ••Transition elements</p> <p>This module provides a context for synoptic assessment and the subject content links strongly with the content encountered in Module 2: Foundations in chemistry and Module 3: Periodic table and energy.</p>
Spring 1	<p><b>Topic: Module 3 – Periodic table and energy</b></p> <p>••The periodic table and periodicity ••Group 2 and the halogens ••Qualitative analysis</p> <p>This module provides learners with a knowledge and understanding of the important chemical ideas that underpin the study of inorganic and physical chemistry</p>	<p><b>Module 6 – Organic chemistry and analysis</b></p> <p>••Aromatic compounds ••Carbonyl compounds ••Carboxylic acids and esters</p> <p>This module provides a context for synoptic assessment and the subject content links strongly with the content encountered in Module 2: Foundations in chemistry and Module 4: Core organic chemistry.</p>

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Spring 2	<p><b>Topic: Module 3 – Periodic table and energy</b></p> <p>Enthalpy changes ••Reaction rates and equilibrium (qualitative)</p> <p>There are opportunities for developing mathematical skills when studying enthalpy changes and reaction rates and when carrying out quantitative practical work.</p>	<p><b>Module 6 – Organic chemistry and analysis</b></p> <p>Nitrogen compounds ••Polymers ••Organic synthesis</p> <p>This module introduces several new functional groups and emphasises the importance of organic synthesis.</p>
Summer 1	<p><b>Module 4 – Core organic chemistry</b></p> <p>••Basic concepts ••Hydrocarbons ••Alcohols and haloalkanes</p> <p>The module provides learners with a knowledge and understanding of the important chemical ideas that underpin the study of organic chemistry:</p> <p>This module also provides learners with an opportunity to develop important organic practical skills, including use of Quickfit apparatus for distillation, heating under reflux and purification of organic liquids.</p>	<p><b>Module 6 – Organic chemistry and analysis</b></p> <p>••Chromatography and spectroscopy (NMR)</p> <p>This module also adds NMR spectroscopy to the instrumentation techniques used in organic and forensic analysis.</p>



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Summer 2	<p><b>Module 4 – Core organic chemistry</b> ••Basic concepts</p> <p>Organic synthesis ••Analytical techniques (IR and MS)</p> <p>In the context of this module, it is important that learners should appreciate the need to consider responsible use of organic chemicals in the environment. Current trends in this context include reducing demand for hydrocarbon fuels, processing plastic waste productively, and preventing use of ozonedepleting chemicals.</p>	<b>Revision for exams</b>

### Key Stage 5: Physics Curriculum Intent (BRIEF):

	Year 12	Year 13
Autumn 1	<p><b>Topic: Module 2 – Foundations in Physics</b></p> <p>Understanding of the common units and maths skills required to access the A-level course.</p> <p><b>Topic: Module 4 - Electrons, waves and Photons</b></p> <p>Explain current, its unit and Kirchhoff's laws. Calculate mean drift velocity of charge carriers. Explain and calculate EMF. Explain and calculate resistivity</p>	<p><b>Topic: Module 5 - Newtonian world and Astrophysics continued</b></p> <p>Demonstrate and apply knowledge of:</p> <ul style="list-style-type: none"> <li>• Simple harmonic oscillations</li> <li>• Gravitational fields</li> <li>• Newton's laws of gravitation</li> <li>• Planetary motion</li> <li>• GPE</li> <li>• Stars</li> </ul>



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		<ul style="list-style-type: none"><li>• Electromagnetic radiation from stars</li></ul>
Autumn 2	<p><b>Topic: Module 3 - Forces and Motion</b> Understand and calculate motion in a variety of contexts using appropriate units and graphs where required. Explain and calculate acceleration taking into account external forces. Use understanding of forces to calculate work done, efficiency and power.</p> <p><b>Topic: Module 4 - Electrons, waves and Photons</b> Understand and be able to apply a range of rules to series and parallel circuits Understand and be able to make calculations on potential dividers. Electromagnetic waves, stationary waves and superposition of waves. Wave particle duality and the photoelectric effect.</p>	<p><b>Topic: Module 6 - Particles and Medical Physics</b> Demonstrate and apply knowledge of:</p> <ul style="list-style-type: none"><li>• Capacitors</li><li>• Electric fields</li><li>• Electric potential energy</li><li>• Magnetic fields</li> <li>•</li></ul>



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Spring 1	<p><b>Topic: Module 4 continued.</b></p> <p><b>Topic: Module 3 - Forces and Motion</b> Describe and explain how materials behave when stretched or squashed including stress and strain. (Young's modulus.) Use Newton's laws of motion to explain movement, momentum and calculate force.</p>	<p><b>Topic: Module 6 continued.</b></p> <ul style="list-style-type: none"><li>• Motion of charged particles</li><li>• The nuclear atom</li><li>• Fundamental particles</li><li>• Radioactivity including Fission and Fusion</li><li>• Using X-rays</li><li>•</li></ul>
Spring 2	<p><b>Topic: Module 3 and 4 continued.</b></p>	<p><b>Topic: Module 6 continued.</b></p> <ul style="list-style-type: none"><li>• Diagnostic methods in medicine</li><li>• Ultrasound</li></ul>
Summer 1	<p><b>Revision and preparation for internally assessed AS examinations.</b></p>	<p><b>Revision and preparation for external examinations.</b></p>
Summer 2	<p><b>Topic: Module 5 - Newtonian world and Astrophysics</b> Demonstrate and apply knowledge of:</p> <ul style="list-style-type: none"><li>• Thermal equilibrium</li><li>• Kinetic model of matter</li><li>• Specific heat capacity</li><li>• Ideal gas laws</li><li>• Kinematics of circular motion</li><li>• Centripetal force</li></ul>	<p><b>External Examinations.</b></p>