Science Subject Intent

The science department empowered students by strengthening their ability to think critically, evaluate evidence and fostered their curiosity of the natural world. Students will

- Know fundamental scientific principles from biology, chemistry and physics that will provide a foundation for understanding and navigating the world.
- Understand the processes of scientific inquiry that lead to the creation and development of concepts and theories.
- Appreciate how science can be used to explain observations and make predictions about natural phenomena.

Seven Year Plan

Year 7			
	Cycle 1	**Cycle 2**	**Cycle 3**
Content	Science skills, Cells and life processes, Forces, and space, Particles and solutions	Reproduction. Atoms and elements, Energy	Ecology, Acids and alkalis, Waves
Skills	Using laboratory equipment safely/hazard management Recording and analysing data	Evaluating models Recalling and using technical vocabulary accurately and appropriately	Using laboratory equipment safely/hazard management Evaluating models
Progression	Using practical scientific methods and processes when carrying out scientific enquiries. Organ systems in plants and animals The force of gravity and the effect of resistive forces like air resistance and friction Solids, liquids and gases. Knowledge of some separation techniques	The life process of reproduction in some plants and animals Students have learned about materials and how they can be grouped and compared but have not been taught about atoms and elements Energy has not been explicitly taught yet	Animals and plants are adapted to suit their environments Acids can react with bicarbonate of soda Light travels in straight line from sources to objects then our eyes. Sounds are made by vibrations
Link to GCSE	B1 cells, C1 atomic structure, P5 forces	B5 homeostasis, P1 energy, C1 atomic structure	B7 ecology, C4 chemical changes, P6 waves
Year 8			
	Cycle 1	**Cycle 2**	**Cycle 3**
Content	The body, Metal reactions, Forces and motion	Plants and photosynthesis, Chemical reactions, Electricity, and magnetism	Variation and inheritance, Pressure, density and moments, Earth materials and the atmosphere
Skills	Using and rearranging equations using the algebraic method Recalling and using technical vocabulary accurately and appropriately	Evaluating models Using laboratory equipment safely/hazard management	Using and rearranging equations using the algebraic method Evaluating models
Progression	*From KS2-* Properties of materials Forces *From y7-* Cells and life processes	*From KS2-* Plants Electricity Forces and magnets *From y7-*	*From KS2-* *Evolution and inheritance* *rocks* *From y7-* Reproduction

	Atoms and elements Forces and space	Cells and life processes Atoms and elements Particles and solutions	Atoms and elements/Particles and solutions Energy *From cycles 1 & 2* Plants and photosynthesis Forces and motion
Link to GCSE	B2 organisation, C4 chemical changes, P5 forces	B4 bioenergetics, C2 bonding, structure, and properties of matter/C3 quantitative chemistry P1 energy/P2 electricityP7 magnetism and electromagnetism	B6 inheritance and variation C9 the evolution of the atmosphere P3 particle model of matter /P5 forces
Year 9 – Transition to KS4			
	Cycle 1	**Cycle 2**	**Cycle 3**
Content	Atomic structure and the periodic table, Cells	Particle model of matter, Bonding, Organisation	Atomic structure, Infection and response,
Skills	Evaluating models Using laboratory equipment safely/hazard management	Evaluating models Recalling and using technical vocabulary accurately and appropriately	Evaluating models Recalling and using technical vocabulary accurately and appropriately
Progression	From KS3 Particles and solutions, atoms and elements, cells and life processes	From KS3 Particles and solutions, atoms and elements, chemical reactions, the body, plants and photosynthesis	From KS3 Particles and solutions, pressure density and moments, cells and life processes, plants and photosynthesis
Link to GCSE / A-Level	C2 bonding, P3 particle model, P4 atomic structure, B2 organisation ***A level*** ***Explores these topics in more detail***	C1 atomic structure and the periodic table, P4 atomic structure, B1 cells ***A level*** Cells, atomic structure, organisation	C1 atomic structure and the periodic table, P3 particle model of matter, B1 cells ***A level*** Particle physics, nuclear physics, photosynthesis and respiration
Year 10			
	Cycle 1	**Cycle 2**	**Cycle 3**
Content	Bioenergetics, Energy changes, Energy	Infection and response, Electricity, Chemical changes, Quantitative	Homeostasis, Forces and Chemistry of the atmosphere
Skills	Using and rearranging equations using the algebraic method Recalling and using technical vocabulary accurately and appropriately	Recording and analysing data Using laboratory equipment safely/ Hazard management	Using and rearranging equations using the algebraic method Recalling and using technical vocabulary accurately and appropriately
Progression	*From KS3* Energy (y7), chemical reactions (y8) *From y9* B1 cells C2 bonding, structure, and properties of matter	*From KS3* Energy (y7), Electricity and magnetism (y8) chemical reactions (Y8) reproduction (y7) *From y9* B1 cells	*From KS3* Earth materials and atmosphere (Y8) Forces (Y7) forces and motion (Y8) *From y9* C1 Atomic structure and the periodic table/C2 bonding, structure, and properties of matter

		C2 bonding, structure, and properties of matter *From cycle 1* P1 energy	
Link to GCSE / A-Level	B4 homeostasis B6 inheritance and variation ***A level biology*** 3.2.4. cell recognition and the immune system ***A level chemistry*** 3.1.12 Acids and bases/ 3.2.6 Reactions of ions in aqueous solution/ 3.2.5 Transition metals ***A level Physics*** Particle physics – rest energies $E=mc^2$ Conservation of energy Energy level diagrams	B6 inheritance and variation C9 chemistry of the atmosphere P7 magnetism and electromagnetism ***A level biology*** 3.2.3 transport across cell membranes 3.6 organisms respond to changes in their internal and external environment ***A level chemistry*** 3.1.12 Acids and bases/ 3.2.6 Reactions of ions in aqueous solution/ 3.2.5 Transition metals ***A level Physics*** Electromagnetic induction Photoelectric effect	C7 organic chemistry/C10 using resources ***A level chemistry*** 3.3 organic chemistry ***A level Physics*** Calculating resultant forces, resolving forces into components Particle interactions, strong and weak nuclear forces, gravitational force, electrostatic force Mechanics and statics
Year 11 – Transition to KS5			
	Cycle 1	**Cycle 2**	**Cycle 3**
Content	Inheritance, Organic, Waves	Ecology, magnetism, Rates, using resources	Revision/exam prep
Skills	Using and rearranging equations using the algebraic method Recording and analysing data	Evaluating models Recalling and using technical vocabulary accurately and appropriately	Using and rearranging equations using the algebraic method Recalling and using technical vocabulary accurately and appropriately
Progression	Variation and inheritance, waves (yr7) Chemical reactions (yr8)	Ecology (yr7) Electricity and magnetism (yr8)	All KS3 and KS4
Link to GCSE / A-Level	***A level biology*** ***A level chemistry*** Energetics, organic and further organic ***A level Physics*** Electromagnetic waves, Maxwell's formula for the speed of light Wave particle duality Stationary waves and superposition	***A level biology*** ***A level chemistry*** ***A level Physics*** Magnetic fields, flux density Electromagnetic induction Magnetic flux and flux linkage	

Year 12 Biology			
	Cycle 1	**Cycle 2**	**Cycle 3**
Content	Introduction to the course/ study habits/maths skills	3.3 (part 1) surface area to volume ratio/gas exchange	3.3 (part 2) digestion and absorption/mass transport

	3.1 Biological molecules 3.2 cells	3.4 (part 1) Nucleic acids and protein synthesis	3.4 (part 2) genetic diversity
Skills	Using and rearranging equations using the algebraic method Recording and analysing data Evaluating models Using laboratory equipment safely/ Hazard management Recalling and using technical vocabulary accurately and appropriately Making notes and summarising information	Using and rearranging equations using the algebraic method Recording and analysing data Evaluating models Using laboratory equipment safely/ Hazard management Recalling and using technical vocabulary accurately and appropriately Making notes and summarising information	Using and rearranging equations using the algebraic method Recording and analysing data Evaluating models Using laboratory equipment safely/ Hazard management Recalling and using technical vocabulary accurately and appropriately Making notes and summarising information
Progression	*From GCSE* B1 cell biology B2 organisation C2 bonding, structure and properties of matter P1 energy	*From GCSE* B1 cell biology B2 organisation B3 bioenergetics B6 inheritance and variation *From cycle 1* 3. biological molecules	*From GCSE* B2 organisation B6 inheritance and variation B7 ecology *From cycle 1 and 2* 3.1 biomolecules 3.2 cells
Link to university	Biology based degrees, biology/biochemistry/genetics/environmental science/biomedical science/bioengineering/nursing		
Year 13 biology			
	Cycle 1	**Cycle 2**	**Cycle 3**
Content	3.5 energy transfers in and between organisms 3.6 organisms respond to changes in their internal and external environments	3.7 genetics, populations, evolution, and ecosystems 3.8 the control of gene expression	Course review and consolidation Exam skill sand exam practice
Skills	Using and rearranging equations using the algebraic method Recording and analysing data Evaluating models Using laboratory equipment safely/ Hazard management Recalling and using technical vocabulary accurately and appropriately Making notes and summarising information	Using and rearranging equations using the algebraic method Recording and analysing data Evaluating models Using laboratory equipment safely/ Hazard management Recalling and using technical vocabulary accurately and appropriately Making notes and summarising information	Recalling and using technical vocabulary accurately and appropriately Making notes and summarising information
Progression	*From GCSE* B5 homeostasis and response	*From GCSE* B6 inheritance and variation	

	B7 ecology *From year 12* 3.1 biological molecules	B7 ecology *From year 12* 3.4 genetics and diversity	
Link to university	Biology based degrees, biology/biochemistry/genetics/environmental science/biomedical science/bioengineering/nursing		
Year 12 Chemistry			
	Cycle 1	**Cycle 2**	**Cycle 3**
Content	**Amount of substance, atomic structure, bonding, energetics**	**Kinetics, periodicity, introduction to organic chemistry, equilibria, oxidation, groups of PT**	**Further organic chemistry, optical isomerism, aromatic chemistry**
Skills	Using and rearranging equations using the algebraic method Recording and analysing data Evaluating models Using laboratory equipment safely/hazard management Recalling and using technical vocabulary accurately and appropriately Making notes and summarising information	Using and rearranging equations using the algebraic method Recording and analysing data Evaluating models Using laboratory equipment safely/ Hazard management Recalling and using technical vocabulary accurately and appropriately Making notes and summarising information	Using and rearranging equations using the algebraic method Recording and analysing data Evaluating models Using laboratory equipment safely/ Hazard management Recalling and using technical vocabulary accurately and appropriately Making notes and summarising information
Progression	**C1 Atomic structure, C2 bonding, C3 quantitative chemistry, C5 energy changes**	**C7 Organic chemistry, C4 chemical changes**	**C7 Organic chemistry**
Link to further study	**Climbing the mountain to university**	**Climbing the mountain to university**	**Climbing the mountain to university**
Year 13 Chemistry			
	Cycle 1	**Cycle 2**	**Cycle 3**
Content	**Acids and bases, chromatography, organic synthesis, rates**	**Thermodynamics, electrode potentials, equilibrium, transition metals, reactions of ions**	**Revision and exam preparation**
Skills	Using and rearranging equations using the algebraic method Recording and analysing data Evaluating models Using laboratory equipment safely/hazard management Recalling and using technical vocabulary accurately and appropriately Making notes and summarising information	Using and rearranging equations using the algebraic method Recording and analysing data Evaluating models Using laboratory equipment safely/hazard management Recalling and using technical vocabulary accurately and appropriately Making notes and summarising information	Using and rearranging equations using the algebraic method Recording and analysing data Evaluating models Using laboratory equipment safely/hazard management Recalling and using technical vocabulary accurately and appropriately Making notes and summarising information
Progression	**C4 Chemical changes, C6 rate and extent of chemical change**	**C4 chemical changes, C1 atomic structure**	

Link to further study	**Climbing the mountain to university**	**Climbing the mountain to university**	**Chemistry, biochemistry, chemical engineering, pharmacy, materials science and many more!**
Year 12 Physics			
	Cycle 1	**Cycle 2**	**Cycle 3**
Content	**Mechanics**	**Waves** **Electricity**	**Quantum mechanics** **Particle physics**
Skills	Using and rearranging equations using the algebraic method Recording and analysing data Evaluating models Using laboratory equipment safely/hazard management Recalling and using technical vocabulary accurately and appropriately Making notes and summarising information	Using and rearranging equations using the algebraic method Recording and analysing data Evaluating models Using laboratory equipment safely/hazard management Recalling and using technical vocabulary accurately and appropriately Making notes and summarising information	Using and rearranging equations using the algebraic method Recording and analysing data Evaluating models Using laboratory equipment safely/hazard management Recalling and using technical vocabulary accurately and appropriately Making notes and summarising information
Progression	**P5 Forces**	**P6 Waves, P2 Electricity**	**P4 Atomic structure, P3 Particle model**
Link to further study	**Climbing the mountain to university**	**Climbing the mountain to university**	**Climbing the mountain to university**
Year 13 Physics			
	Cycle 1	**Cycle 2**	**Cycle 3**
Content	**Circular and simple harmonic motion** **Gravitational, electric and magnetic fields**	**Thermal physics** **Nuclear physics** **Option topic (Astrophysics)**	**Revision and exam preparation**
Skills	Using and rearranging equations using the algebraic method Recording and analysing data Evaluating models Using laboratory equipment safely/hazard management Recalling and using technical vocabulary accurately and appropriately Making notes and summarising information	Using and rearranging equations using the algebraic method Recording and analysing data Evaluating models Using laboratory equipment safely/hazard management Recalling and using technical vocabulary accurately and appropriately Making notes and summarising information	Using and rearranging equations using the algebraic method Recording and analysing data Evaluating models Using laboratory equipment safely/hazard management Recalling and using technical vocabulary accurately and appropriately Making notes and summarising information
Progression	**P5 Forces, P7 Magnetism**	**P4 Atomic structure, P3 Particle model** **Forces and space (yr7)**	**KS3, KS4 and KS5**

Link to further study	**Climbing the mountain to university**	**Climbing the mountain to university**	**Experimental physics, mathematical physics, astrophysics, engineering, materials science and many more!**
Year 12 BTec Forensic science			
	Cycle 1	**Cycle 2**	**Cycle 3**
Content	**Unit 1 – Principles and applications of science**	**Unit 1 Revision – Unit 3 – Science investigation skills**	**Unit 3 exam prep – Unit 2 – Practical scientific procedures /Unit 8 Physiology of human body systems**
Skills	Using and rearranging equations using the algebraic method Recording and analysing data Evaluating models Using laboratory equipment safely/hazard management Recalling and using technical vocabulary accurately and appropriately Making notes and summarising information	Using and rearranging equations using the algebraic method Recording and analysing data Evaluating models Using laboratory equipment safely/hazard management Recalling and using technical vocabulary accurately and appropriately Making notes and summarising information	Using and rearranging equations using the algebraic method Recording and analysing data Evaluating models Using laboratory equipment safely/hazard management Recalling and using technical vocabulary accurately and appropriately Making notes and summarising information
Progression	**Cells/ Atomic structure/ Waves**	**Required practical skills**	**Required practical skills/B2 Organisation**
Link to A-Level			
Year 13 BTec Forensic science			
	Cycle 1	**Cycle 2**	**Cycle 3**
Content	**Unit 4 – Forensic Investigation procedures in science. Unit 5 – Applications of criminology.**	**Unit 6 - Criminal Investigation Procedures in Practice**	**Optional unit**
Skills	Using and rearranging equations using the algebraic method Recording and analysing data Evaluating models Using laboratory equipment safely/hazard management Recalling and using technical vocabulary accurately and appropriately Making notes and summarising information	Using and rearranging equations using the algebraic method Recording and analysing data Evaluating models Using laboratory equipment safely/hazard management Recalling and using technical vocabulary accurately and appropriately Making notes and summarising information	Using and rearranging equations using the algebraic method Recording and analysing data Evaluating models Using laboratory equipment safely/hazard management Recalling and using technical vocabulary accurately and appropriately Making notes and summarising information
Progression			
Link to A-Level			