

Subject Vision — Why Applied Science Matters

Our Vision

Year 12 BTEC Applied Science is where science stops being something that happens to you and starts being something you do. Students on this course are not passive recipients of knowledge — they are scientists in training, learning to use the concepts of biology, chemistry and physics as working tools that can be applied to real problems in healthcare, industry and the natural world. That shift, from understanding science to doing science, is what the BTEC course is designed to produce.

Every lesson is designed around genuine application. The course rewards students who can explain why, not just what — who can take a biological concept and apply it to a clinical context, a chemical principle and connect it to an industrial process, or a physics equation and use it to solve an engineering problem. These are the skills that employers and university lecturers actually need.

The Three Units This Year

- ▶ **Unit 1** — Principles and Applications of Biology: cells and tissues, biological molecules, homeostasis; a 50-mark external exam.
- ▶ **Unit 2** — Principles and Applications of Chemistry: atomic structure and bonding, periodicity and physical chemistry, organic chemistry; a 50-mark external exam.
- ▶ **Unit 3** — Principles and Applications of Physics: waves and optical fibres, forces and motion, electrical circuits and thermal energy; a 50-mark external exam.

Curriculum Journey — Learning Sequence by Term						
	AUTUMN 1	AUTUMN 2	SPRING 1	SPRING 2	SUMMER (EXAMS)	SUMMER (POST-EXAM)
UNIT 1: BIOLOGY	A: Cells & Tissues Prokaryotic/eukaryotic cells, specialised cells, Gram staining, tissues, magnification calculations.	B: Biological Molecules Carbohydrates, proteins, nucleic acids, lipids, enzymes, cell transport (diffusion, osmosis, active transport).	C: Homeostasis Negative/positive feedback, blood glucose regulation, thermoregulation, nervous and endocrine integration.	Revision Full Unit 1 content revision: Cells & Molecules, then Enzymes, Transport & Homeostasis.	Pearson External Exam 50-mark, 1-hour examination on all of Unit 1.	Practical Skills Intro Unassessed introduction to colorimetry and plant growth microscopy techniques for Unit 4.
UNIT 2: CHEMISTRY	A/B: Atomic Structure & Bonding Electronic structure, ionisation energies, ionic/covalent/metallic bonding, molecular shapes, intermolecular forces.	C/D: Periodicity & Physical Chem Period 3 properties, oxidation numbers, mole calculations, kinetics (collision theory, activation energy, rate).	D/E: Physical & Organic Chem Enthalpy, Hess's law, equilibrium (Le Chatelier's, Kc); organic nomenclature, isomerism, alkanes/alkenes/alcohols.	E: Organic Chem + Revision Commercially important reactions, environmental impact of organic compounds; full Unit 2 revision.	Pearson External Exam 50-mark, 1-hour examination on all of Unit 2.	Practical Skills Intro Unassessed introduction to titration and cooling curve techniques for Unit 4.
UNIT 3: PHYSICS	A: Waves & Optical Fibres Wave properties, superposition, diffraction gratings, emission spectra, stationary waves, EM spectrum.	B: Forces & Motion Distance-time/velocity-time graphs, Newton's laws, F=ma, momentum and impulse, terminal velocity.	C: Electrical Circuits Electrical components, Ohm's law, series/parallel circuits, power and energy calculations, household electricity.	C: Thermal Energy + Revision Conduction, convection, radiation, specific heat capacity; full Unit 3 revision.	Pearson External Exam 50-mark, 1-hour examination on all of Unit 3.	Practical Skills Intro Unassessed introduction to electrical circuits and solar cell techniques for Unit 4.
How the Three Units Connect Units 1, 2 and 3 are taught in parallel and are not isolated: atomic structure and bonding (Unit 2) inform biological molecules (Unit 1); enzyme kinetics and cellular transport (Unit 1) connect to physical chemistry kinetics and equilibrium (Unit 2); wave physics and energy transfer (Unit 3) link to biological communication systems. All specification content is completed before May, leaving four weeks for revision, and the post-exam term introduces the practical techniques Unit 4 will build on in September.						

Assessment Information		
Unit 1: Biology ▶ Cells & Tissues assessment and Biological Molecules & Enzymes assessment ▶ Homeostasis end-of-topic assessment ▶ Pearson external examination — 50 marks, 1 hour (May/June)	Unit 2: Chemistry ▶ Atomic Structure and Bonding assessments; Periodicity assessment ▶ Physical Chemistry mid-test and Organic mid-test ▶ Pearson external examination — 50 marks, 1 hour (May/June)	Unit 3: Physics ▶ Waves assessment and Forces assessment ▶ Electrical Circuits assessment and Thermal end-of-topic assessment ▶ Pearson external examination — 50 marks, 1 hour (May/June)

★ PATHS Marking Framework			
Every formal assessment is followed by feedback using PATHS — the school's consistent feedback model, applied across Units 1, 2 and 3. No PATHS cycle is complete until the student has responded.			
	Element	What it means	Example in this year
P	Positive Comment	A specific, sincere comment on a genuine strength of the work — never generic praise.	“Your explanation of active transport correctly identifies the role of ATP and the carrier protein, and links this to movement against the concentration gradient.”
A	Attainment Mark / Grade	A clear mark or grade band showing where the work sits against the BTEC mark scheme.	“This response is at Pass level. To reach Merit you need to apply the enzyme structure to the specific context in the question — explain why the substrate no longer fits the active site after the inhibitor has bound.”
T	Target to Improve	One single, specific, prioritised target — never a list.	“Your next step is to always read the context given in the question and use its specific details in your answer — BTEC questions always have a named substance, organism or situation your answer must refer back to.”
H	How-to Instructions	Concrete, do-able steps telling the student exactly how to act on the target.	“(1) Identify the command word; (2) identify the specific context named; (3) state the relevant scientific concept; (4) apply it to the named context; (5) check your answer uses the words from the question.”
S	Student Response	Students respond in green pen in dedicated improvement time; the teacher checks the response.	Students respond in green pen: acknowledge the target, rewrite the incorrect answer in full using the guidance, and note what they will do differently on the next assessment.