

BTEC National Applied Science (Level 3) - Long Term Plan

Assessment outcomes

AO1: Demonstrate knowledge and understanding of scientific concepts and theories, terminology, definitions and scientific formulae.

AO2 Apply knowledge and understanding of scientific concepts and theories, procedures, processes and techniques.

AO3 Analyse and interpret scientific information.

The qualification is designed to help students build a wide range of **transferable, digital, and sustainability skills** so that students develop key skills that are valued by employers, universities, and training providers. These skills are built directly into lessons and assessments where they naturally fit. activities These fall into four main areas:

Transferable Skills for Life and Work

- **Managing Yourself:** Students learn to take responsibility for their work, build resilience, recognise their strengths, set personal goals, and begin planning future career pathways.
- **Effective Learning:** Learners develop independent study skills, including managing their own learning, reflecting on progress, carrying out research, and developing a mindset of continuous improvement.
- **Interpersonal Skills:** The course strengthens communication skills (written, verbal, and non-verbal), teamwork, and the ability to work effectively with others from different backgrounds.
- **Problem Solving:** Students are encouraged to think critically, solve real-world problems, and use creativity and innovation when applying scientific knowledge.

Digital Skills

- Use digital tools to analyse and solve problems
- Communicate and collaborate using digital platforms
- Understand digital security and online safety
- Handle data responsibly and securely

Sustainability Skills

Applied Science also helps students develop awareness of sustainability and global responsibility. Content is linked to the **UN Sustainable Development Goals (SDGs)**, encouraging learners to understand how science contributes to environmental protection, ethical decision-making, and sustainable development.

Teachers will share teaching the units content which will be taught as a spiral curriculum to support learning and retrieval of knowledge.

Year 12		
Term 1	Term 2	Term 3
<p>Unit 1A: Structure and function of cells and tissues</p> <ul style="list-style-type: none"> • A1 Structure and function of cells and tissues • A2 Structure and function of specialised cells in multicellular organisms • A3 Structure and function of biological tissues <p>Unit 2A: Atomic and electronic structure</p> <ul style="list-style-type: none"> • A1.1 Features of the periodic table and their relationship with atomic structure • A1.2 Electronic structure • A1.3 Ionisation energy <p>Unit 2B: Bonding and structure</p> <ul style="list-style-type: none"> • B1.1 Metallic bonding • B1.2 Ionic bonding • B1.3 Covalent bonding • B1.4 Typical physical properties of substances • B1.5 Molecular shape 	<p>Unit 2D: Physical Chemistry</p> <ul style="list-style-type: none"> • D1.1 Concept of the mole and use in calculations • D1.2 Chemical kinetics • D1.3 Chemical energetics • D1.4 Chemical equilibrium • D1.5 Application of chemical kinetics, energetics and equilibrium to the chemical industry • D1.6 Application of green chemistry in the chemical industry <p>Unit3B: Forces in transportation and Newtons Laws of Motion</p> <ul style="list-style-type: none"> • B1 Measurement and representation of motion • B2 Laws of motion <p>Unit 1C: Cell transport and enzyme activity</p>	<p>Unit 4: Practical Scientific Procedures and Techniques</p> <p>Unit in brief Students will be introduced to quantitative laboratory techniques, including chromatography, colorimetry and laboratory safety, which are relevant to the scientific laboratory environments.</p> <ul style="list-style-type: none"> • A1 Laboratory equipment and its calibration • A2 Preparation and standardisation of solutions using titration • A3 Determination of purity of organic compounds • A4 Evaluating accuracy and reliability using critical thinking skills <ul style="list-style-type: none"> • B1 Colorimetry • B2 Plant growth

- B1.6 Electronegativity and polarity
- B1.7 Intermolecular forces:
- B1.8 Hydrogen bonding

Unit 3 A: Understanding waves and optical fibres

- A1 Working with waves
- A2 Principles of optical fibres
- A3 Uses of electromagnetic waves in communication

Unit 1B: Biological Molecules

- B1 Structure and function of water
- B2 Structure and function of carbohydrates
- B3 Structure and function of proteins
- B4 Structure and function of nucleic acids
- B5 Structure and function of lipids

Unit 2C: Periodicity (period 3 elements)

- C1 Changes in physical properties
- C2 Oxidation number concept, oxidation and reduction
- C3 Trends and observations for reactions
- C4 Differences in physical properties for the oxides and chlorides
- C5 Acid-base behaviour of Period 3 oxides and hydroxides
- C6 The action of water with chlorides
- C7 Write balanced equations
- C1.8 Predict the physical and chemical properties of elements in other periods
- C1.9 Uses of Period 3 elements and compounds

- C1 Cell transport mechanisms
- C1 Cell transport mechanisms
- C1 Cell transport mechanisms

Unit 2E: Organic Chemistry

- E1.1 Knowledge and understanding of key terms used in organic chemistry
- E1.2 Structure representations of organic compounds
- E1.2 Structure representations of organic compounds
- E1.4 Isomerism
- E1.5 Sigma and pi molecular orbitals in alkanes and alkenes
- E1.6 Changes in boiling point within due to changes in chain length or branching
- E1.7 Types of reactions of organic compounds
- E1.8 Reactions of commercial importance
- E1.9 Benefits and problems arising from combustion, halogenoalkanes (CFCs), polymers (plastics) and alcohol (ethanol)
- E1.10 Solutions to environmental problems caused by organic compounds and their usage

Unit3C: Electrical circuits and the transfer of energy

- C1 Use of electrical components
- C2 Equations
- C3 Electrical energy usage
- C4 Energy transfer
- C5 Change of state

Year 13		
<p>Term 1</p> <p>Unit 4: Practical Scientific Procedures and Techniques</p> <p>Unit in brief Students will be introduced to quantitative laboratory techniques, including chromatography, colorimetry and laboratory safety, which are relevant to the scientific laboratory environments.</p> <ul style="list-style-type: none"> • C1 Transfer of thermal energy • C2 Transfer of energy through electrical circuits • C3 Transfer of energy from a renewable resource • D1 Personal responsibility • D2 Interpersonal skills • D3 Professional practice 	<p>Term 2</p> <p>Unit 5: science investigation skills</p> <p>Unit in brief This unit enables students to gain an understanding and the skills required to undertake an investigative project.</p> <ul style="list-style-type: none"> • A1 Literature review • A2 Investigative project proposal • B1 Project scheduling • B2 Project planning • B3 Health and safety and ethical considerations 	<p>Term 3</p> <p>Unit 5: science investigation skills</p> <p>Unit in brief This unit enables students to gain an understanding and the skills required to undertake an investigative project.</p> <ul style="list-style-type: none"> • C1 Experimental procedures and techniques • C2 Collect, collate and analyse data • C3 Data presentation • D1 Scientific report for the investigative project • D2 Scientific evaluation of findings • D3 Skill development within project work