ST JOHN BOSCO COLLEGE
BATTERSEA

The Spirit of St John Bosco College
RUAH - the breath of God

Pearson BTEC Level 3 National Certificate in Applied Science

Introduction to BTEC

The applied science sector is diverse and essential to the UK economy, encompassing fields such as biomedical, forensic, physical, and chemical sciences. According to the UK Office for National Statistics and STEM Learning, there are approximately **9.4 million people** employed in STEM-related roles across the country, equating to around **29% of the total workforce**. This sector plays a crucial role in driving economic growth**,** supporting innovation, and enabling UK companies to remain competitive in an increasingly global marketplace.

From the **2025 academic year**, students will undertake the updated **Pearson BTEC Level 3 National in Applied Science (AAQ)**. This qualification is part of Pearson's **Advanced Applied Qualifications (AAQs)**, developed in line with government reforms to applied general qualifications. It is designed for post-16 learners who want to continue their education through applied learning and progress to **higher education and careers** in science-based fields. It is **equivalent in size to one A level**, with a total of **360 guided learning hours**.

Unlike previous versions, the AAQ is now **50% externally assessed**. All external assessments are set and marked by Pearson and spread throughout the course, ensuring a consistent and rigorous standard across all learners and centres. **Internal assessment**, through supervised coursework and practical assignments, makes up the remaining 50%.

The qualification is graded **Pass, Merit, Distinction, and Distinction***, directly aligned with A level grades **E, C, A, and A***. According to recent performance data, around **75% of students achieved a Merit or above**, reflecting strong outcomes for dedicated learners.

In addition to developing core scientific knowledge and understanding, students also gain essential transferable skills, including:

- Practical laboratory techniques and safety
- Data collection, analysis, and evaluation
- Time management and working to deadlines
- Teamwork, communication, and interpersonal effectiveness
- Responsiveness to feedback and continual improvement

These skills prepare learners not only for success in higher education, but also for the demands of a modern and evolving science-based workforce. The **Pearson BTEC Level 3 National in Applied Science (AAQ)** provides a solid foundation for students aiming to contribute meaningfully to one of the UK's most dynamic and impactful sectors.

What will you study?

Year 12	Year 13
Biology: • Unit 1: Principles & Applications of Biology –external exam Chemistry: • Unit 2: Principles & Applications of Chemistry –external exam • Unit 4: Practical Scientific Procedures & Techniques internal assessment	Physics • Unit 3: Principles & Applications of Physics – external exam • One Optional Unit (choose 90 GLH, internal): • Unit 5: Science Investigation Skills *or* • Unit 6: Contemporary Issues in Science

The transition work in this booklet will enable you to access the first exam module and gives you the opportunity to show your writing skills, as coursework is a key part of this course. This booklet will be taken in and assessed by your teacher in September.

BTEC Applied Science (AAQ) Year 12 – Prior Knowledge

This assessment covers key prior knowledge areas for students starting the Pearson BTEC Level 3 National in Applied Science (AAQ). It focuses on Unit 1 (Biology), Unit 2 (Chemistry), and Unit 4 (Practical Science Skills). Answer each question in full sentences and provide detailed explanations.

Unit 1: Principles and Applications of Biology

1. Compare the structure and function of prokaryotic and eukaryotic cells. Include at least two structural differences and one similarity.

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2. Explain the processes of diffusion, osmosis, and active transport. Use examples from living organisms to show how each is used to maintain homeostasis.

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3. Describe the structure of DNA and its role in protein synthesis. Include the terms base pairing, transcription, and translation.

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5. Enzymes are biological catalysts. Explain how enzyme activity is affected by temperature and pH, and relate this to the lock and key theory.

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6. Carbohydrates, proteins, and lipids are essential macromolecules in living organisms. Describe their structures and biological functions. Include one test for each.

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Unit 2: Principles and Applications of Chemistry

1. Describe the structure of an atom, including the relative mass and charge of subatomic particles, and how this relates to the periodic table.

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2. Compare and contrast ionic, covalent, and metallic bonding. Use diagrams to explain how particles are arranged and how this affects physical properties.

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3. Explain how to calculate the empirical formula and molecular formula of a compound using experimental data. Show full working.

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4. Describe the pH scale and explain how acids and alkalis interact in neutralization reactions. Include the ionic equation for a typical neutralization.

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5. Group 1 and Group 7 elements show clear trends in reactivity. Compare their properties, using the periodic table to explain the patterns observed.

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Unit 4: Practical Scientific Procedures and Techniques

1. You are preparing a standard solution using a solid solute. Describe the method you would use and explain why each step is important for accuracy.

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2. Explain the principles and procedures of an acid-base titration. Include a description of how to determine the concentration of an unknown solution.

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3. Colorimetry is used to determine the concentration of a solution. Describe how a colorimeter works and explain how you would prepare and use a calibration curve.

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4. Compare the uses and procedures of calorimetry and colorimetry in the laboratory. Discuss the strengths and limitations of each technique.

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5. Laboratory safety is essential in all practical work. Describe five specific hazards you might encounter during wet chemistry experiments and how you would reduce the risk of each.

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6. When metals react with hydrochloric acid, a salt and hydrogen gas produced. A learner investigates the reactivity series by reacting metals with hydrochloric acid.

Here is the learner's method:

- Place magnesium ribbon in a boiling tube
- Add hydrochloric acid
- Count the number of bottles of hydrogen produced
- Repeat for aluminium, calcium granules, copper, iron and zinc

The result of the lens investigation Ashanti table below

Metal	Number of bubbles
Magnesium	72
Aluminium	6
Calcium	97
Copper	0
Iron	19
Zinc	46

The learner concludes the metals in order of reactivity are

Most reactive	Calcium
	Magnesium
	Zinc
	Iron
	Aluminium
Least reactive	Copper

Evaluate the learner's investigation. You should think about the following:

- Method of the investigation – have appropriate variables been used, are the results valid, were there control variables present
- Results collected – was the method appropriate for the investigation
- Conclusions made – are the conclusions made correct based on the results, is there any way you could improve the investigation