



APPLIED SCIENCE

TOGETHER WE SUCCEED
ACHIEVEMENT ASPIRATION HIGH EXPECTATIONS COMMUNITY

BTEC LEVEL 3 NATIONAL EXTENDED CERTIFICATE IN APPLIED SCIENCE AAQ

Aims of the Course:

Designed for learners who are interested in learning about the Science sector alongside other fields of study, with a view to progressing to a wide range of higher education courses, not necessarily in Applied Science.

To be taken as part of a programme of study that includes other appropriate BTEC Nationals or A-Levels.

BTEC Nationals required applied learning that brings together knowledge and understanding (the cognitive domain) with practical and technical skills (the psychomotor domain). This is achieved through learners performing vocational tasks that encourage the development of appropriate vocational behaviours (the affective domain) and transferable skills. Transferable skills are those such as communication, teamwork, research and analysis, which are valued in both higher education and the workplace.

Programme of Study:

Learners will cover the following topics:

- **Unit 1:** Principles and Applications of Biology - Mandatory - External
- **Unit 2:** Principles and Applications of Chemistry - Mandatory - External
- **Unit 3:** Principles and Applications of Physics - Mandatory - External
- **Unit 4:** Practical Scientific Procedures and Techniques - Mandatory - Internal
- **Unit 5:** Science Investigation Skills - Optional - Internal

Assessment:

Unit weighting

Externally assessed - 50% externally assessed

Internally assessed - 50% internally assessed

Unit 4: Practical Scientific Procedures and Techniques - Mandatory - Internal

While you develop your practical skills, the discussion and analysis of group results will allow you to understand your progress in relation to that of others and also to gain an understanding of the reliability, repeatability and reproducibility of various procedures and techniques. You will have the opportunity to use problem-solving skills when you undertake chromatography work. There is scope throughout the unit to reflect on the skills you have gained and how you may develop further.

Unit 5: Science Investigation Skills - Optional - Internal

In this unit, you will carry out an individual investigative project that you have chosen in collaboration with your teacher. You will carry out a scientific literature search and review, considering the project's aims and objectives and formulating a suitable hypothesis that you can test by using practical work.

You will then produce a realistic plan and submit it to your tutor for the first assessment and feedback. Once you have approval to continue, over the course of several weeks you will carry out the project safely using your scientific investigation skills, project management skills and what you have learnt from the other units. Finally, you will prepare an evaluative report that will consider the project outcomes and suggest amendments that may have improved those outcomes.

Grading of all the units are graded Pass, Merit or Distinction. The overall qualification is graded as P, M, D and D*.

(Learners must pass each unit in order to pass the qualification)

Exam Board: Pearson

Approaches to Learning:

This is a practical based subject, incorporating a large quantity of ICT based research. Learners will develop their independent skills and be involved in presentations.

This course is for Learners who have a keen interest in science and show enthusiasm towards the subject. They will need to be good at independently researching material and have good organisational and time management skills.

The Pearson BTEC Level 3 National Certificate in Applied Science is intended as an Applied General qualification for post-16 learners who want to continue their education through applied learning and who aim to progress to higher education, and ultimately to employment, possibly in the applied science sector. The qualification is equivalent in size to a full A-Level and aims to give a basic introduction to the study of applied science. Learners who wish to take this qualification will have successfully completed a Level 2 study program with GCSEs or vocational qualifications. It is normally taken alongside other Level 3 qualifications.

Entry Requirements:

Five grade 9-4 GCSE passes including English and Maths. 44 in Combined Science (Trilogy) or 4 in each separate science and a grade 4 in maths.

STEP-UP INDEPENDENT STUDY TASKS

How will the tasks support your understanding of the course?

On this course you will be required to complete internal coursework modules and external exam modules. These tasks are directly linked to topics that will be covered in the assignments and which you will be examined on in Unit 1.

What skills will you begin to develop by completing this work?

Task 1 has been designed for you to use your research to carry out the calibration techniques on the different instruments that you will be using as part of the coursework module. You will also be expected to film yourself carrying out the calibrations as part of the evidence for your work and to make it easier for you to write up the procedures in your coursework. Task 2 has been designed to give you a flavour of the sort of exam questions that you would be expected to answer for the Unit 1 module.

Task 1

As part of the Coursework aspect of the applied science course you will be required to carry out research and conduct practical work.

For your first task you are required to research how to carry out calibration according to the manufacturer's instructions of pH meters and probes, checking calibration with certified weights of balances and how to calibrate volumetric glassware including finding out the density of water at different temperatures and finally how you calibrate thermometers by using ice and boiling water.

You will need a computer for this task, you can use YouTube or search calibration techniques but you need to find methods and procedures for the calibration of the above instruments.

Work needs to be submitted as a mini report and you need to reference your work.

Task 2

Introduction to the chemistry module of Unit 1.

Complete the exam questions using the information on balanced equations, relative atomic mass, atomic number and relative molecular mass, moles, molar masses and molarities, and those on the quantities used in chemical reactions including mass, volume of solution, concentration, reacting quantities and percentage yields.

You will need the sheets of information and the exam questions to complete (see below).

Task 2 Resources

Exam questions

[Balancing Equations 1](#)

[Balancing Equations 2](#)

[Relative Formula Mass](#)

[Moles](#)

[Reacting Mass Calculations 1](#)

[Concentration of Solutions](#)

[Reacting Mass Calculations - Introduction](#)

[Calculations Mixture 1](#)

[Percentage Mass](#)

Resources to help

<https://www.bbc.co.uk/bitesize/topics/z87mw6f>

<https://classroom.thenational.academy/units/quantitative-chemistry-4db7>

TO DEEPEN YOUR UNDERSTANDING

Research chromatographic techniques including the theory of how chromatography works, equipment and procedures used in chromatography. The terminology:

- mobile and stationary phases and adsorption
- the difference between the principles of paper chromatography and the principles of thin-layer chromatography (TLC)

How do you choose which developing solvent and vessel to use and how do you prepare methods for samples including solvent extraction, filtration, concentration by evaporation and the use of locating agents?

This also needs to be submitted as a mini report.

COMPLETED TASK

Student Name			
Subject Teacher		Date:	
Form Tutor:		Date:	