



## SCIENCES

### BIOLOGY

**Faculty Contact:** Mr I Davies, PT Science

#### Levels Available

National 3, 4 and 5, Higher and Advanced Higher

#### Purpose, Aims and Benefits of the Course

Biology affects everyone and aims to find solutions to many of the world's problems. It explores the use of genetic modification to produce new plants and drugs, devising fertility treatments, curing genetic diseases, and exploring new sources of food.

##### National 3, 4 and 5

Unit 1: LIFE ON EARTH - How living things fit into the natural world and how they depend on each other.

Unit 2: CELL BIOLOGY - All living things are made of cells, and an understanding of how they work and the processes that occur in them is fundamental.

Unit 3: MULTICELLULAR ORGANISMS - Some of the processes that occur within the bodies of animals and plants.

##### Higher

Unit 1: DNA AND THE GENOME- A study of DNA structure, production of proteins, the applications of DNA technology and therapeutic use of stems cells.

Unit 2: METABOLISM AND SURVIVAL - the process of respiration and how it is essential in metabolism.

Unit 3: SUSTAINABILITY AND INTERDEPENDENCE - sustainability of food production.

##### Higher Human

Unit 1: HUMAN CELLS – DNA structure, gene expression, mutation and genetic disease. Cellular respiration and energy systems.

Unit 2: PHYSIOLOGY AND HEALTH – Anatomy and physiology of reproduction. Cardiovascular physiology and pathology of cardiovascular disease.

Unit 3: NEUROBIOLOGY AND IMMUNOLOGY: Physiology of nervous system, memory, body defences and immunization.

##### Advanced Higher

Unit 1: CELLS AND PROTEINS – a study of the structure and roles of proteins in cell processes.

Unit 2: ORGANISMS AND EVOLUTION – a study of the co-evolution of parasites and their hosts.

Unit 3: INVESTIGATIVE BIOLOGY - practical skills will be developed to a high level and a Practical Investigation will be completed.

#### Progression Routes

BGE → National 3 → National 4 → National 5 → Employment, training, further education

BGE → National 4 → National 5 → Higher → Employment, training, further education

BGE → National 5 → F.A → Employment, training, further education

BGE → National 5 → Higher → Advanced Higher → Employment, training, further education



## SCIENCES

### CHEMISTRY

**Faculty Contact:** Mr I Davies, PT Science

#### Levels Available

National 3, 4 and 5, Higher and Advanced Higher

#### Purpose, Aims and Benefits of the Course

The purpose of the course is to develop learners' curiosity, interest and enthusiasm for Chemistry in a range of contexts. The key skills of scientific inquiry and investigation are integrated and developed throughout the course. The relevance of Chemistry is highlighted by the study of the applications of Chemistry in everyday contexts. This will enable learners to become scientifically literate citizens, able to review the science-based claims they will meet. The courses give the opportunities for learners to develop the ability to think analytically, creatively and independently, and to make reasoned evaluations.

##### National 3, 4 and 5

Unit 1: CHEMICAL CHANGES & STRUCTURE You will build on detailed chemical concepts and use these in analytical applications. You will develop skills and awareness of ethical and environmental issues in a local and international context.

Unit 2: NATURE'S CHEMISTRY You will build on the understanding of natural resources and associated products to gain knowledge and develop skills. You will apply these skills when considering ethical and environmental implications of the application of chemical knowledge to fuelling and feeding a modern society.

Unit 3: CHEMISTRY & SOCIETY You will be introduced to important chemical concepts and apply skills in areas such as the development and use of novel and new materials, including forms of energy generation.

##### Higher

Unit 1: CHEMICAL CHANGES & STRUCTURE

Unit 2: RESEARCHING CHEMISTRY

Unit 3: NATURE'S CHEMISTRY

Unit 4: CHEMISTRY & SOCIETY

##### Advanced Higher

Unit 1: INORGANIC AND PHYSICAL CHEMISTRY, Unit 2: ORGANIC CHEMISTRY AND INSTRUMENTAL ANALYSIS and Unit 3: RESEARCHING CHEMISTRY

#### Progression Routes

BGE → National 3 → National 4 → National 5 → Employment, training, further education

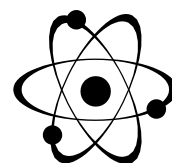
BGE → National 4 → National 5 → Higher → Employment, training, further education

BGE → National 5 → F. A. → Employment, training, further education

## SCIENCES

### PHYSICS

**Faculty Contact:** Mr I Davies, PT Science



#### Levels Available

National 3, 4 and 5, Higher and Advanced Higher

#### Purpose, Aims and Benefits of the Course

The courses give students an insight into the underlying nature of our world and its place in the universe. From the study of the electrical and heat energy that we use in our society, to the exploration of space, they cover a range of applications of the relationships that have been discovered through experiment and calculation, including those used in modern technology.

Advances in Physics mean that our view of what is possible is continually being updated. These courses allow students to understand the processes behind scientific advances and to appreciate and contribute to topical scientific debate.

#### National 3, 4 and 5

Unit 1: DYNAMICS AND SPACE - This unit explores concepts relevant to study of the universe and its exploration.

Unit 2: ELECTRICITY AND ENERGY - This unit explores relationships in heat energy and in electrical energy

Unit 3: WAVES AND RADIATION - This unit explores issues surrounding electromagnetic and nuclear radiation.

#### Higher

Unit 1: OUR DYNAMIC UNIVERSE

Unit 3: ELECTRICITY

Unit 2: PARTICLES AND WAVES

Unit 4: RESEARCHING PHYSICS

#### Advanced Higher

Unit 1: ROTATIONAL MOTION AND ASTROPHYSICS

Unit 2: QUANTA AND WAVES

Unit 3: ELECTROMAGNETISM

#### Progression Routes

BGE → National 3 → National 4 → National 5 → Employment, training, further education

BGE → National 4 → National 5 → Higher → Employment, training, further education

BGE → National 5 → F. A. → Employment, training, further education

BGE → National 5 → Higher → Advanced Higher → Employment, training, further education



## SCIENCES

### Foundation Apprenticeship in Scientific Technologies

**Faculty Contact:** Mr I Davies, PT Science

#### About the course

This course provides an excellent opportunity for students to achieve a **Higher** level qualification that combines school-based learning with a substantial element of work experience in a research facility.

#### Course overview – SEE PAGE 65 FOR FURTHER DETAILS

##### Course Overview:

This course will help you discover what a career in the science industry would be like, and if it's right for you, while you're still at school. It is a unique opportunity to work towards a qualification widely recognised by Universities, Colleges, and the Science industry. It is equivalent to a **Higher** qualification. The course is being offered to S4 and S5 students across all six East Lothian secondary schools. It is delivered on a Tuesday and a Thursday afternoon (1.30pm-4/5pm). Transport to and from the learning location, and research facilities, will be provided..

##### Year One:

Students will study fundamental chemistry concepts whilst gaining confidence in a wide range of chemical and biological experimental techniques. There are several research facilities offering their labs and research scientists; Charles River Laboratories, The Scottish Rural College, Edinburgh University, Royal Dick Vet School, Scottish Centre for Regenerative Medicine, Pure Malt, and the Roslin Institute.

##### Year Two:

Students will spend most of their Tuesday and Thursday afternoons at their allocated research facility. During this time they will record and gather evidence of their lab work in order to pass three skills-based SVQ units.

**Students are expected to be on placement during certain school holidays which will be confirmed in due course.**

##### Assessment:

Throughout the two year course students are expected to pass a range of internal assessments relevant to the course subject; there are no external exams.

As the course follows a two year programme, **there is no partial award or credit at the end of year 1.**

For this reason, students must be committed to completing the course in its entirety. The exception to this is the Direct Entry course for S6 students, which can be completed in one year.

#### Progression:

On completion of this course students will be in a position to:

- Greatly improve their chances of gaining entry to a variety of undergraduate science courses (students are encouraged to check entry requirements with individual Universities and Colleges).

Apply for entry level positions in the Science industry via Modern/Graduate Apprenticeship programmes.

## SCIENCES

### NPA6 SCIENTIFIC TECHNOLOGIES

**Faculty Contact:** Mr I Davies, PT Science



#### Recommended Entry Requirements:

S5 and 6 pupils should have a C pass in at least one National 5 Science subject, along with a pass in national 4 Maths. S4 pupils should be on track to achieve these results.

#### Course Overview:

This course will help you discover what a career in the science industry would be like, and if it's right for you, while you're still at school. It is a unique opportunity to work towards a qualification widely recognised by Universities, Colleges, and the Science industry.

The course is being offered to S4, S5 and S6 pupils who have passed at a national 5 level in a science and at national 4 maths. The NPA Scientific Technologies group award is part of the Foundation Apprenticeship in Scientific Technologies and is aimed at learners who are interested in working in science-based industries but is also suitable for a wider range of learners.

Students will study fundamental chemistry concepts whilst gaining confidence in a wide range of chemical and biological experimental techniques. During this time they will record and gather evidence of their lab work in order to pass internal assessments based on lab safety, practical techniques and fundamental science.

Students will learn to use scientific methods and equipment accurately, use problem solving to interpret experimental data, and combine and present their ideas while collaborating with others.

#### Assessment:

Throughout the year students are expected to pass a range of internal assessments relevant to the course subject; **there are no external exams.**

#### Progression Routes

After completion of this course you will be available to apply for:

- Higher Chemistry
- Foundation Apprenticeship



## SCIENCES

### LABORATORY SCIENCE (LAB SKILLS)

**Faculty Contact:** Mr I Davies, PT Science

#### Levels Available (Entry based on prior attainment)

National 5

#### **Purpose, Aims and Benefits of the Course**

Laboratory Science (Lab Skills) is a Skills for Work Course which introduces learners to knowledge and skills required for employment/further study in the industries and services using laboratory science. The course aims to develop an awareness of the types and range of career options within industry whilst developing practical skills including the preparation of compounds and solutions, titration, microbiology and measuring radioactivity. There are 4 units.

#### Careers using Laboratory Science

This unit introduces learners to the variety of ways in which science and laboratory skills are used in different industries and services, and about the job roles that use these skills. Learners investigate a range of career opportunities in industries and services that use laboratory science. Learners will continually self-evaluate throughout the course based on employability skills and attitudes desired by employers, including problem solving and communication skills.

#### Working in a Laboratory

This unit provides learners with the opportunity to learn basic laboratory skills such as handling chemicals and preparing solutions, and calculate and present results of their practical work. To maintain health and safety while working in a laboratory environment, learners follow safety and security procedures, and carry out risk assessments.

#### Practical Skills

This unit provides learners with the opportunity to develop the skills most commonly used in laboratories, including titration, microbiology and radioactivity.

#### Practical Investigation

In this unit, learners work to produce a plan, including practical procedures, to investigate a scientific topic. They devise methods that include a practical procedure to test their aim. Learners are assessed on their ability to carry out the practical procedure competently and safely. Learners produce a scientific report with their individual analysis and evaluation

#### Assessment

Students are expected to pass a range of internal assessments such as lab report submissions. health and safety assessments and skills-based assessments. There are no

#### **Progression Routes**

This course has potential to lead on to other qualifications in Biology, Chemistry and Physics (National 5) or for further study/employment/training within a scientific industry