

SCIENCES
BIOLOGY



Course/Subjects Name

Biology

Levels Available (Entry based on prior attainment)

National 3, National 4 and National 5

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 developing new sources of food.

The courses develop scientific understanding of biological issues and aims to develop learners' interest in and enthusiasm for biology, by using a variety of approaches, with an emphasis on practical activities. The courses have three units with the same title, similar content but at different levels of difficulty.

Life on Earth

This will include world ecosystems, evolution, natural selection and competition, behaviour, biodiversity, decay, recycling, microorganisms, and ethical issues.

Students following National 4 courses will also have an Added Value unit which draws upon and extends skills they have learned from the other units.

Cell Biology

This will include cell structure and processes within cells, such as transport, photosynthesis and respiration, as well as DNA, protein and biotechnology.

Multi-cellular Organisms

This will include a comparative approach to the study of plants and animals, through areas such as reproduction and inheritance, the need for transport within organisms, digestion and associated enzymes, control and communication, and health.

Homework

Home learning will be required to support school based learning. This will include a variety of tasks including research projects, study questions, review of classwork. The time students will be expected to spend on home learning tasks will vary according to level of study and task. On average, students will be expected to spend up to one hour per week.

Assessment

For each unit, students will be assessed by an internal Attainment Tracking Assessment as well as ongoing formative assessments. National 3 and 4 courses require the completion on key area assessments set by the SQA. There will be extended exam practice at the end of unit 2 and the SQA course exam will be given in May for the National 5 course. In addition, students will be assessed in Practical skills, and will be required to complete a Research Assignment. This Assignment will be marked by the SQA and will account for 20% of the overall course mark.

Progression Routes

These courses may provide progression to other SQA qualifications, such as National 5, Higher, Advanced Higher in Biology, Chemistry or Physics, Foundation Apprenticeship in Scientific Technologies or further study, employment or training. Successful attainment at one level in Biology will allow students to progress to the next level. Entry to Chemistry or Physics courses will be considered on an individual basis.

Career Opportunities

Biology courses lead to many careers where biology is applied including: medicine, dentistry, veterinary sciences, physiotherapy, nursing, speech and occupational therapy, psychology, sport science, forensic science, agriculture, plant and animal breeding, food science, dietetics, microbiology, ecology, conservation, pharmacology and biochemistry. The comparatively new field of biotechnology is developing rapidly and could provide many jobs in the future.

Faculty Contact

Mr I Davies
PT Science

SCIENCES
BIOLOGY HIGHER



Course/Subjects Name

Biology Higher

Recommended Entry

Students are expected to have attained a pass at National 5 Biology, or the equivalent.

Course Details

The Higher Biology course offers a broad and up-to-date selection of concepts and ideas relevant to the central position of life science within our society. Learners develop deeper understanding of the underlying themes of biology — evolution and adaptation; structure and function; genotype and niche — and the scale of topics ranges from molecular through to whole organism and beyond.

Course Units

1) *DNA and the Genome*

A study of the structure of DNA and how it provides the basis for storing information in all living organisms is covered. The link between DNA replication and mitosis, as well as the application in DNA technology will be studied. The course looks at how genes are expressed in the process of Protein synthesis. This leads on to the study of therapeutic uses of stem cells and a wider understanding of gene technology.

2) *Metabolism and Survival*

This topic looks at the fundamental process of cellular respiration and how it is essential for metabolism. Moving to the scale of the whole organism, adaptations for the survival of extreme conditions are studied.

3) *Sustainability and Interdependence*

The basis for this topic is a study of the sustainability of food production through the use of genetic engineering and reproductive technology, as well as the more traditional techniques of selective breeding and tissue culture. The need to maintain genetic stocks is emphasised as well as ethical considerations. The importance of relationships between living organisms and their ecosystem are studied.

Purpose

The course provides a study of some of the more important biological topics and builds on the work covered at National 5 level. The relevance of biological topics to issues which face society is emphasised. As a practical subject, investigative and experimental work is an important component.

Assessment

The final grade will be determined by the course assignment and end of course exam. This final external exam will consist of two papers and lasts 3 hours.

Progression

Students who achieve Higher Biology may progress to:

- Advanced Higher Biology
- HNC, HND or Degree in all branches of Biological Sciences
- Other Higher Education courses
- Employment in a Biological or Biotechnological field

Homework

Homework will be given weekly and forms an integral part of the course. It is designed to:

- Reinforce classwork
- Help develop study skills
- Prepare for assessment

Additional Information

Higher Biology is a useful qualification for students who are interested in this field. It can be useful in many fields of employment or Higher education.

Higher Biology is particularly useful for progression to employment or courses in:

Biotechnology, Agriculture, Ecology, Medicine, Nursing, Physiotherapy, Veterinary Science, Animal Science, Sports Science, Physical Education, Botany, Genetics, Biochemistry etc.

Faculty Contact

Mr I Davies
PT Science

SCIENCES
BIOLOGY ADVANCED HIGHER



Course/Subjects Name
Biology Advanced Higher

Recommended Entry

Entry to Advanced Higher Biology is dependent on the student having gained an award in Higher Biology.

Course Details

The course provides study of a wide range of Biology topics which build on the work covered at Higher level.

Course Units:

1) *Cells and Proteins*

This unit focuses on the role that proteins play in the structure and functioning of cells and organisms. A study is made of the details of protein structure and the many roles proteins play such as enzymes, signals, receptors, channels, transporters and structural components. The unit emphasises the use of practical techniques in the analysis of important proteins. Advanced practical work is a mandatory part of this Unit.

2) *Organisms and Evolution*

This unit explores the importance of parasites in evolution. It builds on the concepts of evolution, genetics, parasitism and disease developed at Higher level and investigates the co-evolution of parasites and their hosts.

3) *Investigative Biology*

The unit develops the skills of analysis and evaluation of scientific data leading to a deeper understanding of experimental design. The planning and carrying out of a 20 hour Practical Investigation is a major part of this unit.

Assessment

All units will be internally assessed. The Course Assessment will consist of an exam at the end of the course and the Investigation report which will be submitted.

Homework

Homework will include completion of lab reports, reading and note making, as well as practice of exam style questions.

Additional Information

Students will be expected to take on a lot of responsibility for organising themselves and managing their own work. In addition students will be expected to participate in collaborative practical work with Advanced Higher students from other East Lothian schools. This practical work is considered mandatory and will involve travelling to and from other East Lothian schools on occasion.

Faculty Contact

Mr I Davies

PT Science

SCIENCES
BIOLOGY HUMAN HIGHER



Course/Subjects Name

Biology Human Higher

Recommended Entry

Students are expected to have attained a pass at National 5 Biology, or the equivalent.

Course Details

The Higher Human Biology course offers an in-depth study of some important areas of human biology; cellular processes, reproductive and cardiovascular physiology, immunology and neuroscience. Learners develop deeper understanding of some key underlying themes of human biology – the importance of understanding cellular processes, the link between cellular processes and physiology, disease pathology and potential treatments and recent advances in stem cell biology and neuroscience.

Course Units

1 Human Cells

This topic looks at the structure and function of DNA, replication and gene expression. It goes on to look at mutation and genetic disease and considers the burgeoning field of human genomics. It also covers the biochemistry of metabolism and energy supply to muscle cells.

2 Physiology and Health

This topic is in two parts: the first covers human reproduction in depth including hormonal control of fertility and ante and postnatal screening, it then covers the anatomy and physiology of the cardiovascular system and the pathology of cardiovascular disease.

3 Neurobiology and Immunology

Another two part unit; the first covers the nervous system, cerebral cortex and memory before considering cellular processes in the nervous system including the action of various drugs; the second part covers the body's defences against pathogens, immunisation and clinical trials of vaccines and drugs

Purpose

The course provides an introduction to some very important areas of human biology including physiology, cell biology, immunology and neuroscience. As a practical subject, investigative and experimental work is an important component.

Assessment

All students must pass the unit tests to be awarded the Higher course pass. If a student fails the unit test they will be given the opportunity to re-sit. Final grade will be determined by the end of course exam and an assignment. This final external exam will consist of two papers of 40 minutes and 2 hours, 20 minutes respectively.

Progression

Students who achieve Higher Human Biology may progress to:

- Advanced Higher Biology;
- HNC, HND or Degree in all branches of Biological Sciences or Health professions;
- Other Higher Education courses.

Homework

Homework will be given weekly and forms an integral part of the course. It is designed to:

- Reinforce classwork
- Help develop study skills
- Prepare for assessment

Additional Information

Higher Human Biology is a useful qualification for students who are interested in biology, medicine and health professions. It can be useful in many fields of employment or Higher education. Higher Human Biology is particularly useful for progression to employment or courses in: physiotherapy, radiology, medicine, nursing, veterinary science, animal science, sports science, physical education, zoology, immunology, physiology and psychology.

Faculty Contact Mr I Davies, PT Science

SCIENCES CHEMISTRY



Course/Subjects Name

Chemistry

Levels Available (Entry based on prior attainment)

National 3, National 4 and National 5

Purpose, Aims and Benefits of the Course

Chemistry is all around us - every time we light a match, boil an egg or simply breathe in and out, we perform a chemical reaction. Our bodies function entirely as a result of the chemical processes that go on within them. Our clothes and nearly all the objects of our everyday life are manufactured using Chemistry. The courses aim to develop an interest in, and enthusiasm for, Chemistry.

You will develop important and relevant skills, attitudes and attributes including; scientific and analytical thinking skills, developing an understanding of Chemistry's role in scientific issues, acquiring and applying knowledge of Chemistry concepts, an understanding of chemical products and how they are formed and applied in society. A variety of approaches will be used, with an emphasis on practical activities and investigations. The courses have three units with the same title, similar content but at different levels of difficulty:

Chemical Changes and 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.

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.

Chemistry in 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.

Homework

Home learning will be required to support school based learning. This will include a variety of tasks including research projects, study questions, review of classwork. The time students will be expected to spend on home learning tasks will vary according to level of study and task. On average, students will be expected to spend up to one hour per week.

Assessment

For each unit, students will be assessed by an internal Attainment Tracking Assessment as well as ongoing formative assessments. National 3 and 4 courses require the completion on key area assessments set by the SQA. There will be extended exam practice at the end of unit 2 and the SQA course exam will be given in May for the National 5 course. In addition, students will be assessed in Practical skills, and will be required to complete a Research Assignment. This Assignment will be marked by the SQA and will account for 20% of the overall course mark.

Progression Routes

These courses may provide progression to other SQA qualifications, such as National 5, Higher, Advanced Higher in Chemistry, Biology or Physics, Foundation Apprenticeship in Scientific Technologies or further study, employment or training. Successful attainment at one level in Chemistry will allow students to progress to the next level. Entry to Biology or Physics courses will be considered on an individual basis.

Career Opportunities

Chemistry courses lead to many careers where chemistry is applied including; medicine, dentistry, veterinary sciences, pharmaceuticals, chemical engineering, forensic science, oceanography, petroleum industry, environmental chemistry, biotechnology, materials science, plastics industry and textiles. Chemistry is a very versatile science. Mastery of Chemistry is associated with excellent analytical and mathematical skills. Students of Chemistry are able to solve problems and think things through. These skills are useful for any job.

Faculty Contact

Mr I Davies, PT Science

SCIENCES
CHEMISTRY HIGHER



Course/Subjects Name

Chemistry Higher

Recommended Entry

Higher Chemistry is suitable for learners who are secure in their attainment of National 5 Chemistry. The course may be suitable for those wishing to study Chemistry for the first time.

Course Details

Chemistry, the study of matter and its interactions, contributes essential knowledge and understanding across all aspects of our lives. Chemistry explains the links between the particulate nature of matter and the macroscopic properties of the world. Chemistry research and development is essential for the introduction of new products. The chemical industry is a major contributor to the economy of the country.

The course is composed of the following units:

Chemical Changes and Structure

This unit covers the knowledge and understanding of controlling reaction rates and periodic trends, and strengthens the learner's ability to make reasoned evaluations by recognising underlying patterns and principles. Learners will investigate collision theory and the use of catalysts in reactions. Learners will explore the concept of electro-negativity and intra-molecular and intermolecular forces. The connection between bonding and a material's physical properties is investigated.

Researching Chemistry

This unit covers the key skills necessary to undertake research in Chemistry. Learners will research the relevance of chemical theory to everyday life by exploring the chemistry behind a topical issue. Learners will develop the key skills associated with collecting and synthesising information from a number of different sources. Equipped with the knowledge of common Chemistry apparatus and techniques, they will plan and undertake a practical investigation related to a topical issue.

Nature's Chemistry

This unit covers the knowledge and understanding of organic Chemistry within the context of the chemistry of food and the chemistry of everyday consumer products, soaps, detergents, fragrances and skincare. The relationship between the structure of organic compounds, their physical and chemical properties and their uses are investigated. Key functional groups and types of organic reaction are covered.

Contd.

Chemistry in Society

This unit covers the knowledge and understanding of the principles of physical chemistry which allow a chemical process to be taken from the researcher's bench through to industrial production. Learners will calculate quantities of reagents and products, percentage yield and the atom economy of processes. They will develop skills to manipulate dynamic equilibria and predict enthalpy changes. Learners will investigate the ability of substances to act as oxidising or reducing agents and their use in analytical chemistry through the context of volumetric titrations. Learners will use analytical chemistry to determine the purity of reagents and products.

Purpose

The purpose of the course is to develop learners' curiosity, interest and enthusiasm for Chemistry in a range of contexts. The skills of scientific inquiry and investigation are 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 course provides well-mapped concept and skills development pathways. The course develops scientific understanding of issues relating to Chemistry, and uses the development of chemical theory to build an extensive set of skills for learners. Through application of a detailed knowledge and understanding of chemical concepts, in practical situations, learners develop an appreciation of the impact of Chemistry on their everyday lives. The course gives the opportunities for learners to develop the ability to think analytically, creatively and independently, and to make reasoned evaluations. By using the broad skills base and knowledge and understanding of detailed Chemistry concepts, learners will become scientifically literate citizens. It offers a broad, versatile and adaptable skills set which is valued in the workplace, and forms the basis for progress onto study of Chemistry at a higher level, while also providing a knowledge base useful in the study of all of the sciences.

Assessment

The final grade will be determined by the course assignment and end of course exam. This final external exam will consist of two papers and lasts 3 hours.

Progression

Students who achieve Higher Chemistry may progress to:

- Advanced Higher Chemistry
- HNC, HND or Degree in all branches of Chemistry and related subjects such as Environmental Science, Pharmacy & Engineering
- Employment including work based training for SVQ Laboratory Operations

Homework

Homework will be given regularly and forms an integral part of the course. It is designed to:

- Reinforce class work
- Help develop study skills
- Prepare for assessment

Additional Information

Higher Chemistry is a useful qualification for students who are interested in this field. It can be useful in many fields of employment or Higher education. Higher Chemistry is particularly useful for progression to employment or courses in: Food Science, Agriculture, Medicine, Nursing, Physiotherapy, Veterinary Science, Dentistry, Forensic Science, Biochemistry, Textiles etc.

Faculty Contact

Mr I Davies
PT Science

SCIENCES
CHEMISTRY ADVANCED HIGHER



Course/Subjects Name

Chemistry Advanced Higher

Recommended Entry

Advanced Higher Chemistry is suitable for learners who are secure in their learning of Higher Chemistry. This course emphasises practical and experiential learning opportunities, with a strong skills-based approach to learning.

Course Details

Advanced Higher Chemistry develops learners' knowledge and understanding of the physical and natural environments beyond Higher level. The course builds on Higher Chemistry continuing to develop the underlying theories of Chemistry and the practical skills used in the Chemistry laboratory. Learners develop the skills of independent study and thought that are essential in a wide range of occupations.

The course is composed of the following units:

1) Inorganic and Physical Chemistry

This unit develops a knowledge and understanding of the principles and concepts of inorganic and physical chemistry. Learners will discover how electromagnetic radiation is used in atomic spectroscopy to identify elements. They will extend an understanding of the concept of atomic structure by considering atomic orbitals and electronic configuration related to the periodic table. Using electron pair theory, learners will predict the shape of molecules. Learners will gain an understanding of the physical and chemical properties of transition metals and their compounds. Learners will investigate the quantitative component of chemical equilibria. They will develop their understanding of the factors which influence the feasibility of chemical reactions. Learners will progress their understanding of reaction kinetics by exploring the order and mechanisms of chemical reaction.

2) Organic Chemistry and Instrumental Analysis

This unit develops a knowledge and understanding of organic chemistry. Learners will research the structure of organic compounds, including aromatics and amines, and draw on this to explain the physical and chemical properties of the compounds. They will consider the key organic reaction types and mechanisms, and link these to the synthesis of organic chemicals. Learners will discover the origin of colour in organic compounds and how elemental analysis and spectroscopic techniques are used to verify chemical structure. They will study the use of medicines in conjunction with the interactions of the drugs.

Contd.

3) Researching Chemistry

In this unit, learners will be given the opportunity to gain an understanding of stoichiometric calculations, to develop practical skills and to carry out research in Chemistry. Learners will develop the key skills associated with a variety of different practical techniques, including the related calculations. Equipped with the knowledge of Chemistry apparatus, techniques and an understanding of concepts, learners will identify, research, plan and safely carry out a Chemistry practical investigation of their choice. The unit will equip learners with the scientific background and skills necessary to analyse scientific articles and use them in order to make informed choices and decisions.

Assessment

All units will be internally assessed. The Course Assessment will consist of an exam at the end of the course and the Investigation report which will be submitted.

Homework

Homework will include completion of experimental reports, reading and note making, as well as practice of exam style questions.

Progression

On successful completion of this course, learners could progress to:

- HND/degree programmes in a chemistry-based course or a related area, such as medicine, law, dentistry, veterinary medicine, engineering, environmental and health sciences
- Careers in a chemistry-based discipline or related area, or in a wide range of other areas, such as oil and gas exploration, renewable energy development, engineering, technology, pharmaceuticals, environmental monitoring, forensics, research and development, management, civil service and education

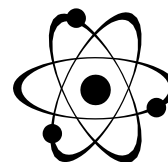
Additional information

Advanced Higher Chemistry encourages independent learning and allows learners to make connections between science and the world in which they live, learn and work. Learners will develop transferable skills and be better prepared for future study and/or employment. Due to the interdisciplinary nature of the sciences, learners taking this course along with other science subjects will enhance their skills, knowledge and understanding.

Faculty Contact

Mr I Davies
PT Science

SCIENCES
PHYSICS



Course/Subjects Name

Physics

Levels Available (Entry based on prior attainment)

National 3, National 4 and National 5

Purpose, Aims and Benefits of the Course

The course gives 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, it covers 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. This course allows students to understand the processes behind scientific advances and to appreciate and contribute to topical scientific debate.

Dynamics and Space

This unit explores concepts relevant to study of the universe and its exploration, while developing skills in investigation, experiment and analysis. It will focus on relationships involving forces in a transport context; along with the impact space exploration has had on society. Students will have the opportunity to undertake a range of practical activities and discuss issues surrounding space exploration.

Electricity and Energy

This unit explores relationships in heat energy and in electrical energy, while developing skills in investigation, experiment and analysis. It will focus on concepts in energy and energy transformation appropriate to this level and introduce some electronic systems and components. Students will undertake a range of activities, including designing and building electrical and electronic circuits.

Waves and Radiations

This unit explores concepts that are relevant to electrical and mechanical equipment in use in society, while developing skills in investigation, experiment and analysis. It will focus on the use of electromagnetic waves and sound waves in medicine and communications. Students will explore issues surrounding electromagnetic and nuclear radiation.

Homework

Home learning will be required to support school based learning. This will include a variety of tasks including research projects, study questions, review of classwork. The time students will be expected to spend on home learning tasks will vary according to level of study and task. On average, students will be expected to spend up to one hour per week.

Assessment

For each unit, students will be assessed by an internal Attainment Tracking Assessment as well as ongoing formative assessments. National 3 and 4 courses require the completion on key area assessments set by the SQA. There will also be the SQA course exam in May for National 5. In addition, students will be assessed in Practical skills, and will be required to complete a Research Assignment. This Assignment will be marked by the SQA and will account for 20% of the overall course mark.

Progression Routes

These courses may provide progression to other SQA qualifications, such as National 5, Higher, Advanced Higher in Physics, Foundation Apprenticeship in Scientific Technologies or further study, employment or training. Successful attainment at one level in Physics will allow students to progress to the next level. Entry to Biology or Chemistry courses will be considered on an individual basis.

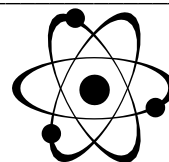
Career Opportunities

Physics courses lead to many careers where Physics is applied including; aerospace, armed forces and defence solutions, astronomy, education, engineering, medicine, meteorology and climate change, nanotechnology, oil and gas, renewable energy, scientific research, space exploration industries, telecommunications and careers outside science.

Faculty Contact

Mr I Davies
PT Science

SCIENCES
PHYSICS HIGHER



Course/Subjects Name

Physics Higher

Recommended Entry

Higher Physics is suitable for learners who are secure in their attainment of National 5 Physics. In addition, a good pass at National 5 Mathematics is strongly recommended.

Course Details

The course develops knowledge and understanding and skills in Physics in the following units.

Our Dynamic Universe (H)

Content outline:

- Equations of Motion;
- Forces, energy and power;
- Collisions and explosions;
- Gravitation;
- Special relativity;
- The expanding universe;
- Big Bang Theory

Particles and Waves (H)

Content outline:

- The Standard Model
- Forces on Charged Particles
- Nuclear Reactions
- Wave Particle Duality
- Interference and Diffraction
- Refraction of Light
- Spectra

Electricity (H)

Content outline:

- Electrons and Energy
- Electrons at Work

Researching Physics (H)

Students will develop the key skills necessary to undertake research in Physics and demonstrate the relevance to everyday life by exploring the physics behind a topical issue.

Purpose

The purpose of the course is to develop learners' curiosity, interest and enthusiasm for Physics in a range of contexts. The skills of scientific inquiry and investigation are developed throughout the course. The relevance of Physics is highlighted by the study of the applications of Physics in everyday contexts. This will enable learners to become scientifically literate citizens, able to review the science-based claims they will meet.

Due to the interdisciplinary nature of science, learners benefit from studying Physics along with other subjects from the Sciences, Technologies, and Mathematics curriculum areas.

The course develops scientific understanding of issues relating to Physics. It will enable learners to gain an in-depth knowledge of concepts in Physics, and to develop confidence in the skills of scientific inquiry.

Learners will develop ability in describing and interpreting physical phenomena using mathematical skills, and will practice scientific methods of investigation from which general relationships are derived and explored.

Assessment

The final grade will be determined by the course assignment and end of course exam. This final external exam will consist of two papers and lasts 3 hours.

Progression

- Advanced Higher Physics
- Degree, HND or HNC in Physics, Science, Mathematics, Computing or Engineering field.
- Employment in Physics, Science, Mathematics, Engineering, Technology or related area.

The course or its component units may also form part of one or more Scottish Group Awards.

Homework

Homework will be given weekly and forms an integral part of the course. It is designed to:

- Reinforce class work
- Help develop study skills
- Prepare for assessment

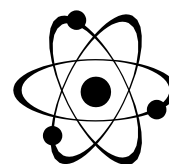
Additional Information

Physics courses lead to many careers where Physics is applied including; aerospace, armed forces and defence solutions, astronomy, education, engineering, medicine, meteorology and climate change, nanotechnology, oil and gas, renewable energy, scientific research, space exploration industries, telecommunications and careers outside science.

Faculty Contact

Mr I Davies
PT Science

SCIENCES
PHYSICS ADVANCED HIGHER



Course/Subjects Name

Physics Advanced Higher

Recommended Entry

Good passes at Higher is essential in both Mathematics & Physics

Course Details

The course is composed of the following units:

Rotational Motion and Astrophysics

This unit develops knowledge and understanding and skills in Physics related to rotational motion and astrophysics. It provides opportunities to develop and apply concepts and principles in a wide variety of situations involving angular motion. An astronomical perspective is developed through a study of gravitation, leading to work on general relativity and stellar Physics.

Quanta and Waves

This unit develops knowledge and understanding and skills in Physics related to quanta and waves. It provides opportunities to develop and apply concepts and principles in a wide variety of situations involving quantum theory and waves. The unit introduces non-classical Physics and considers the origin and composition of cosmic radiation. Simple harmonic motion is introduced and work on wave theory is developed.

Electromagnetism

This unit develops knowledge and understanding and skills in Physics related to electromagnetism. It provides opportunities to develop and apply concepts and principles in a wide variety of situations involving electromagnetism. The unit develops knowledge and understanding of electric and magnetic fields and capacitors and inductors used in d.c. and a.c. circuits.

Investigating Physics

In this unit, learners will develop key investigative skills. The unit offers opportunities for independent learning set within the context of experimental Physics. Learners will identify, research, plan and carry out a Physics investigation of their choice.

Purpose

The purpose of the course is to build on the knowledge and skills developed by the learner in the Higher Physics course and to use their mathematical knowledge and skills to analyse and solve problems in real-life contexts.

As our understanding of Physics and its potential applications is constantly evolving, our success as an industrial society depends on the development of young people who are secure in their knowledge of Physics and who are resilient, adaptable, creative and inventive.

The course offers opportunities for collaborative and independent learning set within familiar and unfamiliar contexts, and seeks to illustrate and emphasise situations where the principles of Physics are used and applied, thus promoting the candidate's awareness that Physics involves interaction between theory and practice. An opportunity for engaging in some independent research is provided. The resulting elements of knowledge and understanding and skills form the basis of the Advanced Higher Physics course.

Assessment

Unit Assessment:

All units are internally assessed on a pass/fail basis. If a candidate fails to meet the standard set out in the unit specification, he/she will be given a reassessment opportunity.

Course Assessment:

Component 1-Question Paper (100 marks)

Component 2- Project (30 marks)

The course assessment is graded A–D. The grade is determined on the basis of the total mark (130 marks).

Homework

Homework will include completion of experimental reports, reading and note making, as well as practice of exam style questions.

Progression

On successful completion of this course, learners could progress to:

- ◆ HND/degree programmes in a physics-based course or a related area, such as engineering, electronics, computing, design, architecture or medicine
- ◆ Careers in a physics-based discipline or related area, or in a wide range of other areas, such as oil and gas exploration, renewable energy, construction, transport or telecommunications

Additional information

Advanced Higher Physics encourages independent learning and allows learners to make connections between science and the world in which they live, learn and work. Learners will develop transferable skills and be better prepared for future study and/or employment. Due to the interdisciplinary nature of the sciences, learners taking this course along with other science subjects will enhance their skills, knowledge and understanding.

Faculty Contact

Mr I Davies
PT Science

SCIENCES & SOCIAL SUBJECTS
ENVIRONMENTAL SCIENCE



Course/Subjects Name
Environmental Science

Levels Available (Entry based on prior attainment)

National 4 and 5 – This course is run jointly by Science and Social Subjects faculties

Purpose, Aims and Benefits of the Course

Environmental science is the study of the effects of natural and human processes, and of interactions of the physical components of the planet. Environmental issues are prevalent in the world right now. This course will look at biological, geographical and sustainability factors in the environment and their impact on our planet. It will develop an understanding of environmental issues using a variety of approaches, including going on field trips to study different ecosystems and the human impacts on them.

The course has three units.

Living Environment

This unit looks into biological factors and the environment. It includes world ecosystems and biodiversity, interdependence of living things and human influences on biodiversity.

Earth's Resources

This unit looks into geographical factors in the environment. It includes Earth's systems and their interactions, the geosphere (structure of the Earth and rocks), the hydrosphere (uses of and problems with water), the biosphere (regions of Earth occupied by life) and the atmosphere (uses of gases and wind farms).

Sustainability

This will include social, economic and environmental issues, global citizenship, food, water, energy and waste management. It will look into human impact on the production and management of these, and how we can improve the situation.

Homework

Home learning will be required to support school based learning. This will include a variety of tasks including research projects, study questions, review of classwork. The time students will be expected to spend on home learning tasks will vary according to task. On average, students will be expected to spend up to one hour per week.

Assessment

For each unit, students will internal attainment tracking assessments and formative assessment. In addition, students will be assessed in practical skills, and will be required to complete a Research Assignment. This Assignment will be marked by the SQA and will account for 20% of the overall course mark.

Progression Routes

In certain circumstances, the course could lead into Higher Biology and/or Higher Geography.

Career Opportunities

Agricultural engineer, botanist, building technician, commercial energy assessor, countryside officer, ecologist, energy engineer, environmental consultant, environmental health officer, food manufacturing inspector, geoscientist, geo-technician, land surveyor, marine engineer, meteorologist, minerals surveyor, oceanographer, oil and gas industry, recycling officer, research scientist, tree surgeon, waste management officer, water network operative, zoologist.

Faculty Contacts

Mr I Davies, PT Science

Miss L Illingworth, PT Social Subjects