Science – Senior Phase Course Overview

Biology

Studying Biology will allow learners to investigate the applications of biology in society and the environment. These cover relevant and contemporary areas of biology ranging from microscopic cell structure to huge ecosystems, while allowing learners to develop an understanding of the underlying themes.

National 4 & National 5 Biology (SCQF Levels 4 & 5)

Entry Requirements: None needed but S3 Biology is preferred.

Course Summary: The National 4 & 5 Biology Courses cover major areas of biology including cellular, whole organism and ecosystems. The key areas of biodiversity, interdependence, natural selection & evolution, body systems & cells and genetics & inheritance are developed through the course.

In S4, pupils will be working towards gaining a qualification in the Senior Phase. National 4 & 5 courses have three units:

* Cell Biology

* Multicellular Organisms

* Life on Earth

Assessment: At National 4 pupils will have to pass each individual unit and complete an Added Value Unit which will be graded as a pass or fail. This will involve the pupils having to research a key area of the course and present their findings in a report, poster or presentation.

At National 5 the Course assessment will consist of two components: a question paper (100 marks) and an assignment (20 marks). The overall grade will be calculated by weighting the exam (80%) and the assignment (20%) together.

Progression: A pass at National 4 Biology can lead to National 5 Biology or National 5 Heath Sector. A pass at National 5 Biology can lead to Higher Human Biology.

Higher Human Biology (SCQF Level 6)

Entry Requirements:

•National 5 pass in Biology
• Students in S6 who have been successful at Higher in another Science subject.

Course Summary: The Higher Human Biology Course enables learners to develop and apply knowledge and understanding of human biology, and an understanding of human biology's role in scientific issues and relevant applications of human biology, including their impact on society and the environment. Learners will build upon knowledge from National 5 by further studying areas such as respiration, the importance of enzymes,

DNA. Pupils will learn about the reproductive, circulatory and nervous systems in far greater depth.

Higher Human Biology consists of 3 full units:

* Human Cells * Physiology & Health * Neurobiology & Immunology

Assessment: At Higher the Course assessment will consist of two components: a question paper (120 marks) and an assignment (20 marks). The overall grade will be calculated by weighting the exam (80%) and the assignment (20%) together.

Progression: A pass at Higher Human Biology could lead to studying Advanced Higher Biology.

Successful completion of the Biology courses can lead on to further study and/or employment in a huge range of areas. Examples of these include ecology, nursing, medicine, dentistry, dietetics, psychiatry, forensics, agriculture, radiography, horticulture, food science, pharmacology, biochemistry, marine biology, sports science, physiotherapy, veterinary medicine and speech therapy.

Chemistry

Studying Chemistry will allow learners to investigate a variety of contexts relevant to chemistry's impact on the environment and society through the chemistry of the Earth's resources, the chemistry of everyday products and environmental analysis.

National 4 & National 5 Chemistry (SCQF Levels 4&5)

Entry Requirements: None needed but S3 Chemistry is preferred.

Course Summary: The National 4 & 5 Chemistry courses enable learners to develop and apply knowledge and understanding of Chemistry. Learners also develop an understanding of Chemistry's role in scientific issues and relevant applications of chemistry, including the impact these could make in society and the environment.

In S4, pupils will be working towards gaining a qualification in the Senior Phase. National 4 & 5 courses have three units that pupils must pass to gain an overall award:

* Chemical Changes & Structure * Chemistry in Society* Nature's Chemistry

Assessment: At National 4 pupils will have to pass each individual unit and complete an Added Value Unit which will be graded as a pass or fail. This will involve the pupils having to research a key area of the course and present their findings in a report, poster or presentation.

At National 5 the Course assessment will consist of two components: a question paper (100 marks) and an assignment (20 marks). The overall grade will be calculated by weighting the exam (80%) and the assignment (20%) together.

Progression: A pass at National 4 Chemistry can lead to National 5 Chemistry or National 5 Health Sector. A pass at National 5 Chemistry can lead to Higher Chemistry.

Higher Chemistry (SCQF Level 6)

Entry Requirements:

• National 5 pass in Chemistry

• Students in S6 who have been successful at Higher in another Science subject.

Course Summary : The Higher Chemistry Course develops learners' curiosity, interest and enthusiasm for chemistry in a range of contexts. The course allows pupils to build on their knowledge from National 5 in areas such as reaction rates, periodic trends, relationships between compounds' structure and their physical and chemical properties and analysing data to calculate quantities of reagents, products and percentage yields.

Higher Chemistry consists of 2 full units and 2 half units that pupils must pass to gain an overall award:

* Nature's Chemistry (full unit) * Chemistry in Society (full unit)

* Chemical Changes & Structure (half unit) * Researching Chemistry (half unit)

Assessment: At Higher the Course assessment will consist of two components: a question paper (120 marks) and an assignment (20 marks). The overall grade will be calculated by weighting the exam (80%) and the assignment (20%) together.

Progression: A pass at Higher Chemistry could lead to studying Advanced Higher Chemistry.

Successful completion of the Chemistry courses can lead on to further study and/or employment in a huge range of areas. Examples of these include agriculture, biochemistry, chemical engineering, dentistry, dietetics, environmental health, forensics, medicinal chemistry, medicine, nursing, oil & gas production, pharmaceuticals, biotechnology and research and development.

Physics

Studying Physics gives learners an insight into the underlying nature of our world and its place in the universe. From the sources of the energy we use, to the exploration of space, Physics covers a range of applications of the relationships that have been discovered through experiment and calculation.

National 4 & National 5 Physics (SCQF Levels 4&5)

Entry Requirements: None needed but S3 Physics is preferred.

Course Summary: The National 4 & 5 Physics courses enable learners to develop a deeper understanding of physics concepts and the ability to describe and interpret physical phenomena using mathematical skills.

In S4, pupils will be working towards gaining a qualification in the Senior Phase. National 4 & 5 courses have three units that pupils must pass to gain an overall award:

* Dynamics & Space * Electricity & Energy * Waves & Radiation

Assessment: At National 4 pupils will have to pass each individual unit and complete an Added Value Unit which will be graded as a pass or fail. This will involve the pupils having to research a key area of the course and present their findings in a report, poster or presentation.

At National 5 the Course assessment will consist of two components: a question paper (135 marks) and an assignment (20 marks). The overall grade will be calculated by weighting the exam (80%) and the assignment (20%) together.

Progression: A pass at National 4 Physics can lead to National 5 Physics or National 5 Practical Electronics. A pass at National 5 Physics can lead to Higher Physics.

Higher Physics (SCQF Level 6)

Entry Requirements:

• National 5 pass in Physics

• Students in S6 who have been successful at Higher in another Science subject.

Course Summary: The Higher Physics Course develops learners' curiosity, interest and enthusiasm for physics in a range of contexts. The skills of scientific inquiry and investigation are developed throughout the Course, and the relevance of physics is highlighted by the study of the applications of physics in everyday contexts. Pupils will build upon their work at National 5 by studying many topics in more details including dynamics, kinematic, space time, the application of particles and waves, electricity and electrical storage and transfer.

Higher Physics consists of 2 full units and 2 half units that pupils must pass to gain an overall award:

* Our Dynamic Universe (full unit) * Particles & Waves (full unit)

* Electricity (half unit) * Researching Physics (half unit)

Assessment: At Higher the Course assessment will consist of two components: a question paper (155 marks) and an assignment (20 marks). The overall grade will be calculated by weighting the exam (80%) and the assignment (20%) together.

Progression: A pass at Higher Physics could lead to studying Advanced Higher Physics.

Successful completion of the Physics courses can lead on to further study and/or employment in a huge range of areas. Examples of these include radiography, physiotherapy, civil aviation, medicine, computing, astronomy, construction, audiology, astrophysics, finance, ophthalmics, architecture, surveying, dentistry, and electronics, engineering and sound technology.

Health Sector

This course is designed to introduce students to the health sector and prepare them for future careers in this area by focusing on essential areas of knowledge and employability skills.

National 4 & National 5 Health Sector (SCQF Levels 4&5)

Entry Requirements: None needed but a National 4 pass in any of the 3 sciences or an interest in the Health sector is beneficial.

Course Summary: Candidates will develop a range of knowledge and skills required in this vocational area. Candidates will investigate a range of job roles and career opportunities as well as participating in a job interview.

Candidates will also develop a wide range of skills, including research and self-evaluation skills. Emphasis throughout all Units is on the employability skills and attitudes which will help prepare candidates for the workplace.

National 4 & 5 courses have five units that pupils must pass to gain an overall award:

* Working in the Health Sector* Life Sciences Industries

* Improving Health & well-being* Physiology of the cardiovascular system

* Working in non-clinical roles

Assessment: At both National 4 and National 5 level all assessment is done within the school, throughout the whole year. There is no final exam. Assessments tasks will include investigating and report on different jobs within the sector, taking part in mock interviews and successfully demonstrating skills in providing emergency life support.

Progression: A pass at National 4 or National 5 Health sector can open up pathways into careers and college courses in the Health sector.

Practical Electronics

Practical Electronics is a practical course that allows students to develop a knowledge and understanding of key concepts in electronics and apply these in a range of practical ways.

National 4 & National 5 Practical Electronics (SCQF Levels 4&5)

Entry Requirements: None needed but a pass at National 4 or National 5 Physics is beneficial.

Course Summary: The National 4 & 5 Practical Electronics courses enable learners to develop:

- a range of practical skills in electronics, including skills in analysis and problem-solving, design skills, skills in the safe use of tools and equipment, and skills in evaluating products and systems

- awareness of the importance of safe working practices in electronics
- an understanding of the role and impact of electronics in changing and influencing society and the environment.

National 4 & 5 courses have three units that pupils must pass to gain an overall award:

* Circuit design * Circuit construction * Circuit simulation

Assessment: At National 4 pupils will have to pass each individual unit and complete an Added Value Unit which will be graded as a pass or fail. This will involve the pupils having to complete practical activities related to the course.

At National 5 the Course assessment will consist of two components: a question paper (60 marks) practical activities (70 marks) which are carried out throughout the year. The overall grade will be calculated by weighting the exam (30%) and the practical activities (70%) together.

Progression: Successful completion of the course could lead on to studying Physics at National 5. This course also provides a good grounding to pupils who could be interested in a career or further study in electronics, electrical engineering and related disciplines

Powering Futures

Powering Futures Award (SCQF Level 6)

This award is paired with STEM Leader Award (SCQF Level 7)

Entry Requirements: None needed.

Course Summary: The Powering Futures award involves young people working in teams to overtake an industry challenge. They will choose a challenge to work on and design a solution to tackle a real-world problem. In doing so, they will develop a range of meta-skills including problem solving, collaboration and communication.

Assessment: The course is assessed through a log book and final presentation. Learners have 4 outcomes to complete and evidence is collected in their log books and presentations. The log books are internally assessed by the class teacher and subject to external verification by the awards provider, Powering Futures. Young people working in their teams also have to complete a final presentation and deliver this in front of a panel of industry judges. There is no external exam for Powering Futures but successful completion of the logbook and final presentation are required to secure a pass.

Progression: Participation in the Powering Futures Award helps young people to develop a wide range of meta-skills to enable them to be more ready for the world of work. This can lead to employment opportunities and build confidence for applying for university, college and apprenticeships too.

STEM Leader

Young STEM Leader Awards (SCQF Levels 4-6)

Entry Requirements: None needed but an interest in STEM is beneficial.

Course Summary: Young STEM Leader Awards at SCQF Levels 4, 5 and 6 (YSL4, YSL5 and YSL6) are formal qualifications, credit rated by SQA, that enable young people to support, engage and inspire others in STEM in their schools, communities or youth groups. On completion of these awards, YSLs will be able to plan, lead and evaluate STEM activities, events and interactions.

Each level within the formal version of the programme carries credit points for the young people and the award is available on Insight for centres to gain the associated tariff points

YSL4 focusses on identifying the impact of STEM on people, society and the environment locally, nationally and internationally. YSLs will deliver activities, events or interactions which share this impact with others. In addition, YSLs are encouraged to explore and improve their own leadership and teamworking skills and qualities within their learning community.

YSL5 focusses on identifying current and future opportunities in STEM that are available to young people locally, nationally and internationally. YSLs will deliver activities, events or interactions which share these current and future opportunities with others. In addition, YSLs are encouraged to explore their own potential in STEM and how they may access the opportunities that STEM offers.

YSL6 focusses on identifying the skills, qualities and behaviours of good leaders and positive role models. At this level, YSLs are encouraged to explore the challenges and issues that exist in STEM such as stereotypes, misconceptions and outdated views and how they can positively challenge these through the delivery of activities, events or interactions. In addition, YSLs will learn the importance of health and safety and safeguarding when leading learning experiences for others.

The Young STEM Leader Programme enables young people in Scotland to inspire, lead and mentor their peers through the delivery of STEM activities, events or interactions within their learning communities.

As well as developing important leadership, communication and employability skills, completing a Young STEM Leader award will motivate young people to progress their STEM studies leading towards positive destinations in STEM.

Above all, the Programme aims to promote curiosity in STEM, allowing Young STEM Leaders to learn about the world around them in a fun, engaging and accessible way.

Assessment: All YSL Awards from Levels 4-6 are dependent on successful completion of a log book. This is internally assessed by the class teacher, internally verified by another YSL teacher within the school and externally verified by SSERC, the award provider.

Progression: A pass at YSL Awards 4-6 can lead to progression to the YSL award above. For example, a pass at YSL 6 could lead to completion of the STEM Leader 7 Award. They

also help young people develop their meta-skills including leadership and collaboration and help prepare young people to move into STEM-based careers.

STEM Leader (SCQF Level 7)

This award is paired with the Powering Futures Award (SCQF Level 6).

Entry Requirements: None needed but YSL Awards 4-6 are beneficial, as is an interest in STEM.

Course Summary: The SCQF Level 7 Award in STEM Leadership, developed in partnership with Ocean Winds, enables learners aged 16+ to improve their leadership skills and qualities through an independent STEM research project.

The award is centred around six learning outcomes that enable STEM Leaders to

- Actively reflect on their leadership skills and qualities
- Devise a research question linking to the UN Sustainable Development Goals
- Undertake independent research with support from relevant others
- Manage, document and share the results of their work

Assessment: Gaining the STEM Leader Award (SCQF Level 7) is dependent on successful completion of a log book. This is internally assessed by the class teacher, internally verified by another YSL teacher within the school and externally verified by SSERC, the award provider. All Stem Leader pupils also need to successfully present their project findings to a panel.

Progression: The STEM Leader 7 Award help young people develop their meta-skills including leadership and collaboration and help prepare young people to move into STEM-based careers.