Higher Biology — draft Course rationale and summary

May 2011

This edition: May 2011, draft version 1.0

Published by the Scottish Qualifications Authority
The Optima Building, 58 Robertson Street, Glasgow G2 8DQ
Ironmills Road, Dalkeith, Midlothian EH22 1LE

www.sqa.org.uk

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Course rationale

Background

All new and revised National Courses reflect Curriculum for Excellence values, purposes and principles. They offer flexibility, provide more time for learning, more focus on skills and applying learning, and scope for personalisation and choice.

In this Course, and its component Units, there will be an emphasis on skills development and the application of those skills. Assessment approaches will be proportionate, fit for purpose and will promote best practice, enabling learners to achieve the highest standards they can.

This Course provides learners with opportunities to continue to acquire and develop the attributes and capabilities of the four capacities, as well as skills for learning, skills for life and skills for work.

All Courses provide opportunities for learners to develop breadth, challenge and application, but the focus and balance of the assessment will be appropriate for the subject area.

Relationship between the Course and Curriculum for Excellence values, purposes and principles

Through enjoyable learning in biology, learners develop their interest in and understanding of the world. They engage in a wide range of investigative tasks, which allows them to develop important skills to become creative, inventive and enterprising, in a world where the skills and knowledge developed in biology are needed across all sectors of society and the economy.

The Higher Biology Course allows learners to understand and investigate the living world in an engaging and enjoyable way. It develops learners' ability to think analytically, creatively and independently and to make reasoned evaluations. The Course provides opportunities for learners to acquire and apply knowledge to evaluate biological issues, assess risk and make informed decisions. This enables learners to develop an informed and ethical view of complex issues.

Learners will be able to develop their communication, collaborative working and leadership skills and be able to apply critical thinking in new and unfamiliar contexts to solve problems. The Course will further the development of responsible citizens through studying areas such as environment and sustainability.

Purpose and aims of the Course

Science is vital to everyday life and allows us to understand and shape the world in which we live and influence its future. Scientists play a key role in meeting society's needs in areas such as medicine, energy, industry, material development, the environment and sustainability. As the importance and application of science continues to grow and develop, more trained scientists will be required. It is also important that everyone has an informed view of science.

The Course is a broad and up-to-date selection of concepts and ideas relevant to the central position of life science within our society. It builds on previous learning, such as the Biology (National 5) Course, and covers all of the major themes of biology (cells, evolution, genetics, energy, homeostasis and ecosystems).

The Course allows learners to develop deeper understanding of the underlying themes of biology: evolution and adaptation; structure and function; genotype and niche. Within each of the three Units, the scale of topics ranges from molecular through to whole organism and beyond. In addition, to increase the relevance of the Course, within each Unit the most relevant applications of biological understanding are highlighted. The Course allows flexibility and personalisation by offering choice in the contexts studied.

Due to the interdisciplinary nature of the sciences, learners may benefit from studying Higher Biology along with other science subjects, as this may enhance their skills, knowledge and understanding.

The Course provides opportunities to develop investigative science and practical skills, contributing to learners' scientific literacy and to developing skills for learning, life and work. Skills will be developed in each of the Units, in the context of discrete areas of content. These skills prepare learners for life in the 21st century by enabling them to adapt their learning to new situations, solve problems, make decisions based on evidence, and evaluate the impact of science developments on their own heath and wellbeing, society and the environment. By setting the acquisition of biological knowledge and skills in the context of Higher Biology, a stimulating, relevant and enjoyable curriculum prepares learners for further education, training or employment in areas associated with life sciences.

The Higher Biology Course aims to enable learners to:

- develop scientific and analytical thinking skills in a biological context
- develop understanding of biological issues
- acquire and apply knowledge and understanding of biological concepts
- develop understanding of relevant applications of biology in society
- develop a deeper understanding of the underlying themes of biology, including evolution and adaptation; structure and function; genotype and niche
- develop applied problem solving skills in a biological context

Information about typical learners who might do the Course

The Course is suitable for learners who are secure in their attainment of Biology (National 5) or an equivalent qualification.

This Course emphasises practical and experiential learning opportunities, with a strong skills-based approach to learning. It takes account of the needs of all learners and provides sufficient flexibility to enable learners to achieve in different ways.

The Course will allow opportunities for learners to develop biological knowledge and skills that directly relate to real situations, including thinking skills, inquiry and investigative skills, problem solving and practical skills.

On successful completion of this Course, the learner could progress to:

- Advanced Higher Biology
- Higher in another science subject
- National Certificate Group Awards
- HNC, HND or degree in a biology-based course or a related area
- employment

Course summary

Course title: Higher Biology

SCQF level 6 (24 SCQF credit points)

Course outline

Mandatory Units

Biology: DNA and the Genome (Higher)	(6 SCQF credit points)
Biology: Metabolism and Survival (Higher)	(6 SCQF credit points)
Biology: Sustainability and Interdependence (Higher)	(6 SCQF credit points)

Course assessment (6 SCQF credit points)

This Course includes six SCQF credit points for 40 additional programmed hours to allow preparation for Course assessment. The Course assessment covers the added value of the Course. Further information on the Course assessment is provided in the Assessment section.

Course structure and conditions of award

The Course is practical and experiential, developing skills in a biological context. Learners will gain knowledge and understanding of biology and develop this through a variety of approaches, including practical activities.

By completing this Course, learners will develop important skills, attitudes and attributes related to biology, including: developing scientific and analytical thinking skills in a biological context; developing understanding of biological issues; and acquiring and applying knowledge and understanding of biological concepts.

Learners will also develop: understanding of relevant applications of biology in society; deeper understanding of the underlying themes of biology, including evolution and adaptation, structure and function, and genotype and niche; and problem solving skills.

In addition to developing specific scientific skills, in areas such as experimentation and investigation, learners will also gain valuable transferable skills, for learning, life and work, such as literacy, numeracy and communication.

Units are statements of standards for assessment and not programmes of learning and teaching. They can be delivered in a variety of ways.

Biology: DNA and the Genome (Higher)
In this Unit, learners will develop knowledge through study of DNA and the genome. This Unit explores the molecular basis of evolution and biodiversity, while the unity of life is emphasised in the study of gene expression. This approach enables the development of both analytical thinking and problem solving skills in context. An understanding of gene expression, at the cellular level, leads to the study of differentiation in organisms. In addition, it covers the evolution and structure of the genome and genomics, including personal genomics.

Biology: Metabolism and Survival (Higher)
In this Unit, learners will develop knowledge by investigating the central metabolic pathways of ATP synthesis by respiration and how control of the pathways is essential to cell survival. Analytical thinking and problem solving skills will be developed in context, through investigation of how cellular respiration is fundamental to metabolism and by examining the stages of respiration. In whole organisms, it considers adaptations for the maintenance of metabolism for survival. In addition, it examines the importance of the manipulation of metabolism in micro-organisms, both in the laboratory and in industry, including ethical considerations.

Biology: Sustainability and Interdependence (Higher)
In this Unit, learners will develop knowledge by investigating how humans depend on sufficient and sustainable food production from a narrow range of crop and livestock species, focusing on photosynthesis in plants. Analytical thinking and problem solving skills will be developed contextually within these topics. The

importance of plant productivity and the manipulation of genetic diversity to maintain food security are emphasised. The Unit also covers interrelationships and dependence through symbiosis and social behaviour. By studying biodiversity, the Unit attempts to measure, catalogue, understand and address the human impact, including mass extinction.

To gain the award of the Course, the learner must pass all the Units as well as the Course assessment. The required Units are shown in the Course outline section. Course assessment will provide the basis for grading attainment in the Course award.

Assessment

Information about assessment standards for the Course will be included in the *Course Assessment Specification*, which will provide full details including advice on how a learner's overall attainment for the Course will be determined.

Unit assessment

All Units are internally assessed against the requirements shown in Unit specifications.

They will be assessed pass/fail within centres.

SQA will provide rigorous external quality assurance, including external verification, to ensure assessment judgements are consistent and meet national standards.

Exemplification of possible assessment approaches for these Units will be provided in the *National Assessment Resource.*

Course assessment

Courses from National 4 to Advanced Higher include assessment of added value[1]. At National 5, Higher and Advanced Higher, the added value will be assessed in the Course assessment. The added value for the Course must address the key purposes and aims of the Course as defined in the Course Rationale. It will do this by addressing one or more of breadth, challenge or application.

In the Higher Biology Course, added value will focus on:

- breadth
- challenge
- application

Learners will draw on and extend the skills they have learned during the Course. This will be assessed within a question paper[2] and a case study[3], requiring demonstration of the breadth of knowledge and skills acquired from across the Units in unfamiliar contexts and/or integrated ways.

[1] Definitions can be found here: www.sqa.org.uk/sqa/45528.html

[2] See link above for definitions.

[3] See link above for definitions.