Higher
Course
Specification

# Higher Biology Course Specification (C707 76)

**Valid from August 2014**

This edition: April 2014, version 2.0



Please refer to the note of changes at the end of this Course Specification for details of changes from previous version (where applicable).

# Course outline

**Course title:** Higher Biology

**SCQF:** level 6 (24 SCQF credit points)

**Course code:** C707 76

**Mandatory Units**

| | | |
|---|---|---|
| **H4KD 76** | **Biology: DNA and the Genome (Higher)** | **6 SCQF credit points** |
| **H4KE 76** | **Biology: Metabolism and Survival (Higher)** | **6 SCQF credit points** |
| **H4KF 76** | **Biology: Sustainability and Interdependence (Higher)** | **6 SCQF credit points** |

**Course assessment** **6 SCQF credit points**

This Course includes six SCQF credit points to allow additional time for 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.

## Recommended entry

Entry to this Course is at the discretion of the centre. However, learners would normally be expected to have attained the skills, knowledge and understanding required by the following or equivalent qualifications and/or experience:

- National 5 Biology Course or relevant component Units

## Progression

This Course or its Units may provide progression to:

- Advanced Higher Biology
- other qualifications in Biology or related areas
- further study, employment and/or training

Further details are provided in the Rationale section.

## Equality and inclusion

This Course Specification has been designed to ensure that there are no unnecessary barriers to learning or assessment. The individual needs of learners should be taken into account when planning learning experiences, selecting assessment methods or considering alternative evidence. For further information, please refer to the *Course Support Notes.*

# Rationale

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

Biology Courses should encourage development of skills and resourcefulness, which lead to becoming a confident individual. Successful learners in biology think creatively, analyse and solve problems. Biology aims to produce responsible citizens, through studying of relevant areas of biology, such as health, environment and sustainability.

Biology affects everyone and aims to find solutions to many of the world's problems. Biology, the study of living organisms, plays a crucial role in our everyday existence, and is an increasingly important subject in the modern world. Advances in technologies have made this varied subject more exciting and relevant than ever.

An experimental and investigative approach is used to develop knowledge and understanding of biology concepts.

## Purpose and aims of the Course

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

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 develops the concepts of biology.

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 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.

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 development of skills prepares learners 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 health and wellbeing, society and the environment. By setting the acquisition of 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 Course allows flexibility and personalisation by offering choice in the contexts studied.

The aims of the Course are to enable learners to:

- develop and apply knowledge and understanding of biology
- develop an understanding of biology's role in scientific issues and relevant applications of biology, including the impact these could make in society and the environment
- develop scientific inquiry and investigative skills
- develop scientific analytical thinking skills, including scientific evaluation, in a biology context
- develop the use of technology, equipment and materials, safely, in practical scientific activities, including using risk assessments
- develop planning skills
- develop problem solving skills in a biology context
- use and understand scientific literacy to communicate ideas and issues and to make scientifically informed choices
- develop the knowledge and skills for more advanced learning in biology
- develop skills of independent working

## Information about typical learners who might do the Course

The Course is suitable for learners who are secure in their attainment of the National 5 Biology Course or an equivalent qualification. The Course may be suitable for those wishing to study biology for the first time.

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.

Biology Courses are offered from SCQF level 3 to SCQF level 7. Vertical progression is possible through these levels, while lateral progression is possible to other qualifications in the sciences. This Course can also assist entry to employment, training and further education.

# Course structure and conditions of award

## Course structure

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

Units can be taught sequentially or in parallel to each other. However, learning and teaching approaches should provide opportunities to integrate skills, where possible.

**Biology: DNA and the Genome (Higher)**

In this Unit, learners will develop knowledge through study of DNA and the genome. The Unit covers the key areas of
structure of DNA; replication of DNA; control of gene expression; cellular differentiation; the structure of the genome; mutations; evolution; genomic sequencing.

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, the Unit 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.

The Unit covers the key areas of metabolic pathways and their control; cellular respiration; metabolic rate; metabolism in conformers and regulators; metabolism and adverse conditions; environmental control of metabolism; genetic control of metabolism; ethical considerations in use of microorganisms, hazards and control of risks. 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 microorganisms, 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. The Unit covers the key areas of food supply, plant growth and productivity; plant and animal breeding; crop protection; animal welfare; symbiosis; social behaviour; mass extinction and biodiversity.

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.

## Conditions of award

To gain the award of the Course, the learner must pass all of 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.

# Skills, knowledge and understanding

Further information on the assessment of the skills, knowledge and understanding for the Course is given in the *Course Assessment Specification*. A broad overview of the mandatory subject skills, knowledge and understanding that will be assessed in the Course is given in this section.

This includes:

- demonstrating knowledge and understanding of biology by making statements, describing information, providing explanations and integrating knowledge
- applying biology knowledge to new situations, analysing information and solving problems
- planning and designing experiments/practical investigations to test given hypotheses or to illustrate particular effects
- carrying out experiments/practical investigations safely, recording detailed observations and collecting data
- selecting information from a variety of sources
- presenting information appropriately in a variety of forms
- processing information (using calculations and units, where appropriate)
- making predictions and generalisations from evidence/information
- drawing valid conclusions and giving explanations supported by evidence/ justification
- evaluating experiments/practical investigations and suggesting improvements
- communicating findings/information effectively

Skills, knowledge and understanding to be included in the Course will be appropriate to the SCQF level of the Course. The SCQF level descriptors give further information on characteristics and expected performance at each SCQF level (www.sqa.org.uk/scqf).

# Assessment

Information about assessment for the Course is included in the *Course Assessment Specification*, which provides 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 the *Unit Specification.*

They can be assessed on a Unit-by-Unit basis or by combined assessment.

They will be assessed on a pass/fail basis within centres. SQA will provide rigorous external quality assurance, including external verification, to ensure assessment judgments are consistent and meet national standards.

The assessment of the Units in this Course will be as follows.

**Biology: DNA and the Genome (Higher)**
Learners who complete the Unit will be able to:

- apply skills of scientific inquiry and draw on knowledge and understanding of the key areas of this Unit to carry out an experiment/practical investigation
- draw on knowledge and understanding of the key areas of this Unit and apply scientific skills

**Biology: Metabolism and Survival (Higher)**
Learners who complete the Unit will be able to:

- apply skills of scientific inquiry and draw on knowledge and understanding of the key areas of this Unit to carry out an experiment/practical investigation
- draw on knowledge and understanding of the key areas of this Unit and apply scientific skills

**Biology: Sustainability and Interdependence (Higher)**
Learners who complete the Unit will be able to:

- apply skills of scientific inquiry and draw on knowledge and understanding of the key areas of this Unit to carry out an experiment/practical investigation
- draw on knowledge and understanding of the key areas of this Unit and apply scientific skills

## 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

The learner will: draw on and extend the skills they have learned during the Course. These will be assessed within a question paper and an assignment[2], requiring demonstration of the breadth of skills, knowledge and understanding acquired from across the Units in unfamiliar contexts and/or integrated ways.

[1] Definitions can be found here: http://www.sqa.org.uk/jargonbuster

[2] See link above for definitions.

# Development of skills for learning, skills for life and skills for work

It is expected that learners will develop broad, generic skills through this Course. The skills that learners will be expected to improve on and develop through the Course are based on SQA's *Skills Framework: Skills for Learning, Skills for Life and Skills for Work* and drawn from the main skills areas listed below. These must be built into the Course where there are appropriate opportunities.

**1 Literacy**

1.2 Writing

**2 Numeracy**

2.1 Number processes
2.2 Money, time and measurement
2.3 Information handling

**5 Thinking skills**

5.3 Applying
5.4 Analysing and evaluating
5.5 Creating

Amplification of these skills is given in SQA's *Skills Framework: Skills for Learning, Skills for Life and Skills for Work*. The level of these skills will be appropriate to the level of the Course. Further information on building in skills for learning, skills for life and skills for work for the Course is given in the *Course Support Notes*.

# Administrative information

**Published:** April 2014, version 2.0

## History of changes to National Course Specification

| Course details | Version | Description of change | Authorised by | Date |
|---|---|---|---|---|
| | 2.0 | Page 5 – under Course structure, more detail has been added regarding key areas<br><br>Page 7 - the Skills, Knowledge and Understanding section has been rewritten to better explain what is required | Qualifications Development Manager | April 2014 |
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