



## Higher National Unit Specification

### General information for centres

**Unit title:** Biology: an Introduction

**Unit code:** F3SJ 34

**Unit purpose:** This Unit provides an introduction to biology for candidates who require this knowledge to underpin their studies of other subjects, such as ecology and environmental sciences. The aim is to give the candidate an overview of the major aspects of biology but with an emphasis on an understanding of inheritance and evolution.

On completion of the Unit the candidate should be able to:

- 1 Describe the structure and explain the main physiological processes of the major organs in plants
- 2 Describe the structure and explain the main physiological processes of the major organs in animals
- 3 Explain the principles of inheritance and evolution

**Credit points and level:** 1 HN credit at SCQF level 7: (8 SCQF credit points at SCQF level 7\*)

*\*SCQF credit points are used to allocate credit to qualifications in the Scottish Credit and Qualifications Framework (SCQF). Each qualification in the Framework is allocated a number of SCQF credit points at an SCQF level. There are 12 SCQF levels, ranging from Access 1 to Doctorates.*

**Recommended prior knowledge and skills:** Access to this Unit will be at the discretion of the centre. As this is an introductory Unit, no prior knowledge of biology is necessary although it would be beneficial if candidates had experience of studying science subject(s) at SCQF level 5.

**Core Skills:** There are opportunities to develop the Core Skill of *Communication* at SCQF level 6 in this Unit, although there is no automatic certification of Core Skills or Core Skills components.

**Context for delivery:** If this Unit is delivered as part of a Group Award, it is recommended that it should be taught and assessed within the subject area of the Group Award to which it contributes.

## General information for centres (cont)

**Assessment:** Outcomes 1 and 2 of this Unit could be assessed separately or together, by a single assessment which samples the items in the Knowledge and/or Skills for the two Outcomes. As sampling is used, these two Outcomes must be assessed under supervised conditions and the assessment must be unseen. Outcome 3 could be assessed by a series of extended response questions or a submission to be produced in the candidate's own time.

## Higher National Unit specification: statement of standards

**Unit title:** Biology: an Introduction

**Unit code:** F3SJ 34

The sections of the Unit stating the Outcomes, Knowledge and/or Skills, and Evidence Requirements are mandatory.

Where evidence for Outcomes is assessed by sampling, the whole of the content listed in the Knowledge and/or Skills section must be taught and available for assessment. Candidates should not know in advance the items on which they will be assessed, and different items should be sampled on each assessment occasion.

### Outcome 1

Describe the structure and explain the main physiological processes of the major organs in plants

#### Knowledge and/or Skills

- ◆ Plant organs:
  - root
  - stem
  - leaf
  - flower
- ◆ Photosynthesis
- ◆ Transport systems in vascular plants
- ◆ Reproductive systems in plants: sexual and asexual

#### Evidence Requirements

Evidence for the Knowledge and/or Skills in this Outcome will be generated through sampling. All of the items listed in the Knowledge and/or Skills section must be taught only three Knowledge and Skills items should be assessed, one of which must be the first Knowledge and Skills bullet point.

Candidates must not know in advance which **three** items will be assessed, and different combinations of items should be sampled on each assessment occasion. The assessment must be unseen, closed-book and carried out under supervised conditions.

Candidates will need to provide evidence to demonstrate their knowledge and/or skills by showing that they can:

- ◆ describe the structure of two plant organs
- ◆ describe the raw materials, products and site of photosynthesis in plants
- ◆ explain the function of the phloem, xylem and transpiration in the transport of water and sap in vascular plants
- ◆ explain the main features of the sexual and asexual reproductive systems in plants, to include at least one named example of each

## Higher National Unit specification: statement of standards (cont)

**Unit title:** Biology: an Introduction

### Assessment Guidelines

This Outcome could be assessed on its own or in conjunction with Outcome 2, the details of which are given under Outcome 2. The candidate may draw and label a simple diagram to help illustrate their description of the main organs.

### Outcome 2

Describe the structure and explain the main physiological processes of the major organs in animals

### Knowledge and/or Skills

- ◆ Animals:
  - Birds, fish, mammals, arthropods
- ◆ Animal organs
  - heart and blood vessels of mammals
  - blood vessels of arthropods
  - lungs of mammals
  - lungs of birds
  - gills of fish
  - crop, gizzard, stomach and intestines of birds
  - stomach and intestines of mammals
  - kidneys of mammals
  - mammalian dentition
- ◆ Digestive systems: ruminant and non-ruminant mammals; birds
- ◆ Blood and circulatory systems
- ◆ Control systems: nerves, hormones
- ◆ Reproductive systems and behaviour in animals: sexual; asexual; parthenogenesis; parental care

### Evidence Requirements

Evidence for the Knowledge and/or Skills in this Outcome will be generated through sampling. All of the items listed in the Knowledge and/or Skills section must be taught but only the first two Knowledge and skills must always be assessed and three others sampled. On each assessment occasion, there should be a choice from at least two of mammals, birds, fish and arthropod organs and **four of the nine** groups of animal organs and structures only must be assessed.

Candidates must not know in advance which five items will be assessed, and different items should be sampled on each assessment occasion. Assessment must be unseen, closed-book and carried out under supervised conditions.

## **Higher National Unit specification: statement of standards (cont)**

### **Unit title:** Biology: an Introduction

Candidates will need to provide evidence to demonstrate their Knowledge and/or Skills by showing, that they can:

- ◆ describe the structure of four different animal organs
- ◆ explain the function of the major organs of the digestive systems of ruminant and non-ruminant mammals and birds
- ◆ explain the role of the blood cells and circulatory system in the transport of respiratory gases
- ◆ explain the distinctions between neural and endocrine control systems in vertebrates
- ◆ explain the main types of reproductive system and behaviour in animals, to include at least one named example each of sexual and asexual reproduction, parthenogenesis and parental care.

### **Assessment Guidelines**

The candidate may draw and label a simple diagram to help illustrate their description of the structure of the main plant organs.

This Outcome could be assessed on its own or in conjunction with Outcome 1, possibly in the form of in-class restricted and extended response questioning with a recommended assessment time of 90 minutes if both are combined.

### **Outcome 3**

Explain the principles of inheritance and evolution

#### **Knowledge and/or Skills**

- ◆ Genes and chromosomes
- ◆ Biological variation
- ◆ Single-factor Mendelian inheritance
- ◆ Evolution by natural selection

#### **Evidence Requirements**

Candidates will need to provide evidence to demonstrate their Knowledge and/or Skills by showing that they can:

- ◆ explain the key influences of genes and chromosomes on biological variation, including the role of meiosis and recombination
- ◆ explain the key principles of single-factor Mendelian inheritance, to include an explanation of dominant and recessive alleles
- ◆ explain the principles of evolution by natural selection, to include the role of common ancestry, genetic variation and adaptation

This is an open-book assessment.

## **Higher National Unit specification: statement of standards (cont)**

**Unit title:** Biology: an Introduction

### **Assessment Guidelines**

This Outcome could be assessed by a series of extended response questions and evidenced by a submission (presentation, report, project) to be completed in the candidate's own time. The candidate could be asked to produce an answer showing the links between genes, inheritance, variation and evolution.

## Administrative Information

**Unit code:** F3SJ 34  
**Unit title:** Biology: an Introduction  
**Superclass category:** RH  
**Original date of publication:** August 2008  
**Version:** 01

### History of Changes:

Version	Description of change	Date

**Source:** SQA

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## **Higher National Unit specification: support notes**

### **Unit title: Biology: an Introduction**

This part of the Unit specification is offered as guidance. The support notes are not mandatory.

While the exact time allocated to this Unit is at the discretion of the centre, the notional design length is 40 hours.

### **Guidance on the content and context for this Unit**

This Unit provides an introduction to biology for candidates who require this knowledge to underpin their studies of other subjects. It presupposes no previous experience of the subject but could also be taken as a refresher course. The aim is to give candidates an overview of the major aspects of biology but selected areas may be treated in greater depth to meet the requirements or interests of particular groups of candidates or programmes of study. Real life examples and practical experience should be used whenever possible to illustrate the applications of the Unit to the candidates' general programme of study. Candidates studying this Unit may go on to study Units in ecology or environmental subjects.

A useful approach to Outcomes 1 and 2 could be to emphasise the underlying unity of structure while describing the diversity of solutions to physiological problems. Particular groups of organisms could be studied in more depth according to the requirements of different programmes of study but an overview would introduce examples from a range of plants and animals, including both aquatic and terrestrial.

Outcome 3 introduces the concepts of inheritance and evolution and so supports studies of biological diversity. Candidates should be given guidance to help them to integrate the material so that, for example, their explanation of natural selection is informed by what they know of reproductive processes and the rules of genetic inheritance. The genetics component should be taught with an emphasis on the end results, rather than the intracellular processes, bearing in mind that no prior knowledge of biochemistry is assumed. Candidates should be helped to develop an appreciation of the role of genetics in generating variation, and the role of natural selection in acting on that variation to drive evolution.

### **Guidance on the delivery and assessment of this Unit**

It is anticipated that class discussion may be used extensively to place the different subject areas in context, to discuss their relevance to named species or habitats and to explore the relationship of this Unit with others in the programme of study. This subject area lends itself to the use of visual aids including live or preserved specimens, photographs and videos. Web-based material, where available, may be very useful.

Outcome 1 and 2 are suited to an assessment instrument that would test/assess factual based knowledge involving a mix of formats. This could typically be an in-class restricted/extended response questioning sampling Knowledge and/or Skills.



## Higher National Unit specification: support notes (cont)

### Unit title: Biology: an Introduction

Outcome 3 lends itself to a more discursive style of assessment, such as a submission in the form of a presentation, report or project). The assessment instrument could be issued early in the Unit to allow candidates to make relevant notes at the same time as the material is being covered in class, and to give them time for extra reading. If the submission is well structured, logical, clear and properly referenced it could contribute towards the development of the Component 'Written Communication' of the Core Skill Communication at SCQF level 6.

#### *Opportunities for developing Core Skills*

Although the Unit is designed to provide candidates with the knowledge and skills related to their specific occupational area, there may be opportunities to develop the Core Skill of *Communication* at SCQF level 6. The production of submission, if selected for Outcome 3, if well structured, logical, clear and properly referenced could contribute towards the Core Skill *Communication* at SCQF level 6. If returned as a written report or submission, the general skill for this component is 'Produce a well-structured written communication on complex topics'. If an oral submission, the general skill for this component is 'Produce and respond to oral communication on a complex topic'. The general skill for this component is 'Produce a well-structured written communication on complex topics'. It is anticipated that class discussion will be used extensively to place the different subject areas in context, to discuss their relevance to named species or habitats and to explore the relationship of this Unit with others in the programme of study, all giving opportunities to develop Oral Communication.

### Open learning

It would be possible to deliver this Unit by distance or blended learning methods, including internet-based material and directed reading. Arrangements would have to be made to ensure that the assessments for Outcomes 1 and 2 were carried out under closed-book, supervised conditions.

### Candidates with disabilities and/or additional support needs

The additional support needs of individual candidates should be taken into account when planning learning experiences, selecting assessment instruments or considering alternative Outcomes for Units. For information on these, please refer to the SQA document *Guidance on Assessment Arrangements for Candidates with Disabilities and/or Additional Support Needs*, which is available on SQA's website: [www.sqa.org.uk](http://www.sqa.org.uk).

## General information for candidates

### Unit title: **Biology: an Introduction**

This Unit is designed to provide you with the knowledge of biology needed to underpin studies of other subjects, such as ecology and environmental sciences. The aim is to give you an overview of the major aspects of biology but with an emphasis on an understanding of inheritance and evolution. No previous knowledge of biology will be assumed but even if you have studied the subject before, you should find this emphasis gives you a better understanding of the biological basis of biodiversity and environmental science.

The Unit is divided into three main areas of study, each of which has its own Outcome.

In the first two Outcomes you will look at the structure of the major organ structures and physiological systems in plants and animals. You will see how the huge diversity of living things is built from just a few types of organic structure. You will examine the similarities and differences in the organs of different types of plant and animal and begin to think about how the diversity of life is based on a degree of unity of structure. The processes that go on inside living things — their physiology is then investigated. You will look at how the different organ systems function together to make a viable, successful organism. You will see how different species have found different answers to the same problems of existence.

The assessment for Outcomes 1 and 2 are held under closed-book, supervised conditions, are sampled and may be assessed by restricted/extended response questions. You will not be told in advance which items will be assessed. A different combination of items will be assessed on each occasion.

In Outcome 3 you will consider how biological diversity has evolved by means of natural selection, a mechanism first proposed by Charles Darwin and Alfred Russell Wallace. Selection between different variations can only operate if that variation already exists, so in this Outcome you will also be asked to look at how the genes and chromosomes give rise to natural variation — the science of genetics. Thus, Outcome 3 is an integration of biology at the cellular scale and the evolutionary scale.

The submission for Outcome 3, which could be a presentation, report or project, could provide you with an opportunity to develop the Core Skill *Communication* at SCQF level 6.