



Biology (National 5)

Draft National Course Assessment Specification



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

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Course outline

Course title:	Biology (National 5)
SCQF level:	5 (24 SCQF credit points)
Course code:	to be advised
Course assessment code:	to be advised

The purpose of the Course Assessment Specification is to ensure consistent and transparent assessment year on year. It describes the structure of the Course assessment and the mandatory skills, knowledge and understanding that will be assessed.

Course assessment structure

Component 1 — question paper	80 marks
Component 2 — assignment	20 marks
Total marks	100 marks

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.

Equality and inclusion

This Course Assessment Specification has been designed to ensure that there are no unnecessary barriers to assessment. Assessments have been designed to promote equal opportunities while maintaining the integrity of the qualification.

For guidance on assessment arrangements for disabled learners and/or those with additional support needs, please follow the link to the Assessment Arrangements web page: www.sqa.org.uk/sqa/14977.html.

Guidance on inclusive approaches to delivery and assessment of this Course will be provided in the *Course Support Notes*.

Assessment

To gain the award of the Course, the learner must pass all the Units as well as the Course assessment. Course assessment will provide the basis for grading attainment in the Course award.

Course assessment

SQA will produce and give instructions for the production and conduct of Course assessments based on the information provided in this document.

Added value

The purpose of the Course assessment is to assess added value of the Course as well as confirming attainment in the Course and providing a grade. The added value for the Course will 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 this Course assessment, added value will focus on the following:

- ◆ breadth — drawing on knowledge and skills from across the Course
- ◆ challenge — requiring greater depth or extension of knowledge and/or skills
- ◆ application — requiring application of knowledge and/or skills in practical or theoretical contexts as appropriate

This added value consists of:

- ◆ a question paper, which requires learners to demonstrate aspects of breadth, challenge and application; learners will apply breadth and depth of skills, knowledge and understanding from across the Course to answer questions in biology
- ◆ an assignment, which requires learners to demonstrate aspects of challenge and application; learners will apply skills of scientific inquiry, using related knowledge, to carry out a meaningful and appropriately challenging task in biology and communicate findings

Grading

Course assessment will provide the basis for grading attainment in the Course award.

The Course assessment is graded A–D. The grade is determined on the basis of the total mark for all Course assessments together.

A learner's overall grade will be determined by their performance across the Course assessment.

Grade description for C

For the award of Grade C, learners will have demonstrated successful performance in all of the Units of the Course. In the Course assessment, learners

will typically have demonstrated successful performance in relation to the mandatory skills, knowledge and understanding for the Course.

Grade description for A

For the award of Grade A, learners will have demonstrated successful performance in all of the Units of the Course. In the Course assessment, learners will typically have demonstrated a consistently high level of performance in relation to the mandatory skills, knowledge and understanding for the Course.

Credit

To take account of the extended range of learning and teaching approaches, remediation, consolidation of learning and integration needed for preparation for external assessment, six SCQF credit points are available in Courses at National 5 and Higher, and eight SCQF credit points in Courses at Advanced Higher. These points will be awarded when a grade D or better is achieved.

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Structure and coverage of the Course assessment

The Course assessment will consist of two Components: a question paper and an assignment. The question paper will have two Sections. The assignment will have one Section.

Component 1 — question paper

The purpose of this question paper is to assess breadth of knowledge from across the Units, depth of understanding, and application of this knowledge and understanding to solve problems and to explain the impact of biological applications on society/the environment.

This question paper will give learners an opportunity to demonstrate the following skills, knowledge and understanding:

- ◆ integrate and apply biology knowledge and understanding
- ◆ apply scientific inquiry skills
- ◆ apply scientific analytical thinking skills
- ◆ explain the impact of applications to society/the environment

The question paper will have 80 marks (80% of the total mark).

This question paper has two Sections.

Section 1, titled 'Objective Test', will have 20 marks.

Section 2, titled 'Paper 2', will contain restricted and extended response questions and will have 60 marks.

Marks will be distributed approximately evenly across the three Units.

The majority of the marks will be awarded for applying knowledge and understanding. The other marks will be awarded for applying scientific inquiry and scientific analytical thinking skills.

Component 2 — assignment

The purpose of this assignment is to assess the application of skills of scientific investigation/research and the impact of applications to society/the environment, using related knowledge, by carrying out a meaningful and appropriately challenging task in biology and communicating findings.

This assignment will give learners an opportunity to demonstrate the following skills, knowledge and understanding:

- ◆ investigate/research an appropriate biology topic/issue
- ◆ process the information gathered, using scientific investigative/research skills
- ◆ apply knowledge and understanding related to the topic/issue
- ◆ present a reasoned and well-developed conclusion, supported by evidence

The assignment will have 20 marks (20% of the total marks).

This assignment has one Section.

The majority of the marks will be awarded for applying scientific investigative/research skills. The other marks will be awarded for applying related knowledge and understanding.

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Setting, conducting and marking of assessment

Question paper

This question paper will be set and marked by SQA, and conducted in centres under conditions specified for external examinations by SQA. Learners will complete this in 1 hour and 30 minutes.

Controlled assessment — assignment

This assignment is:

- ◆ set by SQA
- ◆ conducted under a high degree of supervision and control

Evidence will be submitted to SQA for external marking.

All marking will be quality assured by SQA.

Learners will complete the write-up of this assignment in no more than one hour and under open book supervised conditions.

SQA will provide an assignment specification for the generation of evidence. Learners will have a choice of topic/issue to be investigated/researched. SQA will specify the extent of the material to be taken into the write-up.

The production of evidence for assessment will be conducted:

- ◆ with the use of specified resources
- ◆ in time to meet a submission date set by SQA
- ◆ independently by the learner

Further mandatory information on Course coverage

The following gives details of mandatory skills, knowledge and understanding for the Biology (National 5) Course. Course assessment will involve sampling the skills, knowledge and understanding. This list of skills, knowledge and understanding also provides the basis for the assessment of Units of the Course.

The following gives details of the skills of scientific inquiry, investigation and analytical thinking.

Learners should be able to:

- ◆ apply knowledge and understanding of biology to unfamiliar situations, interpret information and solve problems
- ◆ select information from a variety of sources
- ◆ present information appropriately in a variety of forms
- ◆ process information, using calculations where appropriate
- ◆ plan, design and carry out investigations/research to test a hypothesis or to illustrate effects
- ◆ evaluate experimental procedures
- ◆ draw valid conclusions and give explanations supported by evidence or justification
- ◆ make predictions and generalisations based on evidence/information
- ◆ communicate findings

These skills will be assessed, across the Course, in the context of the mandatory knowledge.

The following table specifies the mandatory knowledge for the Biology (National 5) Course assessment.

Cell Biology
Cell structure <ul style="list-style-type: none">◆ cell ultrastructure and functions to include cell walls, mitochondria, chloroplasts, cell membrane, vacuole, nucleus, ribosomes and plasmids in typical plant, animal, fungi and bacteria cells
Transport across cell membranes <ul style="list-style-type: none">◆ cell membrane structure◆ concentrations gradients, passive transport, including diffusion and osmosis◆ the energy requirement for active transport
Producing new cells <ul style="list-style-type: none">◆ maintenance of chromosome complement (diploid) by mitosis◆ sequence of events of mitosis, including equator and spindle fibres◆ cell production by cell culture using aseptic techniques
DNA, production of proteins and genetic engineering <ul style="list-style-type: none">◆ structure of DNA — double-stranded helix held by complementary base pairs◆ function of DNA — base sequence determines amino acid sequence in protein◆ messenger RNA in protein production◆ protein structure — amino acid sequence determines protein shape and

function

- ◆ proteins to include structural, enzymes, hormones, antibodies, and their functions
- ◆ the effects of temperature and pH on proteins
- ◆ transfer of genetic information and genetic engineering

Chemical energy in cells

- ◆ chemistry of photosynthesis, as a series of enzyme-controlled reactions, in a two-stage process — light reaction and carbon fixation
- ◆ the end product of photosynthesis (sugar) and its use in cells
- ◆ the impact of limiting factors on the rate of photosynthesis
- ◆ chemistry of respiration as a series of enzyme-controlled reactions
- ◆ ATP production and its use
- ◆ in the absence of oxygen, energy is produced by alternative pathways, which produce different end-products

Multicellular Organisms

Cells, tissues and organs

- ◆ differentiation leads to specialisation through expression of genetic information as proteins
- ◆ specialisation of cells, in animals and plants, leads to the formation of a variety of tissues and organs
- ◆ production of specialised cells in animals
- ◆ production of non-specialised cells in meristems in plants

Control of biological processes

- ◆ nervous control in animals, including structure and function of central nervous system (CNS)
- ◆ rapid reflex action and reflex arc, including sensory, relay and motor neurons
- ◆ hormonal control in animals, including function of endocrine glands and hormones
- ◆ feedback control to maintain stable internal body conditions
- ◆ detection, consequences/treatment when control fails, eg diabetes
- ◆ internal communication in algae and plants by electrical impulses

Reproduction and inheritance

- ◆ the structures and sites of gamete production in plants and animals
- ◆ the fertilisation of haploid gametes to produce a diploid zygote
- ◆ comparison of discrete and continuous variation
- ◆ identify phenotype and homozygous/heterozygous genotype of individuals from family trees

The need for transport

- ◆ surface area to volume ratio as a reason for transport systems
- ◆ structures and processes involved in the movement of water into and through plants, including transpiration, and the movement of minerals and sugar in plants
- ◆ structures and processes involved in the transport of materials in animals in circulatory, breathing and digestive systems

Health and disease

- ◆ response to infection, including lymphocytes, phagocytes and antibodies
- ◆ the effect of lifestyle choices, environment and heredity on health

Life on Earth

Biodiversity and the distribution of life

- ◆ factors that affect biodiversity
- ◆ factors affecting distribution of biomes
- ◆ ecosystems and ecological niches
- ◆ energy flow through ecosystems
- ◆ destabilising influences and the carrying capacity of ecosystems
- ◆ predator/prey interactions
- ◆ the roles, requirements and tolerances of an organism within a niche and the factors which determine it
- ◆ nutrients cycles, including the biochemistry of the nitrogen cycle
- ◆ interspecific and intraspecific competition
- ◆ strategies to reduce competition

Techniques used to study organisms and the environment

- ◆ sampling, the selection of appropriate sampling techniques, sources of error and how they might be minimised
- ◆ measuring biotic and abiotic factors
- ◆ identifying organism using paired-statement keys and branching keys

Adaptation, natural selection and the evolution of species

- ◆ mutation, variation, selection and the evolution of species
- ◆ the role of adaptation for increased survival
- ◆ natural selection and speciation through isolation and selection
- ◆ natural and manmade extinctions
- ◆ the tree of life

Behaviour

- ◆ comparison of types of learned and unlearned behaviour
- ◆ development in walking/speech/cognitive abilities
- ◆ the importance of parental care in social development and competence

Food security and ethical issues

- ◆ food production and ethical issues, including increasing food yield through GM crops, monoculture, intensive farming and overfishing
- ◆ function and effects of natural and artificial fertilisers and pesticides
- ◆ indicator species in relation to pollution, food stocks, resources and conservation issues
- ◆ biological control and farming practices as alternatives to pesticides for intensive farming

Administrative information

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Superclass: to be advised

History of changes

Course details	Version	Description of change	Authorised by	Date

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