



Higher National Unit Specification

General information for centres

Unit title: Plant Biology

Unit code: DP4M 34

Unit purpose: This Unit is designed to provide candidates with an awareness of the characteristics of plants within the major plant categories, the relationship between structure and function of major types of plant tissues and awareness of the relationships between the structure of different plants and their life in different environments.

On completion of the Unit candidates should be able to:

- 1 Describe the main characteristics of the major plant categories.
- 2 Describe the structure of major plant tissues in relation to function.
- 3 Describe plant body structure in relation to function including adaptations to different environments.
- 4 Perform practical investigations into plant body adaptations to different environments.

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 is at the discretion of the centre. However, it would be beneficial if candidates have experience of studying Biology at Higher or equivalent, or had recent relevant work experience. Where the Unit is delivered as part of an HN Science Group Award, it is anticipated that candidates will have commenced or completed (DJ1K 34) Cell Biology: Theory and Practice prior to this Unit.

Core Skills: There may be opportunities to gather evidence towards the Core Skill of Problem Solving at Higher level 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.

Assessment: Outcomes 1, 2 and 3 should be assessed by a holistic end of Unit assessment under closed-book supervised conditions. Candidates should obtain at least 60% of the marks available in order to pass; although they can be assessed on an Outcome-by-Outcome basis.

Outcome 4 should be assessed by practical activity. Candidates should be assessed on practical ability, analysis of data, and on the quality of their laboratory report.

Higher National Unit specification: statement of standards

Unit title: Plant Biology

Unit code: DP4M 34

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

Where evidence for Outcomes is assessed on a sample basis, 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 main characteristics of major plant categories

Knowledge and/or Skills

- ◆ Mosses and Liverworts
- ◆ Clubmosses
- ◆ Ferns
- ◆ Gymnosperms
- ◆ Angiosperms: Dicotyledone
- ◆ Angiosperms: Monocotyledone

Evidence Requirements

In order to achieve this Outcome, candidates will need evidence to demonstrate that they have gained the Knowledge and/or Skills listed above by describing the main characteristics of the major plant groups listed. Assessment should be carried out under supervised closed-book conditions. Evidence for the Knowledge and/or Skills will be provided on a sample basis. In any assessment, candidates will need to demonstrate that they can answer questions based on a sample of three out of six Knowledge and/or Skills items for this Outcome.

Higher National Unit specification: statement of standards (cont)

Unit title: Plant Biology

Assessment Guidelines

This Outcome should be assessed under closed-book, supervised conditions, ~~ideally in a holistic end of Unit test with~~ using a holistic test covering Outcomes 1 ~~and~~ 3.

Outcome 2

Describe the structure of major plant tissues in relation to function

Knowledge and/or Skills

- ◆ Parenchyma
- ◆ Collenchyma
- ◆ Sclerenchyma
- ◆ Xylem
- ◆ Phloem

Evidence Requirements

In order to achieve this Outcome, candidates will need evidence to demonstrate that they have gained the Knowledge and/or Skills listed above. Assessments should be carried out under supervised, closed-book conditions. A candidate's response will be judged satisfactory for this Outcome when the evidence produced is sufficient to show that the candidate is able to:

- ◆ describe the features that distinguish each tissue listed in the Knowledge and/or Skills, including those forms found within vascular tissue for Parenchyma and Sclerenchyma, in terms of:
 - living or dead on maturity
 - details of cell wall structure/materials
 - cell shape
 - distribution in the plant
- ◆ explain how the structure of each tissue is related to their main functions

Evidence for the Knowledge and/or Skills will be provided on a sample basis. In any assessment, candidates will need to demonstrate that they can answer questions based on a sample of three out of five Knowledge and/or Skills items for this Outcome.

Assessment Guidelines

This Outcome should be assessed under supervised, closed-book conditions, ~~ideally in a holistic end of Unit test with~~ using a holistic test covering Outcomes 1 and 3. Candidates should obtain at least 60% of the marks available for the assessment in order to pass.

Higher National Unit specification: statement of standards (cont)

Unit title: Plant Biology

Outcome 3

Describe plant body structure in relation to function including adaptations to different environments

Knowledge and/or Skills

- ◆ gas exchange
- ◆ nutrition
- ◆ transport
- ◆ water conservation
- ◆ reproduction

Evidence Requirements

In order to achieve this Outcome, candidates will need evidence to demonstrate that they have gained the Knowledge and/or Skills listed. Assessment should be carried out under supervised, closed-book conditions. A candidate's response will be judged satisfactory for this Outcome when the evidence provided is sufficient to show that the candidate is able to:

- ◆ describe the structures plants use for gas exchange, nutrition (photosynthesis and obtaining minerals), transport, water conservation, or reproduction
- ◆ describe at least two ways in which the structures plants use for gas exchange, nutrition (photosynthesis and obtaining minerals), transport, water conservation, or reproduction are adapted to different environments

Evidence for the Knowledge and/or Skills will be provided on a sample basis. In any assessment candidates will need to demonstrate that they can answer questions based on a sample of three out of five Knowledge and/or Skills items for this Outcome.

Assessment Guidelines for Outcomes 1, 2 and 3

~~It is recommended that assessment for Outcomes 1–3 is done in one holistic assessment event, however assessment can be done on an Outcome by Outcome basis if preferred. Assessment for all Outcomes should be done under closed book supervised conditions and if done in a single event should last no more than two hours.~~

Outcomes 1-3 should be assessed under closed book supervised conditions using a holistic test with a cut off score of 60%

Higher National Unit specification: statement of standards (cont)

Unit title: Plant Biology

Outcome 4

Perform practical investigations into plant body adaptations to different environments

Knowledge and/or Skills

- ◆ practical skills related to plant body adaptations
- ◆ work in a safe manner regarding current Health and Safety regulations
- ◆ data recording, analysis and interpretation
- ◆ presentation of laboratory reports
- ◆ report results clearly and concisely

Evidence Requirements

Candidates will need evidence to demonstrate their practical skills by showing that they can perform two investigations into plant adaptations to different environments.

Evidence for this Outcome should be gathered by the candidate performing at least two practical activities and should be recorded on a checklist. The candidate should also submit a formal laboratory report for one of the investigations.

Candidates should be assessed on both their performance in completing the laboratory work and on their ability to produce a satisfactory laboratory report.

Assessment Guidelines

This Outcome should be assessed by the use of at least two practical experiments. This Outcome will be used to reinforce the theoretical knowledge gained in Outcomes 1–3. Checklists to determine satisfactory performance during the practicals should be developed. The candidate should submit a formal laboratory report for one of the practicals.

Administrative Information

Unit code:	DP4M 34
Unit title:	Plant Biology
Superclass category:	RH
Original date of publication:	August 2005
Version:	03 (June 2009)
History of changes:	SQA

Version	Description of change	Date
02	Minor text changes.	28/7/2008
03	Changes made to standardise assessment guidelines and minor text changes.	03/06/09

Source: SQA

© Scottish Qualifications Authority 2005, 2008, 2009

This publication may be reproduced in whole or in part for educational purposes provided that no profit is derived from reproduction and that, if reproduced in part, the source is acknowledged.

SQA acknowledges the valuable contribution that Scotland's colleges have made to the development of Higher National qualifications.

Additional copies of this Unit specification can be purchased from the Scottish Qualifications Authority. Please contact the Customer Contact Centre for further details, telephone 0845 279 1000.

Higher National Unit specification: support notes

Unit title: Plant Biology

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 is designed to provide candidates with an overview of the plant kingdom.

Outcomes 1 and 2

Representatives of the major plant categories are used to ensure the candidates gain an awareness of the characteristics of plants within these major categories.

A brief study of plant histology provides the opportunity to develop an understanding of some of the relationships between structure and function of major types of plant tissues.

The study of the relationships between the body structures of different plants and their life in different environments will provide candidates with an overview of plant biology. Candidates should be able to describe the features that distinguish Parenchyma, Collenchyma, Sclerenchyma, Xylem and Phloem in terms of cells that are living or dead on maturity, structure of the cell wall, cell shape and distribution throughout the plant. The structure of the cell types should be related to their function.

Practical activities could support these themes as they are developed.

Outcome 3

The study of the relationships between the body structures of different plants and their life in different environments will provide candidates with an overview of plant biology. Plant structures could include the following:

- ◆ Gas exchange: Stomata, lenticels
- ◆ Nutrition: Photosynthesis, chloroplasts, leaf structure, C₃ vs. C₄ plants, minerals
- ◆ Transport: Transpiration, translocation
- ◆ Water conservation: Hydrophytes, halophytes, mesophytes, xerophytes
- ◆ Reproduction: Asexual and sexual

Outcome 4

Laboratory investigations might include:

- ◆ study of specimens eg Mosses, liverworts, ferns
- ◆ dissection of flowers
- ◆ examination of the microscopic structure of roots and shoots

Higher National Unit specification: support notes (cont)

Unit title: Plant Biology

- ◆ Rates of Photosynthesis in *Elodea*
- ◆ Effects of varying environmental parameters on transpiration rates
- ◆ Mineral nutrition of sunflowers
- ◆ section cutting of celery petiole

This Unit could lend itself to site visits to Botanical gardens or other suitable site.

Guidance on the delivery and assessment of this Unit

Open learning

If this Unit is delivered by open or distance learning methods, additional planning resources may be required for candidate support, assessment and quantity assurance. A combination of new and traditional authentication tools may have to be devised for assessment and reassessment purposes.

Disabled candidates and/or those with additional support needs

The additional support needs of individual candidates should be taken into account when planning learning experiences, selecting assessment instruments, or considering whether any reasonable adjustments may be required. Further advice can be found on our website www.sqa.org.uk/assessmentarrangements

General information for candidates

Unit title: Plant Biology

This Unit is designed to provide you with an awareness of the characteristics of plants within their major classification groupings.

You will look at the relationships between structure and function of major types of plant tissues and then study the relationships between the structure of different plants and they are adapted to life in different environments.

On successful completion of this Unit you will be able to:

- 1 Describe the main characteristics of the major plant categories.
- 2 Describe the structure of major plant tissues to function.
- 3 Describe plant body structure to function including adaptations to different environments.
- 4 Perform practical investigations into plant body adaptations to different environments.

Outcome 1

You will look at the main characteristics of major plant categories.

The assessment for this Outcome, ~~which may will~~ be integrated with Outcomes 2 and 3, and is a closed-book supervised test. ~~You will be expected to describe the main characteristics of the major plant categories.~~

Outcome 2

In this Outcome you will examine the distinguishing features of the five major plant tissues: Parenchyma, Collenchyma, Sclerenchyma, Xylem and Phloem.

You will look at how the structure of these plant tissues is related to function.

The assessment for this Outcome, which will be integrated with Outcomes 1 and 3, is a closed-book supervised test.

Outcome 3

In this Outcome you will learn about the structures plants use for Gas exchange, Nutrition, Transport, Water conservation, and Reproduction.

You will study how these structures are adapted to different environments.

The assessment for this Outcome, which will be integrated with Outcomes 1 and 2, is a closed-book supervised test.

General information for candidates

Unit title: Plant Biology

Outcome 4

During the work for Outcomes 1–3, you will be given a series of practical activities/laboratory investigations to complete.

To complete this Outcome you will be assessed during 2 practical investigations. You will be assessed by checklists and by your submission of a laboratory report for one of the investigations.