

-SQA-SCOTTISH QUALIFICATIONS AUTHORITY

**Hanover House
24 Douglas Street
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NATIONAL CERTIFICATE MODULE DESCRIPTOR

-Module Number- 7310081 **-Session-1991-92**
-Superclass- RH

-Title- **INTRODUCING FLOWERING PLANTS (X^{1/2})**

-DESCRIPTION-

Purpose This module provides an introduction to the structure of the principal plant components that are visible under a light microscope.

The module would be suitable for inclusion in an introductory programme in biology.

It could be offered in conjunction with other Stage 1 Biology or Science modules.

Preferred Entry Level No formal entry requirements.

Outcomes The student should:

1. identify the structural components of flowering plants;
2. identify a range of monocotyledons and dicotyledons;
3. explain secondary thickening in the first three years of growth of a dicotyledonous stem;
4. describe sexual reproduction in higher plants.

Assessment Procedures Acceptable performance in this module will be satisfactory achievement of all the Performance Criteria specified for each Outcome.

The following abbreviations are used below:

PC Performance Criteria
IA Instrument of Assessment

Note: The Outcomes and PCs are mandatory and cannot be altered. The IA may be altered by arrangement with SQA. (Where a range of performance is indicated, this should be regarded as an extension of the PCs and is therefore mandatory.)

OUTCOME 1 IDENTIFY THE STRUCTURAL COMPONENTS OF FLOWERING PLANTS

PCs

- (a) The identification of the external components of the flowering plant is correct with respect to:
 - (i) name;
 - (ii) position;
 - (iii) function.

- (b) The identification of the internal components of the flowering plant visible under the light microscope is correct with respect to:
 - (i) name;
 - (ii) position;
 - (iii) function.

IA Assignment

An assignment to assess the student's ability to identify the structural components of flowering plants under closed book conditions.

The assignment will involve the identification of, for PC (a):

10 external components of flowering plants from a range of plant material;

for PC (b):

5 internal components of flowering plants from prepared slides or photomicrographs.

A checklist should be compiled to ensure a reliable interpretation of the student's performance.

Satisfactory achievement of the Outcome will be demonstrated by the student achieving 10 correct responses for (a) and 5 correct responses for (b).

OUTCOME 2 IDENTIFY A RANGE OF MONOCOTYLEDONS AND DICOTYLEDONS

PC (a) The identification of monocotyledons is correct with respect to:

- (i) flower structure;
- (ii) leaf structure;
- (iii) vascular bundle arrangement;
- (iv) seed structure.

(b) The identification of dicotyledons is correct with respect to:

- (i) flower structure;
- (ii) leaf structure;
- (iii) vascular bundle arrangement;
- (iv) seed structure.

IA Objective Questions

10 objective questions to assess the student's ability to identify a range of monocotyledons and dicotyledons under closed book conditions.

The questions should be allocated as follows:

PC (a) 5 questions
(b) 5 questions

Several types of objective questions would be appropriate for this assessment. The questions should cover at least two monocotyledons and two dicotyledons.

Satisfactory achievement of the Outcome will be demonstrated by the student achieving 4 correct responses for (a) and 4 correct responses for (b).

OUTCOME 3 EXPLAIN SECONDARY THICKENING IN THE FIRST THREE YEARS OF GROWTH OF A DICOTYLEDONOUS STEM

PCs (a) The description of the development of cells from cambium tissue is correct with respect to:

- (i) xylem formation;
- (ii) phloem formation;
- (iii) medullary ray formation.

- (b) The explanation of the development of annual rings in a dicotyledonous stem is correct with respect to:
- (i) the formation of spring wood;
 - (ii) the formation of autumn wood.

IA Extended Response Questions

2 extended response questions to assess the student's ability to explain secondary thickening in the first three years of growth of a dicotyledonous stem under open book conditions.

The questions should be allocated as follows:

- PC (a) One question requiring an answer of about 150 words.
- (b) One question requiring an answer of about 50 words.

Satisfactory achievement of the Outcome will be demonstrated by the student achieving acceptable responses for both questions.

OUTCOME 4

DESCRIBE SEXUAL REPRODUCTION IN HIGHER PLANTS

PCs

- (a) The description of sexual reproduction in higher plants is correct with respect to:
- (i) pollination;
 - (ii) fertilisation;
 - (iii) seed formation;
 - (iv) fruit formation;
 - (v) seed dispersal.
- (b) The description of the germination process is correct with respect to:
- (i) conditions required;
 - (ii) plumule growth;
 - (iii) radical growth;
 - (iv) name given to germination type.

IA Objective Questions

9 objective questions to assess the student's understanding of sexual reproduction in given higher plants under closed book conditions.

The questions should be allocated as follows:

- | | | | |
|-----|--------------------------|---|---|
| (a) | pollination | 1 | |
| | fertilisation | 1 | |
| | seed formation | | 1 |
| | fruit formation | 1 | |
| | seed dispersal | | 1 |
| (b) | conditions required | | 1 |
| | plumule growth | | 1 |
| | radical growth | | 1 |
| | name of germination type | | 1 |

Several types of objective questions may be appropriate for the above assessments.

Satisfactory achievement of the Outcome will be demonstrated by the student achieving 5 correct responses for (a) and 4 correct responses for (b).

**The following sections of the descriptor are offered as guidance.
They are not mandatory.**

CONTENT/CONTEXT

Corresponding to Outcomes 1-4:

1. The identification of sepals, petals, anther, stamen, ovary carpel, leaf, petiole, stem, node, internode, roots, seed, bulb, corm, rhizome and fruit. The identification of epidermis, palisade, mesophyll, spongy mesophyll, guard cells, parenchyma, xylem, cambium, phloem, cuticle.
2. Monocotyledons could include: iris, tulip, crocus, gladiolus, alstromeria, freesia.
Flower parts: trimerous.
Leaf structure: linear leaves, parallel venation.
Vascular arrangement: scattered.

Dicotyledons could include: wallflowers, poppies, dianthus, buttercups, lobelia, nasturtium, potentilla.
Flower parts: tetramerous, pentamerous.
Leaf structure: petiole, net-like venation.
Vascular arrangement: ring.
3. (a) Mitosis, interfascicular cambium, secondary xylem vessels and phloem with companion cells.
4. Different methods of pollination should be covered. The process of fertilisation in terms of growth of pollen tube, fusion of the male and female nuclei, embryo, testa, endosperm, dry fruits, succulent fruits, and the cotyledon(s).

The production of fruits and dispersal of seeds is in terms of animals, water, wind and mechanical means.

SUGGESTED LEARNING AND TEACHING APPROACHES

During the work of the module students should have several opportunities to practise their skills. Each student should be assessed at appropriate points throughout the module. Where a student is unsuccessful in achieving an Outcome, provision should be made for remediation and reassessment.

Practical work is likely to play a significant part in this module. Samples of flowering plants could be restricted during the winter months; samples would be dependant on the season.

A student-centred, resource-based approach is likely to be the most flexible for this module. The Outcomes can be integrated so that concepts can be developed.

Outcome 4 in this module is identical to Outcome 3 in 7310041 Introducing Reproduction (X $\frac{1}{2}$). If both modules are forming part of a programme the student will only need to be assessed once for this Outcome.

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