

-SQA-SCOTTISH QUALIFICATIONS AUTHORITY

**Hanover House
24 Douglas Street
GLASGOW G2 7NQ**

NATIONAL CERTIFICATE MODULE DESCRIPTOR

-Module Number- 7310061 **-Session-1991-92**
-Superclass- RH

-Title- **INTRODUCING ECOLOGICAL PRINCIPLES (x 1/2)**

-DESCRIPTION-

Purpose This module provides an introduction to the basic concepts of ecology.

The module is suitable for use in an introductory programme in ecology or biology. It could be offered in conjunction with 7310071 Introducing Ecological Investigations (x 1/2) and other Stage 1 Biology or Science modules. The module could also be used as a general interest topic in a variety of programmes.

Preferred Entry Level No formal entry requirements.

Outcomes The student should:

1. apply the concepts of ecology to a variety of ecosystems;
2. apply the concept of energy flow to ecosystems;
3. apply the concept of nutrient cycling to ecosystems;
4. investigate the effects of human activity on ecosystems.

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 APPLY THE CONCEPTS OF ECOLOGY TO A VARIETY OF ECOSYSTEMS

- PCs (a) The explanation of the given terms is correct.
 (b) The application of the concepts of ecology to describe or explain a given situation is correct.

IA Structured Questions

3 structured questions to assess the student's ability to apply the concepts of ecology to a variety of ecosystems under closed book conditions.

The structured questions should be such that both aquatic and terrestrial ecosystems are covered and should assess the student's understanding of the inter-relationships of the components of the ecosystem.

The questions must contain all the items listed below:

for PC (a) terms: biotic, biotic, biomes, habitat, community, ecosystem, niche, population.

for PC (b) situations: predation, competition.

Satisfactory achievement of the Outcome will be demonstrated by the student achieving both the Performance Criteria within the 3 questions.

OUTCOME 2 APPLY THE CONCEPT OF ENERGY FLOW TO ECOSYSTEMS

- PCs (a) The explanation of energy flow is correct with respect to:
- (i) energy entering the ecosystem;
 - (ii) energy losses from the ecosystem;
 - (iii) energy transfer.

- (b) The application of the concept of energy flow to a given ecosystem is correct with respect to:
- (i) food chains and food webs;
 - (ii) pyramid of numbers and biomass;
 - (iii) efficiency of energy transfer.

IA Structured Questions

2 structured questions to assess the student's ability to apply the concept of energy flow in given ecosystems under closed book conditions.

The questions should be allocated in a way to allow the student to look at two different ecosystems.

Satisfactory achievement of the Outcome will be demonstrated by the student achieving all the Performance Criteria within the 2 questions.

OUTCOME 3

APPLY THE CONCEPT OF NUTRIENT CYCLING TO ECOSYSTEMS

PCs

- (a) The explanation of nutrient cycling is correct with respect to:
- (i) different forms of nutrients;
 - (ii) conversion of different forms of nutrients.
- (b) The application of the concept of nutrient cycling in given ecosystems is correct with respect to:
- (i) use of nutrients by organisms;
 - (ii) importance of nutrient cycling to ecosystems.

IA Structured Questions

2 structured questions to assess the student's ability to apply the concept of nutrient cycling in given ecosystems under closed book conditions.

The questions should be allocated as follows:

1 question on carbon cycling in an ecosystem;
1 question on nitrogen cycling in a different ecosystem.

Satisfactory achievement of the Outcome will be demonstrated by the student achieving all the Performance Criteria within the 2 questions.

OUTCOME 4 INVESTIGATE THE EFFECTS OF HUMAN ACTIVITY ON ECOSYSTEMS

- PCs
- (a) The identification of human activities causing changes in ecosystems is correct with respect to:
 - (i) harmful factors;
 - (ii) beneficial factors.
 - (b) The explanation of how human actions affect ecosystems is correct with respect to:
 - (i) harmful factors;
 - (ii) beneficial factors.

IA Assignment

An assignment to test the student's ability to investigate the effects of human activity on ecosystems under open book conditions.

For PC (a) the student will be required to identify 6 examples of human activities covering water, air and land ecosystems. At least two harmful and two beneficial factors must be identified.

For PC (b) the student will be required to explain one beneficial and one harmful human activity from those identified in PC (a).

The assignment, covering both Performance Criteria, will involve the student presenting evidence, not exceeding 150 words.

Satisfactory achievement of the Outcome will be demonstrated by the student achieving ALL the Performance Criteria.

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

CONTENT/CONTEXT

Corresponding to Outcomes 1-4:

1. Students should be encouraged to study a wide variety of ecosystems such as: woodland, farmland, rivers, lochs, seashore, ponds. Choice of ecosystem will depend on student's needs and the local environment.
2. The following terms may be introduced (although not assessed): herbivores, carnivores, producers, consumers.
3. Nitrogen cycle to cover: nitrogen, ammonia, nitrites, nitrates protein, urea. Details of bacteria are not required. The carbon and nitrogen cycles should not be studied in isolation, but should be integrated within the chosen ecosystems.
4. Harmful human activities could include: oil spillages, sulphur dioxide release, agrochemicals, over-fishing, waste disposal, heavy metals.

Beneficial human activities could include: breeding of endangered species, bio-degradable/recycling, sewage treatment, conservation, legislation eg. Clean Air Act.

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.

A student-centred, resource-based approach is likely to be most flexible for this module. The Outcomes can be integrated so that concepts can be developed throughout the module. Outcomes 1 and 2 especially require an integrated approach.

The module will complement 7310071 Introducing Ecological Investigations (X^{1/2}) and can be run in conjunction with other Stage 1 Biology modules.

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