# National Unit Specification: general information

**UNIT** Soils - Structure and Function (Intermediate 2)

**NUMBER** D29F 11

**COURSE** Crop Establishment (Intermediate 2)


**SUMMARY**

The unit is designed to meet the needs of candidates following a range of programmes and is particularly suitable for the land and environment sector. On completion of the unit candidates will be able to describe how soils are formed, describe the components of a typical soil, its key characteristics and how to classify it. Candidates will also be able to investigate and analyse soils using standard field and laboratory methods.


**OUTCOMES**

1 Describe soil formation processes.
2 Describe and determine the key characteristics of soils.
3 Investigate and classify soils.

**RECOMMENDED ENTRY**

While entry is at the discretion of the centre, candidates would normally be expected to have attained one of the following:

- Standard Grade Biology, Chemistry, Geography, Physics or Science at grade 3 or 4
- Intermediate 1 Managing Environmental Resources or its component units.

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## Administrative Information


**Superclass:** SB

**Publication date:** October 1999

**Source:** Scottish Qualifications Authority 1999

**Version:** 01

## CREDIT VALUE

0.5 credit at Intermediate 2.

## CORE SKILLS

Information on the automatic certification of any core skills in this unit is published in *Automatic Certification of Core Skills in National Qualifications* (SQA, 1999).

# National Unit Specification: statement of standards

**UNIT** Soils - Structure and Function (Intermediate 2)

Acceptable performance in this unit will be the satisfactory achievement of the standards set out in this part of the unit specification. All sections of the statement of standards are mandatory and cannot be altered without reference to the Scottish Qualifications Authority.

**OUTCOME 1**
Describe soil formation processes.

**Performance criteria**

a) The process of soil formation is described accurately with regard to effects of topography, climate and time on parent rock material.
b) The effects of plants, animals and humans on soil formation are described accurately.
c) The nature and function of the major components of a typical soil are described accurately.

**Evidence requirements**
Please refer to *Evidence requirements for the unit* at the end of the Statement of Standards.

**OUTCOME 2**
Describe and determine the key characteristics of soils.

**Performance criteria**

a) The texture of given soils is described accurately using standard terminology.
b) The structure of given soils is described accurately using standard terminology.
c) The factors affecting natural soil fertility are described accurately.
d) The key characteristics of given soils are determined accurately.

**Evidence requirements**
Please refer to *Evidence requirements for the unit* at the end of the Statement of Standards.

**OUTCOME 3**
Investigate and classify soils.

**Performance criteria**

a) Soil horizons are described accurately in terms of thickness, colour, texture and structure.
b) Soil profiles are described accurately with respect to component horizons.
c) Given soil types are classified accurately using standard terminology.
d) The potential of given soils to support plant growth is described accurately with reference to appropriate maps.

## National Unit Specification: statement of standards (cont)

**UNIT** Soils - Structure and Function (Intermediate 2)

**Evidence requirements**
Please refer to *Evidence requirements for the unit* at the end of the Statement of Standards.

**EVIDENCE REQUIREMENTS FOR THE UNIT**

**Outcome 1**
Written and/or oral evidence of the candidate's ability to describe soil formation processes is required. An appropriate level of attainment in a closed book test with items covering all performance criteria could be used.

**Outcome 2**
Evidence of an appropriate level of attainment must be generated with items covering all performance criteria. A report of the investigation of three soil samples is required and should include texture and structure determinations together with the determination of three other characteristics from mineral content, organic content, water content, pH status and the status of individual mineral nutrients. The report must be based on investigations in which the candidate has demonstrated an acceptable level of participation. Although the collection of the information may involve group work, the report must be the individual work of the candidate.

**Outcome 3**
Evidence of an appropriate level of attainment must be generated with items covering all performance criteria. A report of the investigation of three soil profiles is required and must be the individual work of the candidate. The report must be based on investigations in which the candidate has demonstrated an acceptable level of participation. The collection of the information may involve group work.

# National Unit Specification: support notes

**UNIT** Soils - Structure and Function (Intermediate 2)

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 20 hours.

## GUIDANCE ON THE CONTENT AND CONTEXT FOR THIS UNIT

This unit should be delivered within the appropriate context for the particular candidate group. Care should be taken, however, to ensure that a suitable balance is achieved and that reference is made to both unimproved and improved soils.

1 The relevance of parent rock material to the nature and properties of soils requires a very brief introduction to rock types and the effects of environmental factors on them. Since Scotland has been heavily glaciated, the importance of the action of ice and the deposits left behind by retreating glaciers as the parent material for soil forming processes should be considered. Other effects of topography, climate and time could be considered from the point of view of a local river and its catchment. The ability of trees to take root in rock crevices and become instrumental in rock-splitting could be considered. Other effects of micro-organisms, plants, invertebrates and vertebrates, including man, on soil formation and change should be included. Additional local information should be considered where appropriate. The nature and function of inorganic material, organic matter, air, water and living organisms should be covered.

2 Soil texture should include a quantitative consideration of particle size as the basis for distinguishing between sands, silts, clays and intermediate textures. Although field methods of texture determination are adequate for the investigative work, candidates should be aware of quantitative methods using, for example, soil sieves. Soil structure should be considered by observing samples of a range of soils in the field, where possible. Factors affecting soil fertility should include water holding capacity (and related characteristics such as potential for waterlogging, ease of cultivation, tendency to poach, earliness, etc.), pH and mineral nutrient levels.

3 Reference should be made to brown earths, podsols, gleys, organic soils and rendzinas even though all of these types may not be found in the local area. Fieldwork on soil characteristics for outcome 2 could be combined with work on soil types although samples for the former should be restricted to topsoil. Work on soil types should concentrate on the preparation and investigation of soil pits but other methods (for example, the use of soil augers) could be described. The sites investigated should be located on an appropriate soil or land capability map and the potential of the soil to support plant growth should be determined according to the candidate's particular interests.

## National Unit Specification: support notes (cont)

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### GUIDANCE ON LEARNING AND TEACHING APPROACHES FOR THIS UNIT

The delivery of this unit should reflect a strongly candidate-centred approach. Every effort should be made to make delivery appropriate to the needs of individual candidate groups.

Although soil formation processes and an introduction to the concepts of soil texture and soil structure could be delivered in a classroom situation, the remainder of the unit could be delivered by site visits incorporating practical fieldwork and associated laboratory work.

### GUIDANCE ON APPROACHES TO ASSESSMENT FOR THIS UNIT

Centres may use the instruments of assessment which are considered by teachers/lecturers to be the most appropriate. An integrated assessment in the form of a test with questions covering all performance criteria could be used for outcome 1. Outcomes 2 and 3 can be assessed together by participation in practical field and laboratory investigations and an appropriate level of attainment in the associated report.

### SPECIAL NEEDS

This unit specification is intended to ensure that there are no artificial barriers to learning or assessment. Special needs of individual candidates should be taken into account when planning learning experiences, selecting assessment instruments or considering special alternative outcomes for units. For information on these, please refer to the SQA document *Guidance on Special Assessment and Certification Arrangements for Candidates with Special Needs/Candidates whose First Language is not English* (SQA, 1998).