



## National Unit Specification: general information

**UNIT** Sportsturf Industry: Soils and Rootzones (SCQF level 5)

**CODE** F6TM 11

### SUMMARY

Candidates who achieve this Unit will have a greater understanding of the processes that formed natural soils over a period of time. Candidates will be able to identify the properties of a soil that make them suitable or unsuitable for sportsturf by completing a textural analysis. Candidates will be able to correctly identify a range of soil structures, appreciate what constitutes a fertile soil and explain the components of a soil suitable for the sportsturf industry. Candidates will also appreciate the range of soil amendments and substitute materials that have developed over recent years.

The Unit is designed for candidates wishing to develop their knowledge of soils who are starting a career in the sportsturf industry.

### OUTCOMES

- 1 Describe the processes that influence soil formation.
- 2 Describe the characteristics of a range of soils.
- 3 Describe a range of rootzone materials used in the sportsturf industry.

### RECOMMENDED ENTRY

Entry is at the discretion of the centre.

### CREDIT VALUE

1 credit at SCQF level 5 (6 SCQF credit points at SCQF level 5\*).

*\*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.*

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#### Administrative Information

**Superclass:** SF

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## **National Unit Specification: general information (cont)**

**UNIT**      Sportsturf Industry: Soils and Rootzones (SCQF level 5)

### **CORE SKILLS**

There is no automatic certification of Core Skills in this Unit.

There are opportunities for Core Skill development; these are highlighted in the Support Notes of this Unit Specification.

## **National Unit Specification: statement of standards**

### **UNIT Sportsturf Industry: Soils and Rootzones (SCQF level 5)**

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 SQA.

#### **OUTCOME 1**

Describe the processes that influence soil formation.

##### **Performance Criteria**

- (a) Describe correctly the soil formation processes with regard to the effects of topography, climate and time on parent rock material.
- (b) Describe correctly the effects of plants, animals and humans on soil formation processes.

#### **OUTCOME 2**

Describe the characteristics of a range of soils.

##### **Performance Criteria**

- (a) Identify accurately the texture of a range of soils.
- (b) Describe correctly the structure and profile of a range of soils.
- (c) Describe correctly the factors that influence soil fertility.
- (d) Describe correctly the major components of a typical soil.

#### **OUTCOME 3**

Describe a range of rootzone materials used in the sportsturf industry.

##### **Performance Criteria**

- (a) Describe correctly the proportion of materials used in developing rootzone material for different sportsturf surfaces.
- (b) Describe correctly how the proportion of materials will affect drainage, root development and stability of different sportsturf surfaces.
- (c) Describe correctly soil amendments and substitute materials used in rootzones.

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

**UNIT** Sportsturf Industry: Soils and Rootzones (SCQF level 5)

### **EVIDENCE REQUIREMENTS FOR THIS UNIT**

**All relevant operational procedures undertaken in this Unit must adhere to current legislation, regulations, codes of practice and manufacturers' recommendations where appropriate.**

Evidence is required to demonstrate that candidates have achieved all Outcomes and Performance Criteria.

#### **Outcome 1 — Written and/or oral recorded evidence**

The candidate must describe the formation of soils to the standard specified in the Performance Criteria (a) and (b).

The evidence for this Outcome is written and/or recorded oral evidence assessed through an open-book exercise.

#### **Outcome 2 — Written and/or oral recorded evidence and performance evidence**

For Performance Criterion (a) the candidate must, through a checklist:

- ◆ provide evidence of the textural type of a minimum of four different soils by tactile analysis
- ◆ state the characteristics that enabled identification

For Performance Criteria (b), (c) and (d) the candidate must complete a multiple choice assessment, which covers a minimum of three questions on the following areas:

- ◆ Soil texture
- ◆ Soil structure
- ◆ Soil profiles
- ◆ Soil fertility
- ◆ Major soil components

#### **Outcome 3 — Written and/or oral recorded evidence**

The candidate is required to complete a short answer response which covers a minimum of one question from each of the following areas:

- ◆ The proportion of materials for either a golf green or another sportsturf area
- ◆ The effect of rootzone materials on drainage, root development and stability
- ◆ Soil amendments
- ◆ Soil substitutes

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

### **UNIT**      Sportsturf Industry: Soils and Rootzones (SCQF level 5)

The Assessment Support Pack for this Unit provides appropriate instruments of assessment, assessor checklists and assessor guidance. Centres wishing to develop their own assessments should refer to the assessment support pack to ensure a comparable standard.

Centres must be satisfied that the evidence submitted is the work of individual candidates.

When using Performance Evidence, assessor observation checklists and other assessment records should be maintained and kept up to date to keep track of candidate progress and to provide evidence for internal and external verification purposes.

## National Unit Specification: support notes

### UNIT Sportsturf Industry: Soils and Rootzones (SCQF level 5)

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 is a mandatory Unit of the National Certificate in Greenkeeping, but can also be taken as a free-standing Unit.

This Unit is aligned to the following Lantra, Sector Skills Council's National Occupational Standard (NOS) Units:

- (L2) Establish plants outdoors
- (CU2) Monitor and Maintain Health and Safety
- (L27) Use and maintain equipment and machines

It is important to recognise that the term soil relates to the “in-situ” materials that support the growth of turf to avoid confusion with the widening range of prepared rootzone, soil amendment and soil substitute materials.

#### Outcome 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, a rolling surface will increase removal of water and increase erosion therefore reducing the development of deep soils. Climate conditions such as temperature and precipitation influence chemical and physical processes. The effect of time rocks are subjected to weathering should be considered.

The ability of trees to take root in rock crevices and become instrumental in rock-splitting should 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.

#### Outcome 2

For Performance Criteria (b), (c) and (d) the candidate could complete a multiple choice assessment, which covers a minimum of three questions on the following areas:

- ◆ Soil texture
- ◆ Soil structure
- ◆ Soil profiles
- ◆ Soil fertility
- ◆ Major soil components

## **National Unit Specification: support notes (cont)**

### **UNIT Sportsturf Industry: Soils and Rootzones (SCQF level 5)**

Candidates should be able to determine the soil texture categories of sands, silts and clays. Although tactile methods of texture determination is adequate for this Unit, candidates should be aware of quantitative methods using, for example, soil sieves.

Reference should be made to the following soil structures; crumb, granular, blocky and platy. It may be possible to observe different soil structure through a range of soil profiles. Profile pits can be created to examine natural soils. Soil horizons can be recorded to determine soil type and structure.

Factors affecting soil fertility should include water holding capacity (and related characteristics such as potential for water-logging, ease of cultivation, soil temperature, etc.), pH and mineral nutrient levels.

The nature and function of inorganic material, organic matter, air, water and living organisms should be covered. Living organisms should include: algae, fungi, actinomycetes and bacteria.

#### **Outcome 3**

A rootzone is the top layer of material in the construction profile. By describing rootzones there is no requirement to explain the full layers of a construction type. The proportions of materials used for a rootzone suitable for a range of sportsturf surfaces should be described for Performance Criterion (a). Two essential surfaces to be described are a golf green and a cricket square. Candidates should be able to describe rootzone material for at least two other surfaces. The optimum proportions of sand silt and clay for each surface should be described.

Performance Criterion (b) expands on Performance Criterion (a) by developing knowledge of the affects of differing proportions of sand, silt and clay. Candidates should be aware that higher proportions of round shaped sand will improve porosity and assist drainage capability whereas they would reduce stability of the surface. Higher proportions of clay will reduce drainage capability but increase water holding capacity. Higher proportions of silt are of no benefit to any type of rootzone material.

Performance Criterion (c) investigates the use of substitute materials such as re-cycled glass for construction work and sand fibre, mesh elements, propylene strands and rubber crumb for amendments can be used for this Outcome. Visits to facilities that support any of the listed materials will be beneficial to candidates. Both the advantages and disadvantages of each material should be understood by candidates.

## National Unit Specification: support notes (cont)

### UNIT Sportsturf Industry: Soils and Rootzones (SCQF level 5)

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

Classroom activity should be used to introduce soil formation (Outcome 1). Candidates can develop their knowledge by group activities by researching through ICT media and investigating library text books. This Outcome should be taught in the early stages of the Unit so that adequate time can be allocated. Milestones can be set for the completion of the report. It may well be that there is evidence of soil formation within distance of a visit from the centre such as glacial erosion. Walks from the David Marshall Lodge Visitors Centre near Aberfoyle provide an illustrated teaching source.

Outcome 2 can be lead by practical demonstrations of textural analysis by sedimentation using the principles Stokes Law by placing samples of a soil in a 500ml measuring tube which will provide evidence of different soil materials. Samples of different soil structure collected over a period of time will assist in demonstrating the different soil structures. Natural soil profiles can be obtained or purchased to show a range relevant to the areas of Scotland.

Outcome 3 should be delivered after candidates appreciate the natural materials that make up our soils. It is then possible to understand why these natural materials have to be mixed or modified to create a suitable rootzone for sportsturf surfaces. A visit to a quarry that extracts or mixes any of the raw material used in rootzones would be beneficial to the candidates. Visits to relevant sports facilities covering a range of different surfaces will greatly enhance classroom activity. If possible a visit to a glass re-cycling plant will enhance the candidate experience. Visiting speakers who have experience of working on facilities using soil amendments or substitute materials will be useful for the candidates.

#### OPPORTUNITIES FOR CORE SKILL DEVELOPMENT

In this Unit candidates will develop skills valued by employers. Candidates will be involved, as part of a group, researching and planning information to be used in the report for Outcome 1. There are good opportunities for developing aspects of Core Skills:

- ◆ *Communication* (SCQF level 4)
- ◆ *Problem Solving* (SCQF level 4)
- ◆ *Working with Others* (SCQF level 4)

#### GUIDANCE ON APPROACHES TO ASSESSMENT FOR THIS UNIT

For Outcome 1 a candidate could produce a report. This assessment should be given at an early stage of the Unit so that time can be planned for individual consultation with candidates. Where evidence is generated orally an assessor checklist and/or recording of the information should be completed. Candidates who do not submit a report to the required standard must be provided with adequate feedback before they attempt a re-assessment.

The multiple choice question paper for Outcome 2 could be set from a suitable programme using ICT. There should be at least two alternative papers for use in re-assessment.



## **National Unit Specification: support notes (cont)**

### **UNIT        Sportsturf Industry: Soils and Rootzones (SCQF level 5)**

#### **Opportunities for the use of e-assessment**

E-assessment may be appropriate for some assessments in this Unit. By e-assessment we mean assessment which is supported by Information and Communication Technology (ICT), such as e-testing or the use of e-portfolios or e-checklists. Centres which wish to use e-assessment must ensure that the national standard is applied to all candidate evidence and that conditions of assessment as specified in the Evidence Requirements are met, regardless of the mode of gathering evidence. Further advice is available in *SQA Guidelines on Online Assessment for Further Education (AA1641, March 2003)*, *SQA Guidelines on e-assessment for Schools (BD2625, June 2005)*.

#### **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](http://www.sqa.org.uk/assessmentarrangements)