

Unit 13: Construct and Establish Sports and Amenity Turf Areas

Unit code:	M/600/9922
QCF Level 3:	BTEC National
Credit value:	10
Guided learning hours:	60

● Aim and purpose

This unit aims to provide learners with an understanding of how to construct and establish sports and amenity turf areas and how these can be applied in practice. This unit is primarily aimed at learners within a centre-based setting looking to progress into the sector or further education and training.

● Unit introduction

Using the correct methods to construct and establish both sports and amenity turf areas is essential in order to produce a healthy grass sward that is fit for purpose.

Although the majority of turf maintenance employees may not be directly involved in the construction and establishment of sports turf, they do need to be familiar with how different techniques are used so they can maintain the area to the correct standard.

The unit will look at the construction and establishment of the wide range of sports and amenity turf areas available. This will include both summer and winter sports turf including football pitches, rugby pitches, cricket squares, bowling greens and golf greens. Amenity areas will include both fine and recreational turf area construction.

The main focus for learners is on developing and improving their understanding of construction and establishment techniques for a wide range of turf surfaces, which will include technical and practical capabilities.

On completion of the unit learners will have a clear understanding of the theory and practice of pre-site inspections and surveying techniques. In addition, they will be able to understand the importance of the grading and drainage of a site including the different types of drainage systems/methods. Following surveying, marking out, grading and installation of drainage systems, comes the construction and preparation of land. This will focus on sports turf construction and learners will develop a clear understanding of this area and be able to establish grass swards from seed and turf. Learners will also develop a clear understanding of the use of ameliorated rootzones and specialised constructions.

Practical operations are a key element in the construction and establishment of turf. In addition to theory and research elements, this unit will include practical opportunities for learners to cover initial surveying, setting out, and all facets of amenity and sports turf construction through to establishment

● Learning outcomes

On completion of this unit a learner should:

- 1 Be able to investigate and survey a site for a new sports or amenity turf area
- 2 Understand the principles of grading and drainage
- 3 Understand the construction and preparation of land for sports turf construction
- 4 Understand the use of artificial or ameliorated rootzones and specialised constructions
- 5 Be able to establish swards from seed and turf.

Unit content

1 Be able to investigate and survey a site for a new sports or amenity turf area

Site investigation: soil types (physical properties, nutrient status, pH); vegetation; existing services eg drainage, gas, electricity, water; gradients; identification and protection of trees and other features; accessibility; planning permission

Surveying: topographic maps; soil variability maps; site maps/plans; electromagnetic scanning technology (EMI); water table; site layout and orientation of sports pitches; feasibility studies

Initial survey: soil profile pits; soil sampling; Cable Avoidance Tool (CAT) scanning; recording information

Comprehensive survey: chain surveying; assessment of levels; transferring of information to plans

2 Understand the principles of grading and drainage

Grading: laser levelling; boning rods, pegs and tape measure; grading method including both mechanical and manual; topsoil cleaning/retention and subsoil removal

Drainage: surface drainage; sub-surface drainage; construction; maintenance; drainage types including land/tile drains; mole drains; French drains; rubble drains and soakaways

Setting out: levelling and surveying; surface and under surface drainage; falls, flow rates and outfalls

3 Understand the construction and preparation of land for sports turf construction

Construction and preparation: chemical, cultural and biological control of weeds; cultivation; stone removal/burying; topsoil spreading; levelling; rolling, soil improvement, lime application, fertiliser treatment; pest control; health and safety considerations; environmental and sustainability factors

Sports turf: football pitches; rugby pitches; cricket squares; bowling greens; golf greens

4 Understand the use of artificial or ameliorated rootzones and specialised constructions

Artificial and ameliorated rootzones: calcined montmorillonite clays; granular pumice; specialised sands; sphagnum peat; peat free composts; fen soil; plastic granules; natural and artificial recycled material; prepared rootzone mixtures; wetting agents

Specialised construction: stone carpets; blinding layers including ash, grit, coarse sand, geotextile membranes; loksand and other materials used for binding soils together for added stability; hydroseeding

5 Be able to establish swards from seed and turf

Equipment: manual; pedestrian; tractor mounted

Selecting seed: certified; species and cultivars; calculating quantities required

Selecting turf: turf quality; sources of turf eg sea-washed, specialised grown; calculating quantities required

Establishment and aftercare: seed sowing (manually and using pedestrian equipment); laying turf; aftercare of sown and turfed areas; health and safety

Assessment and grading criteria

In order to pass this unit, the evidence that the learner presents for assessment needs to demonstrate that they can meet all the learning outcomes for the unit. The assessment criteria for a pass grade describe the level of achievement required to pass this unit.

Assessment and grading criteria		
To achieve a pass grade the evidence must show that the learner is able to:	To achieve a merit grade the evidence must show that, in addition to the pass criteria, the learner is able to:	To achieve a distinction grade the evidence must show that, in addition to the pass and merit criteria, the learner is able to:
P1 carry out a site investigation and report on its suitability for summer and winter uses	M1 undertake a comprehensive site survey including assessment of levels, transferring information to a plan	D1 evaluate the use of different types of surveying techniques and methods
P2 carry out and plot a survey using appropriate equipment [SM]		
P3 describe acceptable surface levels for winter and summer sports		
P4 describe the techniques of major and minor grading and equipment used for grading and earth movement [CT]	M2 undertake the grading of a site using both laser levels and traditional techniques	D2 analyse different types of drainage systems available and their uses
P5 review the suitability and layouts of types of drainage systems appropriate to turf areas		
P6 explain the 12 month and routine aftercare for drainage systems appropriate to turf areas		
P7 review methods of assessing the condition of the soils		
P8 describe methods and purposes of land clearance, primary and secondary cultivations, and equipment that may be used		
P9 explain the establishment of swards from seed and turf for defined turf types and standards	M3 discuss construction and establishment techniques used for a range of sports turf surfaces	D3 compare in detail grass seed and turf establishment

Assessment and grading criteria		
To achieve a pass grade the evidence must show that the learner is able to:	To achieve a merit grade the evidence must show that, in addition to the pass criteria, the learner is able to:	To achieve a distinction grade the evidence must show that, in addition to the pass and merit criteria, the learner is able to:
P10 describe specialised constructions for specific uses		
P11 evaluate the use and composition of artificial or ameliorated rootzones in specific sports [IE]		D4 evaluate the environmental impact of artificial and ameliorated rootzones and specialised construction techniques.
P12 select an appropriate seed mix and application rate for a specified use	M4 discuss the reasons for using specialised construction techniques.	
P13 prepare land safely for sowing grass seed or laying turf		
P14 establish grassed areas safely from seed and turf		
P15 assess the quality of delivered turf for a specific use.		

PLTS: This summary references where applicable in the pass criteria, in the square brackets, the elements of the personal, learning and thinking skills. It identifies opportunities for learners to demonstrate effective application of the referenced elements of the skills.

Key	IE – independent enquirers CT – creative thinkers	RL – reflective learners TW – team workers	SM – self-managers EP – effective participators
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Essential guidance for tutors

Delivery

Delivery of this unit will involve practical assessments, written assessment, visits to suitable collections and will link to work experience placements.

The use of as wide a range of techniques as possible is essential including lectures, seminars, site visits, sward construction practicals and internet/library-based research. Delivery should stimulate, motivate, educate and enthuse learners and utilise the framework of personal, learning and thinking skills.

Tutors must stress the importance of safe working practices, legal obligations and effective management in order to ensure turf maintenance operations have a minimal impact on the environment. It is essential that full risk assessments are undertaken before any practical activity.

Tutors should consider integrating the delivery, independent study and assessment for this unit with other relevant units and assessment instruments learners are taking as part of their programme of study.

Learning outcomes 1 and 2 are likely to be delivered using a variety of practical sessions including site assessment, surveying, setting out and grading. These should be backed up by a series of lectures and discussions in order to deliver the underpinning knowledge needed to undertake the practical elements. Environmental impact and health and safety will play an important part in these activities. Although all practical activities can focus on one area, and be linked, it will also be necessary to organise sufficient visits to other areas in order to compare different soil types, drainage and gradients. This will allow learners to evaluate what is required in terms of surveying and setting out for different sites and how this can affect construction and establishment. Lectures and talks by representatives from sportsfield construction companies and landscape architects will be helpful in enabling learners to understand the standards set by industry. This in turn will encourage, interest and motivate learners and encourage further research.

Access to IT facilities and drawing boards and equipment is essential. The use of textbooks, digital cameras and other mobile devices for gathering information should be encouraged.

Learning outcome 3 is likely to be delivered using a combination of lectures, learner research and site visits. Visits to the following sports surfaces will be required and, where possible, these should be newly renovated or constructed surfaces or those of an exceptional high quality. Surfaces should include both winter and summer pitches (for example football and rugby pitches, cricket squares, bowling greens and golf greens). Talks and lectures should be arranged and these could include head greenkeepers. These visits and talks could be linked to learning outcomes 1 and 2.

Learning outcome 4 will involve learners researching artificial and ameliorated rootzones: what they are, what is available, their effectiveness and their environmental impact. COSHH regulations should be incorporated into any research. Learners will also investigate the use of specialised constructions as part of this research. Rootzone materials and specialised construction materials should be available to learners for this purpose. Representatives from the suppliers of these materials could give talks to learners. Information leaflets from these companies regarding their products should be obtained to aid learner research. Access to IT facilities is essential for learning outcome 4. In addition to this, visits to facilities using rootzone materials and specialised constructions should be organised and this can be linked to the visits for learning outcomes 1, 2 and 3.

Learning outcome 5 gives learners the opportunity to carry out practical construction/preparation work, seeding and turfing. This could be linked to learning outcomes 1 and 2 and the area which was used for surveying and setting out could be used. A full risk assessment should be undertaken before learners start their activities, health and safety legislation adhered to and the correct PPE worn by all learners. All practical activities should be undertaken in ways which minimise the impact on the environment.

Outline learning plan

The outline learning plan has been included in this unit as guidance and can be used in conjunction with the programme of suggested assignments.

The outline learning plan gives **an indication of the volume of learning it would take the average learner** to achieve the learning outcomes. It is **indicative and is one way of achieving the credit value**.

Learning time should address all learning (including assessment) relevant to the learning outcomes, regardless of where, when and how the learning has taken place.

Topic and suggested assignments/activities and/assessment
Introduce and overview of the unit.
Assignment 1: Assessment and Surveying Techniques (P1, P2, M1, D1)
Tutor introduces the assignment brief.
Theory sessions; gathering information and surveying techniques.
Practical activity: surveying.
Transfer of information/drawing plans.
Visiting speakers.
Site visits to sports turf facilities.
Assignment 2: Setting Out and Preparing for Grading and Drainage (P3, P4, P5, P6, P7, P8, P9, M2, M3, D2, D3)
Tutor introduces the assignment brief.
Theory sessions: setting out.
Theory sessions: drainage and grading.
Practical activity: setting out for drainage and grading.
Practical activity: grading.
Practical activity – drainage.
Visiting speakers.
Site visits to sports turf facilities.
Assignment 3: Sports Turf Construction (P12, P13, P14, P15, M4)
Tutor introduces the assignment brief.
Theory sessions: construction techniques.
Theory sessions: seeding and turfing.
Practical activity: construction techniques.
Practical activity: seeding and turfing.
Visiting speakers.
Site visits to sports turf facilities.
Assignment 4: Rootzones and Specialised Constructions (P10, P11, D4)
Tutor introduces the assignment brief.
Theory sessions: introduction to research.
Visiting speakers.
Site visits to sports turf facilities.
Learner research.
Learner presentations.
Unit review.

Assessment

For P1, learners are required to undertake a site assessment. To ensure that assessment is fair, the size and complexity of the task should be the same for all learners. For P2, learners are required to plot a survey and this could be linked to M1 where learners are required to undertake a survey and record the information using a plan. Evidence for P1 and P2 could be recorded by the tutor during practical sessions together with a completed report on suitability. If this format is used then suitable evidence from guided learning activities would be observation records completed by learners and the tutor.

P3 and P4 deal with the achievement of acceptable grades and surface levels. P5 and P6 deal with the layout and maintenance of drainage systems. Evidence for all four of these criteria could be generated through questioning and observation sheets when learners are undertaking the practical activities in P2.

For P7, P8 and P9, learners need to provide information on the construction and preparation of sites for sports turf. Learners must provide information in the context of at least three different sports turf surfaces. Evidence could be in the form of a report linked to P1 and P2.

For P10 and P11, learners need a thorough understanding of artificial or ameliorated rootzones and specialised constructions. Evidence may be presentations or learner-designed descriptive leaflets or posters.

For P12, P13, P14 and P15, learners need a thorough knowledge of, and skills in, construction, seeding and turfing techniques. P7 must include pH, pests and diseases, weeds, nutrient status, pollutants and microclimate. These skills could be assessed during practical activities using observation and questioning sheets. Tutors should ensure that the complexity of the task is the same for all learners.

M1 is an extension of P1 as learners develop a comprehensive and detailed survey and transfer the information to a plan. The finished plan could form part of the assessment for P1 and M1.

For M2, learners will need to demonstrate they are able to level and grade a site using both laser levels and more traditional methods such as pegs, boning rods and tape measures. This could be assessed as a practical.

For M3, learners are required to discuss different types of construction and establishment techniques for a minimum of three different sports turf surfaces. Learners must make a comparison of different techniques and refer to related health and safety and environmental issues in their discussion. The surface to be considered may be specified by the tutor or agreed through negotiation with learners. Evidence could be presented as a written report or presentation.

For M4, learners are required to discuss the reasons for using specialised construction techniques. Evidence could be presented in a written report or presentation.

For D1, learners are required to evaluate the different types of surveying techniques and methods which are used. Evidence could be presented within a report linked to P1 and M1 or through tutor/learner discussion recorded on an observation sheet.

For D2, learners need to provide an in depth analysis of the different types of drainage systems available and a clear and informed focus on their uses. Assessment could be carried out as part of a report linking to D1.

For D3, learners are required to compare the different types of grass seed and turf establishment techniques available and must refer to the advantages and disadvantages of both. Assessment could be carried out as part of a report linking to D1 or could be made during turfing and seeding practicals using questioning and observation sheets.

For D4, learners will need to evaluate the environmental impact of artificial and ameliorated rootzones and specialised construction techniques. Evidence could be presented in a written report or presentation.

Programme of suggested assignments

The following table shows a programme of suggested assignments that cover the pass, merit and distinction criteria in the grading grid. This is for guidance and it is recommended that centres either write their own assignments or adapt any Edexcel assignments to meet local needs and resources.

Criteria covered	Assignment title	Scenario	Assessment method
P1, P2, M1, D1	Assessment and Surveying Techniques	During practical sessions you are required to assess and survey an area which could be used for the construction and establishment of sports turf. Once the area has been surveyed you need to draw up the information gathered into a plan.	Report.
P3, P4, P5, P6, P7, P8, P9, M2, M3, D2, D3	Setting Out and Preparing for Grading and Drainage	Using the plan that you have produced, you are now required to set out levels for grading the site, and also plot the drainage using information supplied by your tutor.	Practical evidence.
P12, P13, P14, P15, M4	Sports Turf Construction	You are required to carry out a range of construction and establishment techniques as directed by your tutor. This will also include seeding and turfing an area.	Practical evidence. Report.
P10, P11, D4	Rootzones and Specialised Constructions	You are required to undertake a research project on the use, availability and environmental impact of a range of artificial and ameliorated rootzones and specialised construction materials.	Presentation.

Links to National Occupational Standards, other BTEC units, other BTEC qualifications and other relevant units and qualifications

This unit forms part of the BTEC Land-based sector suite. This unit has particular links with:

Level 2	Level 3
Understand the Principles of Sports and Amenity Turf Maintenance	L19 Create grassed and planted areas L23 Prepare sites for landscape construction and installation
	Maintain Turf in Parks and Gardens
	Manage Winter and Summer Sports Turf Surfaces
	Manage Amenity Turf

Essential resources

Learners will need access to appropriate sites to carry out practical work and assessment. Learners will also require appropriate tools, equipment and consumables to undertake surveying, construction, seeding and turfing tasks. Tools will include both hand-held, pedestrian operated and powered equipment. Learners will require access to IT and library facilities.

Employer engagement and vocational contexts

In order to deliver this unit it is essential that centres have close links with sports turf providers, sportsfield contractors and landscape architects, in order that visits can be arranged and guest lecturers, promotional material and samples can be utilised.

Links with professional organisations such as the Institute of Groundsmanship and the Sports Turf Research Institute will allow learners to access information on current research and development and possibly provide guest speakers. All learners should be encouraged to join these organisations as student members.

Indicative reading for learners

Textbooks

Arthur J – *Practical Greenkeeping* (Kyodo Printing Co, 1997) ISBN 978-0907583042

Beard J – *Turf Management for Golf Courses. Second Edition* (An Arbor Press, 2001) ISBN 978-1575040929

Brown S – *Sports Turf and Amenity Grassland Management* (Crowood Press, 2005) ISBN 978-1861267900

Perris J and Evans R – *The Care of the Golf Course, 2nd Edition* (Sports Turf Research Institute 1996)
ISBN 1873431198

Journals

The Greenkeeper

The Groundsman

Horticulture Week

Turf Professional

Websites

www.bigga.org.uk

The British and International Golf Greenkeepers Association

www.hse.gov.uk

Health and Safety Executive

www.iog.org

The Institute of Groundsmanship

www.pitchcare.com

Pitchcare

www.stri.co.uk

The Sports Turf Research Institute

www.the-gtc.co.uk

The Greenkeepers Training Committee

Delivery of personal, learning and thinking skills (PLTS)

The following table identifies the PLTS opportunities that have been included within the assessment criteria of this unit:

Skill	When learners are ...
Independent enquirers	identifying and reviewing the composition of rootzone mixes evaluating grass seed and turf establishment and the advantages and disadvantages of each
Creative thinkers	identifying levels and gradients and setting out and plotting undertaking an assessment and survey of a site
Self-managers	organising themselves to undertake surveying, plotting and construction practicals.

Although PLTS opportunities are identified within this unit as an inherent part of the assessment criteria, there are further opportunities to develop a range of PLTS through various approaches to teaching and learning.

Skill	When learners are ...
Independent enquirers	researching information regarding rootzones and specialist constructions investigating site levels
Creative thinkers	applying techniques and methodology in order to survey and plot out a site
Reflective learners	analysing the information gathered from the survey in order to plot a site
Team workers	working together during practical activities
Effective participators	participating in practical activities and applying the techniques and skills learned in previous sessions.

● Functional Skills — Level 2

Skill	When learners are ...
ICT – Use ICT systems	
Select, interact with and use ICT systems independently for a complex task to meet a variety of needs	using the internet to research information regarding the variety of tasks and assignments set preparing PowerPoint presentations
Use ICT to effectively plan work and evaluate the effectiveness of the ICT system they have used	
Manage information storage to enable efficient retrieval	
Follow and understand the need for safety and security practices	
Troubleshoot	
ICT – Find and select information	
Select and use a variety of sources of information independently for a complex task	
Access, search for, select and use ICT-based information and evaluate its fitness for purpose	
ICT – Develop, present and communicate information	
Enter, develop and format information independently to suit its meaning and purpose including: <ul style="list-style-type: none"> • text and tables • images • numbers • records 	
Bring together information to suit content and purpose	
Present information in ways that are fit for purpose and audience	
Evaluate the selection and use of ICT tools and facilities used to present information	
Select and use ICT to communicate and exchange information safely, responsibly and effectively including storage of messages and contact lists	

Skill	When learners are ...
Mathematics	
Understand routine and non-routine problems in a wide range of familiar and unfamiliar contexts and situations	using a variety of mathematical equations and methods when surveying, setting out and plotting gradients
Identify the situation or problem and the mathematical methods needed to tackle it	
Select and apply a range of skills to find solutions	
Use appropriate checking procedures and evaluate their effectiveness at each stage	
Interpret and communicate solutions to practical problems in familiar and unfamiliar routine contexts and situations	
Draw conclusions and provide mathematical justifications	
English	
Speaking and listening – make a range of contributions to discussions and make effective presentations in a wide range of contexts	contributing to group discussions presenting information to their peer group writing reports and evaluations.
Reading – compare, select, read and understand texts and use them to gather information, ideas, arguments and opinions	
Writing – write documents, including extended writing pieces, communicating information, ideas and opinions, effectively and persuasively	