Unit 23: Understanding Landscape Rock and Water Features

Unit code: K/601/2110

QCF Level 3: BTEC National

Credit value: 10

Guided learning hours: 60

Aim and purpose

This unit aims to introduce learners to rock and water features and how the associated skills and knowledge and how these can be applied in practice. It is designed for learners in centre-based settings looking to progress into the sector or onto further/higher education. The learner will consider both manmade and natural rock and water features and look at the environmental impact of these. They will explore the properties of materials and develop their understanding of how technical data and dimensions are used in the construction of features.

Unit introduction

The rock and water features within our landscapes has maintained it popularity over the years, this has been partly driven by gardening TV programmes and the development of new products. This has led to a continued demand from both the public and private sectors for professionals with the skills and knowledge to design, construct and maintain such features.

This unit focuses on developing those skills required for the design, planning and construction of rock and water features. The unit will also cover knowledge concerning material selection and after care, including plants commonly used with this landscape situation.

On completion of this unit learners will be able to develop and apply practical competence in the planning and construction of formal and informal rock and water features relevant to the built landscape environment. Emphasis is placed on the practical skills including all aspects of safe and efficient site management in preparation for employment.

Learning outcomes

On completion of this unit a learner should:

1 Understand commonly used formal and informal rock and water features

2 Understand commonly used materials available for the construction of rock and water features

3 Be able to plan, construct and plant rock and water features

4 Understand the plants commonly used in rock and water features.

Unit content

1 Understand commonly used formal and informal rock and water features

Built features: purpose; siting; health and safety aspects; formal and informal design criteria; rock gardens; sinks and troughs; dry stone walls; rock sculptures and features; raised and sunken ponds; canals; cascades; fountains; spouts; wildlife ponds; bog gardens; bridges; jetties; legal considerations when altering the flow of natural watercourses

Rock and water in the natural environment: rock outcrops; screes; moraines; alpine meadows; rock pools; streams; ponds; lakes; waterfalls; adaptation for the built environment; environmental awareness (alpine, wetland, aquatic ecosystems)

2 Understand commonly used materials available for the construction of rock and water features

Materials: rock (sedimentary, metamorphic, igneous, sandstone, limestone, slate, granite, artificial); regions of origin; aggregates; gravels; chippings; water; technical data; standard dimensions; environmental impact of removing and using natural materials

Pond construction: clay; concrete; butyl and PVC liners; fibreglass and plastic shells; timber; pipe materials and fittings; waterproofing agents; environmental impact of rock and aggregate extraction; personal protective equipment (PPE); health and safety; relevant current legislation

3 Be able to plan, construct and plant rock and water features

Planting techniques: directly into soil beds; aquatic containers; surface floaters

Rock: construction techniques across the range of built features; safe handling; placing of rocks

Water: construction techniques using all materials across the range of natural and built features; methods of disguising pond edges; selection of pumps; plumbing and electrics; health and safety

Maintenance: annual requirements across the range of rock and water features; PPE; risk assessment; health and safety

4 Understand the plants commonly used in rock and water features

Plants: true alpines and garden alpines; botanical adaptations; suitability for rock gardens, troughs, sinks, raised beds, dry stone walls

Aquatics: marginals; oxygenators; floaters; deep-water plants, botanical adaptations; suitability for ponds and bog gardens; purposes of planting in water; 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 explain commonly used formal and informal rock and water features	**M1** make design recommendations for the construction of a rock and water feature for a specific situation	**D1** evaluate the suitability of a rock and water feature including its design and environmental impact within the landscape
P2 outline the site requirements of commonly used formal and informal rock and water features [RL]		
P3 explain properties of selected materials available for the construction of rock and water features [IE]	**M2** justify the selection of landscape materials for the construction of rock and water features	
P4 outline reasons for selected materials used for the construction of rock and water features		
P5 plan rock and water features		**D2** produce a detailed maintenance plan for both hard and soft elements within a rock and water feature.
P6 safely carry out construction of selected rock and water features to meet given objectives [CT, TW, SM, EP]		
P7 safely carry out planting of selected rock and water features to meet given objectives		
P8 identify plants suitable for selected rock gardens and water features	**M3** produce a planting plan for a rock and water feature.	
P9 justify the choice of suitable plants.		

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	RL – reflective learners	SM – self-managers
	CT – creative thinkers	TW – team workers	EP – effective participators

Essential guidance for tutors

Delivery

Delivery of this unit will involve practical assessments, written assessment, visits to suitable collections and will have links to industrial experience placements.

Tutors are encouraged to use a wide range of techniques in delivering this unit. Lectures, practicals, discussions, site visits and supervised landscape practicals should all be used to motivate and educate learners. If team activities are undertaken tutors must ensure that each learner produces sufficient assessment evidence to meet the assessment and grading criteria on an individual basis.

Learners must have the opportunity to undertake the planning and construction techniques, individually or as part of a small construction team. At all times it is essential that tutors stress the importance of sound construction and horticultural techniques, environment management and the need to manage the tasks with consideration towards safety.

Health and safety issues relating to excavation and moving heavy objects must be stressed and regularly reinforced, and risk assessments must be undertaken prior to practical activities. Adequate PPE must be provided and used following the production of suitable risk assessments.

Tutors should consider integrating the delivery, private study and assessment for this unit with other relevant units that learners may be taking as part of their programme of study.

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
Assignment 1: Materials File (P1, P2, P3, P4) Tutor introduces the assignment.
Theory session: Introduction to the range of rock and water features including pumps and fountains and cascades etc.
Practical activities and assessment – involving the marking out, excavation and construction of a rock and water feature, including the installation of liners, pumps and planting as required by the design specifications.
Theory session: Introduction to the characteristics of Alpine plants, including their planting and maintenance requirements.
Theory session: Introduction to the characteristics of aquatic plants, including their planting and maintenance requirements.
Practical & studio work: Designing rock and water features, presentation of design concepts and ideas.
Theory session: sustainability and environmental impact of Rock and Water features.
Assignment 2: Design Proposal (P5, P8, P9, M1 M2, M3) Tutor introduces the assignment.

Topic and suggested assignments/activities and/assessment
Assignment 3: Evaluation and Maintenance Plan (D1, D2) Tutor introduces the assignment.
Assignment 4: Construction of Rock and Water Features (P6, P7) Tutor introduces the assignment.
Unit review.

Assessment

For P1, learners must explain commonly used formal and informal rock and water features. It is expected that, as a minimum, learners will provide evidence for at least three commonly used formal rock and water features and three informal ones. Evidence for this could take the form of a pictorial presentation with notes an annotated poster or leaflet or a project.

For P2, they must outline the site requirements for formal and informal rock and water features

For P3, learners must explain properties of selected materials available for the construction of rock and water features. It is expected that, as a minimum, learners will provide evidence for at least six commonly used materials. Tutors should identify the materials or agree them through discussion with learners.. Evidence for this could be presented in the form of a portfolio of materials gathered by learners and accompanied by notes on the properties of each.

P4 requires learners to outline reasons for selected materials used within the construction of built rock and water features. Tutors should identify the materials or agree them through discussion with the learners. Where possible, to ensure fairness of assessment the size and complexity of the tasks should be the same for each learner. Evidence could be in the same form as for P3.

For P5, learners must plan for selected rock and water features. It is expected that, as a minimum, learners will provide evidence for at least two rock features and two water features. Tutors should identify the features and the objectives or agree them through discussion with learners. This may be the same as those used to provide evidence for other grading criteria. Evidence could be in the same form as for P6 and P7.

For P6, learners must safely carry out the construction of selected rock and water features to meet given objectives. Tutors should identify the features and the objectives or agree them through discussion with learners. It is expected that, as a minimum, learners will provide evidence for at least two rock and two water features which may be incorporated with other criteria. This criterion could be assessed directly by the tutor during practical activities. If this format is used then suitable evidence from guided activities would be observation records completed by the tutor and accompanied by appropriate work logs or other relevant learner notes. If assessed during a placement, witness statements should be provided by a suitable representative and verified by the tutor.

For P7, learners must carry out the planting of selected rock and water features to meet given objectives. Tutors should identify the features and the objectives or agree them through discussion with learners. Where possible, to ensure fairness of assessment the size and complexity of the tasks should be the same for all learners. It is expected that, as a minimum, learners will provide evidence for at least two rock features and two water features. This criterion could be assessed directly by the tutor during practical activities. If this format is used then suitable evidence from guided activities would be observation records completed by the tutor and accompanied by appropriate work logs or other relevant learner notes.

For P8, learners are required to identify plants suitable for selected rock gardens and water features and justify their choice. It is expected that, as a minimum, learners will provide evidence for at least two rock gardens and two water features. This could take the form of a number of plant profiles developed by learners or

assessed during practical activities using the method described in P3.

For P9, learners are required to justify plants chosen for selected rock gardens and water features. It is expected that, as a minimum, learners will provide evidence for at least two rock gardens and two water features. This could take the form of a number of plant profiles developed by the learners or assessed during practical activities using a portfolio of evidence.

For M1, learners are required to make design recommendations for the construction of a rock and water feature for a specific situation. Tutors should identify a suitable location and establish a design brief or agree them through discussion with the learners.

For M2, learners are required to justify the selection of landscape materials for the construction of rock and water features. It is expected that, as a minimum, learners will provide evidence for at least two rock features and two water features.

M3 requires learners to produce a planting plan for a rock and water feature. The plant selections should take into account the role of plants in maintaining water quality in water features and the aesthetic requirements of rock features taking into account the botanical adaptations of plants that live in alpine and aquatic environments. Evidence for this could be presented as part of an overall design and planning exercise incorporating additional criteria in the form of a pictorial presentation with notes (possibly using appropriate software or overhead projector), an annotated poster or leaflet or a design project.

D1 requires learners to evaluate the suitability of a rock and water feature including the design and environmental impact within the landscape. Learners should carry out an evaluation of at least one rock feature and one water feature discussing the environmental impact of using natural materials in the creation of these features. Learners could use as examples materials that they have used in providing evidence for other assessment and grading criteria.

For D2, learners must produce a detailed maintenance plan for selected rock and water features to meet given objectives. Evidence could be in the form of a report or article for a gardening magazine.

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, P3, P4	Materials File	Research and produce a detailed portfolio on the materials commonly used within the construction of Rock and water features.	Portfolio, posters or presentations.
P5, P8, P9, M1 M2, M3	Design Proposal	Design a rock and water feature for a give location and brief. The design must provide justification for material and plant selection including the environmental impact to the landscape.	Drawings, story board, planting plan, presentation. Observation record/witness statement.
D1, D2	Evaluation and Maintenance Plan	Produce a detailed evaluation and yearly maintenance plan for a rock and water feature.	Report/article.
P6, P7	Construction of Rock and Water Features	Carry out the construction and planting of a rock and water feature.	Practical assessment. Observation records.

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
Undertake Work Related Experience in the Land-based Industries	Undertake and Review Work Related Experience in the Land-based Industries

Essential resources

Learners will need access to appropriate facilities and landscape materials to undertake practical activities. These facilities may include drawing studios landscape plots or actual landscape projects. Site safety signage and equipment, PPE must be used throughout the practicals

Employer engagement and vocational contexts

This unit focuses on the practical aspects of rock and water features, including construction and maintenance within a landscape setting. It will also provide learners with the background knowledge covering a variety of design, construction and horticultural skills, techniques, health and safety and legislation requirements. Centres are encouraged to create and develop links with local landscape and building contractors, architects and local authorities, via guest lectures, workshops or visits to see landscape design and construction in action.

Indicative reading for learners

Textbooks

Elliot J – *Alpines in Sinks and Troughs* (AGS Publications, 1974) ISBN 0900048557

Robinson P – *Rock and Water Gardening* (Lorenz Books, 2001) ISBN 0754806863

Swindells P and Mason D – *The Complete Book of the Water Garden* (Cassell Illustrated, 2002) ISBN 1841881716

Journal

The Garden Design journal (Landscape Design Trust)

Websites

www.blueplanetbiomes.org/alpine.htm	Alpine
www.defra.gov.uk	Department for Environment, Food and Rural Affairs
www.hsegov.uk	Health and Safety Executive
www.lantra.co.uk	Lantra Sector Skills Council
www.nsiuk.org	Natural Stone Institute
www.rhs.org.uk	Royal Horticultural Society
www.watergarden.com	The Water Garden

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	researching landscape materials commonly used in the construction of rock and water features
Creative thinkers	applying techniques and knowledge whilst problem solving, addressing design issues and material selection and forward planning for maintenance requirements
Reflective learners	reflecting on the design and environmental needs
Team workers	undertaking team practical activities in the construction of rock and water features
Self-managers	showing initiative and imagination within the solutions of a design scenario
Effective participators	participating safely in practical team activities and applying the techniques and skills learned from previous activities.

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 health and safety regulations investigating the roles and function of aquatic plants within a water feature
Creative thinkers	applying techniques and design principles whilst participating in design activities
Reflective learners	analysing their own performance whilst participating in a team or individual practical activities, identifying strengths and areas for improvement
Team workers	supporting others within the team and being an active team player
Self-managers	working to deadlines independently and within a team
Effective participators	participating in practical activities and applying the techniques, skills and knowledge 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	researching the internet for information on hard and soft landscape materials looking at a range of rock and water design solutions by accredited designers
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	
Mathematics	
Understand routine and non-routine problems in a wide range of familiar and unfamiliar contexts and situations	calculating quantities of materials for the construction of rock and water features. using mathematical formula to calculate loadings on pumps and water features, flow rated, pressure etc
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	participating in group interaction and discussion presenting design ideas and solutions to meet specific briefs
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	