Unit 28: Routine Plant Management

Delivery guidance

Approaching the unit

'Unit 28: Routine Plant Management' covers the underpinning principles of and practical applications to cultivation, growth and maintenance to support the healthy growth of plants.

This unit covers the underpinning knowledge and practical activities involved in the routine management of plants. Learners wishing to follow a career in working with plants on private estates, domestic gardens and on municipal and/or public landscapes will be able to use the knowledge and skills gained from this unit to work for a range of organisations such as the International National Trusts Organisation, botanic gardens and designed landscapes. As a result, it is important that they are able to access a range of plant species, styles and facilities in order to carry these out.

Work experience in a relevant setting will be invaluable to learners. Local employers and placement providers should be encouraged to take an active part in assessing learners' capabilities. Witness statements should also be used in order to provide evidence of learners sufficiently meeting the assessment criteria. Local authorities and estate managers could be asked to take groups of learners on tours of their landscaped areas, showing learners the reality of different approaches to dealing with a range of plant species in different contexts, e.g. access to formal successional bedding or prairie landscapes.

The unit may be best served by initially delivering set theory-based sessions, followed by a range of practical tasks to cover individual plant management. Learners will need access to the appropriate environment and facilities and equipment required to carry out a range of propagation activities (as well as resources related to research, e.g. the use of the internet and library facilities):

- structures (e.g. greenhouses and/or polythene tunnels)
- specialised equipment and materials (e.g. irrigation systems, fertiliser distributors)
- manual/mechanical tools (e.g. secateurs, digging forks and rotovators)
- plant collections (e.g. edible and ornamentals).

The delivery of the unit will involve practical assessments, written assessments, visits to suitable plant collections and employer premises.

The use of virtual learning environments (VLE) for learners to share their knowledge of maintaining various plant species and styles is an excellent way of drawing upon resources that learners can bring to their learning experience. This could include links to relevant professional websites and/or employers; stored handouts to cover class-based activities; videos of key techniques or an overview of environmental factors; and/or physical structures.

Delivering the learning aims

Learning aim A

Learning aim A is concerned with learners being able to identify a range of different plants to introduce the planting and growing requirements that support healthy growth. This is an ideal opportunity to engage learners by incorporating their own experience of working with key plant types, which will provide them with a basis for exploring the differences and similarities of familiar and unfamiliar plant groups. Learners are likely to find the identification of plant health-related indicators challenging, and so this should be introduced once tutors are certain that the basics of providing diagnostic tests have been fully grasped. Utilise learners who have a good understanding of this process to mentor those who are finding it more difficult. Often this is an effective way to engage the class and promote a deeper understanding of the requirements and identification skills involved.

It is likely that learners will be working with and around a range of plant types throughout the duration of the unit delivery. Ensure that you make use of this, reinforcing the knowledge and planning aspects of the unit – along with the opportunities for gathering evidence for learner skills development – with what they are carrying out on a daily basis.

Learning aim B

Learning aim B focuses on the cultivation methods and planting systems that affect husbandry and growth. It is important that for this learning aim, planting styles are introduced according to the unit content, and learners will need to explore the effectiveness of these planting systems. To enable the completion of this aim, it would be worth exploring the use of edibles and successional bedding, as well as other ornamentals to investigate cultivation and effective systems. Where centres have difficulties accessing areas to cultivate, it would be worth contacting local employers (e.g. Local Authority Parks' Departments), charitable organisations (e.g. Royal Horticultural Society Gardens, a UK organisation) or volunteer groups and local communities.

Learning aim C

Learning aim C is the most practical unit, as it involves learners demonstrating how to carry out routine husbandry tasks to maintain the health and growth of plants, such as feeding and watering requirements, temperature, ventilation and plant protection. This may influence the order in which you deliver the learning aims, as learning aim C introduces the health and safety requirements for working with plants. Therefore, it might be more appropriate for learners if this is delivered at the beginning of the unit, to ensure that they maintain their personal safety (or at least starting with learning aim B before they carry out the cultivation methods). It is strongly recommended that learners keep and maintain a reflective log of all of their unit activities and make recommendations for improvements.

Assessment model (in internally assessed units)

Learning aim	Key content areas	Recommended assessment approach
A Understand planting and growing requirements to support the healthy growth of plants	**A1** Establishing plants **A2** Requirements for growth	A presentation/report on the establishment techniques and growth requirements for plants
B Apply cultivation methods for plant husbandry and growth	**B1** Cultivation methods **B2** Planting systems	An evaluative report on the effectiveness of husbandry techniques used in the care of plants supported by evidence of practical plant husbandry activities, including evidence such as diary entries, photographs and witness statements
C Carry out routine husbandry tasks to maintain the health and growth of plants	**C1** Working safely **C2** Feeding and watering requirements **C3** Temperature and ventilation and plant protection	

Assessment guidance

For learning aim A, learners will need to produce a written report explaining the basic requirements to support the healthy growth of plants and the factors that may affect the success of establishment and growth of plants. Tutors should identify the plant type through an initial discussion with learners. Evidence needs to be report based; however, it could take the form of a pictorial presentation with notes or a slide presentation. More able learners will be able to further extend their reports by further analysing the requirements for the establishment and growth of plants. Learners will need to demonstrate the impact on successful plant husbandry.

For learning aim B, the focus is on cultivation techniques and planting systems. As a result, learners should be given the opportunities to work on a variety of borders and planting styles, so that a wide range of techniques and methods can be demonstrated and practised. It is critical that centres have a wide range of plant material available so that learners can undertake the various cultivation techniques. Learners should be involved in planning and designing borders.
Therefore, access to measuring and drawing equipment is required. Learners will need to produce an evaluative report explaining the range of planting systems used to promote good plant husbandry. In addition to this, learners will need to prepare for plant growth by selecting and using the most appropriate cultivation techniques. More able learners will further evaluate the systems used in cultivating a range of plants. Evidence needs to be report based; however, it could take the form of a pictorial presentation with notes or a slide presentation. In addition to this, learners will need to include witness statements and/or observation records of their cultivation techniques.

For learning aim C, learners will need to develop their knowledge and ability to manage the establishment and maintenance of plant species. The range of plants is broad, and it is anticipated that the centre's own plant collections will be supplemented by guided visits to specialist gardens or plant collections to broaden learners' experience of plants and management techniques. Learners will need to collate evidence that demonstrates sound and practical plant husbandry activities. Evidence could include diary entries, videos and/or photographs, and the use of witness statements and/or observation records.

Getting started

This provides you with a starting place for one way of delivering the unit, based around the recommended assessment approach in the specification.

Unit 28: Routine Plant Management

Introduction

Tutors can begin the delivery of this unit by defining what is meant by 'routine plant management' and the range of plants learners will be working with. This will vary depending on the centre facilities and their links to local employers. Tutors should also summarise the current national situation with regard to potential employment opportunities. This unit will help to prepare learners for a career in landscape management, such as a sole trader, part of a contract maintenance team or as part of team for organisations such as the International National Trusts Organisation.

Tutors should aim to use as wide a range of delivery techniques as possible. Lectures, discussions, seminar presentations, practical demonstrations, research using the internet and/or library resources and the use of personal and/or industrial experience, e.g. with major gardens open to the public and botanical institutions, would all be suitable. In all cases, delivery should stimulate, motivate and educate the learner.

If using employer resources for work experience or a visit, tutors should make supervisors aware of the requirements of the unit before any work-related activities are undertaken, so that naturally occurring evidence can be collected at this time. For example, learners may have the opportunity to carry out plant husbandry techniques, such as preparing the ground, monitoring plant health and application of fertilisers, and they should ask for observation records and/or witness statements to be provided as evidence for this.

Visiting expert speakers from the industry could add to the relevance of the subject for learners. For example, garden society representatives or contract landscapers or horticulturists could talk about their work, the plants they grow and the propagation and production methods they use.

Health and safety issues relating to working with plant maintenance materials and equipment must be emphasised and reinforced regularly. Risk assessments must be undertaken before practical activities. Adequate PPE must be provided and used following the production of suitable risk assessments.

There will be great benefit in employer engagement, such as guest speakers, technical workshops, contribution to unit assignments, assessment of practical skills, observation and support and/or mentoring. Former BTEC learners, who have successfully completed the course, could also be asked to share their experiences or act in a mentoring capacity.

Learning aim A – Understand planting and growing requirements to support the healthy growth of plants

To introduce the unit, facilitate a class discussion considering which factors are important in establishing various plant species and establishing the levels of experience that learners already have.

- For learning aim A1, learners can form into pairs to discuss the key factors to consider when selecting and establishing plant species. This could include building target plant populations for specific scenarios, such as for formal bedding displays, herbaceous borders or appropriate turf for a utility lawn.
- Learners can carry out independent research into the requirements of specific plant types, covering the following criteria:
  - variety and choice
  - genus and species
  - cultivars
  - resistance to weather
  - disease and drought
  - yield
  - end use
  - suppliers' recommended varieties.
- Tutor can deliver a presentation to learners on growing conditions and soil-based and/or soil-less growing media. Learners will need to have access to various growing media in order to explore comparisons. In addition, it would be useful for learners to visit an appropriate local employer to observe systems such as the use of hydroponics.
- Tutor can deliver a presentation to learners on growing conditions and soil-based and/or soil-less growing media. Learners will need to have access to various growing media in order to explore comparisons. In addition, it would be useful for learners to visit an appropriate local employer to observe systems such as the use of hydroponics.
- Learners can take part in knowledge quizzes on plant types, species and establishment to consolidate their learning.
- For learning aim A2, tutor to give a presentation and incorporate a Q&A session to explain how and why different growth stages require a range of requirements for growth (e.g. germination, emergence and elongation).
- Learners could look at case studies outlining growth requirements for plant species, in order to plan how the needs of the plant are met for specific stages of growth. This should be further explored with learners by relating this to the environmental conditions required (e.g. temperature, space and lighting levels).
- Learners to form into small groups to assess the support mechanisms currently available for growing plants, such as trellises, canes and stakes. Learners would benefit from practical demonstrations on how support mechanisms are used for specific plant types. Learners could participate in carrying out such support mechanisms for specific plants, or have access at the centre (or even at an employer's premises) to real-life scenarios. Alternatively, a tutor-led demonstration of good practice when using support mechanisms could be by using video clips.
- Learners should be given a clear brief of the assessment requirements and use independent study time to practise their report production skills. Submitting their draft online will allow you to feed back to learners and give guidance prior to the completion of the summative assignment.

Learning aim B – Apply cultivation methods for plant husbandry and growth
● For learning aim B1, tutor could deliver a presentation and incorporate a Q&A session to explain cultivation methods, their benefits and optimum timings. To include primary, secondary, deep cultivation, double digging, rototilling, non- inversion and consolidation, and the optimum timing of each cultivation method throughout the year. ● Tutor to show learners a range of tools and equipment used in cultivation tasks (e.g. spades, forks and trowels) and ask learners to consider their appropriateness to each cultivation task(s) covered by the unit content. ● Tutor to demonstrate good practice when handling tools and equipment for cultivation tasks. This could be *in situ* or on an employer's premises. Evidence of good practice should be recorded through the use of observation records, or alternatively, witness statements with photographic evidence. It is important that learners have access to sites for cultivation to meet the assessment criteria. ● Tutor could discuss with learners the various ways in which cultivation quality can be affected by the tools and equipment used. Alternatively, this may be easier to demonstrate as part of the pre-start check process regarding equipment usage and the cultivation techniques concerned. Learners could carry out various techniques to demonstrate an awareness of how they and their manual and/or mechanical tools and equipment can impact on cultivation quality. Learners could also film peers demonstrating this good practice. These video clips could then form part of the evidence towards meeting assessment criteria, and perhaps be useful as future class resources. ● For learning aim B2, tutor to facilitate a class discussion on why rotation and choice of plants is important to maintain healthy plant growth. Demonstrate how to plan for rotation using appropriate plant examples, such as formal successional bedding and/or the use of edibles. ● Tutors could introduce a concise session covering monoculture and intercropping planting systems either using a slide presentation or by visiting relevant employers to see first-hand systems in use. Learners should keep notes and take images through the use of video and/or photographs to help inform their final assessed report. Alternatively, learners could undertake tasks involving these systems, e.g. preparation of site and installing a grassed area from seed or turf, or maximising edibles by planting quick growing vegetables between longer term examples, e.g. using spring onions between carrots. ● Allow learners' access to various plant catalogues to help plan for effective plant selections. Consider the time of the year and availability of plant material in order to do this effectively. ● Tutor to introduce planting styles for different systems, facilitating a class discussion on the range of styles available and establishing the levels of experience that learners already have. ● Learners to carry out research into the range of planting styles (e.g. formal, informal, border, cottage garden and prairie garden) and report their findings to the rest of the group, demonstrating increased knowledge and understanding of the topic. Learners could do this in pairs and produce either a slide presentation or a presentation that could be based in a garden area for a visual approach. Learners could take notes from their peers to inform their own knowledge and understanding of other planting styles. Individually, learners will need to gather relevant information to help compile their final written report.

Learning aim C – Carry out routine husbandry tasks to maintain the health and growth of plants

● Depending on the programme of study learners are enrolled on and the access they have to plants, the health and safety aspect of this learning aim could be covered first before the rest of the content.
● For learning aim C1, learners are to form into pairs to discuss the hazards particular to working with different:
  ○ plants
  ○ manual handling
  ○ chemicals.
● This can be extended to discuss roles and responsibilities under state health and safety regulations and laws as appropriate.
● Tutor to show learners the different types of relevant personal protective equipment (PPE) and discuss how this is selected and used for particular husbandry tasks.
● Tutor to deliver a presentation that outlines the relevant laws/legislation in terms of rights and responsibilities when routinely managing plants.
● Learners could work in pairs to create risk assessments for various husbandry tasks involved in caring for various plant types, considering the care required when working with potentially harmful plants, e.g. spines and stings.
● Tutor to demonstrate good practice when handling plant material and carrying out husbandry tasks. This could be *in situ* when circumstances allow, as well as through the use of video clips. Learners could film peers demonstrating good practice, and then use these video clips to form part of the evidence towards meeting the summative assessment criteria, and perhaps be useful as future class resources.
● For learning aim C2, a variety of guest speakers (such as a head gardener, specialist grower and/or maintenance contractor) could come into the centre to explore the practical applications of feeding and watering with learners.
● Learners could then inspect plants at the centre or at a local employer's premises, exploring watering regimes and potential application methods, noting their suitability to specific plant species.
● Tutor could deliver a presentation and incorporate a Q&A session to explain plant nutrition, including artificial nutrition, natural nutrition and feed in water.
● Allow learners access to a range of nutritional sources in order to stimulate a class discussion about the different nutritional components and their suitability for different plant species. This could be further explored by discussing application processes and timings. This is a perfect opportunity for a team teaching activity involving plant and soil science tutors. Learners could undertake lab activities exploring plant nutritional requirements and deficiencies. Tutors could set up identification tests that cover key plant nutrients and their impact on plant growth, (e.g. major and minor nutrient disorders) using plant samples that indicate nutrient deficiencies. Learners could research solutions to these disorders or investigate plants and apply remedial actions.

Learning aim C – Carry out routine husbandry tasks to maintain the health and growth of plants

- For learning aim C3, tutor could facilitate a class discussion on the factors that optimise growing conditions for good plant health and growth, establishing the levels of experience that learners already have. Tutors could use more experienced learners to support the delivery by relating their own experience in this topic area to that gained from work experience. This could be achieved by an informal discussion with their peers, managed by the tutor, or it could include presentations using diaries, photographic albums or videos of current and/or previous experience. Learners could take notes to help inform their own skills development and part use this evidence in their final assessed report.
- For interior plants, tutors should use various facilities and structures to assist in optimising plant growth. Learners will need to access structures where they can undertake improvements to ventilation, check and manage temperature regimes and protect against the elements such as frost. Tutor could demonstrate good practice in practical tasks with learners recording their abilities in pairs using video and/or photographs. This evidence will be useful as part of the final evaluative report.
- For exterior plants, tutor should discuss with learners the various options in maintaining plants in good condition. After demonstrations by the tutor covering
- the use of various materials used for protecting plants against variable weather conditions, learners can undertake relevant practical sessions to support the completion of their diaries.
- In addition to centre-based activities, tutors could engage with local employers to talk about how plants are monitored to maintain the health and growth of plants. Learners can take notes to support their own. Some employers may be able to help provide practical opportunities and thereby potential witness statements. Learners can use witness statements to help inform their final assessed report.
- Learners will require access to various facilities and materials in order to demonstrate correct husbandry tasks for optimising growing conditions for good plant health and growth. Evidence such as a diary supported by photographs, video clips and/or witness statements would be helpful.
- Learners should spend a significant length of time addressing plant health maintenance tasks of different species of plants, through practical activities and duties at the centre. Learners should gain evidence for their portfolio through the use of videos, witness statements and professional discussions with centre staff and/or various employers. They should be aware that their attention to health and safety and professional working responsibilities is a key part of meeting the summative assessment criteria in order to pass the unit. It would be useful for learners to keep a reflective diary throughout the process, as this will assist in compiling the evidence for the portfolio later on.
- Learners will need to spend time compiling their portfolio and organising the evidence into a logical format for submission. They will also need to spend time ensuring they have reflected on the handling and husbandry techniques, equipment and systems they have used, paying attention to both the practical and theoretical aspects. Some evidence of this could perhaps be in the form of a *viva voce* or semi-structured interview.
- Ultimately, learners will need to produce an evaluative report on how effective husbandry techniques have been mapped to the techniques that they have used. This should include the following forms of evidence: use of diaries, photographs and/or video, witness statements and/or observation records, as well as the written report.

Details of links to other BTEC units and qualifications, and to other relevant units/qualifications

This unit links to:

- Unit 27: Identification, Planting and Care of Plants
- Unit 29: Plant Propagation Activities

Resources

In addition to the resources listed below, publishers are likely to produce Pearson-endorsed textbooks that support this unit of the BTEC Internationals in Agriculture/Horticulture/Land-based subjects. Check the Pearson website (http://qualifications.pearson.com/endorsed-resources) for more information as titles achieve endorsement.

Textbooks

Brickell C, *Royal Horticultural Society Gardeners' Encyclopedia of Plants and Flowers* (1st Edition), DK, 1994 ISBN 9780751301472 – an updated expert guide with over 8,000 easy-to-find plants supported by clear photographs and information relating to plant care and preferred site and condition

Brickell C, *Royal Horticultural Society Encyclopedia of Gardening* (4th UK Edition), DK, 2012 ISBN 9781409383949 – a comprehensive guide covering step-by-step key husbandry tasks linked to specific plant groups

Adams C, Early M, Brook J and Bamford K, *Principles of Horticulture: Level 3* (1st Edition), Routledge, 2014 ISBN 9780415859097 – a useful textbook explaining the fundamentals of growing plants with a strong link between plants science and horticultural practices

Buczacki S and Harris K, *Pests, Diseases and Disorders of Garden Plants* (4th Revised Edition), HarperCollins, 2013 ISBN 9780007488551 – a practical, highly illustrated guide to dealing garden hygiene and plant care and control, including an assessment of pesticides and chemicals. Special attention is given to the increasing importance of biological control in gardens

Journals

Horticulture Week (Haymarket Media) – this weekly magazine is useful for tutors to keep up to date with current research and best practice in matters relating to the sustainable management of trees and shrubs.

The Garden (RHS) – a monthly magazine produced by the RHS, useful for tutors to keep up to date with current research and best practice in matters relating to practical gardening, plants & advice

Websites

'International Plant Propagators Society'' – information on horticulture from a leading cultivated plant conservation charity.

'The International Society for Horticultural Science' – information on horticulture from a leading gardening charity inspiring excellence in the science, art and practice of horticulture.

'The Health and Safety Executive (HSE)' – search the website for information on legislation and regulations in the horticulture industry.

'BBC.co.uk' – search for the archived webpage 'Gardening guides', which summarises a range of husbandry tasks that can be further explored. In some cases, the text is supported by video footage demonstrating sound step-by-step technical advice and guidance.

Pearson is not responsible for the content of any external internet sites. It is essential for tutors to preview each website before using it in class so as to ensure that the URL is still accurate, relevant and appropriate. We suggest that tutors bookmark useful websites and consider enabling learners to access them through the school/college intranet.