



Unit 39: Outdoor Horticultural Crop Production

Delivery guidance

This unit will provide learners with the practical skills and knowledge required to cultivate, grow and maintain a range of commercial outdoor horticultural crops. Knowledge of plant types will include edibles, such as fruit and vegetables, bulbs, cut flowers and foliage. Learners will need to consider how site requirements have an impact on the growth and development of plants as well as the resource requirements, which will include structures and facilities for a range of outdoor horticultural crops.

Learners will be required to investigate two named outdoor horticultural crops: one edible and one ornamental, using examples of plants that have complex needs to understand their production requirements and the factors that affect plant growth and establishment. Learners will compare the different production requirements and make links relating to organic guidelines where appropriate.

Access to a suitable outdoor growing area with opportunities for hands-on practical experience is critical to this unit. Learners will be given a brief to individually carry out tasks in establishing, maintaining, harvesting, grading and storing outdoor horticultural crops, including the completion of appropriate records. Learners will carry out their tasks on their selected crops, learning how to manage and monitor their plants, which will include plant health and the importance of timing on production.

Connections with a range of local professionals, such as small-, medium- and large-scale local growers, can be used to offer support by arranging external visits and guest speakers.

Approaching the unit

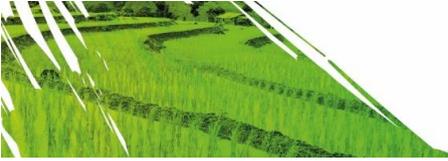
There needs to be flexibility in the method of delivery and the timing of this unit to suit the correct timings of the outdoor crops being established.

Learning aims may be combined so that the theory is taught alongside practical tasks, helping learners to put the unit into context. Other units could be linked where appropriate: for example, you could teach health and safety considerations in *Unit 2: Estate Skills* relating to the use of tools, equipment and machinery or link to *Unit 7: Work Experience in the Land-based Sectors*, where learners will work directly with outdoor crops.

For learning aim A, learners investigate the key requirements for the commercial production of outdoor horticultural crops. They should be shown the wide range of plant types that are grown outdoors, including top fruit, soft fruit, vegetables, bulbs, flowers and foliage. They will then be able to select and investigate one edible and one ornamental crop type that is suitable for their first assignment.

You could arrange visits to small-, medium- and large-scale growers so that learners can observe a range of different growing systems for outdoor crops first-hand, which will help them to understand the importance of selecting the appropriate sites, growing systems and storage and packing facilities. Guest speakers can also enhance these visits by providing information on establishing and harvesting techniques. Site selection and growing systems for outdoor crops are a critical element of this learning aim, as learners need to have an understanding of:

- soil
- seasonal characteristics



- aspect, topography, exposure and protection
- access requirements to crops for growing and mechanisation
- availability of services (e.g. mains water, drainage, electricity)
- structures, including production, potting and packing areas
- irrigation requirements
- relevant legislation
- location of end users, including proximity to markets.

Learners are also required to understand the requirements involved in becoming a certified organic grower. A visit to an organic grower would be beneficial.

Learners will need access to a full range of resources required for outdoor crop production in order to gain an understanding of how to manage and monitor crop health, including pests, diseases, disorders, planning, timing and costs. They will also need to be aware of always adhering to the key principles of legislation and regulations.

For learning aims B and C, learners will gain an understanding of plant production and be able to carry out site preparation, planting, establishment, monitoring and maintenance of their outdoor crop. It is possible that learners will need to be grouped for the practical tasks. You should consider both your class and production area sizes: however, it is essential to remember that learners have to produce their own evidence individually.

Tutor-led practical demonstrations will be used to show safe tool, equipment and machinery use and how site preparation, establishment, monitoring and harvesting tasks are completed safely and effectively. You should take into account learners' previous experience in this area, as more advanced learners could be asked to demonstrate some practical tasks where appropriate. Ensure that learners work independently on their tasks so you can monitor their skills development. Learners must also be able to demonstrate that they can meet the legislative requirements of safe working practices and use personal protective equipment (PPE) correctly. This must be demonstrated by staff and learners throughout the unit delivery.

Learners will be required to use accepted working practices to carry out the appropriate harvesting, grading and storage methods to meet legislative requirements and ensure the successful growth, health and maintenance of their chosen protected crops.



Assessment model

Learning aim	Key content areas	Recommended assessment approach
<p>A Investigate key requirements for the commercial production of outdoor horticultural crops</p>	<p>A1 Plant suitability for outdoor horticultural crop production systems A2 Site selection and growing systems for outdoor horticultural crops A3 Resource requirements A4 Factors affecting the management of plant growth and establishment</p>	<p>An illustrated report or presentation that researches site considerations, facilities and techniques (including the use of organics) in the management of commercial outdoor crop production for two contrasting outdoor horticultural crops, one of which meets approved organic guidelines.</p>
<p>B Carry out the establishment and maintenance of outdoor horticultural crops</p>	<p>B1 Site preparation and establishment methods for outdoor horticultural crops B2 Maintaining outdoor horticultural crops</p>	<p>Evidence of carrying out tasks in establishing, maintaining, harvesting, grading and storage of outdoor horticultural crops to meet current standards and production targets. Completion of appropriate records.</p>
<p>C Use accepted working practices to carry out harvesting, grading and storage of outdoor horticultural crops</p>	<p>C1 Harvesting and grading of outdoor horticultural crops C2 Maintaining the shelf life of outdoor horticultural crops</p>	

Assessment guidance

This is an optional, internally examined unit comprised of two summative assignments that will examine learner knowledge through written tasks and practical competency skills.

For learning aim A, learners are required to write an illustrated report or produce a presentation on the production requirements of one edible and one ornamental outdoor crop, one of which needs to meet the approved organic guidelines.

Learners should use clear diagrams, photographs, charts and supporting examples to illustrate their findings and document their research of site considerations, facilities and techniques in the management of commercial outdoor crop production for both of their selected crops. Learners should make comparisons between their two selected crops and present their information in a clear and logical way, using technical terms and accurate botanical plant names throughout.

In the second assignment for learning aims B and C, learners must provide evidence of carrying out practical tasks in establishing, maintaining, harvesting, grading and storing outdoor horticultural crops, including the completion of appropriate records. It is essential that learners are provided with a suitable production area to carry out the full scope of the unit and produce their own evidence, even when working within small groups.

Learners must gather a wide range of evidence to show that they have completed their practical tasks to standard. This should include a risk assessment, completed crop monitoring sheets and a series of annotated photographic evidence sheets demonstrating the practical tasks being carried out in a time efficient and appropriate manner. You will complete observation pro formas that will include evidence of learners:

- selecting and using tools, equipment and materials safely and correctly
- preparing their site
- planting and establishing crops
- monitoring and maintaining crop health ready for harvest.

Learners must also demonstrate clear consideration of the environment, safe working practices and working to site conditions effectively.

Learners must discuss with you when they consider their crop to be ready for harvest with clear reasoning. This can be an observation report from the teacher, a voice-recorded discussion or video evidence of the discussion taking place.

Learners will then gather evidence of their harvest via photographic evidence sheets, records or video evidence. This will show learners correctly and efficiently harvesting, loading, grading and monitoring their outdoor crops with consideration to storage hygiene and reasons for this. Learners should use the correct horticultural terminology and botanic names throughout.



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 39: Outdoor Horticultural Crop Production

Introduction

Introduce learners to protected horticultural crop production and the plant types that are grown in protected environments. There are excellent opportunities to develop strong links with local employers during this unit, especially during the introduction. Learners could visit a range of local small-, medium- and large-scale growers. Guest speakers or guided tours will enable learners to gain knowledge first hand of the vast range of protected crops grown in the UK.

This could also be a good opportunity for learners to see the wide range of protected cropping areas, tools, equipment and materials used. There are also excellent resources that can support the delivery of this unit, such as video clips that show commercial growers producing edible crops and ornamental plants.

Learning aim A: Investigate key requirements for the commercial production of outdoor horticultural crops

- You could begin learning aim A1 by delivering a presentation on the different plant types that are grown outdoors. You could start with edibles, bringing a range of examples into class including top fruit, soft fruit and vegetables (using examples listed in the unit specification). Ask learners to categorise these edibles, followed by a class discussion on their production, including seeds, seedlings, budded stock, grafted stock, bare root, containerised and container grown stock.
- Bulb, flower and foliage production could be delivered separately with examples being brought into the classroom. You could show learners their production by using relevant video clips.
- You could facilitate an interactive whiteboard task where learners look at the categories of all outdoor crops discussed so far and consider and compare their ages, sizes and intended market(s).
- For learning aim A2, learners could be given an assignment task sheet where they must develop some questions to ask that cover site selection and growing systems for outdoor crops during an arranged visit to commercial growers. These questions will support their choice of edible and ornamental crop for their report or presentation.
- You could arrange a series of visits to commercial growers to look at a range of outdoor crops (covering both edible and ornamental crops if possible) being grown on small-, medium- and large-scale sites. Ensure that learners are able to see site considerations and all stages of outdoor crop production from preparation to sale. You should also speak to employers in advance to discuss the learning aims of this unit in preparation for when learners ask their questions.
- Another guest speaker (or a site visit to an organic grower) could be arranged to discuss the management techniques available to the organic grower. Guest speakers (or growers) should be supplied with the unit content for LAA2 in advance, so they can prepare information on:
 - the roles of soil health and fertility
 - nutrient management protocols
 - organic weed, pest and disease management.
- As a formative assessment activity, learners are to produce an individual factsheet on gaining certification of organic status. This should also include the benefits and limitations of certified status for growers; the time and costs required to convert; and the availability of inputs.

- For learning aim A3, learners could be introduced to their growing areas and facilities during a tour of the site. Learners could list what resources are available in their own growing facilities ready to start planning their crops. This should cover:
 - buildings and structures for tasks
 - tools
 - machinery
 - equipment
 - information for recording purposes, i.e. documentation.
- For learning aim A4, you could deliver a presentation on monitoring and maintaining outdoor plant growth, which should include the following criteria:
 - growing space available
 - seed densities
 - spacing correctly for time of year
 - stage of development
 - shape and size of plant
 - thinning, pruning and trimming
 - providing support.
- Facilitate a practical session where learners must correctly identify the health problems of outdoor crops, including pests, diseases, viruses and disorders and feed requirements. Where possible, show learners some real examples.
- You could deliver a presentation on how, when and why it is so important to monitor protected crops. It should include factors that affect timeline planning, such as natural growth times of crops, work schedules, contingency planning and production timings, seasonal markets and costs versus pricing. Following on from this presentation, learners could produce a chart detailing all of the factors outlined in the presentation to use in their own planning.
- Learners are to produce monitoring sheets to use when completing the designated monitoring activities on their selected outdoor crop for learning aim B.
- A research activity could be set for learners to find out about key legislation and codes of practice in relation to growing outdoor crops. They could then produce a list of these, including a brief explanation of their importance for each one.
- For the summative assessment activity, learners are to write an illustrated report or produce a presentation on the production requirements of one edible and one ornamental crop, one of which needs to meet approved organic guidelines. Learners are to follow assignment brief provided by you.

Learning aim B: Carry out the establishment and maintenance of outdoor horticultural crops

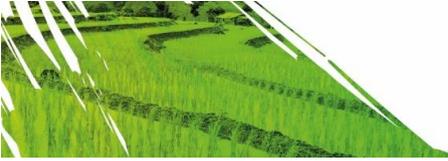
- For learning aim B1, learners are to be given an outdoor cropping area to prepare, establish, maintain and monitor a named outdoor crop. Learners may have to work in small groups, but it is critical that they produce their own practical evidence independently.
- Facilitate a tutor-led session on assessing risks that relate to practical tasks, including the relevant tools, equipment, materials, people and area they are working in. You could demonstrate to learners the practical preparation of the outdoor cropping area, along with sowing and planting tasks that are suitable to the crops being established.
- As a formative assessment activity, learners could be given a risk assessment template and produce a risk assessment for their practical tasks, which includes personal protective equipment (PPE) requirements.



- For learning aim B2, arrange a series of practical sessions where learners will carry out the preparation of their own outdoor growing area (including any of the criteria listed in the unit specification for LAB1 that is relevant to their crop). Learners will need to demonstrate how to:
 - ensure continuous safe working practices
 - select and safely use the correct tools and equipment
 - perform the necessary pre-use checks and post-use maintenance tasks
 - minimise environmental damage while working
 - leave the work area clean and tidy after tasks
 - dispose of any organic and inorganic waste correctly.
- You should complete written observation records for each task and ensure that photographs and/or video evidence is obtained throughout each practical session. Over several weeks, learners will use their own monitoring sheets to record crop development (e.g. propagation record, growing-on log and crop records) and then carry out the relevant tasks as necessary. This could include:
 - pruning, tidying, support and training
 - providing additional protection
 - irrigation and application of fertiliser and pinching-out
 - feeding and watering
 - weed removal
 - health checks (e.g. pests, diseases and disorders, good hygiene practices)
 - working safely, minimising damage and disposing of waste correctly
 - record completion.
- Facilitate tutor-led discussions after each practical session (or as appropriate) to check learners' progress and offer support in relation to monitoring and recording crops.

Learning aim C: Use accepted working practices to carry out harvesting, grading and storage of outdoor horticultural crops

- For learning aim C1, you could deliver a presentation on harvesting and grading of crops to meet required standards, so that learners understand the:
 - maturation characteristics (i.e. skin colour, size and stage of development)
 - packaging and labelling requirements
 - harvesting containers
 - waste management
 - environmental impact
 - health and safety issues, including safe working practices and the consequences if not followed (e.g. injury to self or others).
- Arrange a visit to a local employer, such as a commercial flower grower or food producer to look at harvesting and storage of protected crops. You should speak to the employer in advance to discuss the unit requirements for learning aim C in relation to harvesting and grading and maintaining shelf life of their crop.
- Once it has been agreed that the crop is ready for harvest, you could arrange a series of practical sessions where learners carry out the correct harvesting, grading operations and quality standards, making clear links to their previous nursery visits and employer talks. Learners should always demonstrate continuous safe working practices, such as the correct selection and use of tools and equipment that includes pre-use checks and post-use maintenance. They must also ensure to minimise environmental damage while working, disposing of any organic and inorganic waste correctly and leaving their work area clean and tidy after tasks. You should



complete written observation records for each task and ensure that photographs and/or video evidence is obtained throughout each practical session.

- Throughout the practical sessions, learners will need to demonstrate robust ways of maintaining the shelf life of their harvested crop, including selecting correct storage and cooling methods where appropriate, pest and disease control and decay prevention. They should make clear links to the importance of storage hygiene and justify their own methods with accuracy.
- As a formative assessment activity, learners could gather evidence of how they have met EU quality standards and plant passport requirements, where required. This could be evidenced through photographic evidence, video recordings or a blog showing how standards are kept and how unsatisfactory products do not reach the market.
- Facilitate a tutor-led discussion after each practical session (or as appropriate) to check learners' progress and offer support in relation to keeping accurate records and using suitable horticultural terminology.



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

This unit links to:

- Unit 2: Estate Skills
- Unit 7: Work Experience in the Land-based Sectors
- Unit 27: Identification, Planting and Care of Plants
- Unit 28: Routine Plant Management
- Unit 29: Plant Propagation Activities
- Unit 31: Nursery Stock Production
- Unit 33: Pests and Disease in Plants
- Unit 38: Protected Horticultural Crop Production.

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

Adams, C. R. and Early, M. P. (2008) *Principles of Horticulture* (5th edition) Abingdon: Routledge (ISBN 978 0750686945) – an excellent introduction to horticultural study, which describes the commercial aspects of growing crops.

Journals

The Fruit Grower Magazine – interesting articles and up-to-date technology related to growing fruit.

Videos

A search online for a range of appropriate outdoor crop videos will support the teaching of this unit, especially some of the latest technology used in outdoor crop production, harvesting and storage of food crops from both the UK and The Netherlands. Videos should be chosen by you to ensure they are relevant to the learner's area of growing or link to external visits.

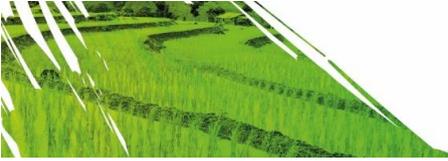
Websites

www.cha-hort.com – Commercial Horticultural Association (CHA) – a British trade association for manufacturers and suppliers of plants to commercial growers all over the world.

www.hse.gov.uk – Health and Safety Executive (HSE) – includes essential information on staying safe in the workplace.

www.rhs.org.uk – The Royal Horticultural Society (RHS) – information on weeds, pests, diseases and growing plants.

An internet-based search for local commercial growers will also support the teaching of this unit.



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 students to access them through the school/college intranet.