Unit 21: Root Crop and Field Vegetable Production

Delivery guidance

Approaching the unit

Unit 21: Root Crop and Field Vegetable Production covers the husbandry and processing requirements in relation to the production of root crops and field vegetables. Learners wishing to develop careers working on farm or within the management of production and processing systems will use the skills and knowledge developed from studying this unit. Access to root crops and field vegetables forms an important part of the delivery of this unit.

The development of practical skills through taught sessions, as well as access to real-life work experience, will enhance delivery and learners should be encouraged to take advantage of any placements available. Local employers should be encouraged to get involved and add value to the delivery of the content.

It would be beneficial for learners to use and access a virtual learning environment (VLE) for sharing and storing information relevant to the topics studied. Resources such as worksheets, web links and appropriate videos can be used, in order to give learners the opportunity to share and develop knowledge outside of the classroom environment.

Visits to local businesses would give learners some context for the theory learned in the unit. This may involve a grower, processing plant or frozen food factory, giving learners an insight into the future employment opportunities available, as well as a greater understanding of how these crops are prepared beyond the farm gate.

Delivering the learning aims

Learning aim A

Learning aim A focuses on the key biological and physical requirements for the production and husbandry of root crops and field vegetables, including the role of legislation and codes of practice. It allows learners to build upon existing knowledge from other units, for example, *Unit 17: Crop Production*, *Unit 19: Combinable Crop Production and Processing* and *Unit 23: Land-Based Machinery Operations*, and then apply it to a root crop and field vegetable context.

Learning aim B

Learning aim B explores the processing and quality requirements for marketing root crops and field vegetables. The unit looks at the processing of root crops: from leaving the field through to the processes they go through before they become a saleable product. The unit then looks at marketing and the different options for selling produce, and its importance in ensuring produce will meet the standards required for sale. The use of a guest speaker here will ensure learners are receiving up-to-date industry knowledge to include in their work. Tutors could also include a visit to a processing plant to help with the delivery of this learning outcome.

Learning aim C

Learning aim C is more practical, as it will enable learners to carry out husbandry skills related to the growing cycle of these crops. Learners will be actively involved in preparing seedbeds and undertaking husbandry tasks, which include fertiliser application, monitoring the crop and identifying weeds, pests and diseases.

Throughout the unit, learners will need to combine practical husbandry tasks along with field visits. These will then underpin the theoretical delivery of the unit, as well as allowing opportunities for gathering evidence. It may be that learning aim C is delivered alongside A and B, as husbandry tasks will need to be undertaken throughout the growing period of the crops.

Assessment model

Learning aim	Key content areas	Recommended assessment approach
A Investigate production and husbandry requirements for root crops and field vegetables	**A1** Key biological and physical requirements for production **A2** Key husbandry requirements **A3** The role of legislation and codes of practice	A report evaluating the production and husbandry requirements of producing root crops and field vegetables.
B Explore the processing and quality requirements for marketing root crops and field vegetables	**B1** Processing root crops and field vegetables **B2** Quality requirements for marketing root crops and field vegetables	A report or presentation on how root crops and field vegetables are moved from farms and processed and marketed. A practical portfolio relating to the completion of husbandry tasks for root crops and field vegetables.
C Carry out husbandry tasks related to root crops and field vegetables	**C1** General husbandry tasks **C2** Fertiliser application **C3** Weed, pest and disease control	

Assessment guidance

Assessment evidence for learning aim A is to be presented in the form of a written report. This will cover the husbandry requirements for producing root crops and field vegetables and will cover the requirements for production, including soil type, pH level and climatic conditions. Tutors should provide information on the theory of producing root crops and field vegetables and signpost to learners any independent research opportunities to support the notes they will have taken during sessions. The report should be structured in such a way that it can assess the underpinning knowledge for root crop and field vegetable production.

Assessment evidence for learning aims B and C can be split into two parts. Learning aim B can be assessed through the production of either a report or a presentation using a suitable IT application such as PowerPoint or Publisher. Tutors will need to deliver sessions on processing and marketing. The use of a guest speaker here will ensure learners are getting up-to-date industry knowledge to include in their work. Learners are required to create a flow chart for two root crops and two field vegetables and discuss what happens to these products after they have been harvested; once they have left the farm and are processed; and before they are turned into a product that is ready for sale. For this evidence, learners are also required to include detail on which quality measures are to be met, which may include size, weight and colour.

Learning aim C is designed to be a very practical outcome and should be assessed as such. Learners are required to be actively involved in carrying out husbandry tasks such as seedbed preparation, consolidation and fertiliser application. Learners are also required to identify weeds, pests and diseases relevant to root crops and field vegetables; this could be in the

form of taking photographs of the weeds, pests and diseases found along with detail of their control. Access to a working farm is essential for learners to collate evidence first hand. This can be in the form of a portfolio that can be built up over time and tutors may need to ensure this learning outcome is delivered alongside learning aims A and B to allow enough time for evidence to be gathered.

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 21: Root Crop and Field Vegetable Production

Introduction

This unit will develop skills and knowledge in root crop and field vegetable production. There is a theoretical and practical element to this unit, as well as involvement from local businesses and employers in the way of:

- visits to farms, factories and processing plants
- development of skills through relevant work placements
- tutor knowledge, which will enhance and contribute to the delivery of the unit
- reading material such as journals and magazines, which give technical input and industry updates
- mentoring and support
- guest speakers.

Learning aim A – Investigate production and husbandry requirements for root crops and field vegetables

The introduction to the unit (and learning aim A) may include an overview of the current UK production landscape, including the size of area grown for root crops and field vegetables. An assessment of learners' prior knowledge will help to establish any experience that learners already have.

- Learners can create spider diagrams to identify the husbandry requirements of root crops and field vegetables and use this as a starting point for the unit.
- Learners to form into small groups to research specific growing requirements of a given root crop or field vegetable and feed back to the other members of the class.
- Learners to conduct research and present back to the group or to the farm manager into how the climate has changed. They can explore the different types of climate and find out which environment is best for growing root crops and field vegetables, which can then be extended to look at specific types of weather and the effects that it can have on growth of root crops and field vegetables.
- Tutors can deliver a presentation on the key husbandry requirements of root crops and field vegetables, e.g. rotation, seedbed preparation, fertilisers, weed and pest control. Learners are encouraged to make notes and produce a chart comparing husbandry methods.
- Learners can investigate soil structure by digging soil pits to collect and test the soil for pH levels. This evidence can then be written up as a scientific experiment and included in their portfolio as evidence.
- Tutors can show learners videos of how different root crops and field vegetables are planted or transplanted, illustrating the mechanisms of different machinery. This will enable learners to see the establishment of as many different crops as possible.
- Tutors can arrange for a guest speaker, such as an agronomist, to visit the centre and deliver a presentation on weed, pest and disease control. This will give learners the most up-to-date advice from industry experts out in the field.
- Learners could put together a presentation about the importance of legislation in relation to producing root crops and field vegetables. This could be linked to a particular production crop and would cover the certificates of competence required to be able to apply products, such as chemicals and fertiliser, as well as

demonstrating their knowledge on health and safety in this area.

- Learners should be given clear guidance on what detail needs to be included in their assessed work. They will need to undertake some independent study in order to fulfil the requirements of the assessment, which is a written report for learning aim A.

Learning aim B – Explore the processing and quality requirements for marketing root crops and field vegetables

- Learners could produce a timeline of events leading up to and including harvesting. This would include detail on the final stages of crop growth and provide information on when the crop is ready for harvest. This could then include details on problems that can occur during the harvesting process, e.g. overripe/underripe crops, tuber size and shape.
- A guest speaker such as a farmer, grower or manager of a production system could give learners details on how the timings of a harvest are managed. This can include discussing changes in labour needs to organising machinery, as well as covering how damage is minimised in the field.
- Learners could research and design a storage facility for one or more of the root crops or field vegetables studied in this unit. This may include an indoor or outdoor store (temporary or permanent) and could be extended to discuss any requirements for disease prevention.
- Learners could create and complete a crop storage monitoring document for a given crop or vegetable, which enables them the opportunity to complete documentation that they may come across in future employment.
- A visit to a local supermarket or local farm shop could take place to show learners how food is presented and look at different marketing techniques used by supermarkets.
- Tutors could deliver a lecture on the quality requirements for root crops and field vegetables. This could be supplemented by an independent research activity where learners are to find some examples of root crops and field vegetables that are not perfectly shaped or may be outsize. Tutors can then facilitate a class discussion on the impact of not grading these.
- Learners could create a table of information relating to the different end uses for root crops and field vegetables, identifying both animal and human feed consumption.
- A visit to a farmer, or grower of production plant, would allow learners to see first-hand the process of grading different products and relate these to the intended end market.
- Learners could create a map, to support the food-to-fork journey, which would show how farm produce is transported before it reaches the point of sale. This could be extended to include where in the journey quality assurance checks are made and link this to traceability.
- Learners could be asked to bring in some packaging for a root or field vegetable product and research the origins of the chosen product to see how traceable it is.
- Learners could research the current food assurance schemes and how these link to produce being fit for sale and ascertaining food standards.
- Learners could use online resources to generate a gross margin, which details production costs for different root crops and field vegetables. These can then be compared, and the results shared between learners in the class.

- Learners could produce a leaflet to present information to a farmer or grower, which covers biosecurity through the whole production cycle for root crops and field vegetables. Include criteria such as waste disposal methods.

Learning aim C – Carry out husbandry tasks related to root crops and field vegetables

Depending on how this unit is delivered, including availability of access to root crops and field vegetables, it may be possible that aspects of this learning aim are delivered alongside A and B.

Prior to commencing learning aim C, tutors should ensure that a health and safety briefing has been given and learners have had guidance on the risks involved, as well as access to the relevant personal protective equipment (PPE).

- Learners could devise a schedule of operations for carrying out husbandry tasks for a range of root crops and field vegetables. This could be used as a basis for the upcoming practical tasks.
- Learners should be involved and be able to carry out cultivation techniques for preparing seedbeds for root crops and field vegetables. This may include operating power-driven machinery, which can be highly supervised in order to assist the less confident learner.
- Tutors could give learners a demonstration of which crop protection methods are applicable to different root crops and field vegetables. If access to these crops in the field is limited, then a glasshouse may be used to show how crops are protected against the elements.
- Tutors could show learners a video on irrigation systems and the sustainable use of water for irrigating purposes.
- Learners could devise and complete a monitoring document for use on keeping a regular check on crop growth and development. This could then be used to record such as timings of weed, pest and disease control, as well as fertiliser applications.
- Learners could produce an information factsheet on different types of fertiliser and the methods used for applying fertiliser to a range of root crops and field vegetables. Tutors could then show learners samples of the different types of fertiliser and discuss how crop uses it; the different growth stages; and amounts these are applied depending on the crop.
- Learners would find it beneficial to have access to computer programs such as word processors, presentation software and spreadsheets that will aid their understanding of calculating fertiliser rates.
- Learners should make regular field visits to be able to identify common weeds, pests and diseases. They could collect examples and produce information on each one to aid understanding. If field visits are not always possible, then images of the weeds, pests and diseases could also be used.
- Tutors could deliver a presentation on the specific health and safety measures associated with applying weed, pest and disease control, including completing detailed risk assessments.
- A guest speaker such as a farmer, grower or agronomist could come into the centre to explain their role in controlling weeds, pests and diseases and how this promotes a healthy crop.
- Learners could be able to see an agronomist recommendation sheet for a root crop or field vegetable. They could then interpret the information, and a tutor-led discussion could take place to discuss how this will help the crop.

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

This unit links to:

- Unit 17: Crop Production
- Unit 19: Combinable Crop Production and Processing
- Unit 23: Land-based Machinery Operations.

As well as these links, the knowledge, understanding and skills gained in this unit when combined with the other units within the qualification will prove invaluable to any learners who wish to embark on an independent business venture, or progress into a managerial position.

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 (qualifications.pearson.com/endorsed-resources) for more information as titles achieve endorsement.

Textbooks

Finch S, Samuel A and Lane GP, *Lockhart & Wiseman's Crop Husbandry Including Grassland* (Ninth Edition), Woodhead Publishing, 2014 ISBN 9781782423713 – a detailed book that covers the cultivation, establishment and husbandry of a wide range of crops, including root crops and field vegetables

Soffe RJ, *Agricultural Notebook* (20th Edition), Wiley-Blackwell, 2002 ISBN 9780632058297 – a comprehensive coverage of agricultural practices, which covers a wealth of information including root crop and field vegetable production

Journal

Farmers Weekly (Reed publishing) – Farming – This is a useful weekly journal that growers, producers and tutors can rely on to keep up to date with the latest developments in the industry.

Videos

'AHDB Horticulture' – search for the website, then click on the 'Knowledge Hub' tab and then 'Video Hub' for the development boards section for field vegetables. There are many resources on growing field vegetables from establishment to harvesting.

Websites

'AHDB Horticulture' – an interactive website with up-to-date commodity prices and useful management tools

'British Potato Council' – an interactive website that covers all areas of potato production

'Farmer's Weekly' – a website dedicated for the farmer with up-to-date articles on root crop and field vegetable growth and production

'Processors and Growers Research Organisation' – a website created for the research into varieties and specific grower information on field vegetables

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.