Unit 19: Combinable Crop Production and Processing

Delivery guidance

Approaching the unit

Unit 19: Combinable Crop Production and Processing covers the underpinning knowledge, while developing practical skills, in combinable crop production and processing. The unit aims to increase learners' knowledge by investigating the production requirements for combinable crops to the highest food quality standards ready for the human consumption market, and will be of use to those wanting to develop arable skills for future employment opportunities as farm managers or crop producers. The unit also covers the processing of these combinable products and associated husbandry tasks.

Learners will be required to carry out preparation and cultivation tasks related to combinable crops and so the development of practical skills is important to this unit. It can be supported by organising work experience placements in a relevant setting to add value to the delivery of the unit. Contact with local employers will enhance the content of this unit and employers may even be
involved in assessing learners' practical skills.

Delivering the learning aims

Learning aim A

Learning aim A focuses on the production and establishment needs of combinable crops, such as the role of location; the effects of weather; soil type, pH, structure and indices; key factors relating to the use of seeds; and potential end uses of crop. It also covers crop choice and establishment techniques, as well as the role of legislation and codes of practice, which allows learners to develop their knowledge gained in other units within the qualification.

Learning aim B

Learning aim B examines the processing of combinable crops, such as harvesting, storage and end use of crops, with an emphasis on the quality requirements and importance of food safety, traceability and biosecurity. This learning aim also looks at the quality requirements for marketing combinable crops.

Learning aim C

Learning aim C is the most practical and concentrates on learners being able to carry out preparation and cultivation tasks related to combinable crops. This includes general husbandry tasks, fertiliser application and weed, pest and disease control. It is important to consider the seasonality of production cycles as to when the learning aim should be delivered during the year. It might be a good idea to teach learning outcome C alongside A and B so that your learners see a year cycle. Learners will require access to a range of combinable crops throughout the duration of this unit, as well as being able to assist with husbandry tasks to reinforce the classroom-based theoretical delivery.

The ability to access, share and store information relating to this unit will benefit learners; a virtual learning environment will encourage independent learning to be undertaken in addition to classroom and practical delivery.

Learners will require access to farm or estate records for parts of this unit, as they will need to access real data to support their learning. This includes cropping records and agronomist reports, which may be stored electronically via the VLE.

Witness statement and observation records are useful methods of recording and assessing activities undertaken by learners and these are useful in supporting any evidence the learner provides (practical evidence in particular).

Farm visits and guest speakers will aid the delivery of this unit and broaden the learner knowledge and understanding, especially if the centre has limited access to a range of combinable crops available.

Assessment model

Learning aim	Key content areas	Recommended assessment approach
A Investigate production requirements for combinable crops	**A1** Production requirements **A2** Crop choice and establishment techniques **A3** The role of legislation and codes of practice	A report evaluating the production requirements for combinable crops, including legal requirements, varietal choices and use of establishment techniques.
B Explore the processing and quality requirements for marketing combinable crops	**B1** Processing requirements for combinable crops **B2** Quality requirements for combinable crops	A report or presentation on the processing and marketing of combinable crops. A practical portfolio relating to the completion of preparation and cultivation tasks for combinable crop production.
C Carry out preparation and cultivation tasks related to combinable crops	**C1** General husbandry tasks **C2** Fertiliser application **C3** Weed, pest and disease control	

Assessment guidance

Assessment evidence for learning aim A is to be produced in the form of a report, which will cover the production requirements of three combinable crops. Learners will have to cover details from ideal seedbed to variety choice and discuss the establishment techniques. It would be useful here to choose the three crops carefully, to ensure minimal repetition of detail; for example, a cereal, oilseed and legume crop could be chosen.

There is also a requirement to cover the legal aspects of combinable crop production and include details on the relevant legislation and codes of practice in relation to the environment that affects combinable crop production. Tutors should deliver theory sessions on combinable crop requirements, as well as make use of field visits, particularly if this can be coincided with autumn or spring cultivation work.

Assessment evidence for learning aims B and C can be separated into two assignments. Learning aim B will be in the form of a written report or electronic presentation using, and this will cover the processing and marketing of two combinable crops. It would be useful to select two distinctly different crops for the assessment to avoid duplication of evidence. The detail needs to cover the chosen crops from the point of being marketed on the farm through the relevant process for that product once it leaves the farm.
Tutors are required to deliver theory sessions on marketing crop requirements, storage and processing, as well as financial and production targets. To enhance delivery of this content and assist with the assessment process, visits can also be made to a processing plant so that evidence can be gathered.

Learning aim C is designed to be completed in a very practical manner. Learners will create a practical portfolio, gathering evidence by completing practical tasks associated with preparing and cultivating combinable crops. These portfolios will be made up of a range of general husbandry techniques such as carrying out ploughing, discing, power harrowing, drilling and rolling. Learners should also have some involvement in the application of fertiliser so that they can gain an understanding about the importance of nutrient applications.

Learners will require regular access to these crops so that they can monitor weeds, pests and diseases, looking at their effect on combinable crop production. Tutors will need to give learners some guidance regarding the compilation of their portfolios. It is possible that guest speakers, visits to trial plots or agronomists can also assist with some of the technical detail, especially the fertiliser application rates and weed, pest and disease control.

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 19: Combinable Crop Production and Processing

Introduction

This unit will enable learners to develop the knowledge and understanding required in relation to the production and processing of combinable crops. The unit contains both theoretical and practical aspects in the delivery and assessment of the content. It would benefit from the involvement of local producers, businesses and employers in the form of:

- guest speakers (e.g. grain merchants, seeds sale suppliers, agronomists and technical advisers)
- visits to local or regional trials plots in order to see new emerging cultivation techniques and varieties
- strong tutor subject knowledge to enhance delivery of the unit
- skills development through relevant work placements
- a visit to a processing plant, such as a maltster, flour milling plant and/or feed mill.

Learning aim A – Investigate production requirements for combinable crops

The introduction to the unit and learning aim A should give learners an overview of combinable crop production in a country, including the range of combinable crops grown and the size of area used. An overview of learner's previous experience and information of combinable crop production is a useful place to start in establishing the level of knowledge that already exists.

- Learners can create a list of five facts that they know about a given combinable crop and can share their information between their peers.
- Learners can work in small groups to create information leaflets on the production requirements of combinable crops, such as role of location, effects of weather and soil indices. This can then be shared with other groups to undertake a peer assessment on the work produced.
- Tutors could give each learner a different crop variety to research (e.g. a cereal such as wheat, barley and oats) and allow them a specific length of time to look at the advantages and disadvantages of growing that particular variety. This should include consideration of pre-planting requirements such as seed dressings, machinery selection and plant spacing.
- Learners can investigate the seedbed requirements by going to the field and digging a soil pit, testing for compaction with a penetrometer and assessing soil texture by rubbing soil between fingers. This evidence will link to the summative report that they are required to produce for the learning aim A assessment.
- Learners could put together a presentation on grower requirements for combinable crops. This 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.

  Tutors can arrange for a guest speaker, such as an agronomist, to visit the centre and deliver a presentation on the environmental considerations in relation to the control of weed, pest and disease (they could also link this content to Unit 21: Root Crop and Field Vegetable Production content). This will give learners the most up-to-date advice from industry experts out in the field.
- Tutors can show a range of video evidence looking at different establishment techniques

from traditional ploughing and working of the soil to minimal tillage. Learners could then make notes from the videos and present these by producing a table of evidence, or present information on adopting new method of establishment to the farm manager.

- Learners can independently research the role of legislation on producing combinable crops, such as Nitrate Vulnerable Zones (NVZ) and Local Environmental Risk Assessment Procedures (LERAPs). They could investigate the importance of legislation in food production and compare this to other countries to know the different standards.
- Tutors could arrange for a local producer to speak to the learners on how they decide which crops to grow and how the current market influences their decisions. Learners could take notes and include these in the report for the assessment of learning aim A.
- Learners should be given clear direction and guidance on what 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 combinable crops

Learning aim B looks at the processing, quality and marketing of combinable crops and follows the route of the crop from leaving the farm to becoming a saleable product.
Tutors should ensure a range of crops are discussed in this learning aim.

- Learners could research the marketing specifications of a range of crops and produce their information in a table. This could include moisture content, specific weight and quality issues such as split grains and seeds, as well as the presence of pest and vermin damage.
- Learners could produce a table of the possible end uses for a range of combinable crops and link them to the value of the crop. Learners could also develop this research and extend it to include examples such as human consumption, food manufacturing, pharmaceutical use and industrial use.
- Learners could create factsheets or information cards about the processing requirements of different crops, such as harvesting and storage, and use the information gained for their assessment of learning aim B.
- Learners could research information on different quality requirements of combinable crops and produce pictorial evidence that can then be annotated. This should include marketing and contractual specifications, as well as use of grading machines, transport, production targets and biosecurity.
- Learners could research and design a storage facility for one or more of the combinable crops studied in this unit. This may include bulk or on-floor storage (temporary or permanent) and could be extended in a class discussion on any requirements for disease prevention.
- Learners could create and complete a crop storage monitoring document for a given combinable crop, which gives them the opportunity to complete the 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, where they can look at different marketing techniques used by supermarkets.
- Tutors could deliver a presentation on the safe storage of combinable crops according to moisture content and look at how this can improve the marketability of the produce.
- A guest speaker from a processing plant, such as a maltster or grain and seed merchant, could give learners details on what quality requirements they look out for and how this then attracts the best premium.
- A visit to a local feed mill could enhance the delivery of the unit and allow learners to see the processing of combinable crops after they have left the farm. They can then include information gained from this visit into their assessed work for learning aim B.

Learning aim C – Carry out preparation and cultivation tasks related to combinable crops

Learning aim C is designed to be practical and encourage the development of practical- based skills and knowledge. To allow for seasonal variations and different cropping demands, this learning aim may be delivered alongside learning aims A and B.

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

- Learners could devise a schedule of operations for a range of husbandry activities, including time management.
- Learners should be involved in carrying out seedbed preparation through a range of cultivation techniques for combinable crops. This needs to include cultivation equipment, such as minimum tillage and no-till methods, and cultivation settings. Tutors must ensure that there is supervision for all activities and be aware that less confident learners may require more support during these tasks.
- Learners could collect information from seed bags and compile a range of facts about the strengths and weaknesses of each variety.
- Learners could produce a detailed protocol for the appropriate disposal of waste such as seed, bags and chemicals. This can include the consideration of biosecurity and sustainable waste disposal practices.
- Learners could devise and complete a monitoring document for use on checking the growth and development of combinable crops. This could then be used to record details such as timing of weed, pest and disease control, as well as fertiliser applications.
- Tutors could deliver a presentation on fertiliser use, including the sources available (organic and inorganic types), the correct amount and timing of fertiliser application, application methods and examples of solid and liquid fertilisers.
- Learners would benefit from access to computer programs such word processors and spreadsheets that can 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 their advantages and disadvantages. This will include Local Environmental Risk Assessment for Pesticides (LERAPs) and other aspects of risk assessments such as PPE.
- Learners could complete their own detailed LERAP, along with a task-specific risk assessment.
- Learners could create a pictorial fact file of the different growth stages of a range of combinable crops and annotate these pictures with details on how the crops are managed at each stage.
- A guest speaker such as farmer, grower or agronomist could come into the centre to explain their role in controlling weeds, pests and diseases. They could facilitate a discussion on how their approach promotes healthy growth of crops and end with a Q&A session to answer any learner queries.

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

This unit links to:

- Unit 7: Work Experience in the Land-based Sectors
- Unit 21: Root Crop and Field Vegetable Production
- Unit 22: Organic Agricultural Production.

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 keep up to date with the latest developments in the industry.

Websites

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

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

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.