Unit 1 Principles of Health and Safety

What is this unit about?

Helping learners to understand the principles of health and safety and how to put these into practice in the workplace to ensure their own safety and the safety of others when working in agriculture and production horticulture.

Agriculture and production horticulture sectors continue to be among the most dangerous in terms of injury and fatal accidents. It is essential therefore that everyone understands their role in maintaining and promoting health and safety in the workplace.

Learning outcomes

	Learning Outcome	Topic
1	Understand the role and impact of health and safety legislation in the agriculture and production horticulture industries	1.1) Be aware of legislation and codes of practice relating to health and safety relevant to the sector 1.2) Understand the role of the individual in maintaining the safety of self and others 1.3) Know and follow company policies and procedures
2	Understand safe working practices	2.1) Know and follow company policy and procedures 2.2) Understand and apply safe manual handling techniques 2.3) Work safely at heights when required 2.4) Understand first-aid procedures 2.5) Understand fire safety
3	Understand the safe use of machinery and other equipment	3.1) Understand the purpose and operation of machinery 3.2) Prepare machinery ready for work 3.3) Safely operate machinery 3.4) Carry out operator maintenance and simple repairs
4	Understand the importance of site security in the workplace	4.1) Carry out site security checks and operations according to instruction 4.2) Carry out checks on security equipment (locks, chains, etc.) 4.3) Understand the principles of, and need for, site security 4.4) Monitor site security

Learning outcome 1: Health and Safety

Topic 1.1: Be aware of legislation and codes of practice relating to health and safety relevant to the sector

Main legislation related to the sector and this role will include but not be restricted to:

- Health and Safety at Work Act 1974
- Manual Handling Operations Regulations 1992
- Reporting of Injuries, Diseases and Dangerous Occurrences Regulations (RIDDOR)
- Lifting Operations and Lifting Equipment Regulations (LOLER) 1998
- Provision and Use of Work Equipment Regulations (PUWER) 1998
- Control of Substances Hazardous to Health (COSHH) 2002

- Control of Pesticides Regulations (COPR)
- Biocidal Products Regulations (BPR) (EU)
- Control of Noise at Work Regulations 2005
- Personal Protective Equipment at Work Regulations (PPE) 1992
- Environmental Protection Act 1990

Topic 1.2: Understand the role of the individual in maintaining the safety of self and others
Responsibilities of employer:

- Provide healthy and safe work environment – PPE, signage, first aid
- Understand Health and Safety policy
- Undertake risk assessments and take precautions to prevent staff being injured
- Identify required Training
- Understand requirements and elements of Insurance
- Report certain incidents and accidents

Responsibilities of employee:

- Responsible for own health and safety
- Take reasonable steps not to put others at risk
- Cooperate with employer
- Use equipment safely and according to instructions
- Ensure reporting of accidents, faults and damage
- Follow instructions to ensure safe working practices

Topic 1.3: Know and follow company policies and procedures
Know how employers meet legal responsibilities via:

- Health and Safety policies
- Safe work systems
- Promoting a safe working environment
- Appropriate signs
- Risk Assessments
- Training staff on hazards at work and how to reduce risk
- Where appropriate, use of formal training and accreditation

Learning outcome 2: Understand Safe working practices

Topic 2.1: Know and follow company policy and procedures
Understand what company policies are, what they mean and the importance of following them at all times.

Topic 2.2: Understand and apply safe manual handling techniques
Understand how to lift safely and what the consequences are of not following safe lifting techniques.

This will include: legislation, safe lifting techniques, use of mechanical aids (and appropriate legislation), the immediate and long-term consequences of poor manual handling, undertaking risk assessments before lifting.

Topic 2.3: Work safely at heights when required
Understand the risks of working at heights and the steps to take to minimise risk.

This will include: legislation, how to reduce risks, working on fragile surfaces and vehicles, safe use of ladders, towers, etc.

Topic 2.4: Understand first-aid procedures
Know how to respond to first-aid situations.

This will include: procedures to be taken, how and when to call for assistances, how and when to call emergency services, your own limitations in dealing with a first-aid situation, what and how to report incidents.

Topic 2.5: Understand fire safety
Understand the principles of fire safety and the use, and limitations, of fire safety equipment.

How to raise the alarm, fire drills and evacuations, understanding different fire extinguishers and their appropriate use; understanding own limitations when dealing with fire in the workplace.

Learning outcome 3: Understand the safe use of machinery and other equipment

Topic 3.1: Understand the purpose and operation of machinery
Understand how to use machinery safely by:

- Knowing the purpose of the machinery
- Understanding the layout of machines and their functions
- Using machinery only for its intended purpose
- Using machinery according to manufacturer's instructions and current legislation

Topic 3.2: Prepare machinery ready for work
This will include:

- Pre-start checks
- Daily checks
- Minor adjustments
- Checking attachments
- Lubrication
- Checking and using PPE (personal protective equipment)
- Checking guards, chains, blades, etc.

Topic 3.3: Safely operate machinery
Undertake safe operations in a range of conditions:

- Operations
  - Safe starting
  - Safe operating procedures
  - Risk assessments
  - Appropriate PPE
  - Ensuring health and safety
  - Awareness of others in the area
- Conditions
  - 'In the field'
  - Weather
  - Soil type
  - Ground conditions
  - Topography
  - Noise
  - Public access

Topic 3.4: Carry out operator maintenance and simple repairs
This will include:

- Maintenance – use of operator's manual; lubrication; oil changes; clean or renew filters; necessary adjustments, pressures; record keeping; health and safety

- Relevant repairs – e.g. replacement of belts, tines, blades, batteries, spark plugs, guards
- Identify faults – including tyres; cutting blades; tines; knives; guards; spark plugs; blocked filters

Learning outcome 4: Understand importance of site security in the workplace

Topic 4.1: Carry out site security checks and operations according to instruction
Understand the need to follow instructions, what precautions to take to protect yourself, who else is involved in site security.

Topic 4.2: Carry out checks on security equipment (locks, chains, etc.)
Know the types of security equipment on site and their proper use.

Know to whom defects and faults should be reported.

Topic 4.3: Understand the principles of, and need for, site security
Understand own limitations.

Understand the types of breaches and security issues that may occur.

Know how, and to whom, security incidents should be reported.

Topic 4.4: Monitor site security
Know organisation's security policies and instructions.

Unit 2 Maintain and Store Records in the Workplace

What is this unit about?

This unit is about the effective record keeping and the management and accurate storage of information.

Most workplaces use computers to store and maintain records, but paper-based systems are still used.

Records could include those that are required by law and those that are maintained to aid the efficient running of the business. Where personal information is held, you will need to ensure that only necessary information is held and kept only for the amount of time that it is needed.

Learning outcomes

	Learning Outcome	Topic
1	Maintain and store records within the workplace	1.1) Identify records and check that they are suitable for their intended purpose 1.2) Make entries into records that are accurate and complete 1.3) Transfer records where appropriate and accurately record information as necessary 1.4) Store confidential records in a safe location in accordance with organisational and legislative requirements 1.5) Refile records correctly after use, where applicable 1.6) Where necessary, take the appropriate action to resolve any errors or mistakes which are discovered in the records
2	Know how to maintain and store records within the workplace	2.1) Know the different types of records and systems used for record keeping within the industry 2.2) Know how to maintain, handle and store records under current legislation 2.3) Know the records which are confidential or commercially sensitive and how to deal with these 2.4) Know the correct method and language in which records must be completed within the industry 2.5) Understand the importance of accurate record keeping for production purposes and organisational effectiveness 2.6) Understand and follow the procedures for transferring records 2.7) Know the problems which may occur during the maintenance of

		records and how these should be resolved

Learning outcome 1: Maintain and store records within the workplace

Topic 1.1: Identify records and check that they are suitable for their intended purpose
Will include personnel records, stock records, invoices, order records, machinery repair and service records, health and safety assessments, other risk assessments, planting plans, cropping patterns.

Three main types of storage: physical (paper); electronic (computer, disk, USB stick, etc.); online (website and cloud-based systems). All should be kept securely under lock and key or password-protected where appropriate.

Personnel and other confidential records only to be accessed by appropriate people.

Topic 1.2: Make entries into records that are accurate and complete
Ensure entries are complete and accurate; ensure that they are in chronological order, avoid jargon, abbreviations and slang; complete records as soon as possible after event has taken place; ensure records are dated and signed to create audit trail.

Topic 1.3: Transfer records where appropriate and accurately record information as necessary
Transfer records in ways that ensure the security and confidentiality of the record; personnel and financial records only transferred by appropriate and authorised people.

Topic 1.4: Store confidential records in a safe location in accordance with organisational and legislative requirements
Staff and finance records stored under lock and key or password-protected. All personal and sensitive records stored in accordance with General Data Protection Regulation (GDPR) requirements. Business-sensitive information stored securely and only accessible by authorised personnel.

Topic 1.5: Refile records correctly after use, where applicable
Place files back in right position and appropriate folders. Back up all computer files/records.

Topic 1.6: Where necessary, take the appropriate action to resolve any errors or mistakes which are discovered in the records
Where errors are found, confirm with other staff before adjusting. Confirm stock errors by making physical count if necessary.

Learning outcome 2: Know how to maintain and store records within the workplace

Topic 2.1: Know the different types of records and systems used for record keeping within the industry
Will include personnel records, stock records, invoices, order records, machinery repair and service records, health and safety assessments, other risk assessments, planting plans, cropping patterns.

Topic 2.2: Know how to maintain, handle and store records under current legislation

Ensure entries are complete and accurate; ensure that they are in chronological order, avoid jargon, abbreviations and slang; complete records as soon as possible after event has taken place; ensure records are dated and signed to create audit trail.

Transfer records in ways that ensure security and confidentiality.

All personal and sensitive records stored in accordance with General Data Protection Regulation (GDPR) requirements. Business-sensitive information stored securely and only accessible by authorised personnel.

Topic 2.3: Know the records which are confidential or commercially sensitive and how to deal with these
Staff and finance, business and commercially sensitive data. Keep secure under lock and key or password-protected.

Topic 2.4: Know the correct method and language in which records must be completed within the industry
Avoid jargon and slang. Avoid abbreviations. Use appropriate variety and trade names where appropriate.

Topic 2.5: Understand the importance of accurate record keeping for production purposes and organisational effectiveness
Understand how accurate and timely record keeping allows audit trails to be established. Keep records simple and factual. Avoid offensive statements, speculation and guesswork.

Topic 2.6: Understand and follow the procedures for transferring records
Always have authority to move records; never leave records unattended; do not move personnel or financial records for which you are not authorised.

Topic 2.7: Know the problems which may occur during the maintenance of records and how these should be resolved
May include: incorrect refiling of records; misplaced decimal points; figures transposed incorrectly; wrong locations given for stock; incorrect or out-of-date stock figures; incorrect varieties on planting plans; lack of dates and signatures. Resolved by checking with other staff where necessary; raising issues with line managers; physical checks; checking against labels, etc.

Unit 3 Maintain and Operate Machinery and Other Equipment Safely and Efficiently

What is this unit about?

This unit aims to provide general principles and information on the operation and maintenance of land based machinery and how this can be put into practice.

Learners will understand the purpose and operation of land based machinery, how it is maintained and what personal protective equipment (PPE) is necessary. Learners will also develop knowledge relating to legislation and industry best practice guidance for land based machinery.

Learners will also learn how to safely use and maintain machinery and consider the conditions in which machinery might operate.

Learning outcomes

	Learning Outcome	Topic	
1	Understand the purpose and operation of land based machinery	1.1) 1.2)	Know current legislation and industry guidance relating to machinery State the purpose and operation of land based machines
2	Prepare machinery for use in the land based sector (at least three machines)	2.1) 2.2) 2.3) 2.4)	Prepare selected land based machinery in line with manufacturer's instructions Carry out pre-use checks for selected machinery in line with manufacturer's recommendations Identify common faults and suggest appropriate remedial action Check and report on the safety requirements for selected machinery in accordance with manufacturer's guidance
3	Operate land based machinery	3.1) 3.2) 3.3) 3.4)	Carry out risk assessments Identify ways to reduce environmental impact of using selected land based machinery Operate land based machinery Carry out post-operation procedures

Learning outcome 1: Understand the purpose and operation of land-based machinery

Topic 1.1: Know current legislation and industry guidance relating to machinery
Know and understand the importance of legislation and industry best practice relating to the purpose and operation of land based machinery; this might include:

- Provision and Use of Work Equipment Regulations (PUWER) 1998
- Health and Safety at Work Act 1974
- Management of Health and Safety at Work Regulations
- Control of Substances Hazardous to Health (COSHH) Regulations 2002
- Personal Protective Equipment at Work Regulations (PPE) 1992
- Environmental Protection Act 1990
- Wildlife and Countryside Act 1981
- Control of Noise at Work Regulations 2005

- Control of Vibration at Work Regulations 2005
- Lifting Operations and Lifting Equipment Regulations (LOLER) 1998

Topic 1.2: State the purpose and operation of land based machines
Understand the purpose, operation and working principles/limitations of selected land-based machinery. This might include:

- Whether the machinery is self-propelled, trailed, tractor-mounted, purpose-built or pedestrian
- Power source (electric, battery, spark or compression ignition, PTO, hydraulic)
- Drive and transmission systems
- Cutting mechanisms
- Loading capacity
- Range
- Terrain suitability
- Safety features

Learning outcome 2: Prepare machinery for use in the land based sector

The learner will be able to show that they have the ability to prepare work machines specific to their area of study. Manufacturer's instructions, user manuals or machinery handbooks must be available for learners. Learners should be able to do this for three different machines.

Topic 2.1: Prepare selected land based machinery in line with manufacturer's instructions
Working in accordance with manufacturer's instructions, user manuals or machinery handbooks, prepare selected land based machinery for work.

Topic 2.2: Carry out pre-use checks for selected machinery in line with manufacturer's recommendations
Working in accordance with manufacturer's instructions, user manuals or machinery handbooks, carry out pre-use checks on selected land based machinery.

Topic 2.3: Identify common faults and suggest appropriate remedial action
Common problems that might be identified include:

- Fuel issues – incorrect, polluted, insufficient
- Blocked filters
- Oil pressure issues
- Damaged components
- Damaged or blunt blades
- Fouled or incorrectly set up spark plugs
- Blocked mechanisms
- Starter recoil tension

Topic 2.4: Check and report on the safety requirements for selected machinery in accordance with manufacturer's guidance
Working in accordance with manufacturer's instructions, user manuals or machinery handbooks, check and report on the safety requirements for the selected equipment.

Know where, and to whom, to report problems.

Learning outcome 3: Operate land based machinery

Delivery of this unit should be through supervised practical training and it should reflect use in a realistic work environment. Assessment should only take place after the learner has had sufficient time to develop the necessary operational skills. While the learner is not required to transport machinery, they should be aware of any transport requirements.

Topic 3.1: Carry out risk assessments
Undertake a risk assessment for machinery in accordance with Health and Safety at Work Act 1974.

Topic 3.2: Identify ways to reduce environmental impact of using selected land-based machinery
Learners will be able to show how to minimise environmental damage/impact in relation to:

- Fuel and oil spillages
- Emissions
- Soil stability
- Protected species
- Appropriate waste disposal
- Watercourses

Topic 3.3: Operate land based machinery
Safely and efficiently operate specialist land based machinery and show the following:

- Appropriate risk assessment
- Adherence to safety guidance
- Following the operator's manual
- Monitoring machinery performance
- Communicating effectively
- Clearing any blockages
- Converting between work and storage positions (where appropriate)
  Safe, efficient and economic operation

Topic 3.4: Carry out post-operation procedures
This will include:

- Cleaning
- Inspecting for and reporting any damage or defects
- Lubrication
- Storage
- Security

Unit 4 Crop Establishment

What is this unit about?

Introducing the principles and skills for the preparation of suitable seedbeds/growing medium and to carry out appropriate establishment of a range of crops for maximum growth.

This unit will cover information on the establishment of arable crops and root and field vegetables.

Learning outcomes

	Learning Outcome	Topic
1	Prepare seedbed/growing medium for maximum growth potential	1.1) Know why seedbed preparation is important 1.2) Know the operations of preparing a seedbed according to soil and crop type, weather conditions 1.3) Know the types of equipment used in preparing the seedbed
2	Know how to establish a range of agricultural and horticultural crops for given markets	2.1) Know Crops and life cycles 2.2) Understand end uses and market requirements 2.3) Know planting specifications 2.4) Identify different Crop rotations
3	Plan the nutrition of crops	3.1) Understand and interpret soil-analysis data 3.2) Understand the impact of fertiliser programmes 3.3) Know the function of nutrients, deficiency/excess symptoms 3.4) Know and follow legislative and environmental guidelines
4	Understand control measures for weeds, pests and diseases	4.1) Identify weeds, pests and diseases 4.2) Know the importance of control 4.3) Understand weed, pest and disease biology 4.4) Know the different cultural and chemical control

Learning outcome 1: Prepare seedbed/growing medium for maximum growth potential

This learning outcome will need to be delivered at the start of the production cycle; crop walks will be beneficial to identify cultivation practices and appropriate seedbeds for the crops in the range.

Topic 1.1: Know why seedbed preparation is important
Know why seedbed/growing medium preparation is important, including how to prepare a suitable seedbed/growing medium for different crops.

Topic 1.2: Know the operations of preparing a seedbed according to soil and crop type, weather conditions
Understand the impact of climate, weather, ground condition, previous cropping and the type of crop that is to be planted on the preparation of a seedbed/growing medium.

Topic 1.3: Know the types of equipment used in preparing the seedbed
Know types and their effect on seedbed/growing medium, including:

- Subsoiler

- Plough
- Cultivators – tine, rotary
- Harrows – disc, tine, power
- Rollers – flat, Cambridge, crumbler

Learning Outcome 2: Know how to establish a range of agricultural and horticultural crops for given markets

Topic 2.1: Crops and life cycles
Know different crops and their life cycles in order to recognise seeds and their growth stages in the field – include annual, biennial, perennial and ephemeral.

Topic 2.2: End uses and market requirements
Know the end use and markets for crops, including:

- Named varieties for different uses
- End uses for crops
- Quality standards
- Assurance and quality schemes

Topic 2.3: Planting specifications
Know planting specifications, including:

- Time of drilling/planting
- Seedbed
- Soil type
- Seed rates/plant density
- Planting depth
- Row width and spacing
- Plant populations
- Expected yields
- Thousand Grain Weight

Topic 2.4: Crop rotation
Know crop rotations and the reasons for them, including:

- Restorative crops
- Exhaustive crops
- Continuous cropping
- Break cropping
- Catch cropping

Also crops appropriate to different soil types (clay, sand, silt, loam, chalk and peat).

Learning outcome 3: Plan the nutrition of crops

Plan and monitor crop nutrition throughout the growth cycle using information from soil analysis and according to current legislative and environmental guidelines.

Topic 3.1: Understand and interpret soil-analysis data
Interpret soil analysis data, including:

- Soil Mineral Nitrogen (SMN)
- Soil Nitrogen Supply (SNS)
- Index System
- Field procedures
- Precision farming methods
- Variable rate applications

Topic 3.2: Impact of fertiliser programmes
Plan a fertiliser programme for a named crop. This will include:

- Major and minor nutrients (nitrogen, manganese, phosphate, potassium, sulphur)
- Timing of applications
- Lime
- Manure applications
- Use of appropriate management software (MANNER/PLANET) or written guidance (RB209)
- Avoidance of waste/pollution

Topic 3.3: Function of nutrients, deficiency/excess symptoms
Understand the functions of nutrients, recognise deficiency symptoms and identify how to overcome them. This will include:

- Knowledge of the key minor and major nutrients
- Symptoms caused by an excess or deficiency of those nutrients
- Symptoms caused by associated disease
- Symptoms due to pH levels

Topic 3.4: Know and follow legislative and environmental guidelines
Planning the application of fertilisers and other plant nutrition is controlled by a combination of legislation, regulation and best practice. The following examples are important and there should be an awareness of where each applies:

- Environmental Protection Act 1990
- Cross Compliance Nitrates Directive 1991
- Water Environment (Water Framework Directive 2003)
- Local Environmental Risk Assessment Procedures (LERAPs)
- Nitrate Vulnerable Zones (NVZs) and impact on timing
- Entry Level Scheme rules
- Protecting our Water, Soil and Air (Defra)

Learning outcome 4: Understand control measures for weeds, pests and diseases

Topic 4.1: Weeds, pests and diseases
Weed, pest and disease issues should be identified in at least two crops. Crop walks and an introduction to an agronomist may be useful for this learning outcome.

- Identify soil, stem and leaf diseases
- Identify major weeds and their impact/importance
- Identify pests and the damage they may cause
- Identify beneficial insects

Topic 4.2: Know the importance of control
Understand the impact of weeds, pests and diseases in terms of:

- Yields
- Subsequent crops
- Harvesting
- Storage
- Environment
- Marketing
- Profits

Topic 4.3: Weed, pest and disease biology
Know the biology of weeds, pests and diseases to aid discussions on aspects that are relevant to their spread and control, including:

- Fungal, viral and bacterial diseases
- Spread of weeds, pests and diseases
- Life cycles
- Resistance

Topic 4.4: Cultural and chemical control

Understand and evaluate ways to control weeds, pests and diseases. To include:

- Cultural control – rotations, varietal choice, cultivations, seeds, seed rates, rogueing, fertiliser use, biological controls, beneficial insects
- Chemical control – herbicides, insecticides, fungicides, molluscicides, plant growth regulators (PGRs), seed dressings
- Thresholds and timings

Unit 5 Crop Management

What is this unit about?

This unit will develop the knowledge, understanding and skills to identify, monitor and maintain the healthy growth of crops. It includes the identification of pests, diseases and disorders and implementing the correct procedures to deal with these.

Learning outcomes

	Learning Outcome	Topic
1	Monitor the health of the crop	1.1) Monitor the crop effectively 1.2) Provide clear and accurate information for recording purposes
2	Identify pests, diseases and disorders	2.1) Identify at least one from each category
3	Maintain the healthy growth of extensive crops	3.1) Apply agreed organic or inorganic nutrients 3.2) Minimise risks to crops 3.3) Minimise damage to crops from pests
4	Monitor the effectiveness of the operations	4.1) Monitor and evaluate the effectiveness of the operations
5	Promote health and safety and environmental practice	5.1) Work in a way which promotes health and safety 5.2) Ensure work is carried out in a manner which minimises environmental damage 5.3) Manage and dispose of waste
6	Maintain equipment	6.1) Maintain equipment in a fit state for use
7	Monitor the growth of extensive crops	7.1) Know the relationship between production requirements and the need for monitoring of the crop 7.2) Know the optimum time for monitoring crops 7.3) Know the implications of maintaining the healthy growth of the crop
8	Be aware of factors which affect the healthy growth of crops	8.1) Nutrients 8.2) pH 8.3) Other cultural factors
9	Identify and understand the types of problems and how to deal with them	9.1) Know all the types of problems which may affect the crop, how to recognise them and the corrective action to be taken 9.2) Know the major nutrients and trace elements of the crop 9.3) Find sources of technical advice 9.4) Know the methods used to minimise the damage to crops from pests
10	Know relevant health and safety legislation and environmental good practice	10.1) Know current health and safety legislation, codes of practice and any additional requirements 10.2) Care for the environment 10.3) Know the correct and appropriate methods for disposing of waste 10.4) Keep relevant records

Learning outcome 1: Monitor the health of the crop

Topic 1.1: Monitor the crop effectively
Monitor in accordance with production requirements for the following:

- Desired healthy growth
- Pests
- Diseases
- Disorders

Topic 1.2: Provide clear and accurate information for recording purposes
Know what information is required, where it should be recorded and where the information is retained.

Learning outcome 2: Identify pests, diseases and disorders

Topic 2.1: Identify at least one from each category
Identify at least one from each of the following categories:

- Pests
- Diseases
- Disorders

Learning outcome 3: Maintain the healthy growth of extensive crops

Topic 3.1: Apply agreed organic or inorganic nutrients
Apply nutrients, which can be either organic or inorganic, correctly to maintain the healthy growth of the crop.

Topic 3.2: Minimise risks to crops
Implement methods to minimise risks to crops in accordance with legal and organisational requirements.

Topic 3.3: Minimise damage to crops from pests
Minimise damage to crops from pests through the effective use of scarers or repellents.

Learning outcome 4: Monitor the effectiveness of the operations

Topic 4.1: Monitor and evaluate the effectiveness of the operations
Record the data following processes noted in Topic 1.2.

Learning outcome 5: Promote health and safety and environmental practice

Topic 5.1: Work in a way which promotes health and safety
Undertake work practices that promote health and safety and that are consistent with relevant legislation, codes of practice and company policy.

Topic 5.2: Ensure work is carried out in a manner which minimises environmental damage
Follow regulations, guidelines and best practices – dispose of waste correctly, ensure machinery settings are correct, etc.

Topic 5.3: Manage and dispose of waste

Manage and dispose of waste in accordance with legislative requirements and codes of good practice.

Learning outcome 6: Maintain equipment

Topic 6.1: Maintain equipment in a fit state for use
Know the importance and methods of maintaining equipment in a fit state for use to minimise risks to crops, humans and the environment.

Learning outcome 7: Monitor the growth of extensive crops

Topic 7.1: Know the relationship between production requirements and the need for monitoring of the crop
Know how yield, disease and nutrient levels will be determined by monitoring the crop.

Topic 7.2: Know the optimum time for monitoring crops
Know the optimum time for monitoring crops, given their state of growth, the time of the year and potential risks from pests, diseases and disorders.

Topic 7.3: Know the implications of maintaining the healthy growth of the crop
Know how maintaining the healthy growth of the crop may have an impact on the operator, the environment, the consumer and financial implications.

Learning outcome 8: Be aware of factors which affect the healthy growth of crops

Topic 8.1: Nutrients
Know how nutrients affect the growth and development of crops.

Topic 8.2: pH
Know the meaning of pH and how to establish it to meet the requirements of the crop.

Topic 8.3: Other cultural factors
Know how the previous crop, soil type, weather, etc. affect the nutrient requirements of crops.

Learning outcome 9: Identify and understand the types of problems and how to deal with them

Topic 9.1: Know all the types of problems which may affect the crop, how to recognise them and the corrective action to be taken
This will include problems caused by: animals, viral threats, bacterial threats, fungal diseases, nutrient, trace element deficiencies, insects, drought and water logging.

Topic 9.2: Know the major nutrients and trace elements of the crop
Major: P, N, K.
Trace: Zinc, copper, manganese.

Topic 9.3: Find sources of technical advice
Know where to find sources of technical advice regarding suitable actions to minimise the effects of pests, diseases and disorders.

Topic 9.4: Know the methods used to minimise the damage to crops from pests
Integrated pest management, chemical applications, seed treatments.

Learning outcome 10: Know relevant health and safety legislation and environmental good practice

Topic 10.1: Know current health and safety legislation, codes of practice and any additional requirements
Know current health and safety legislation, codes of practice and any additional requirements which apply to this area of work.

Topic 10.2: Care for the environment
Understand possible environmental damage and how to respond appropriately.

Topic 10.3: Know the correct and appropriate methods for disposing of waste
According to legislation, good practice and company policies and procedures.

Topic 10.4: Keep relevant records
Know the records required for management and legislative purposes and the importance of maintaining them.

Unit 6 Harvesting Operations

What is this unit about?

This unit aims to provide the learner with the skills, knowledge and understanding required to carry out harvesting operations, including the assessment of timing and quality.

The learner will identify the crops which are to be harvested, the resources needed and the appropriate harvesting techniques to match crop condition and quality requirements. Crops include: arable crops, vegetables, fruits or plants.

The learner will also check that the crop is in a condition suitable for harvesting and operate to high levels of hygiene, environmental good practice and health and safety.

Learning outcomes

	Learning Outcome	Topic
1	Select crops ready for harvesting	1.1) Identify the crops which are ready to be harvested in line with required standards considering timing and quality
2	Maintain harvesting operations	2.1) Establish the availability of resources required for harvesting 2.2) Ensure harvesting methods used are effective in meeting the production specification and minimise site damage 2.3) Monitor harvesting methods throughout the process and, where necessary, adjust to improve the process or maintain the quality 2.4) Take appropriate action where problems arise during harvesting 2.5) Assess the condition of the crop during harvesting, and take the correct action when its condition fails to meet the production specification 2.6) Handle harvested crops in a way that minimises damage to the crop 2.7) Prepare the harvested crop correctly for the next stage of the process
3	Use and maintain equipment during harvesting operations	3.1) Ensure equipment is prepared, used and maintained in a safe and effective condition
4	Promote health and safety and environmental good practice	4.1) Work in a way which promotes health and safety, is consistent with relevant legislation, codes of practice and any additional requirements 4.2) Ensure work is carried out in a manner which minimises environmental damage 4.3) Manage and dispose of waste in accordance with legislative requirements and codes of practice

5	Identify and manage factors affecting harvesting operations	5.1) 5.2) 5.3) 5.4)	Identify the crops which are ready to be harvested in line with production requirements Know how and why to adjust the harvesting process Know how to handle crops to minimise damage Know how and why to plan the resources required
6	Identify and deal with harvesting problems	6.1) 6.2)	Identify common problems which arise during harvesting and what actions to take Minimise site damage, both short and long term, during harvesting
7	Understand the reasons for maintaining equipment	7.1)	Know the importance and methods of maintaining equipment ready for use
8	Know relevant health and safety legislation and environmental good practice	8.1) 8.2) 8.3) 8.4)	Know and follow current health and safety legislation, codes of practice and any additional requirements which apply to this area of work Know how to respond to possible environmental damage Know the correct and appropriate methods for disposing of organic and inorganic waste Know the records required for management and legislative purposes and the importance of maintaining them

Learning outcome 1: Select crops ready for harvesting

Topic 1.1: Identify the crops which are ready to be harvested in line with required standards considering timing and quality
Use appropriate methods to identify the crops to be harvested. This will include decisions based on size, weight, colour, maturity, weather and ground conditions, market requirements, freedom from damage by pest, disease or disorder.

Learning outcome 2: Maintain harvesting operations

Topic 2.1: Establish the availability of resources required for harvesting
Consider human, financial, material and equipment resources needed for harvesting.

Topic 2.2: Ensure harvesting methods used are effective in meeting the production specification and minimise site damage
Consider the crop that is being harvested. Hand harvesting, part and selective harvesting, lifting root crops, mechanised harvesting methods.

Ensure the correct use of harvesting aids and equipment. Impact of mechanised equipment on crop and soil. Use of skilled labour.

Topic 2.3: Monitor harvesting methods throughout the process and, where necessary, adjust to improve the process or maintain the quality
Consider the impact of at least three of the following factors:

- Terrain
- Crop condition

- Crop density
- Timing
- Prevailing weather
- Ground condition
- Crop type

Topic 2.4: Take appropriate action where problems arise during harvesting
Consider problems such as:

- Site access
- Machinery breakdowns
- Crops being damaged by current harvesting methods
- Availability of trained staff
- Changing weather
- Ground conditions

Topic 2.5: Assess the condition of the crop during harvesting, and take the correct action when its condition fails to meet the production specification
Take steps to reduce incidences of contamination and damage. Ensure harvested crop meets contract specifications and customer requirements.

Topic 2.6: Handle harvested crops in a way that minimises damage to the crop
See 2.3 and 2.5 above.

Topic 2.7: Prepare the harvested crop correctly for the next stage of the process
Consider handling, transport, packing and storage facilities.

Learning outcome 3: Use and maintain equipment during harvesting operations

Topic 3.1: Ensure equipment is prepared, used and maintained in a safe and effective condition
Consider types of equipment needed, appropriate to the task and crop. These will include hand tools, harvesting aids, harvesters, mechanised equipment, transporting equipment.

Ensure that equipment is maintained ready for use.

Undertake routine maintenance and checks, including lubrications, sharpening, cleaning, manufacturer's checks.

Learning outcome 4: Promote health and safety and environmental good practice

Topic 4.1: Work in a way which promotes health and safety, is consistent with relevant legislation, codes of practice and any additional requirements
Could include:

- Provision and Use of Work Equipment Regulations (PUWER) 1998
- Health and Safety at Work Act 1974
- Management of Health and Safety at Work Regulations
- Control of Substances Hazardous to Health (COSHH) Regulations 2002
- Environmental Protection Act 1990
- Control of Noise at Work Regulations 2005
- Lifting Operations and Lifting Equipment Regulations (LOLER) 1998

Topic 4.2: Ensure work is carried out in a manner which minimises environmental damage

Consider: potential damage to soil structure, run-off and erosion, run-off from storage areas, reducing waste and correctly disposing of waste.

Topic 4.3: Manage and dispose of waste in accordance with legislative requirements and codes of practice
Consider where waste is stored, minimise waste where possible, use of composting techniques, disposal of packaging correctly, recycle where possible, use of licensed contractors.

Learning outcome 5: Identify and manage factors affecting harvesting operations

Topic 5.1: Identify the crops which are ready to be harvested in line with production requirements
See 1.1. Consider factors such as size, weight, colour, maturity, weather and ground conditions, freedom from damage by pest, disease or disorder.

Topic 5.2: Know how and why to adjust the harvesting process
Cover all the following:

- Terrain
- Crop condition
- Crop density
- Prevailing weather
- Ground condition
- Crop type

Topic 5.3: Know how to handle crops to minimise damage
Ensure handling is in line with best practice and is effective; ensure equipment is maintained to reduce incidence of damage; train staff where appropriate; understand customer requirements and standards; monitor harvested crop and adjust handling procedures if damage is occurring; ensure appropriate storage.

Topic 5.4: Know how and why to plan the resources required
To include:

- Equipment
- Human
- Financial
- Material

Learning outcome 6: Identify and deal with harvesting problems

Topic 6.1: Identify common problems which arise during harvesting and what actions to take
Common problems (and solutions) may include:

- Site access (avoid by choice of site, timing of operations and timeliness; use appropriate equipment)
- Damage to crops by equipment (correct choice of equipment and appropriate maintenance prior to and during operations)
- Damage to crops, wastage and maintaining work rates (staff training and supervision)
- Monitoring weather and ground conditions and adapting work practices
- Monitoring ground conditions and choosing appropriate working practices and equipment

Topic 6.2: Minimise site damage, both short and long term, during harvesting
See 4.2 and 6.1 above.

Learning outcome 7: Understand the reasons for maintaining equipment

Topic 7.1: Know the importance and methods of maintaining equipment ready for use
Ensure equipment is ready to use for timely harvest and to maintain the quality of the harvested product. Lack of machinery or equipment can lead to delays and losses.

Prepare equipment prior to harvest, including:

- Sharpening and cleaning cutting equipment
- Cleaning, routine maintenance and servicing of mechanised harvesting equipment
- Checking oil and fuel levels
- Ensuring trailers are clean and in safe working order
- Checking brakes and lights

Clean and store equipment appropriately after use.

Maintain records, e.g. maintenance and repairs.

Report faults.

Learning outcome 8: Know relevant health and safety legislation and environmental good practice

Topic 8.1: Know and follow current health and safety legislation, codes of practice and any additional requirements which apply to this area of work
See 4.1 above.

Topic: 8.2: Know how to respond to possible environmental damage
See 4.2 above.

Topic 8.3: Know the correct and appropriate methods for disposing of organic and inorganic waste
See 4.3 above.

Topic 8.4: Know the records required for management and legislative purposes and the importance of maintaining them
Records may include:

- Cropping plans – including varieties, planting and harvesting times
- Yield and quality records
- Marketing plans
- Harvesting plans and outcomes
- Storage records
- Input usage
- Staff records
- Farm assurance scheme records
- Reporting of problems and quality issues

Records may also be used for management of future cropping, planning of marketing, crop yields, quality monitoring, improving best practice.

These may be recorded by written notes, approved recording form or electronically, as required by the organisation.

Unit 7 Storage

What is this unit about?

This unit is designed to give the learner a broad knowledge of the handling and storage requirements for a range of crops and experience of using related equipment.

It is unlikely that either centres or single enterprises will have the range of facilities covered by this unit. Delivery of this unit should be supported by visits, videos and computer searches to ensure that range of topics are covered. Learners should have knowledge of the range of storage options and practical experience of those in use in the enterprise that they are working in.

Learning outcomes

	Learning Outcome	Topic
1	Know the systems used to maintain harvested combinable crops in store	1.1) Outline combinable crop drying and storage systems 1.2) Describe the factors that define appropriate storage conditions for combinable crops 1.3) Describe how storage systems/dryer designs are influenced by the quality requirements of combinable crops in storage
2	Know the processes and systems to maintain harvested root crops in store	2.1) Outline root crop storage systems 2.2) Describe the factors that define appropriate storage conditions for root crops 2.3) Describe the criteria used to select appropriate storage methods for root crops
3	Understand processes and systems to maintain soft fruit, field vegetables or forage crops in store	3.1) Explain the processes involved in the storage of selected field-scale vegetables, soft fruit or forage crops 3.2) Discuss control of the deterioration of field-scale vegetables, soft fruit or forage crops in store
4	Be able to use machinery and equipment used for handling, cleaning, grading and weighing crops	4.1) Safely operate appropriate equipment for handling, cleaning, grading and weighing selected crops 4.2) Describe the selection and use of equipment for handling, cleaning, grading and weighing selected crops

Learning outcome 1: Know the systems used to maintain harvested combinable crops in store

This outcome refers to a range of combinable crops and will include wheat, barley, oats, beans, peas, oilseed rape.

Topic 1.1: Outline combinable crop drying and storage systems
Identify and explain a range of drying and storage systems, including:

- Permanent
- Portable direct heating systems
- Continuous flow
- Batch

- Ventilated bin dryers
- On-floor dryers

Topic 1.2: Describe the factors that define appropriate storage conditions for combinable crops
Appropriate storage systems should be:

- Clean
- Dust free
- Mildew free
- Contaminant (oil, grease, spillage) free

There should be arrangements for pest control (rodents, insects, birds) and for in-store movement of stored product.

Combinable crops going into store should also be at suitable moisture content for storage and market requirements.

Topic 1.3: Describe how storage systems/dryer designs are influenced by the quality requirements of combinable crops in storage
Design will be influenced by dryer capacity, continuous air flow capacity, volume to be stored, end use of crop (seed, feed, malt, industrial), cost.

Quality requirements will include moisture content, cleanliness, lack of contamination, nutrient content.

Learning outcome 2: Know the processes and systems to maintain harvested root crops in store

This outcome refers to a range of root crops including: potatoes, carrots, parsnips, onions, beet.

Topic 2.1: Outline root crop storage systems
Systems may include outdoor (in-field clamps) or indoor storage (unitised, ventilated, chilled).

Topic 2.2: Describe the factors that define appropriate storage conditions for root crops
Appropriate storage systems should:

- Be clean
- Be able to maintain appropriate moisture content
- Be able to control temperature
- Ensure air movement

Topic 2.3: Describe the criteria used to select appropriate storage methods for root crops
Criteria will include:

- Use of chemicals
- Length of storage time
- Future use of stored crop
- Local climate
- Quantity of crop to be stored
- Costs

Learning outcome 3: Understand processes and systems to maintain soft fruit, field vegetables or forage crops in store

This will include a wide range of crops:

- Soft fruit to include strawberries and raspberries
- Vegetables to include lettuce, cabbage, cauliflower, broccoli, potatoes, carrots, parsnips, onions, beet
- Forage crops to include hay, silage, haylage and treated whole crop cereals

Topic 3.1: Explain the processes involved in the storage of selected field-scale vegetables, soft fruit or forage crops
Chilling, refrigeration, controlled atmosphere, acidification.

Topic 3.2: Discuss control of the deterioration of field-scale vegetables, soft fruit or forage crops in store
Know the importance of timeliness of storage and that many of these crops are perishable.

Know that storage areas should be suitable, decontaminated and cleaned and how to minimise the risk of contamination.

Know how to maintain the health and quality of the crop in store by removal of:

- Diseased, damaged, oversize and undersize crop
- Green waste
- Soil, stones and debris
- Field heat (crop temperature reduction)

If necessary, understand how to effectively store crop treatment: chemical, air, temperature and environmental control.

Learning outcome 4: Be able to use machinery and equipment used for handling, cleaning, grading and weighing crops

Cover a minimum of one of the following categories:

- Soft fruit – to include strawberries and raspberries
- Vegetables – to include lettuce, cabbage, cauliflower and broccoli
- Forage crops – to include hay, silage, haylage and treated whole crop cereals
- Cereals – to include wheat, barley, oats, beans, peas, oilseed rape

Topic 4.1: Safely operate appropriate equipment for handling, cleaning, grading and weighing selected crops
Pre-operation would include checks on:

- Controls
- Pre-start checks
- Understand health and safety requirements
- Safe start and stop procedures
- Power take off (PTO) guards
- Fitness for purpose

In operation, check:

- Appropriate attachment for machine (if used)
- Controls
- Adjustments
- Safe working with machine and attachments
- Fitness for working environment
- Use of codes of practice and manufacturers' instructions

Topic 4.2: Describe the selection and use of equipment for handling, cleaning, grading and weighing selected crops
Appropriate equipment will include:

For handling:

- Forklifts
- Telehandlers
- Tractors
- Trailers
- Boxes
- Augers
- Conveyors

For cleaning, grading and weighing:

- Riddles
- Washers
- Brushers
- Sizers
- Weighing machines

Selection of equipment will be determined by:

- Cost
- Crop volume and size
- Relation to rate of harvesting
- Final use of crop
- Length of time in store
- System design
- Equipment compatibility
- Local climatic conditions
- Codes of practice and legislation

Unit 8 Preparing Growing Media (option)

What is this unit about?

Introducing the skills, knowledge and understanding required for preparing growing media for planting or potting in a container-based system.

Learning outcomes

	Learning Outcome	Topic
1	Prepare growing media	1.1) Know the different properties of the materials used to prepare growing media 1.2) Know procedures for obtaining the materials required 1.3) Know the different methods used for collecting and measuring out materials 1.4) Know methods of incorporating ingredients into the growing medium depending on its use 1.5) Understand the different methods of preparing growing media in relation to planting requirements
2	Know the factors that affect preparation of growing media and operations	2.1) Know the different growing media required for various crops and growing conditions and how this will influence media preparation 2.2) Know what external factors affect the timing of operations and their outcomes 2.3) Know the different storage conditions for growing media and the need for hygiene at all times
3	Plan, obtain and position materials	3.1) Know the correct quantity of source materials 3.2) Understand how to handle materials correctly and safely 3.3) Understand how to measure out and position the correct quantities of materials
4	Capturing information on growing media	4.1) Provide clear and accurate records
5	Select, use and maintain equipment for preparing growing media	5.0) Select appropriate equipment 5.1) Use equipment according to instructions 5.2) Prepare, maintain and store equipment in a safe and effective working condition
6	Understand and promote relevant health and safety legislation and environmental good practice	6.1) Know and work in a way that promotes current relevant health and safety legislation, codes of practice and any additional requirements 6.2) Know the possible environmental damage and how to respond appropriately

		6.3)	Know the correct and appropriate methods for disposing of organic and inorganic waste
		6.4)	Know the records required for management and legislative purposes and how to maintain them
7	Maintain equipment	7.1)	Know the importance of maintaining equipment ready for use

Learning outcome 1: Prepare growing media

Topic 1.1: Know the different properties of the materials used to prepare growing media
This will cover the following:

- Fertiliser: ground limestone; artificial fertilisers (liquids, powders or granules); straights or compounds; slow release; with or without trace elements; organic fertilisers; green manures; bulky organic matter containing nutrients
- Soil conditioners; bulky organic matter; other materials (sand, clay, grit, vermiculite, polystyrene chips); green manures
- Growing media ingredients; peat, loam, green waste, wood products, coir, other composted material, sand, grit
- Additives: fertiliser, lime, wetting agents, pesticides, specialist additives

Topic 1.2: Know procedures for obtaining the materials required
To include:

- Purchase/ordering procedures
- Storage arrangements
- Access to stores
- Recording of materials taken out, used and returned
- Facilities for transport to location required

Topic 1.3: Know the different methods used for collecting and measuring out materials
Collecting using evidence based on:

- Information from cropping programme
- Supervisor organisational procedures
- Ordering/purchasing
- Collecting from storage
- Methods of safe transport to site
- Hand, lifting and carrying equipment
- Transport aids

Measuring out materials:

- Weighing
- Measuring by volume of liquids or solid materials
- Counting

Positioning of materials:

- Near to site of usage
- Safe from damage by people, vehicles, contamination or water
- Not causing a trip hazard or obstruction

Topic 1.4: Know methods of incorporating ingredients into the growing medium depending on its use

Covering: mixing by hand; using mixers (batch or continuous flow); cultivation by hand; using pedestrian-operated or tractor-mounted machinery.

Topic 1.5: Understand the different methods of preparing growing media in relation to planting requirements
Preparation of growing media for use in containers (similar processes can be applied to ground preparation) understand the impact of the following:

- Consistency: evenness within the batch, consistency between batches
- Moisture level: moisture content of bulky materials use, addition of water
- Air-filled porosity
- Structure (fine/coarse) of bulky materials, particle size, type of mixer, required additives to change the properties of the growing medium
- Storage method (bags, bulk), length of storage, impact on nutrient and moisture levels

Learning outcome 2: Know the factors that affect preparation of growing media and operations

Topic 2.1: Know the different growing media required for various crops and growing conditions and how this will influence media preparation
Use examples relevant to the business where the learner is employed. For example:

- *Peat-reduced compost for potting on trees, requires to be free draining (large particles, added forest bark), nutrient available for long-term crop, heavy to resist toppling in wind, sterile to prevent weed growth, capable of being elevated and used in pot filler, added pesticide to control vine weevil.*

Topic 2.2: Know what external factors affect the timing of operations and their outcomes
Timing: date required to meet needs of cropping programme, storage, labour, need for stale seedbeds or consolidation, other pre-planting activities (such as application of herbicides), weather.

Outcomes: material use, soil type, prevailing weather conditions.

Topic 2.3: Know the different storage conditions for growing media and the need for hygiene at all times
Storage: bulk (inside or outside), in bulk bags, in individual bags, need for protection from rain, drying out, contamination, consequent use and handling method.

Hygiene issues: freedom from contamination by pests, diseases, weeds/weeds seed, soil and other matter, animal wastes.

Reasons: avoidance of pests and disease in the crop, reducing weed load, health impact on operatives.

Learning outcome 3: Plan, obtain and position materials

Topic 3.1: The correct quantity of source materials
E.g. fertiliser and bulky ingredients, for preparing growing media in accordance with production requirements.

Topic 3.2: Handle materials correctly and safely
Ensure materials are handled correctly and safely in line with company policies and current legislation and codes of practice.

Topic 3.3: Measure out and position the correct quantities of materials
Using criteria identified in 1.3.

Learning outcome 4: Capturing information on growing media

Topic 4.1: Provide clear and accurate records
Information may include:

- Materials used/remaining
- Date, time, growing medium prepared
- Treatments included in growing media (including use of pesticides); location of growing media (if other than preparation site)
- Condition of growing media
- Problems encountered

Recording methods include written or electronic format or by labelling the growing media.

Learning outcome 5: Select, use and maintain equipment for preparing growing media

Topic 5.1: Select appropriate equipment
Tools and equipment are made available, ready for use.

Equipment may include:

- Mixers
- Soil preparation equipment (hand pedestrian-operated machinery, tractor-mounted machinery)
- Weighing and measuring equipment (scales, measures)

All appropriate personal protective equipment (PPE) is made available, selected and safely used by all persons (e.g. waterproof clothing, steel toe-capped boots, UV Protection, gloves, aprons, hats).

Topic 5.2: Use equipment according to instructions
Used for the operation and in situations as detailed by:

- The manufacturer/supplier/supervisor
- Current legislation and codes of practice

Topic 5.3: Prepare, maintain and store equipment in a safe and effective working condition
Maintain records, e.g. maintenance and repairs. Report faults to line manager.

Learning outcome 6: Understand and promote relevant health and safety legislation and environmental good practice

Topic 6.1: Know and work in a way that promotes current relevant health and safety legislation, codes of practice and any additional requirements
May include:

- Management of Health and Safety at Work regulations
- Environmental protection legislation
- Relevant waste legislation
- Codes of practice Protecting our Water, Soil and Air
- Nitrogen sensitive areas
- Customer regulations and demands
- Assured produce schemes

- Provision and Use of Work Equipment Regulations (PUWER) 1998
- Lifting Operations and Lifting Equipment Regulations (LOLER) 1998
- StopSafe
- Manual Handling

Topic 6.2: Know the possible environmental damage and how to respond appropriately
Issues and responses may include:

Issue: run-off from stored growing media causing pollution of controlled water
Response: store under cover away from water sources; in event of run-off, take steps at a local level to contain pollution and spread of pollution, notify appropriate bodies, e.g. Environment Agency

Issue: leaching of nutrient from growing area to controlled water
Response: limit level of use of nutrient, especially soluble nitrogen from organic and inorganic sources, schedule use only when actively growing and rainfall not expected

Issue: use of non-sustainable materials
Response: check source of all materials, reduce use of peat, reduce usage and wastage of all materials, recycle and re-use

Topic 6.3: Know the correct and appropriate methods for disposing of organic and inorganic waste
Organic waste: reduce waste removed from plant area; unwanted plant material composted (unless the material poses a threat to plant health, e.g. diseased material or perennial weeds).

Inorganic waste: wastes from servicing and maintenance of equipment disposed of in appropriate container; wastage of packaging minimised and, where unavoidable, recycled or disposed of in appropriate container; inorganic waste is carefully controlled until disposed of through licensed provision.

Topic 6.4: Know the records required for management and legislative purposes and how to maintain them
Records required:
- Materials used/remaining
- Date
- Time
- Growing medium prepared
- Treatments included in growing media (including use of pesticides); location of growing media (if other than preparation site); condition of growing media; problems encountered

Recording in written or electronic format or by labelling the growing media.

Importance:
- To identify stock levels of ingredients to enable re-order
- To identify problems with equipment (to facilitate repair)
- Understand required ingredients or prepared media (to avoid problems in future)
- To know the availability of prepared growing media for production programme
- Know the legal requirements – Codes of Practice and legislation

Management purposes:
- Control costs

- Manage resources
- Plan for future actions

Learning outcome 7: Maintain equipment

Topic 7.1: Know the importance of maintaining equipment ready for use
Importance:

- Improved performance
- Ensuring correct operation and output
- Prolonged life
- Greater reliability and reduced breakdown time and cost
- Available for next time needed
- Reduced contamination and crop damage
- Reduced wastage

Methods of maintaining equipment ready for use to minimise risks:

- Routine checking and calibration of all equipment to ensure effective and efficient operation
- Lubrications of machinery as directed by manufacturer
- Periodic servicing of power units
- Checking and cleaning all equipment
- Recharge batteries (if appropriate) after use to ensure readiness for next operation

Unit 9 Communication

What is this unit about?

The aim of this unit is to provide the learner with the knowledge, understanding and skills required to communicate information within the workplace.

Learning outcomes

	Leaning Outcome	Topic
1	Understand the principles and techniques of work-related communication	1.1) Understand the importance of clear and unambiguous communication 1.2) Know the different forms of communication aids and their use 1.3) Understand the value of effective and timely communication in customer care
2	Communicate work-related information	2.1) Communicate with others, including team, clients, the public and colleagues 2.2) Use basic IT systems when communicating

Learning outcome 1: Understand the principles and techniques of work-related communication

Topic 1.1: Understand the importance of clear and unambiguous communication
Know communication techniques used to gain and maintain the attention and interest of an audience.

Understand the purposes of communication to:

- Exchange information
- Make or confirm arrangements
- Persuade staff or customers
- Make plans
- Develop skills and knowledge
- Build or maintain relationships
- Delegate tasks to team
- Advise team where performing well or underperforming

Know:

- The level of detail which may be required and the need for clarity
- The importance of confirming information and why this should be acknowledged and accurately recorded
- The importance of explaining to others the level of confidence that can be placed on the information being communicated
- The relevant legislation in receiving and sending information

Topic 1.2: Know the different forms of communication aids and their use
Know:

- The different methods for communicating information and the ways it may need to be adapted to suit the audience

    - Written, e.g. letters, reports
    - Electronic, e.g. emails, texts
    - Verbal, e.g. telephone calls
    - Face-to-face, e.g. meetings, presentations
    - Distance, e.g. video conferencing
- The principles of effective written communications in a business environment
- The principles of effective verbal communications in a business environment
- The principles of effective IT communications in a business environment
- The advantages and disadvantages of different methods of communication for different purposes

Topic 1.3: Understand the value of effective and timely communication in customer care

Understand:

- The importance of effective communication in customer service
- How tone of voice, choice of expression and body language can affect the way customers perceive their experience
- Why 'customer service language' is used
- Verbal and non-verbal signals that show how a customer may be feeling
- The types of information needed when communicating verbally with customers
- When information may be required urgently
- Why it is important to take messages accurately and the potential effects of not doing so
- The situations in which confidentiality needs to be maintained
- The importance of handling customer complaints

Learning outcome 2: Communicate work-related information

Topic 2.1: Communicate with others, including team, clients, the public and colleagues

Be able to:

- Identify the information to be communicated
- Confirm that the audience is authorised to receive the information
- Provide accurate information using appropriate communication methods, e.g. verbally, in writing, etc.
- Communicate in a way that the listener can understand, using language that is appropriate to the topic
- Confirm that the listener has understood what has been communicated
- Communicate clearly, concisely and professionally with people
- Where communication is in writing, use correct grammar, spelling, sentence structure and punctuation
- Be able to pass on messages accurately, receive and forward on information
- Identify customers' wants and priorities
- Listen 'actively' to what people are saying
- Use a tone of voice and expression that reinforces messages when communicating
- Use language that reinforces empathy with people
- Adapt responses in accordance with people's changing behaviour
- Provide information and advice that meets customers' needs
- Maintain organisational standards of behaviour and communication when interacting with people

- Check that people have understood what has been communicated
- Adhere to organisational policies and procedures, legal and ethical requirements when communicating verbally with people
- Escalate any problems that cannot be resolved by yourself

Topic 2.2: Use basic IT systems when communicating

- Use IT for checking/monitoring works carried out by the team, which might include handheld devices/computer software
- Use mobile phones for making calls
- Send/receive emails

Unit 10 – Input costs, cost of production, margins and impact on business profitability

What is this unit about?

This unit focuses on the range of financial and physical records that are required to meet legal requirements as well as to ensure effective business operation. Learners will become aware of paper-based and computerised systems for financial records and how these can be used to aid decision-making, monitor and control business performance.

Learning outcomes

	Learning Outcome	Topic
1)	Understand how to use financial and physical record-keeping systems	1.1) Monitor business performance and progress 1.2) Financial records 1.3) Physical records

Learning outcome 1: Understand how to use financial and physical record-keeping systems

Topic 1.1: Monitor business performance and progress

Learners will understand how financial and physical records are used in monitoring business performance and progress to include:

- production levels
- costs of production – input costs, staffing costs, drying costs, harvesting costs, etc.
- financial efficiency – monitoring income and expenditure, storing information correctly, recording transactions in a timely manner
- monitoring against targets – check regularly to ensure budget is on target. Check actual spend against budgeted expenditure
- budgets – understand the farm budget and maintain records for inspection (receipts, invoices, purchase orders, etc.)
- previous periods
- relevant review periods, i.e. weekly, monthly, annually – ensures that transactions are being recorded, that expenditure is checked against budget assumptions, allows for appropriate remedial actions
- staff roles in recording and analysing information – spending funds appropriately, managing budgets, monitoring and recording expenditure, recording transactions, keeping records up to date, minimising costs, reporting your own actions and those of your team

Topic 1.2: Financial Records

Learners will understand the importance of keeping accurate financial records in relation to legal requirements and management efficiency.

Learners will understand the following financial records used within the business:

- purchasing and ordering procedures
- order forms and orders
- deliveries and receipts
- invoices and sales records
- credit control
- payment methods
- bookkeeping, i.e. cash analysis, petty cash, cash flow, budgets, computer accounts programmes
- basic accounts, i.e. trading account, balance sheet, depreciation
- taxation, i.e. VAT, income tax PAYE, national insurance contributions, corporation tax
- wage calculation

Topic 1.3: Physical records
Learners will understand the importance of maintaining physical records for the farm business, to include:

- production
- inputs
- staffing
- customers
- resource use
- data protection
- legal requirements to keep records, e.g. pesticide use, veterinary medicines, transport, animal movement, passports

Learners will be able to: identify records and check that they are suitable for their intended use; make entries that are accurate and complete; understand the importance of storing sensitive information in line with legal and organisational requirements; take appropriate actions to remedy mistakes and omissions.

Unit 11 – Soil-based systems (option)

What is this unit about?

Soil-based systems are used to grow a wide variety of crops in fields, including grass, cereals and oilseeds, several vegetables and fruit trees.

Production is dependent on the natural resources available, physical inputs (plant nutrients, etc.) and the weather, which has a significant impact on the growth and ultimate management of a crop. This means you must have the knowledge and ability to adapt at short notice to ensure a high quality product.

This unit requires learners to correctly set and monitor machine performance for good seed establishment and crop growth and to match crop and soil condition and quality requirements during harvest.

Learning outcomes

	Learning outcome	Topic
1	Undertake agricultural crop production	1.1) Know soil types and be able to investigate soil characteristics 1.2) Understand how soil characteristics affect plant growth and development 1.3) Understand how soil characteristics affect plant selection 1.4) Know how to establish crops 1.5) Be able to plan the growth of crops 1.6) Understand how to harvest crops
2	Understand farm machinery and operation	2.1) Understand the factors associated with the selection of agricultural machinery 2.2) Understand the legislation relating to agricultural machinery 2.3) Understand the impact of machinery on plant health, yield and soil structure
3	Maintain non-productive areas	3.1) Understand the impact of different farming practices on the environment 3.2) Know the significant environmental legislation and codes of practice 3.3) Be able to create a habitat management plan 3.4) Be able to complete practical habitat management tasks

Learning outcome 1: Undertake agricultural crop production

Topic 1.1: Know soil types and be able to investigate soil characteristics

- Soil types – loams, clays, silts, sands, organic soils
- Soil characteristics – properties of soil particles, e.g. clay, silt, sand; water holding capacity; aeration; stability; organic matter; pH; soil structure, e.g. crumb structure, aggregate sizes, plough pans

- Testing soils – accurate measurement of soil texture requires laboratory analysis but, for practical purposes, texture can be assessed by hand using the following method: take about a dessertspoonful of soil. If dry, wet up gradually, kneading thoroughly between finger and thumb until soil crumbs are broken down. Enough moisture is needed to hold the soil together and to show its maximum stickiness (RB209).

Topic 1.2: Understand how soil characteristics affect plant growth and development
Soil type and condition – stability, availability of nutrients and water, effects of organic and inorganic fertiliser application, pH, organic matter)

Rooting depth, availability of plant nutrients, drainage, waterlogging, compaction, effects of high soil water content (reduced oxygen availability, poor plant growth), effects of water availability to plants, effects on ability to cultivate

Topic 1.3: Understand how soil characteristics affect plant selection
- Cultural techniques – crop/plant rotations and crop/plant choice, nitrogen fixation
- Cultivations – ploughing, minimal cultivation techniques, zero cultivation, subsoiling
- Establishment – broadcasting, transplanting, precision seeding, direct drilling, use of green manures and muck inclusion
- Crop maintenance – spraying and fertiliser application, damage by machine and its reduction
- Harvesting and seasonality – harvesting damage
- Soil characteristics – proportions of sand, silt, clay, organic matter content, water holding capacity, air, permeability, pH, porosity
- Plant life and earthworm populations
- Compaction capping and smearing

Topic 1.4: Know how to establish crops
Identify appropriate crops and varieties
Crops – cereals, oilseeds, grass, peas, beans, beet, vegetable and alternative crops

Recognise seeds and their growth in field at all stages; named varieties for different uses (milling, malting, bio-fuel and seed, etc.)

Select appropriate equipment for seedbed preparations
Subsoil, mole drain, conventional machinery (plough, disc), non-inversion tillage machinery, match to tractor size, match equipment to soils and timing of use

Identify correct planting specifications
Timing of drilling, crop seedbed, expected yield, soil type, seed rate, depth, row width and spacing, plant population and thousand grain weight (TGW)

Describe a crop rotation suitable for a given soil type
Reasons for crop rotations, restorative and exhaustive crops, continuous cropping, break cropping, catch cropping, roots, set-aside

Given soil type – clay, sand, loam, silt, etc.

Topic 1.5: Be able to plan the growth of crops
Plan a fertiliser programme for named crops
Major and minor nutrients (nitrogen, phosphate, potassium, sulphur, manganese), timing of applications (drilling, spring split applications), lime, manure applications

Describe weed, pest and disease control procedures appropriate to the production of a named crop

Recognise weeds, diseases and pest damage; types of herbicide, fungicide, pesticide, plant growth regulators; application according to crop growth stages and use of UK Pesticide guide

Describe correct legislative and environmental guidelines
Environmental Protection Act 1990, Cross Compliance Nitrates Directive 1991, Water Framework Directive 2003, Local Environmental Risk Assessment Procedures (LERAPs), Nitrate Vulnerable Zones (NVZs) and timing, Entry Level Scheme rules, Defra good practice guidance; for example, Protecting our Water, Soil and Air: A Code of Good Practice for Farmers, Growers and Managers (the "CoGAP"), RB209

Topic 1.6: Understand how to harvest crops
Explain harvesting operations for named crops
Timing and crop maturity, crop flow through machine, pre-harvesting operations (mowing, swathing, topping), field settings and adjustments to machine (minimise crop damage, straw chopping and spreading)

Learning outcome 2: Understand farm machinery and operation

Topic 2.1: Understand the factors associated with the selection of agricultural machinery
Selection from a variety of identified machines – land -ased vehicle, cultivation machine (seeding machine or combination), application machine (liquid, granule or solids), harvesting machine (grass, roots or grain)

Explain the factors that affect the selection of a named agricultural machine
Work expectations, volume of work, conditions, fitness for purpose, legislative requirements, power requirements, available operator expertise/operator training, life expectancy, availability, manufacturer/dealer support, costs, depreciation, resale value, ease of use, compatibility with power unit/other machines in system, after sales and warranty support, service contracts, direct replacement or upgrade

Assess the performance of a named agricultural machine
Work rates, range of outputs/settings, loads, quality of work, running costs, ease of use, operator comfort

Topic 2.2: Understand the legislation relating to agricultural machinery
Legislation – e.g., Provision and Use of Work Equipment Regulations (PUWER) 1998, Health and Safety at Work Act 1974, Management of Health and Safety at Work Regulations 1999, Control of Substances Hazardous to Health (COSSH) Regulations 2002, Manual Handling Operations Regulations 1992, Personal Protective Equipment (PPE) at Work Regulations 1992, Environmental Protection Act 1990, Wildlife and Countryside Act 1981, Control of Noise at Work Regulations 2005, Control of Vibration at Work Regulations 2005, Lifting Operations and Lifting Equipment Regulations 1998

Industry best practice guidance

Topic 2.3: Understand the impact of machinery on plant health, yield and soil structure
- Plant health – use of global positioning systems (GPS) and yield mapping to optimise input use, including seed, fertiliser, pesticides, fuel and water
- Yield – precision farming techniques, spacing advantages (and the impact on plant yields), seed rates, use of GPS technology to identify yield predictions and variable rate applications

Soil structure – controlled traffic farming techniques to minimise compaction, assessing when to use machinery to avoid compaction and other soil damage, selecting appropriate equipment to match soil condition and to avoid damage to soil, no and low tillage regimes to minimise erosion, use of cover crops

Learning outcome 3: Maintain non-productive areas

Topic 3.1: Understand the impact of different farming practices on the environment

- Environmental impact – visual; noise; physical, e.g. waste, pollution control, impact on topography; consumption of raw materials and energy; impact on plant and animal species; immediate and long-term impacts
- Farming practices – conventional, e.g. crop and livestock enterprises using routine and preventative treatments; use of mechanisation; farming for energy production; sustainable, e.g. organic, permaculture

Topic 3.2: Know the significant environmental legislation and codes of practice

Environmental legislation and codes of practice: impact of current relevant legislation and codes of practice

For example, the Wildlife and Countryside Act 1981 (as amended), Environmental Protection Act 1990, Hedgerows Regulations 1997, Control of Substances Hazardous to Health (COSHH) Regulations 2002, Water Framework Directive, Cross Compliance Nitrates Directive, Waste Management (England and Wales) Regulations 2006, Environmental Impact Assessment (Agriculture) (England) Regulations 2006, Heather and Grass Burning Regulations and Code 2007

Environmental organisations: role of regulatory bodies

For example, the Department for Environment, Food and Rural Affairs (Defra), Environment Agency, Welsh Assembly Government; non-governmental organisations, e.g. British Trust for Conservation Volunteers (BTCV), Farming and Wildlife Advisory Group (FWAG), Linking the Environment and Farming (LEAF), Organic Farmers and Growers, Royal Society for the Protection of Birds (RSPB), Save our Songbirds, Soil Association, local wildlife trusts, Woodland Trust

Topic 3.3: Be able to create a habitat management plan

- Habitat management objectives – appropriate objectives, e.g. species protection, species introduction, maintenance or establishment of a habitat, meeting requirements of an agri-environment scheme such as environmental stewardship
- Habitat management methods – selection of appropriate methods, e.g. removal of invasive plant species, removal or reduction of invasive trees, scrub clearance, pond restoration, tree planting, weeding

Topic 3.4: Be able to complete practical habitat management tasks

- Habitat management tasks – selection of suitable tasks, e.g. pond clearance, tree planting, coppicing, hedge laying, pollarding, mowing, brush cutting, removing unwanted plants or trees, weeding, mulching, clearing litter or debris

Unit H1 – Maintain and develop personal performance

What is this unit about?

This unit will provide the learner with the knowledge and skills to agree and develop their own personal performance with an appropriate person.

The learner will maintain and develop personal performance with regards to working to targets and completing specific tasks.

Learning outcomes

	Leaning outcome	Topic
1	Maintain personal performance	1.1) Identify current competence and areas for development using relevant techniques and processes 1.2) Carry out work in accordance with responsibilities and organisational requirements
2	Develop personal performance	2.1) Agree personal performance and targets with an appropriate person 2.2) Review performance and progress regularly and use the outcome to plan future development activities 2.3) Seek advice from an appropriate person if clarification of specific tasks is required 2.4) Seek constructive feedback and advice from others and use it to help maintain and improve performance
3	Know how to develop personal performance	3.1) State own limits of responsibility in relation to specific tasks and activities 3.2) State who to obtain advice from in relation to specific tasks and activities 3.3) List the correct procedures for obtaining advice 3.4) State the risks involved in not obtaining advice when specific tasks and activities are unclear 3.5) Describe how to determine and agree development needs and personal targets 3.6) State why personal performance should be reviewed

Learning outcome 1: Maintain personal performance

Topic 1.1 Identify current competence and areas for development using relevant techniques and processes
May include certificates of competence, previous qualifications, references from previous employers, appraisals, training programmes, team discussions, demonstrations in the work environment, etc.

Topic 1.2 Carry out work in accordance with responsibilities and organisational requirements
Carry out duties according to own work programme and the organisation's requirements. Discuss new areas of work with line managers or supervisors. Clarify precise duties and needs in discussions with line managers. Maintain appropriate records to evidence actions taken. Discuss role with line managers and act on appropriate and relevant feedback.

Learning outcome 2: Develop personal performance

Topic 2.1 Agree personal performance and targets with an appropriate person
In discussions with line managers and/or supervisors, establish your aims and objectives (or goals); i.e. what you want to achieve or where you want to go in the short, medium or long-term in your career. Assess your current position and identify needs for improving skills, knowledge or competence.

Topic 2.2 Review performance and progress regularly and use the outcome to plan future development activities
Agree performance-related reviews with manager. Annual appraisals and more regular review meetings.

To an extent, achievement of this topic will depend on the organisation's processes.

Topic 2.3 Seek advice from an appropriate person if clarification of specific tasks is required
Provide evidence/records (verbal or in writing) of times when advice or guidance has been sought – particularly with reference to development plans agreed as part of Topic 2.1.

Topic 2.4 Seek constructive feedback and advice from others and use it to help maintain and improve performance
Evidence of occasions when feedback has been sought and given may come from a formal write up of performance plans and assessments, or more informal evidence from colleagues and line managers.

Learning outcome 3: Develop personal performance

Topic 3.1 State own limits of responsibility in relation to specific tasks and activities

Know and understand your responsibilities from your job description and be able to relay these.

Topic 3.2 State who to obtain advice from in relation to specific tasks and activities

Appropriate people may include line managers, colleagues, technical experts, veterinarians and other specialists/appropriately qualified people.

Topic 3.3 List the correct procedures for obtaining advice

Understand the organisation's procedures for obtaining advice. Understand organisation's hierarchy. Know the roles and experience of colleagues and managers. Know where to obtain expert advice if needed – technical manuals, specialists, etc.

Topic 3.4 State the risks involved in not obtaining advice where specific tasks and activities are unclear

Be able to state the risks to the individual, livestock and the business if tasks are not carried out correctly. Know to always seek advice if unsure about any particular task or part of task.

Topic 3.5 Describe how to determine and agree development needs and personal targets

This will include one-to-ones, appraisals and performance reviews with managers and supervisors.

Topic 3.6 State why personal performance should be reviewed

Ensures that targets are set and met. Can motivate individuals. Ensures that an individual's performance is helping to achieve their own goals and those of the organisation. Can identify areas that need improvement and training needs. Provides an opportunity to assess future goals.

Unit H3 – Establish and maintain effective working relationships with others

What is this unit about?

This unit will provide the learner with the knowledge and skills required to work effectively with others under minimal direction through clear communication and cooperation.

The learner will establish and maintain effective working relationships with colleagues, supervisors and managers and persons external to the team, department or organisation.

Learning outcomes

	Learning outcome	Topic
1	Maintain working relationships with others	1.1) Identify opportunities to improve working practices with the appropriate person 1.2) Carry out activities requiring cooperation with others, in accordance with required procedures 1.3) Communicate with others in a way that promotes effective working relationships 1.4) Keep others informed about work plans or activities that affect them 1.5) Seek assistance from others without causing undue disruption to normal work activities 1.6) Respond in a timely and positive way when others ask for help or information
2	Understand why good working practices are important	2.1) State why good working relationships are important 2.2) Suggest ways in which good working relationships can be maintained 2.3) State the methods of dealing with disagreements within the workplace 2.4) Describe own level of responsibility in relation to dealing with disagreements 2.5) State why effective communication is important

Learning outcome 1: Maintain working relationships with others

Topic 1.1 Identify opportunities to improve working practices with the appropriate person

Identify and suggest ways in which the business might improve the way things are done; think about health and safety issues, ways to improve animal welfare, ways in which things can be done more efficiently or with improved cost effectiveness. Work closely with managers and colleagues to implement changes and agree on solutions.

Topic 1.2 Carry out activities requiring cooperation with others, in accordance with required procedures
Where agreed, implement the changes, working closely with colleagues, outside organisations and other suppliers, as appropriate.

Topic 1.3 Communicate with others in a way that promotes effective working relationships
Listen attentively and actively to others. Speak clearly and ensure that others understand your message. Demonstrate competence in a variety of communication methods: speaking, writing, email, etc.

Topic 1.4: Keep others informed about work plans or activities that affect them
Ensure effective and timely communication of activities. Tell others of work plans that involve or affect them.

Topic 1.5 Seek assistance from others without causing undue disruption to normal work activities
Be aware that when you need to ask for help or assistance for a task, this should be in line with policies or to ensure your safety in the workplace. Communicate with colleagues and work across departments or teams where necessary.

Topic 1.6 Respond in a timely and positive way when others ask for help or information
Show understanding and respect the needs of others when they ask for assistance. Respond appropriately, in a timely fashion.

Learning outcome 2: Understand why good working practices are important

Topic 2.1 State why good working relationships are important
Build trust and improve efficiency and performance in the workplace.

Topic 2.2 Suggest ways in which good working relationships can be maintained
Honesty, trust, good communication, respecting and recognising the contribution of others, responding to the needs of customers and suppliers.

Topic 2.3 State the methods of dealing with disagreements within the workplace
Business policies, take responsibility, understand the position of others, seek the contribution of a third party, arbitration, mediation.

Topic 2.4 Describe own level of responsibility in relation to dealing with disagreements
Understand your position and level within the organisation’s hierarchy.

Topic 2.5 State why effective communication is important
Helps achieve goals and maintain strong working relationships at all levels of an organisation. Clear lines of communication help build trust and improve morale. Effective communication between colleagues will help reduce the likelihood of workplace misunderstandings and conflict.