Unit 12: Undertake Agricultural Livestock Production

Unit code: A/600/9129

QCF Level 3: BTEC National

Credit value: 10

Guided learning hours: 60

Aim and purpose

This unit aims to introduce learners to the skills and knowledge needed for agricultural livestock production, and how these can be applied in practice. It is designed for learners in centre-based settings looking to progress into the sector or onto further/higher education.

Unit introduction

Developing an understanding of how food is produced is key to ensuring that production systems take account of animal welfare, consumer needs and sound economics for the farmer. This unit focuses on developing a range of practical skills and studying their underlying principles to enable learners to work competently within the broad range of livestock production systems that exist in the UK today.

The unit will cover the major aspects involved in any livestock production system, namely breed selection, animal husbandry, breeding, feeding, health and welfare. The unit covers all common farm mammalian species, and local geography may influence which species is the major focus during unit delivery. However, a general introduction covering all species is expected.

Learners will review the major production systems that exist in the UK across common farm mammalian species. They will focus on the importance and underlying principles of breeding and animal health, as well as interpreting information on the selection of breeding stock. Learners will collect evidence in a practical setting, so access to suitable farm livestock, either during formal instruction or via work experience, will be essential for learners to complete this unit. Learners should also be able to apply their knowledge and develop practical farm livestock skills.

It is envisaged that practical skills will be developed through routine farm work carried out over a period of time to capture the seasonal differences in livestock production. Finally, learners will focus on feeding livestock for optimum production. Throughout delivery of this unit, the importance of learner safety and animal welfare must be emphasised.

Learning outcomes

On completion of this unit a learner should:

1 Understand livestock production systems

2 Know the principles of production animal health and breeding

3 Be able to perform routine livestock production skills

4 Be able to plan livestock production.

Unit content

1 Understand livestock production systems

Beef systems: breed recognition; common production systems eg intensive cereal/bull beef, 18-month semi-intensive, extensive suckler beef, store cattle production; target growth rates; timeliness of husbandry activities; end markets, market requirements and carcass classification; production costs; housing requirements; methods of marketing produce

Dairy systems: breed recognition; common production systems eg high input high output systems, low cost production systems, dairy cow year, frequency of milking, calving pattern; size and scale of industry; replacement options eg home reared, 'flying herd'; housing systems; methods of marketing produce

Pig systems: breed recognition; common production systems eg intensive and outdoor systems, breeding units, rearing units, finishing units, integrated units; pig production cycle; target growth rates; key husbandry factors; farrowing; weaning; reproduction; production costs; housing systems; methods of marketing produce

Sheep systems: breed recognition; common production systems eg lowland, upland and hill sheep systems, shepherd's year, selection of stock, ewe and ram preparation, timeliness of lamb production, end market, carcass classification; methods of marketing produce

2 Know the principles of production animal health and breeding

Selective breeding: selecting suitable animals to breed eg desirable male and female characteristics, estimated breeding values, interpreting sire data, production records, predicted transmitting ability, timeliness of breeding, preparation of male and female breeding stock

Animal breeding: reproduction cycles for common classes of farm livestock,eg importance of good reproductive function, signs of heat, aids to heat, mating detection, breeding records; reproductive techniques eg Multiple Ovulation and Embryo Transfer (MOET), artificial insemination (AI), natural mating, reproduction hormones

Animal health: five needs related to each class of livestock; recognition of signs of health and common diseases; disease and parasite prevention eg vaccination programmes, common treatment methods to prevent disease spread; common zoonoses

Health programmes: review options eg biosecurity, source of stock, quarantine, vaccination, prevention of parasites, diseases, identification techniques, veterinary routines, health protocols

3 Be able to perform routine livestock production skills

Feed and water: provide sufficient, appropriate feed and water to a range of farm animals; legislation controlling animal health and welfare

Stock health check: routine stock health checks and recognition of common signs of health and disease; appropriate recommendations for animals showing signs of ill health; legislation controlling animal health and welfare

Suitable accommodation: space, bedding, ventilation, access to food and water appropriate to animal needs; review housing options available in line with welfare recommendations, codes of practice; legislation controlling animal health and welfare

Stock tasks: routine stock tasks with due regard for own and animals' safety and welfare as recommended in animal welfare codes of practice eg foot trimming, disbudding, castration, vaccination, parasite control, dagging, injection ; personal protective equipment (PPE); health and safety; legislation controlling animal health and welfare

Production records: common production records for a range of routine livestock activities eg growth rates, animal weights, medical treatments, mating and breeding records, passports, EID (Electronic Identification), movement records

4 Be able to plan livestock production

Production planning: review options eg breed selection, stocking rates, seasonality of production, alternative forages, production to meet market requirements

Feed requirements: range of feedstuffs appropriate to different classes of livestock eg forages, concentrates, roughages, processed feeds, by products, forage analyses and nutrient value of feeds; appropriate amounts required for different stages of the production system eg young stock, rearing, growing, lactating, finishing; digestive processes and basic rations for different classes of livestock; feeding during gestation, pre- and post-partum; vitamin and mineral requirements

Assessment and grading criteria

In order to pass this unit, the evidence that the learner presents for assessment needs to demonstrate that they can meet all the learning outcomes for the unit. The assessment criteria for a pass grade describe the level of achievement required to pass this unit.

Assessment and grading criteria		
To achieve a pass grade the evidence must show that the learner is able to:	**To achieve a merit grade the evidence must show that, in addition to the pass criteria, the learner is able to:**	**To achieve a distinction grade the evidence must show that, in addition to the pass and merit criteria, the learner is able to:**
P1 explain major beef, dairy, pig and sheep production systems [IE]		
P2 evaluate beef, dairy, pig and sheep production systems	**M1** explain the range of finishing systems commonly used for a range of livestock	**D1** review methods of selling and marketing specified livestock
P3 discuss factors that determine the choice of a livestock production system [CT]		
P4 describe the husbandry of livestock throughout breeding/production cycles		
P5 describe routine and non-routine livestock production service tasks [SM]	**M2** explain the breeding method of a selected livestock animal	**D2** evaluate a range of breeding methods available to the farmer in terms of animal welfare and efficacy
P6 outline health checks for production livestock		
P7 describe major causes of disease and measures to take	**M3** explain, in detail, biosecurity measures in a given farm environment	
P8 safely carry out routine and non-routine livestock production service tasks to meet given objectives [EP]		
P9 perform husbandry procedures safely on beef and dairy cattle, sheep and pigs [TW]	**M4** maintain accurate records of husbandry procedures	

Assessment and grading criteria		
To achieve a pass grade the evidence must show that the learner is able to:	**To achieve a merit grade the evidence must show that, in addition to the pass criteria, the learner is able to:**	**To achieve a distinction grade the evidence must show that, in addition to the pass and merit criteria, the learner is able to:**
P10 safely apply regulations and legislation relevant to livestock production		
P11 plan production for beef cattle and sheep	**M5** explain timeliness and seasonality of livestock production tasks for a range of species.	**D3** describe the factors that determine the end price a farmer receives for a range of farm livestock.
P12 describe requirements for rearing and finishing systems		
P13 plan health programmes for beef, dairy, pig and sheep production systems.		

PLTS: This summary references where applicable in the pass criteria, in the square brackets, the elements of the personal, learning and thinking skills. It identifies opportunities for learners to demonstrate effective application of the referenced elements of the skills.

Key	IE – independent enquirers	RL – reflective learners	SM – self-managers
	CT – creative thinkers	TW – team workers	EP – effective participators

Essential guidance for tutors

Delivery

Tutors delivering this unit have opportunities to use as wide a range of techniques as possible. Lectures, discussions, seminar presentations, site visits, supervised livestock practicals, internet and/or library-based research and the use of personal and/or industrial experience would all be suitable. Delivery should stimulate, motivate, educate and enthuse learners.

Work placements should be monitored regularly in order to ensure the quality of the learning experience. It would be beneficial if learners and supervisors were made aware of the requirements of this unit before any work-related activities are undertaken, so that naturally occurring evidence can be collected at the time. For example, learners may have the opportunity to undertake tasks associated with feeding, breeding and maintaining livestock health, and they should ask for observation records and/or witness statements to be provided as evidence of this. Guidance on the use of observation records and witness statements is provided on the Edexcel website (www.edexcel.com).

Whichever delivery methods are used, it is essential that tutors stress the importance of animal welfare and the need to comply with current legislation.

Health and safety issues relating to working with livestock, veterinary products and machinery must be stressed and reinforced regularly. Risk assessments must be undertaken before any practical activities, and adequate PPE must be provided.

Tutors should consider integrating the delivery, private study and assessment for this unit with other relevant units and assessment instruments learners are taking as part of their programme of study.

Learning outcome 1 is likely to be delivered through formal lectures, discussions, farm visits and independent learner research. Learners will study the variety of production systems available for different classes of livestock, including breeding and finishing stock. Good performance targets and timings for the various production systems should be understood. Visits to farm businesses — such as dairy, beef, sheep or pig units – to observe efficient production systems in operation could add to the relevance of the subject for learners. Learners may also benefit from a visit to a livestock market to review criteria for animal sales.

Learning outcome 2 could be delivered using practical instruction or farm visits, where learners have the opportunity to become involved in the care of newborn offspring and the breeding female. Formal lectures and discussions can be used to complement practical experience. Opportunities to observe animal breeding techniques will be essential for learners to complete this learning outcome.

Learning outcome 3 must be achieved by the completion of practical tasks used to develop skills in an on-farm situation, either at the centre's own farm or via work placement. Sufficient livestock must be available for routine stock work to be realistic, and to be undertaken in a situation where monitoring and supervision can take place. During delivery, due consideration needs to be given to learners' ages and compliance with animal welfare regulations and codes of practice.

Learning outcome 4 could take the same format as learning outcome 2, with the use of practical activity or visits being an essential method of delivery, for example to a local feed mill or distribution depot. Access to common farm feedstuffs and basic rationing software will enhance delivery.

Outline learning plan

The outline learning plan has been included in this unit as guidance and can be used in conjunction with the programme of suggested assignments.

The outline learning plan gives **an indication of the volume of learning it would take the average learner** to achieve the learning outcomes. It is **indicative and is one way of achieving the credit value.**

Learning time should address all learning (including assessment) relevant to the learning outcomes, regardless of where, when and how the learning has taken place.

Topic and suggested assignments/activities and/assessment
Unit introduction: aims, objectives and delivery/assessments methods.
Lecture and research activities on main livestock production systems for dairy and beef cattle, sheep and pigs, review common production systems, definitions, terminology, timings and cycle of events.
Assignment 1: Farm Production Systems (P1, P2, P3, M1, D1) Learners produce a report and/or presentation to provide information on the main production systems for livestock classes.
Visit to livestock market or abattoir and review carcass/stock values and how value is assessed – assessment.
Review breeding methods and technologies – discuss the benefits of each – discuss hormonal control of reproduction, selection of male and female breeding stock.
Prepare/identify breeding stock – practical activity in selecting stock and observing heat and mating /AI procedures.
Assignment 2: Preparing for Livestock Breeding (P4, P5, P6, P11, M2, D2) Learner presentations on disease issues.
Assessment review livestock welfare laws and construct a leaflet to explain laws to a non- farming audience P10.
Assignment 3: Disease Control (P7, P11, P13, D3)
Lecture on diseases and importance of biosecurity on farms. Learners investigate a range of common farm animal diseases in terms of symptoms recognition, prevention, treatment strategies.
Assignment 4: Practical Stock Work (P8, P9, M5) Undertake routine stock tasks on farm livestock and maintain accurate records.
Carry out practical routine production tasks to develop livestock husbandry skills across a range of farm livestock – work alongside tutors/experienced farm staff to develop skills.
Review common feeds and amounts normally given to livestock throughout the production life cycle. Review these in light of animal digestive systems and common feed processing preservation methods.
Assignment 5: Welfare Audit (P10, M3) Real or case study-derived audit of one farms animal welfare provision.
Assignment 6: Feeding Livestock (P12, M4) identify a range of common livestock feeds and provide nutritional information about them – construct a basic ration for a given animal.
Unit review.

Assessment

To achieve a pass grade learners must meet the 13 pass criteria listed in the assessment and grading criteria grid.

For P1, P2 and P3, learners must provide information on a range of common production systems for a range of farm livestock. Learners are expected to outline production systems, typical targets that should be achieved and timescales within which these targets should be achieved. Seasonality must also be included, where appropriate, particularly in relation to grazing livestock. Evidence could take the form of a pictorial presentation with notes (possibly using appropriate software or an overhead projector), an annotated poster or a project.

For P4, learners must describe the husbandry of livestock breeding/production cycles for a minimum of two different livestock animals. For P5, learners must describe the tasks required to prepare these animals for breeding. This could be assessed through oral questioning during a practical situation, production of a report or direct practical assessment.

P6 and P7 require learners to provide information on livestock animal health checks, major causes of disease and measures that can be taken to prevent these. Learners must show that they can recognise signs and causes of potential health problems in livestock. This could be assessed directly by the tutor during practical activities to undertake health checks, together with verbal questioning, or through a project. Evidence could be linked with that provided for P13.

P8 and P9 require learners to perform routine stock duties with different classes of livestock. Assessment could be through the demonstration of competence in the tasks performed, along with oral questioning to confirm underpinning knowledge. Evidence could be witness statements from tutors or work placement providers.

P10 requires learners to demonstrate an understanding of the relevant legislation and regulations which apply to farm livestock. This could be through producing a poster which shows the main legislation which applies to the welfare of livestock or through a recorded question and answer session during practical activities.

For P11 and P12, learners must plan and describe production for beef cattle and sheep. They must include methods of providing feed and water for selected feeding programmes. Learners should identify the equipment that is commonly used and how it is operated and maintained. They should also include recommended space allowances (where appropriate), stocking rates and number of animals per feeder. Feeding programmes should cover livestock at the different stages of growth and production listed in the unit content. Evidence for P11 could be a completed production plan. P12 could be assessed directly by the tutor during practical activities or through learner presentations, feed identification test or a poster explaining the digestive processes for ruminants and monogastrics. For P13, learners need to provide plans of health programmes for beef, dairy, pig and sheep production systems. Assessment for P13 could link to that for P11 and/or P6 and P7.

For M1, learners must explain the range of finishing systems commonly used for a range of livestock, this must be based on the livestock referred to in P2. Evidence could link to that for P2.

For M2, learners must explain a breeding method for one selected livestock animal. Where possible, to ensure assessment is fair the size and complexity of the tasks should be the same for all learners. Learners should include efficient service management using natural or artificial insemination, and care of the breeding female during all stages of the breeding cycle. Learners should also include how the newborn would be cared for. Evidence could take the form of a poster, presentation or written evidence and could be linked to P5.

M3 requires learners to explain biosecurity measures in a given farm environment. Tutors should identify the farm environment or agree this through discussion with learners. Where possible, to ensure assessment is fair the size and complexity of the tasks should be the same for all learners. M3 could be assessed using short questions, pictorial or video evidence of livestock behaviour.

For M4, learners should be able to complete basic breeding records correctly.

For M5, learners must explain timeliness and seasonality for a minimum of two livestock production systems ensuring targets and timing are achieved. Tutors should identify the systems or agree them through discussion with learners. These could be based on the systems used in P1. Where possible, to ensure assessment is fair the size and complexity of the tasks should be the same for all learners.

Learners should identify the optimum time at different stages of production and the live weight gain or milk production at these stages. Basic feeding, breeding and health tasks should be included, where appropriate. Evidence could take the form of a poster, presentation or written evidence and could be linked to P1.

For D1, learners need to review the options for selling and marketing a minimum of two stock species namely livestock markets, deadweight, selling on contract. Learners could produce a report to review the relative merits of each method of sale.

D2 requires learners to evaluate a range of breeding methods in terms of animal welfare and efficacy. Previous breeding records, breed type, estimated breeding values and visual observation should be included in the evidence where appropriate.

For D3, learners must compare different in market requirements and the influences on targets and timings for selected production systems. Tutors should identify the systems or agree them through discussion with learners. These could be the same as those covered in P1 or M1. Where possible, to ensure assessment is fair the size and complexity of the tasks should be the same for all learners. Learners should show an understanding of market specifications, for example milk constituents, carcase weight, conformation and fat cover. They should also be aware of acceptable market specifications and what penalties or bonuses are applied if they fall outside.

Programme of suggested assignments

The following table shows a programme of suggested assignments that cover the pass, merit and distinction criteria in the grading grid. This is for guidance and it is recommended that centres either write their own assignments or adapt any Edexcel assignments to meet local needs and resources.

Criteria covered	Assignment title	Scenario	Assessment method
P1, P2, P3, M1, D1	Farm Production Systems	You are to provide a summary of a range of livestock production systems for a new entrant into the farming industry. You will (in small groups) review one particular production system and produce a short factsheet to cover the main aspescts of the system. Produce a 'market report' to show the main methods used to sell farm produce and the quality controls that are in place. Propose, for a given system, what a farmer could do to improve the price they receive for their produce.	Written report and group presentation. Written report.

Criteria covered	Assignment title	Scenario	Assessment method
P4, P5, P6, P11, M2, D2	Preparing for Livestock Breeding	Develop a breeding protocol for a new learner who is joining the group. Prepare a checklist of activities that must be carried our before breeding animals. Produce a poster showing reproductive cycles and hormonal control. Using breed information from a range of sources and physical livestock, select animals from which to breed. Justify a mating to meet given objectives.	Written report. Checklist. Poster.
P7, P11, P13, D3	Disease Control	Each learner chooses a disease to investigate and prepares a factsheet showing signs, treatments and prevention.	Factsheet.
P8, P9, M5	Practical Stock Work	Perform routine stock work over a period of time and with a range of livestock.	Work diary. Observation record.
P10, M3	Welfare Audit	Review a farm unit in relation to animal welfare legislation. Produce a written report on the findings of the audit and make recommendations for improvements.	Written report. Video evidence.
P12, M4	Feeding Livestock	Produce a poster showing the main elements of ruminant and monogastric digestion and examples of common feed and their nutrient values. Prepare a ration to meet nutritional needs at different production stages (manual or software produced).	Poster. Simple ration.

Links to National Occupational Standards, other BTEC units, other BTEC qualifications and other relevant units and qualifications

This unit forms part of the BTEC land-based sector suite. This unit has particular links with:

Level 2 FD Agriculture	Level 3 National Diploma Agriculture
Introduction to Farm Animal Production	Element LP25.1 Deliver basic treatments to livestock Element LP25.2 Deliver routine husbandry procedures Element LP28.1 Establish, implement and evaluate a heard breeding plan
Introduction to Animal and Plant Husbandry	Understanding Livestock Breeding and Nutrition
	Undertake Dairy Production
	Undertake Beef Production

Essential resources

Learners will need access to sufficiently large livestock enterprises to enable them to partake in practical activities or visits to facilities associated with breeding, feeding and maintaining health within production systems. These livestock units should meet all health and safety requirements, carry first aid kits and have appropriate public and employer liability insurance. Learners must have access to appropriate library and internet resources to carry out research.

Learners should also have access to suitable mechanised feeding equipment, weighing and animal handling facilities.

Equipment/consumables required to support this unit will include multiple sets of stock task equipment (for example syringes, needles, drenching guns, shears, foot-trimming tools, stock markers, ear tags and tag applicators, stomach tubes, elastrators, rubber rings) together with suitable personal hygiene facilities and PPE.

Equipment and veterinary products should be properly stored and issued to learners under supervision.

Tutors delivering this unit should be competent and experienced in livestock husbandry. They must have recent industrial experience within the livestock production sector, or show evidence of regular contact with the industry and/or technical updating.

Employer engagement and vocational contexts

Additional skill development and experiential learning can be gained in a work placement or farm visit situation. Tutors must ensure that learners are safe, and that experienced, CRB checked staff are used. All appropriate insurance must be in place and parental consent requested for visits and work experience where learners are under 18. Care must be taken to only utilise work placements with high standards of health and safety and animal welfare. Regular monitoring visits should be made to ensure that placement activities are being followed correctly and learner safety is not being compromised. Visiting speakers such as nutritionists, farmers or feed company representatives could add to the relevance of the subject for learners.

Indicative reading for learners

Textbooks

Allen D – *Planned Beef Production and Marketing, 3rd Edition* (Blackwell Science, 1990) ISBN 063202611 1

Croston D and Pollott G – *Planned Sheep Production, 2nd Edition* (Blackwell Science, 1993) ISBN 0632035765

Soffe R and McConnell P – *The Agricultural Notebook, 2nd Edition* (Blackwell Science, 2003) ISBN 0632058293

Speedy A – *Sheep Production: Science into Practice* (Longman Higher Education, 1980) ISBN 0582455820

Websites

www.dairyco.org.uk	Dairy Co
www.dardni.gov.uk	Department of Agriculture and Rural Development, Northern Ireland
www.defra.gov.uk	Department for Environment, Food and Rural Affairs
www.fwi.co.uk	Farmers Weekly Interactive
www.nationalbeefassociation.com	National Beef Association
www.ukagriculture.com	UK Agriculture's online editorial with commentary on farming, conservation and countryside issues

Delivery of personal, learning and thinking skills (PLTS)

The following table identifies the PLTS opportunities that have been included within the assessment criteria of this unit

Skill	When learners are ...
Independent enquirers	identifying and presenting the range of production systems available to livestock farmers in the UK
Reflective learners	recommending improvements to animal welfare conditions
Self-managers	producing a checklist on preparing animals for breeding
Effective participators	taking part in practical animal stock task activities.

Although PLTS opportunities are identified within this unit as an inherent part of the assessment criteria, there are further opportunities to develop a range of PLTS through various approaches to teaching and learning.

Skill	When learners are ...
Independent enquirers	researching the different legislation that affects livestock production practices
Creative thinkers	developing ideas on how to present animal disease factsheets
Reflective learners	accepting different viewpoints on the different production methods for farm livestock
Team workers	working as a team when moving and carrying out practical tasks with different classes of farm livestock
Self-managers	organising time to ensure deadlines for assessment opportunities are met
Effective participators	ensuring adequate participation in practical tasks to develop the full range of livestock handling skills.