SQA Advanced Unit Specification

General information for centres

Unit title: Incubation of Hatching Eggs

Unit code: HW9M 47

Unit purpose: This unit is designed to give candidates the knowledge and skills required to manage a poultry hatchery. It will give them an understanding of the factors affecting the functioning of commercial incubators and the design of a commercial hatchery. The unit will also give candidates an understanding of the factors that influence chick quality and enable them to recognise chick quality defects in day-old chicks and unhatched embryos.

On completion of the unit the candidate should be able to:

1 explain the function and operational management principles of a commercial setter and hatcher
2 prepare plan drawings for a commercial hatchery
3 identify grade A chicks and recognise age and physical abnormalities in poultry embryos
4 explain the techniques used to maximise embryo and day-old chick quality

Credit points and level: 1 SQA Credit at SCQF level 7: (8 SCQF credit points at SCQF level 7*)

**SCQF credit points are used to allocate credit to qualifications in the Scottish Credit and Qualifications Framework (SCQF). Each qualification in the Framework is allocated a number of SCQF credit points at an SCQF level. There are 12 SCQF levels, ranging from National 1 to Doctorates.*

Recommended prior knowledge and skills: Access to this unit is at the discretion of the centre. No prior knowledge is required. However, it is recommended that candidates have sufficient mathematical skills to understand graphical and tabulated data equivalent to SCQF level 5.

Core skills: There are opportunities to develop the core skills of *Numeracy* and *Problem Solving* at SCQF level 6 in this unit, although there is no automatic certification of core skills or core skills components.

Context for delivery: If this unit is delivered as part of a group award, it is recommended that it should be taught and assessed within the subject area of the group award to which it contributes.

Assessment: This unit could be assessed by a closed-book test for Outcomes 1, 3 and 4 and by a short assignment for Outcome 2.

SQA Advanced Unit Specification: statement of standards

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The sections of the unit stating the outcomes, knowledge and/or skills, and evidence requirements are mandatory.

Where evidence for outcomes is assessed on a sample basis, the whole of the content listed in the knowledge and/or skills section must be taught and available for assessment. Candidates should not know in advance the items on which they will be assessed and different items should be sampled on each assessment occasion.

Outcome 1

Explain the function and operational management principles of a commercial setter and hatcher

Knowledge and/or skills

- Single and multi-stage incubation systems
- Hatcher and setter management
- Environmental control

Evidence requirements

Candidates will need to provide evidence to demonstrate their knowledge and/or skills by showing that they can:

- explain the operational management principles of a single or multi-stage incubation system
- explain the operating principles of a hatcher
- describe temperature and humidity profiles in setters and hatchers
- explain the environmental management principles in incubators in respect of:
  - temperature
  - humidity
  - control of gas concentration
  - turning

This is a closed-book, supervised assessment.

Assessment guidelines

This outcome may be assessed by a combination of question types including multiple choice, restricted response and extended response questions.

Outcome 2

Prepare plan drawings for a commercial hatchery

Knowledge and/or skills

- Hatchery sizing
- Functional areas
- Hatchery layout
- Biosecurity
- Hatchery flow issues

Evidence requirements

Candidates will need to provide evidence to demonstrate their knowledge and/or skills by showing that they can:

- prepare a plan drawing showing the layout of a commercial hatchery capable of producing a commercially relevant number of day-old poultry with each incubator, incubator rooms and subsidiary functional area shown to the correct size and sited relative to each other with due regard to a minimum of four biosecurity issues which must be listed and explained
- annotate a hatchery drawing to show solutions to hatchery flow in relation to eggs, chicks and personnel

This is an open-book assessment in which candidate can consult manufacturers' published data to aid the selection and layout of the hatchery.

Assessment guidelines

This outcome may be assessed by means of an assignment where candidates prepare plans for a new commercial hatchery. It is recommended that the size of hatchery could be capable of producing 750,000–1,500,000 day-old chicks per week. Candidates could be encouraged to consult manufacturers' published data to aid the selection of equipment and layout of the hatchery.

Outcome 3

Identify Grade A chicks and recognise age and physical abnormalities in poultry embryos

Knowledge and/or skills

- Embryo development
- Embryo abnormalities
- Chick grading
- Chick handling health and safety

Evidence requirements

Candidates will need to provide evidence to demonstrate their knowledge and/or skills by showing that they can:

- recognise three different physical abnormalities in poultry embryos
- estimate the age of death of four embryos to within three days
- identify Grade A chicks
- describe appropriate techniques to protect health and safety during chick handling

Assessment guidelines

This outcome may be assessed by means of a closed-book assessment.

Outcome 4

Explain the techniques used to maximise embryo and day-old chick quality

Knowledge and/or skills

- Hatching egg sanitisation
- Egg storage
- Chick transport

Evidence requirements

Candidates will need to provide evidence to demonstrate their knowledge and/or skills by showing that they can:

- explain one technique of sanitising hatching eggs to maximise embryo quality
- explain the temperature and humidity profiles for storing eggs for up to:
  (i) one week
  and
  (ii) up to two weeks
- explain the optimum temperature and humidity profiles to use to maximise quality when transporting day-old chicks from the hatchery to the rearing site

This is a closed-book, supervised assessment.

Assessment guidelines

This outcome may be assessed by means of restricted and extended response questions.

Administrative information

Unit code: HW9M 47

Unit title Incubation of Hatching Eggs

Superclass category: SH

Original date of publication: November 2017

Version: 01

History of changes:

Version	Description of change	Date

Source: SQA

SQA acknowledges the valuable contribution that Scotland's colleges have made to the development of SQA Advanced Qualifications.

Further information
Call SQA's Customer Contact Centre on 44 (0) 141 500 5030 or 0345 279 1000. Alternatively, complete our Centre Feedback Form.

SQA Advanced Unit specification: support notes

Unit title: Incubation of Hatching Eggs

This part of the unit specification is offered as guidance. The support notes are not mandatory.

While the exact time allocated to this unit is at the discretion of the centre, the notional design length is 40 hours.

Guidance on the content and context for this unit

The unit is designed to give candidates the knowledge and skills required to manage a poultry hatchery. Commercial poultry production relies upon the ability of species dedicated hatcheries to produce relatively large numbers (500,000–1,000,000) of day-olds chicks per week. The levels of control that need to be exerted over the environment in which the eggs are incubated and the biosecurity associated with incubation and egg handling are both high.

Outcome 1 could explore aspects of environmental control (eg temperature, humidity, gas concentrations, and turning) in so far as gaining an understanding of typical profiles as well as the means by which these profiles are achieved. The importance of precise temperature control, the benefits of non-linear water loss and the way in which factors such as humidifying and cooling systems interact could be best appreciated if site visits to a regulated site could be arranged or through video footage. The pros and cons of single and multi-stage setters are also best examined in a working environment or via video footage so that the impact of these types of setter on the way in which they are managed can be considered in context.

In Outcome 2 candidates could consider factors that influence hatchery design such as the need to ensure that the product flows from one end of the operation to the other without crossing over and thereby compromising biosecurity. Similarly the control of stock and personnel, so as to maintain biosecurity, is addressed. The calculations necessary to calculate incubator capacity, taking into account the incubation period and the failure of a percentage of the eggs to hatch, is covered and from this the size of the incubators, incubator rooms and subsidiary rooms can be determined.

Outcome 3 covers aspects of incubation, and specifically the identification of Grade A chicks and identification of abnormal embryos that fail to hatch and their estimated age of death. The age of normal embryos will be assessed so as to enable candidates to be familiar with the procedures that take place during the investigation of hatch failure in a hatchery. A combination of slides/photographs and DVDs may be used in this outcome.

Hatch failure could be due to: exposed brains, deformed legs, deformed beak, unresorbed yolk sac, externalised digestive tract.

Outcome 4 addresses the techniques used to maximise embryo and day-old chick quality. The importance of temperature control in particular is emphasised as, to a lesser extent, is the control of humidity. Precision of control and the ability of day-olds to lose heat when placed in transport containers as well as during sorting could be explained. The outcome is set in the context of the time from hatch to placement in the rearing unit and the change in environment from hatcher through handling to storage and transport. The framework for this outcome is maximising day-old quality through maintaining the optimum environment throughout the production chain. Egg sanitising methods could be: egg washing and fumigation with formaldehyde.

Guidance on the delivery and assessment of this unit

This unit, which is likely to form part of a group award, is designed to develop the knowledge and skills of candidates following poultry awards and it is best studied in this context.

The unit is expected to be delivered primarily in a classroom environment. However, every opportunity should be sought to investigate hatcheries and systems in a working environment or failing this to use videos of commercial hatcheries. Web-based learning materials may be used to provide a worldwide perspective. Access to a hatchery is highly recommended and can be used to provide variety in samples required for the practical recognition assessments.

The assessment of the unit is a mix of closed-book, in-class tests and a short assignment. This is because the information in Outcomes 1, 3 and 4 should be available for instant recall by practitioners rather than looked up as and when required, particularly as there are safety implications with much of the material. Hence the material should be learned. It is however important to ensure the test papers are structured as far as possible. The planning exercise gives the opportunity for candidates to develop their skills in sketching and drawing to scale. It requires candidates to calculate space and incubator capacities.

Opportunities for developing core skills

In analysing the requirements for the plan drawing, the use of number to determine plant and equipment specifications and problem solving to site operational areas and work out flow are required. Hence successful completion of this unit would suggest the development of the core skills of *Numeracy* and *Problem Solving* at SCQF level 6, although there is no automatic certification of core skills or core skills components.

Open learning

It is possible for this unit to be delivered by distance learning. The assessments may be completed on-line as long as the assessment conditions are met.

Equality and inclusion

This unit specification has been designed to ensure that there are no unnecessary barriers to learning or assessment. The individual needs of learners should be taken into account when planning learning experiences, selecting assessment methods or considering alternative evidence.

Further advice can be found on our website www.sqa.org.uk/assessmentarrangements.

General information for candidates

Unit title: Incubation of Hatching Eggs

This unit introduces you to the principles of incubating poultry and hatching eggs. Commercial poultry production relies upon the ability of species dedicated hatcheries to produce relatively large numbers (500,000–1,500,000) of day-olds chicks per week. The levels of control that need to be exerted over the environment in which the eggs are incubated and the biosecurity associated with incubation and egg handling are both high.

You will look at incubation systems and aspects of environmental control (eg temperature, humidity, gas concentration and turning) required to hatch eggs and the way in which these parameters are achieved, monitored and controlled. Hatchery design is an important element in the success of incubating eggs and therefore you will investigate the critical features of hatchery design, including the factors that impact on biosecurity, during your progress through this unit.

When hatches fail to hatch as intended then the reasons are normally investigated by an examination of those chicks that hatched and those embryos that failed to hatch. Hence, during the course of this unit you will learn to identify Grade A chicks, age of death of embryos and the likely cause of death. Finally, you will look at optimising the quality of eggs prior to beginning their journey to the market place.

The assessment of the unit is a mix of closed-book and short assignments.

There are opportunities to develop the core skills of *Numeracy* and *Problem Solving* at SCQF level 6 in this unit, although there is no automatic certification of core skills or core skills components.