

SQA Advanced Unit Specification

General information for centres

Unit title: Avian Physiology

Unit code: HW9L 47

Unit purpose: This unit is designed to give candidates knowledge of the different anatomical features and organs that comprise functional systems in avian species typically used in poultry production. It looks at the biochemical and physiological control and communication within and between these systems, as these aspects are essential in the management of these species of bird in poultry production for food. The unit looks at how genetic selection used to produce these poultry species has changed the physiology of the birds and resulted in the development of metabolic disorders. This unit will enable candidates to recognise how these disorders affect the different functional systems in the bird and the potential economic consequences to poultry production.

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

- 1 describe the morphological and anatomical features of farmed poultry
- 2 explain the structure and functioning of the main avian organ systems
- 3 explain the control mechanisms of physiological functions in avian species
- 4 describe economically significant metabolic disorders in poultry

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. Although no prior knowledge is required it would be beneficial if candidates had an appreciation of cellular biology equivalent to Biology at SCQF level 5.

Core skills: There are opportunities to develop the core skill of *Communication* 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 may be assessed using three instruments of assessment. Outcome 1 is assessed using a practical exercise undertaken in supervised conditions. Outcome 3 may be assessed by an assignment and Outcomes 2 and 4 may be jointly assessed using an assignment with restricted and extended-response questions.

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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

Describe the morphological and anatomical features of farmed poultry

Knowledge and/or skills

- ◆ Avian farmed poultry species
- ◆ Avian anatomy and morphology
- ◆ Organ identification and features

Evidence requirements

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

- ◆ identify and describe five anatomical features of a bird from farmed poultry exhibits
- ◆ identify and describe the gross morphological features of three organs of farmed avian species from poultry exhibits

Evidence should be generated through a practical exercise undertaken in supervised conditions, with additional evidence gathered using questioning. Lecturers should complete a candidate evidence checklist.

Assessment guidelines

This outcome may be assessed by means of a practical exercise in which candidates identify organs and features of dissected poultry, which are supported by relevant descriptions. Poultry specimens, photographic or video material may be used for identification purposes. Assessors may record the practical identification evidence on checklists and the supporting descriptive evidence may be presented in any suitable format, eg oral questioning or short-answer submissions.

It is recommended that the assessment be undertaken in a clinical/laboratory environment.

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Outcome 2

Explain the structure and functioning of the main avian organ systems

Knowledge and/or skills

- ◆ Organs of the avian body
- ◆ Structure and function of major avian organ systems
- ◆ Ruminant and non-ruminant digestive systems

Evidence requirements

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

- ◆ explain the gross structure of the avian organs for digestion, reproduction, excretion and blood circulation
- ◆ explain at a gross level the functioning of the avian digestive, reproductive, renal and circulatory systems
- ◆ explain the difference in the functioning of the digestive systems in poultry, pigs and ruminants

This is an open-book assessment. A submission date should be agreed with candidates.

Assessment guidelines

This outcome may be assessed by means of a short assignment with restricted and extended-response questions. A response of 1,200 words or equivalent plus supporting diagrams/sketches should be sufficient to supply the required evidence. The assessment of this outcome may be combined with the assessment for Outcome 4. Please see further details under assessment guidelines for Outcome 4.

Outcome 3

Explain the control mechanisms of physiological functions in avian species

Knowledge and/or skills

- ◆ Physiological functioning
- ◆ Control mechanisms
- ◆ Digestive system

Evidence requirements

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

- ◆ explain one physiological control mechanism in avian species
- ◆ explain endocrine, paracrine and neural control mechanisms in avian species
- ◆ explain the mechanism of the uptake, digestion and transport of dietary protein, lipids and carbohydrates in avian species

This is an open-book assessment. A submission date should be agreed with candidates. The assignment should detail the precise control mechanisms to be investigated.

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Assessment guidelines

This outcome may be assessed by means of a short assignment. A response of about 1,200 words plus supporting diagrams/sketches should be sufficient to supply the required evidence.

Outcome 4

Describe economically significant metabolic disorders in poultry

Knowledge and/or skills

- ◆ Metabolic disorders of poultry
- ◆ Prevention strategies
- ◆ Economic impact of disorders

Evidence requirements

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

- ◆ describe the cause, effect and prevention of one specified cardio-vascular metabolic disorder that has a significant economic impact on the poultry industry
- ◆ describe the cause, effect and prevention of one specified metabolic disorder that affects the digestive system of poultry and has a significant economic impact on the poultry industry
- ◆ describe the cause, effect and prevention of one specified skeletal metabolic disorder that has a significant economic impact on the poultry industry
- ◆ describe the potential economic consequence of one specified metabolic disorder

This is an open-book assessment. A submission date should be agreed with candidates.

Assessment guidelines

This outcome may be assessed by means of a short assignment with restricted and extended-response questions. A response of 1,000 words or equivalent plus supporting diagrams/sketches should be sufficient to supply the required evidence. The assessment may also be combined with the assessment for Outcome 2 in which case a submission of 2,000 words or equivalent should be sufficient to generate all evidence for both outcomes.

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Administrative information

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Unit title:	Avian Physiology
Superclass category:	RH
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Version	Description of change	Date

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SQA Advanced Unit Specification: support notes

Unit title: Avian Physiology

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

Virtually all types of productivity and also metabolic disorders in poultry are a function of different biochemical and physiological processes. This unit is designed to improve the candidate's understanding of the key features of avian physiology to enable them to recognise and prevent metabolic disorders and hence improve the cost effectiveness of poultry production.

Outcome 1 is concerned with morphological and anatomical features of farmed poultry. An awareness of the key features of the main organs and systems in poultry species should be developed. Candidates should be able to identify and describe: heart, lungs, lungs, pancreas, kidney, gastro-intestinal tract, reproductive tract, major muscle groups, and the major bones. It is not realistic to expect candidates at this level to identify smaller features such as named blood vessels, nerves or features at a microscopic level.

Outcome 2 considers in detail the structure and the functioning of the main avian organ systems. The key performance relationships between organ structure and functioning must be understood. This will require study of the functioning of the digestive, reproductive, renal and circulatory systems. The candidate must understand the main reasons for occurrence of problems and the linkage with productivity. The outcome also requires an understanding of the differences between the functioning of the digestive systems in poultry, pigs and ruminants.

Outcome 3 considers the control mechanisms that integrate physiological functions in the fowl. In general, the internal environment in a healthy bird is maintained in a stable constant condition. An advantage of homeostatic regulation is that it allows an organism to function effectively in a broad range of environmental conditions. The function of each organ or system in the body is under physiological control, which enables a normal functioning of the avian organism. The control mechanisms fall into three endogenous categories, ie endocrine, paracrine and neural. Candidates should develop an understanding of these mechanisms particularly as applicable to the nutrition of poultry and the relationship to homeostasis. Endocrine factors are chemical signals released from the site of production and transported via the blood system to the target cells, ie hormones. Paracrine factors are chemical signals that move from cell to cell within a tissue type or organ via the intercellular spaces. That is, the target tissue is also the site of production. Neural factors are the nerve cells, which most often work in conjunction with an endocrine factor.

Outcome 4 considers economically significant metabolic disorders in poultry. A metabolic disorder is a medical disorder that affects the production and energy availability within individual animal cells. Although most metabolic disorders are genetic, there are some acquired disorders as a result of discrepancy between needs and supply of nutrients, toxins, infections, etc. Genetic metabolic disorders are also known as inborn errors of metabolism.

Candidates should obtain knowledge of the main metabolic disorders in poultry that have significant economic impact in the poultry industry.

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 study avian physiology in a farm environment. For example, some physiological disorders can be studied as a paper exercise and then reinforced by observing birds with these disorders in farm conditions. The use of dissected birds may be helpful in familiarising candidates with the anatomy of the fowl, and photographic material will be invaluable for recognising some of the more unusual features or conditions of poultry.

The assessment of the unit is largely undertaken as open-book assessments (although Outcome 1 is assessed differently as it uses a practical exercise undertaken in a closed-book, supervised environment.). This is because the information in Outcomes 2, 3 and 4 can, in commercial practice, be looked up as and when required. However, good practice would demand that candidates recognise the more economically significant metabolic disorders and a formative assessment programme may be useful in this regard. It is sensible to link the physiology and functioning of birds with the various disorders that disrupt the birds' normal physiology and functioning, and consequently it is recommended that Outcomes 2 and 4 are assessed together.

Opportunities for developing core skills

The assignment reports required for Outcome 2, 3 and 4 provide ample opportunities to develop *Communication* Core Skill 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. However, it would be beneficial for candidates to have access to a suitable range of farmed poultry. The assessments can be completed on-line, with the exception of the assessment for Outcome 1, which would require attendance at a suitable site where poultry exhibits could be made available (specimens, photographic or video material) and conducted under supervised conditions.

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: Avian Physiology

The unit is designed to increase your understanding of the factors that influence the productivity of farmed poultry and the reasons for development of metabolic disorders. It will also give you an appreciation of the factors that need to be considered in the rearing of birds in practical farm conditions.

Knowledge of avian physiology is a very important to the study of the mechanisms of growth and development of the different organs and systems in poultry. The unit involves the anatomical description of the main organs and systems in avian species and explains their functioning and physiological control. All the key areas of avian physiology are covered, including digestion, reproduction, excretion and blood circulation.

You will gain an understanding of biochemical and physiological control systems and the communication within and between these systems, which are essential in the management of poultry species for food production. The consequences of genetic selection to produce these poultry species have changed the physiology of the birds and have resulted in the development of metabolic disorders. These disorders affect the different functional systems in the bird and represent both a welfare and an economic cost to poultry production and you will learn to recognise their importance.

This unit may be assessed using three instruments of assessment. Outcome 1 is assessed by means of a practical exercise undertaken in supervised conditions. The assessment for Outcomes 2 and 4 may be combined.

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