



National Unit specification: general information

Unit title: Aquaculture: Fin Fish Biology

Unit code: H038 12

Superclass: SJ

Publication date: November 2011

Source: Scottish Qualifications Authority

Version: 01

Summary

The purpose of this Unit is to provide candidates with the knowledge of fin fish biology in relation to the main species farmed in the UK. Candidates will be required to identify the main species farmed and describe their natural life cycle. Candidates will become familiar with fish anatomy and be able to identify the major internal and external structures and their functions, and will include reference to the fishes' physiological adaptations in response to stress or environmental changes.

This is a mandatory Unit in the NPA Fish Health and Nutrition (SCQF level 5) and an optional Unit in the NPA Fish Husbandry (SCQF level 5). It is also available as a standalone Unit.

Outcomes

- 1 Describe the natural life cycle of farmed fish.
- 2 Identify internal and external features of fish anatomy.
- 3 Describe the main functions of internal and external anatomical structures of fish.

Recommended entry

Entry is at the discretion of the centre.

Credit points and level

1 National Unit credit at SCQF level 6 (6 SCQF credit points at SCQF level 6*)

**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 Access 1 to Doctorates.*

General information (cont)

Unit title: Aquaculture: Fin Fish Biology (SCQF level 6)

Core Skills

Opportunities to develop aspects of Core Skills are highlighted in the support notes of this Unit specification.

There is no automatic certification of Core Skills or Core Skill components in this Unit.

National Unit specification: statement of standards

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Acceptable performance in this Unit will be the satisfactory achievement of the standards set out in this part of the Unit Specification. All sections of the statement of standards are mandatory and cannot be altered without reference to SQA.

Outcome 1

Describe the natural life cycle of at least one species of farmed fish.

Performance Criteria

- (a) Describe the stages of the fish life cycle accurately.
- (b) Describe the environmental requirements of one species of fish for each of the main stages of the life cycle.
- (c) Describe the reproductive stages of one species of fish.

Outcome 2

Identify internal and external features of fish anatomy.

Performance Criteria

- (a) Identify and describe correctly the major external features of fin fish anatomy.
- (b) Identify and describe correctly the major internal features of fin fish anatomy.
- (c) Produce accurate laboratory dissection/observation records including clearly labelled anatomical drawings.

Outcome 3

Describe the main functions of internal and external anatomical structures of a fish.

Performance Criteria

- (a) Describe the main structures of external anatomy including the role of these structures.
- (b) Describe the main structures of internal anatomy including the role of major internal organs.
- (c) Describe the regulatory mechanisms that allow a fish to adapt to changes in its external environment.
- (d) Describe the fishes behavioural response to acute and chronic stressors.

National Unit specification: statement of standards (cont)

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Evidence Requirements for this Unit

Evidence is required to demonstrate that candidates have achieved all Outcomes and Performance Criteria.

Outcome 1 — Written and/or recorded oral evidence

Evidence is required to demonstrate that the candidate can:

- ◆ describe the life cycle for a minimum of one species of farmed fish.
- ◆ describe a minimum of three environmental requirements for the major life stages of a given farmed fish.
- ◆ describe the reproductive cycle for a given farmed fish species.

Evidence will be produced in supervised open-book conditions.

Outcome 2 — Written and/or recorded oral evidence and performance evidence

The candidate must be able to perform the following tasks on a minimum of two different farmed fin fish species:

- ◆ identify and describe a minimum of three external features of fin fish anatomy.
- ◆ identify and describe a minimum of three internal features of fin fish anatomy.
- ◆ Produce accurate laboratory records and correctly labelled anatomical drawings from fin fish specimens.

Evidence will be produced under closed-book conditions using laboratory records.

Outcome 3 — Written and/or recorded oral evidence

The candidate must:

- ◆ describe the function of a minimum of three external features, including the physiological role of these structures.
- ◆ describe the function of a minimum of three internal structures including the physiological role of these internal organs.
- ◆ describe a minimum of two regulatory mechanisms that allow fish to adapt to environmental change.
- ◆ describe the behavioural symptoms for a minimum of one acute and one chronic stressor.

Evidence will be produced in closed-book conditions.

National Unit specification: support notes

Unit title: Aquaculture: Fin Fish Biology (SCQF level 6)

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

This is a mandatory Unit in the NPA Fish Health and Nutrition (SCQF level 5) and an optional Unit in the NPA Fish Husbandry (SCQF level 5). It is also available as a standalone Unit.

The Unit is aligned to the following LANTRA Sector Skills Council's National Occupational Standard (NOS) Units:

- ◆ Aqu 4 Grade fish
- ◆ Aqu 7 Collect information of fish growth and development
- ◆ Aqu 12 Monitor the aquatic production environment
- ◆ Aqu 37 Work safely in an aquatic environment

Candidates should have access to a suitable laboratory to achieve the practical competencies. The candidate should be introduced to the commonly farmed Northern European fish species. A comparative approach could be taken with reference to the differences between the biology of salmonids and cyprinids as examples of carnivorous and omnivorous species to develop the candidates understanding of the differences in species biology.

The selection of Atlantic salmon, rainbow trout, brown trout and char is recommended to represent the farmed salmonids. The life cycles of the migratory Atlantic salmon could be closely examined and compared with the non-migratory trout species. Reference could also be made to the life cycle of migratory strains of trout and char.

The environmental requirements of the fish in the wild should be discussed. This should include physical conditions such as substrate type, feeding territory, flow rates, water temperature and water quality requirements for each stage of the life cycle. Reference could be made to the attempts by fish farmers to develop rearing systems and technology appropriate to the natural habitats of particular fish.

The candidate should be introduced to fin fish anatomy to develop knowledge of the appearance of anatomical structures to prepare them for laboratory-based fish dissections. Candidates should ensure that all laboratory and dissection work is carried out in line with current health and safety legislation and is conducted according to standard operating procedures (SOP) using appropriate personal protective equipment (PPE), where required.

The candidate should develop a basic knowledge of the functions of major external and internal features. The mechanisms by which fish can adapt to a fluctuating environment should be discussed and this should include reference to the physiological adaptations of migratory salmonids to salinity changes when moving from fresh to salt water and vice versa.

National Unit Specification: support notes (cont)

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The candidate should be introduced to the classification system as the basis to systematic identification.

The role and methods of anaesthesia should be introduced so candidates can gain an appreciation of their role in welfare standards. An understanding of the fishes stress response and the effects that chronic and acute stress can have on the welfare and management practices in a farming environment should be developed. Candidates should be trained in the use of anaesthetics and be fully aware that the work must be carried out in line with current health and safety legislation and according to SOP using appropriate personal protective equipment.

Guidance on learning and teaching approaches for this Unit

This Unit lends itself to a range of teaching and learning approaches that give consideration to the Curriculum for Excellence capacities and Equalities legislation, through reasonable adjustment for all candidates.

After introductory sessions to cover the biology and life cycles of farmed fin fish, most of the delivery of this Unit should be in a practical context.

A series of dissection practicals is recommended to develop knowledge of external and internal anatomy. Healthy fish specimens should be available to ensure that the candidate becomes familiar with the normal appearance of structures and organs. It is recommended that the candidate dissects a range of species.

The candidate should be encouraged to work systematically and make detailed observations of specimens during dissection practicals. Accurate records and labelled anatomical drawings should be produced and should be based on observations made.

Candidates could practise identification by observing real specimens, slides or high quality illustrations with reference to key information. The recommended reliance in instinctive naming of fish based on visual recognition alone should be discouraged. The candidate should be encouraged to relate all relevant observations of external features to key information.

Guidance on approaches to assessment for this Unit

Outcome 1 could be assessed using an integrated open-book approach such as a portfolio of evidence.

Outcome 2 requires production of lab notes and records to meet the Performance Criteria and short response questions or multiple choice to meet the knowledge requirements.

Outcome 3 could be assessed using extended response questions.

Time should be allowed for any necessary re-assessment.

Centres must be satisfied that the evidence submitted is the work of individual candidates.

National Unit Specification: support notes (cont)

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Assessor observation checklists and other assessment records should be maintained and kept up to date to keep track of candidate progress and to provide evidence for internal and external verification purposes.

Opportunities for the use of e-assessment

E-assessment may be appropriate for some assessments in this Unit. By e-assessment we mean assessment which is supported by Information and Communication Technology (ICT), such as e-testing or the use of e-portfolios or social software. Centres which wish to use e-assessment must ensure that the national standard is applied to all candidate evidence and that conditions of assessment as specified in the Evidence Requirements are met, regardless of the mode of gathering evidence. Further advice is available in *SQA Guidelines on Online Assessment for Further Education (AA1641, March 2003)*, *SQA Guidelines on e-assessment for Schools (BD2625, June 2005)*.

Opportunities for developing Core Skills

In this Unit candidates will develop skills in identifying the main species of fish farmed in the UK.

Candidates will:

- ◆ identify the differences between species.
- ◆ examine the life cycles of the migratory Atlantic salmon in comparison to other species including the non-migratory trout species.
- ◆ identify the environmental requirements of fish in the wild including substrate type, feeding territory, flow rates, water temperature and water quality requirements for each stage of the life cycle.
- ◆ carry out laboratory-based fish dissections in line with current health and safety legislation.
- ◆ maintain a detailed record of observations during dissection practicals to produce accurately labelled anatomical drawings.
- ◆ identify how fish adapt to a fluctuating environment including physiological adaptations of migratory salmonids to salinity when moving from fresh to salt water and vice versa.
- ◆ identify fishes response to stress and the effects that chronic and acute stress can have on the welfare and management practices in a farming environment.

This means that as candidates are doing this Unit they will be developing aspects of the Core Skills of *Problem Solving* and *Communication*.

National Unit specification: support notes (cont)

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Disabled candidates and/or those with additional support needs

The additional support needs of individual candidates should be taken into account when planning learning experiences, selecting assessment instruments, or considering whether any reasonable adjustments may be required. Further advice can be found on our website www.sqa.org.uk/assessmentarrangements

History of changes to Unit

Version	Description of change	Date

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