

## Output 8: RPL/APL resources for Fish Biology and Life Cycles

Recognising Prior Learning (RPL)

Guidance: Multiple Choice

This series of **multiple-choice questions** have been designed so as there is only one possible correct and complete response. This allows prior knowledge to be established through pre-testing, using Response Tools.

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This series of **multiple-choice questions** have been designed so as there is only one possible correct and complete response. This allows prior knowledge to be established through pre-testing, using One2Act tools.

Taxonomy: Subject, Bank number, Question title

Subject: FB/LC = Fish Biology and Life Cycles

Banks: questions of equal weighting asking for the same knowledge/understanding

[Link to Journeyman certificate. Fish Anatomy is found within:](#)

1.5 observe organisms and environments and evaluate changes in relation to [the species' normal appearance and behaviour](#)

3.1 plan, implement, document and evaluate optimal operations [based on the biology of the farmed species](#)

3.7 [recognise normal behaviour](#) and appearance in fish farm organisms and elaborate on common diseases and parasites

- Be able to [recognise normal](#) and abnormal [fish behaviour](#) indicative of disease

3.3 carry out routine measurements of relevant environmental parameters and assess the results [based on the species' environmental requirements and tolerance limits](#)



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## Part a) Salmon lifecycle

Title: FB/LC Bank 1 – Salmon life cycle-yolk sac fry

*With reference to an unlabelled salmon lifecycle image with the yolk sac fry (alevin) highlighted*

1) What is the name of the lifecycle stage highlighted

a) Eyed ova

\*b) Yolk sac fry or alevin

c) Swim up fry

d) Parr

e) Smolt

f) Mature adult

**\*\*insert lifecycle diagram here\*\***

Title: FB/LC Bank2 – Salmon life cycle-smolt

*With reference to an unlabelled salmon lifecycle image with the smolt highlighted*

2) What is the name of the lifecycle stage highlighted

a) Eyed ova

b) yolk sac fry

c) Swim up fry

d) Parr

\*e) Smolt

f) Mature adult

**\*\*insert lifecycle diagram here\*\***

Title: FB/LC Bank 3 – Salmon life cycle-eyed ova

*With reference to an unlabelled salmon lifecycle image with the eyed ova highlighted*

3) What is the name of the lifecycle stage highlighted

- \*a) Eyed ova
- b) yolk sac fry
- c) Swim up fry
- d) Parr
- e) Smolt
- f) Mature adult

**\*\*Insert life cycle diagram here\*\***

Title: FB/LC Bank 4 – Salmon life cycle-parr

*With reference to an unlabelled salmon lifecycle image with the parr highlighted*

Q4) What is the name of the lifecycle stage highlighted?

- a) Eyed ova
- b) yolk sac fry
- c) Swim up fry
- \*d) Parr
- e) Smolt
- f) Mature adult

**\*\*Insert diagram here\*\***

Title: FB/LC Bank 5 – Salmon life cycle-swim up fry

*With reference to an unlabelled salmon lifecycle image with the swim up fry highlighted*

5) What is the name of the lifecycle stage highlighted

- a) Eyed ova
- b) yolk sac fry
- \*c) Swim up fry
- d) Parr
- e) Smolt
- f) Mature adult

**\*\*Insert diagram here\*\***

Title: FB/LC Bank 6 – Salmon life cycle-adult salmon

*With reference to an unlabelled salmon lifecycle image with the adult salmon highlighted*

6) What is the name of the lifecycle stage highlighted

- a) Eyed ova
- b) yolk sac fry
- c) Swim up fry
- d) Parr
- e) Smolt
- \*f) Adult salmon

**\*\*Insert diagram here\*\***

## Part b) Fish breeding strategies

Title: FB/LC Bank 7 – Breeding strategies K

*Some fish deploy the 'R' strategy of reproduction, releasing vast numbers of eggs with low parental care and low survival rates within unstable aquatic environments, whilst others deploy the 'K' strategy produce fewer eggs and with high parental care and achieve high survival rates in more stable aquatic environments*

7) Which of the following fish species follow the R strategy of reproduction

Select AS MANY as you believe to be correct.

a) Three-spine stickle back

b) Atlantic Salmon

\*c) Herring

d) Nile Tilapia

\*e) Halibut

\*f) Common Carp

Title: FB/LC Bank – Breeding strategies R

*Some fish deploy the 'R' strategy of reproduction, releasing vast numbers of eggs with low parental care and low survival rates within unstable aquatic environments, whilst others deploy the 'K' strategy produce fewer eggs and with high parental care and achieve high survival rates in more stable aquatic environments*

8) Which of the following fish species follow the K strategy of reproduction

Select AS MANY as you believe to be correct.

\*a) Three-spine stickle back

\*b) Atlantic Salmon

c) Herring

\*d) Nile Tilapia

e) Halibut

f) Common Carp

Title: FB/LC Bank 9 – Ova incubation-sticky eggs

9) Which of the following fish species have sticky eggs that attach to a substrate for incubation

Select AS MANY as you believe to be correct.

\*a) lumpfish

b) Atlantic Salmon

- \*c) Herring
- d) Nile Tilapia
- e) Sea Bass
- \*f) Common Carp
- g) Atlantic Cod
- h) Halibut
- i) Rainbow Trout

Title: FB/LC Bank 10 – Ova incubation-non-sticky eggs

10) Which of the following fish species have non-sticky eggs that are buried in a gravel substrate to incubate

Select AS MANY as you believe to be correct.

- a) lumpfish
- \*b) Atlantic Salmon
- c) Herring
- d) Nile Tilapia
- e) Atlantic Cod
- f) Common Carp
- h) Halibut
- \*i) Rainbow Trout

Title: FB/LC Bank 11 – Ova incubation-mouth

11) Which of the following fish species are mouth brooders and incubate their eggs in their mouth

Select AS MANY as you believe to be correct.

- a) lumpfish
- b) Atlantic Salmon
- c) Herring
- \*d) Nile Tilapia
- e) Atlantic Cod
- f) Common Carp
- h) Halibut

i) Rainbow Trout

Title: FB/LC Bank 12 – Ova incubation-floating

12) Which of the following fish species have floating eggs that incubate whilst suspended in the water column

Select AS MANY as you believe to be correct.

a) lumpfish

b) Atlantic Salmon

c) Herring

d) Nile Tilapia

\*e) Atlantic Cod

f) Common Carp

\*h) Halibut

i) Rainbow Trout

### Part c) Salmon biology

Title: FB/LC Bank 13 -Salmon migration

13) Why does the Atlantic Salmon migrate from freshwater to the sea?

Select the correct answer.

- a) To find clean unpolluted waters
- b) To find a mate
- c) Increased dissolved oxygen
- \*c) To access and more abundant food supply
- d) To spawn and reproduce

Title: FB/LC Bank 14 -Salmon migration

14) What is the biggest physiological challenge facing the salmon when migrating from freshwater to the sea?

Select the correct answer.

- a) Adapting to a rapid change in water temperature
- b) Adapting to reduced dissolved oxygen levels
- c) Digestion of a marine food supply
- c) Low resistance to water pollution
- \*d) Preparing to cope with the increased water salinity

Title: FB/LC Bank 15 -Salmon migration

15) How does the Atlantic Salmon find the correct tributary in which it was hatched when returning to freshwater from the sea as an adult?

Select AS MANY as you believe to be correct.

- a) By visual navigation using the moon and stars
- \*b) By olfactory recognition of the tributary's water chemistry
- c) By sensing changes in water temperature
- c) By use of the lateral line to sense pressure changes
- d) By visual recognition of river bed structures



Title: FB/LC Bank 16 –salmon maturation male

16) What are the physical signs of sexual maturation in a male Atlantic Salmon

Select AS MANY as you believe to be correct.

- a) Extended protruding vent
- \*b) Darkened body colouration
- c) Extended pelvic fins
- c) Bloated abdomen
- \*d) Hooked kype
- e) Silvery body colouration

Title: FB/LC Bank 17 –salmon maturation female

17) What are the physical signs of sexual maturation in a female Atlantic Salmon

Select AS MANY as you believe to be correct.

- \*a) Extended protruding vent
- \*b) Darkened body colouration
- c) Extended pelvic fins
- \*c) Bloated abdomen
- d) Hooked kype
- e) Silvery body colouration

Title: FB/LC Bank 18 – Salmon maturation

18) What external environmental factors trigger the sexual maturation of the Atlantic salmon in the wild

Select AS MANY as you believe to be correct.

- a) Increasing water temperature
- \*b) Reducing day length
- c) Increased dissolved oxygen
- c) Increasing daylength
- \*d) Reducing water temperature

Title: FB/LC Bank 19 – Salmon spawning

19) How does the male salmon's spermatazoa enter the egg to fertilise it

Select the correct answer.

- a) Entry of spermatazoa via a permeable membrane
- b) Entry of spermatazoa via a spermatopore
- c) Entry of spermatazoa via a micro-canal
- \*d) Entry of spermatazoa via a micropyle
- e) Physical penetration of a weak membrane by spermatazoa

Title: FB/LC Bank 20 – Salmon spawning habitat

20) Under what conditions do Atlantic salmon eggs incubate in the wild once fertilised

Select the correct answer.

- a) Attached to leafy vegetation
- b) Attached to the surface of clean gravel
- c) Buried in a clean sandy substrate
- \*d) Buried in a clean, coarse gravel substrate
- e) Drifting in the water column

Title: FB/LC Bank 21 – Salmon spawning habitat

21) What environmental factor determines the rate at which salmon ova develop during incubation

Select the correct answer.

- a) Light intensity
- b) Dissolved oxygen
- \*c) Water temperature
- d) Chemical water quality
- e) Water flow rates

Title: FB/LC Bank – Salmon juveniles

22) What does a juvenile Atlantic Salmon do immediately after it has hatched?

Select the correct answer

- a) Work its way out of the gravel redd and attach to the stream bed
- b) Work its way out of the gravel redd and start hunting for food

- c) Swim to the water surface to gulp air and inflate its swim bladder
- d) Work its way out of the gravel redd and drift to a food rich area downstream
- \*e) Stay inside the redd to conserve energy whilst absorbing its yolk sac

Title: FB/LC Bank 23 – Salmon juveniles

23) What does a juvenile Atlantic Salmon need to do after it has absorbed its yolk sac?

Select the correct answer.

- a) Actively swim down-stream to find a suitable habitat and area rich in natural food
- \*b) Swim to the water surface to gulp air to inflate their swim bladder before feeding
- c) Immediately start feeding on natural food items in the vicinity
- d) Passively drift downstream to conserve energy until they find a food rich area
- e) Actively swim upstream to find food a suitable habitat and food supply

Title: FB/LC Bank 24 – Salmon juveniles

24) How does the external appearance and anatomy of an Atlantic Salmon parr differ, as compared with a Brown Trout of the same size?

Select AS MANY as you believe to be correct.

- \*a) The pectoral fins are much longer
- b) More strongly defined finger sized darker areas on their sides
- c) Less strongly defined finger sized darker areas on their sides
- d) Pelvic fins are much longer
- \*e) More streamlined body shape
- f) Less streamlined body shape
- \*g) Shorter maxilla that does not extend beyond the eye
- h) Longer maxilla that extends beyond the eye
- \*g) More deeply forked caudal fin (tail)
- h) Less deeply forked caudal fin (tail)
- \*i) Only 1-4 spots on gill cover (operculum) and often only one large spot
- j) Heavily spotted gill cover (operculum) with over 5 spots

#### Alternative question

Examine the two pictures below and identify which fish is an Atlantic salmon parr and which is a Brown trout parr.



Answer: Brown trout (*Salmo trutta*) parr



Atlantic salmon (*Salmo salar*) parr

Title: FB/LC Bank 25 – Salmon juveniles

25) There is limited competition between wild Atlantic Salmon and Brown Trout when both species are living in the same freshwater environment.

Select AS MANY reasons for this as you believe to be correct.

a) The Atlantic Salmon and Brown Trout eat different natural food items

\*b) Atlantic Salmon can occupy the faster-flowing riffles

c) Trout occupy the faster flowing riffles and Atlantic Salmon the pools

Title: FB/LC Bank 26 – Osmo-regulation

26) What is Osmosis?

Select the definition you believe to be correct.

- a) The diffusion of dissolved oxygen from the water through a semi- permeable membrane from a high to a lower concentration
- b) The movement of water through a semi-permeable membrane from a high to a lower concentration solution
- c) The active transport of salts across a semi-permeable membrane from a low to a higher concentration solution
- \*d) The movement of water through a semi-permeable membrane from a low to a higher concentration solution
- e) The movement of salts through a semi-permeable membrane from a high to a lower concentration solution

Title: FB/LC Bank 27 – Osmo-regulation

27) What is the osmoregulatory challenge for the Atlantic salmon during its freshwater phase?

Select AS MANY as you believe to be correct

- a) Losing water to the external environment
- b) Gaining salts from the external environment
- \*c) Gaining Water from the external environment
- d) Losing salts to the external environment
- e) There is no osmo-regulation at this stage of the lifecycle

Title: FB/LC Bank 28 – Osmo-regulation

28) What is the osmoregulatory challenge for the Atlantic salmon during its marine phase?

Select AS MANY as you believe to be correct

- \*a) Losing water to the external environment
- b) Gaining salts from the external environment
- c) Gaining water from the external environment
- d) Losing salts to the external environment
- e) There is no osmo-regulation at this stage of the lifecycle

Title: FB/LC Bank 29 – Osmo-regulation

29) What does the Atlantic Salmon do to deal with osmoregulation during freshwater phase of its lifecycle?

Select AS MANY as you believe to be correct

- a) Consumes more salt rich foods to compensate for the loss of salts
- \*b) Excretes excess water in the form of dilute urine via the kidneys
- c) Gills actively remove excess salts by secreting them
- d) Drinks water to counteract the loss of water to the external environment
- e) Nothing, as there is no osmo-regulatory challenge at this stage of the lifecycle

Title: FB/LC Bank 30 – Osmo-regulation

30) What does the Atlantic Salmon do to deal with osmoregulation during the marine phase of its lifecycle?

Select AS MANY as you believe to be correct

- a) Consumes more salt rich foods to compensate for the loss of salts
- b) Excretes excess water in the form of dilute urine via the kidneys
- \*c) Gills actively remove excess salts by secreting them
- \*d) Drinks water to counteract the loss of water to the external environment
- e) Nothing, as there is no osmo-regulatory challenge at this stage of the lifecycle