



Animal Production

Level II

Learning Guide #32

Unit of Competence: Assist Fish Production

Module Title: Assisting Fish Production

LG Code: AGR APR2 M 10 LO2-LG-32

TTLM Code: AGR APR2 TTLM 0919

LO 2: Body parts of fish



INSTRUCTION SHEET	<i>Learning Guide 32</i>
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This learning guide is developed to provide you the necessary information regarding the following content coverage and topics –

- Preparing for fish raising activities
- Identifying body parts of fish
- Undertaking fish farming work
- Handling and cleaning material and equipment

This guide will also assist you to attain the learning outcome stated in the cover page. Specifically, upon completion of this Learning Guide, you will be able to –

- Prepare for fish raising activities
- Identify body parts of fish
- Undertake fish farming work
- Handle and clean material and equipment

Learning Instructions:

1. Read the specific objectives of this Learning Guide.
2. Follow the instructions described below 3 to 6.
3. Read the information written in the information “Sheet 1, Sheet 2, Sheet 3 and Sheet 4”.
4. Accomplish the “Self-check 1, Self-check 2, Self-check 3 and Self-check 4” in **page -6, 9, 12 and 14** respectively.



1.1. Parts of fish body, location, structure and function

1. **Snout-** The snout is the part of the head of the fish that is in front of its eyes.
2. **Operculum-**The operculum is the bony flap that covers a fish's gills.
3. **Lateral line-**The lateral line runs along the sides of a fish's body. It is used as a sensory organ by the fish.
4. **Dorsal fin-**The dorsal fin is the main fin located on the back of the fish. Fish, like the one shown above, can have one or more dorsal fins. Fish with more than one dorsal fin can have:
 - i. A dorsal fin with spines
 - ii. A dorsal fin with soft rays.

Take care when handling fish with spines in its fins. Wear protective gear such as gloves and wading boots when dealing with such fish.

5. **Pectoral fin-**Pectoral fins are located near the gills of fish.

6. **Adipose fin-**The adipose fin is found on some fish. It is usually located on its back, after the dorsal fin.

7. **Caudal fin-**The caudal fin is the fin on the tail of the fish.

8. **Anal fin-**The anal fin is located after the fish's anal or reproductive organs. Anal fins can be soft, or they may have spines.

9. **Pelvic fin-**The pelvic fin is located under the fish, between its mouth and its anus.

10. **Keel-**The keel is the fleshy or bony ridge located at the end of the fish's body, just before the tail.

11. **Skin-**The skin is the fish's first line of protection against the outside environment. It keeps out bacteria, viruses and fungi and, if it is damaged, the fish is very vulnerable to infection. The skin also keeps out water and keeps salt in or out according to whether the fish is in the fresh water or salt water. Fish's skin secretes mucus which makes it slippery during handling. The skin is also responsible for the external colour and appearance of the fish. Throughout the skin there are colour pigment cells.



12. Scale- the scales are solid calcareous structures embedded in pocket in the tough lower dermal layer of the skin. The 'root' part of the scale is characterized by concentric circular lines reflecting the growth of the fish.

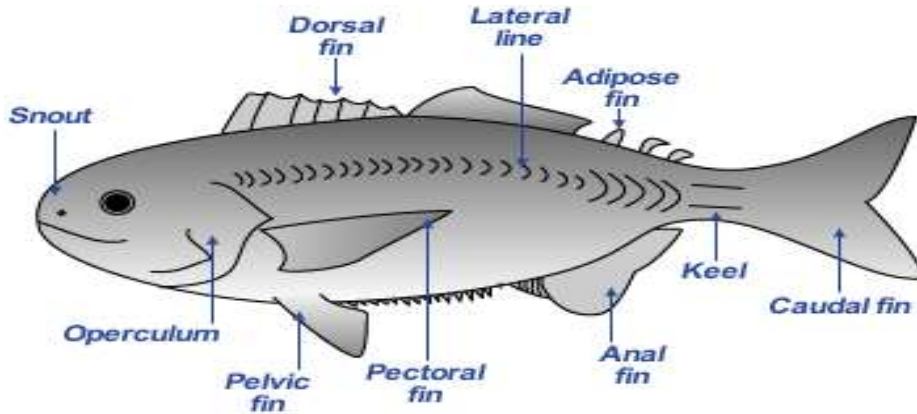


Figure 1. This diagram shows main parts of a fish.

1.2. Functions of body parts of fish

- ✓ **Anal Fin** - fin located near the anal opening; used for balance and steering.
- ✓ **Caudal or Tail Fin** - fin at the tail of a fish; used for propulsion.
- ✓ **Circulatory System** - delivers blood and oxygen throughout the body via the heart.
- ✓ **Digestive System** – breaks down and processes proteins, carbohydrates and fats.
- ✓ **Dorsal Fin** – backside (top) fin on a fish; used for balance and protection.
- ✓ **External Anatomy** - the outside body parts, such as, fins, scales, mouth.
- ✓ **Gills** – organ used to obtain oxygen from the water and rid carbon dioxide.
- ✓ **Gill Rakers** – filter feed tiny prey; appendages along the front edge of the gill arch.
- ✓ **Gonads** – the sex organs; males have testes, females have ovaries. Some fish are hermaphroditic, meaning having both sets of gonads (male & female) in one fish.



- ✓ **Lateral Line** – organ of microscopic pores that sense low vibrations and water pressure.
- ✓ **Nares** - organ to smell; similar to nostrils.
- ✓ **Nervous System** - organs receiving and interpreting stimuli for nares, eyes, lateral line, muscles, and other tissues.
- ✓ **Pectoral Fin** - fins on the sides; used for balance and assist turning.
- ✓ **Pelvic Fin** - belly fins on a fish; used for balance and steering.
- ✓ **Pyloric Caeca** – “finger-like” organ that aids in digestion, using bile from the liver.
- ✓ **Reproductive System** – the organs and tissues involved in reproduction, including gonads, eggs, sperm.
- ✓ **Respiratory System** – organs and tissues involved in the oxygen & carbon dioxide gas exchange, including gills, gill rakers, and gill filaments.
- ✓ **Scales** - protective cover on a fish; similar to skin.
- ✓ **Slime** – slippery covering on scales, protecting fish from bacteria, parasites, etc.
- ✓ **Swim bladder** – found only in “ray-finned” fish; a double sac used to assist in buoyancy.
- ✓ **Urinary System** – the kidneys remove nitrogen (ammonia) from the blood and regulate water balance in the blood and tissues.
- ✓ **Vertebrate** – an organism with a backbone or spine.



Self-check-1

Multiple choose

Directions: Answer all the questions listed below. Use the Answer sheet provided in the next page:

1. Which of the following fin is located on the tail of the fish? (3pts)
A. Anal fin B. Caudal fin C. Pectoral fin D. Adipose fin
2. One is different from the other? (3pts)
A. Anal fin B. Caudal fin C. Gills D. Adipose fin
3. _____ found only in “ray-finned” fish; a double sac used to assist in buoyancy.(3pts)
A. Urinary system B. Slim C. Respiratory system D. Swim bladder

Note: Satisfactory rating – 5 points

Unsatisfactory - below 5 points

You can ask you teacher for the copy of the correct answers.

Answer Sheet

Score = _____

Rating: _____

Name: _____

Date: _____

Short Answer Questions



Proper handling is required during harvesting (capturing), sorting, loading transporting and marketing. Fish after harvest must be sorted according to size and species (if they are captured from natural water bodies), because market price and consumer preference may depend very much on size and type of fish. Thus, after harvesting the initial handling are bleeding and gutting.

- ❖ **Bleeding**- it is the process of removing blood from the fish's body .By cutting the arteries just behind the gills and in front of the heart. The fish are then allowed to bleed in container with water for about 10-15 minutes.
- ❖ **Gutting**- after bleeding, the fish may be gutted (removing the internal organs) by cutting (opening) from the anus to thorax, and then removing internal organs, gills and eyes of the fish. After removing the organs wash with clean water and scrape the fish inside and outside to remove all trace of blood & wastes.
- ❖ Bleeding and gutting helps to prevent spoilage of the fish by bacteria that reduces the quality of the product.

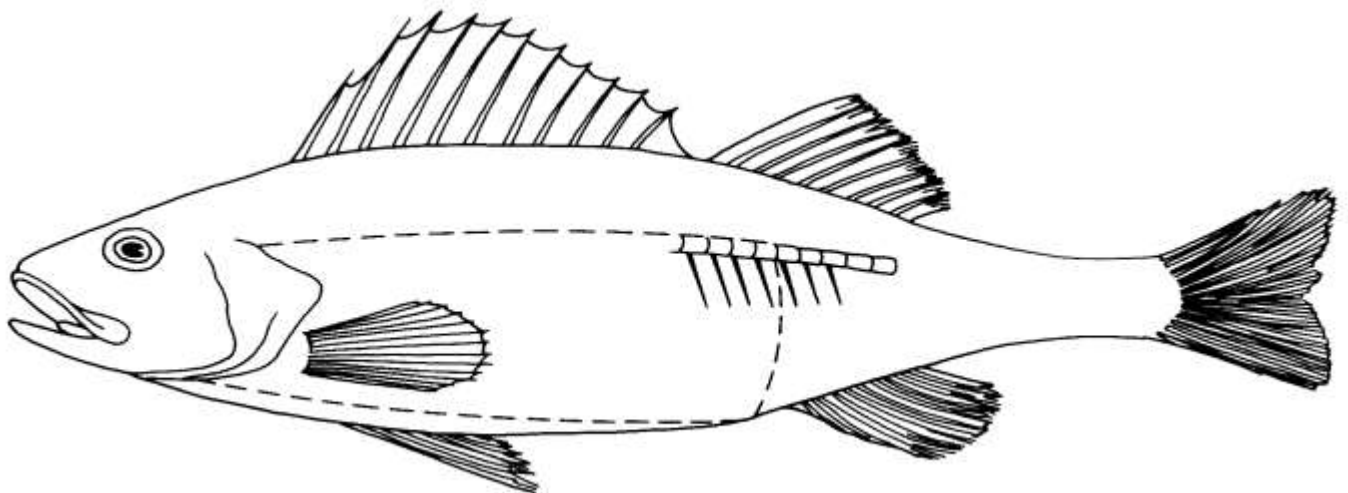




Fig.2 **Dissection lines**

1. Incision at anus. Begin by inserting a fine scalpel blade into the anus (also called the vent) of the fish. The anus is located just anterior to (in front of) the anal fin, on the ventral (lower) side of the fish in most fishes.



Fig.3

2. Cutting anteriorly. The incision is then extended anteriorly along the fish's belly towards the head.



Fig.4

3. Cut between pelvic fins. The incision passes anteriorly between the pelvic (ventral) fins. Depending on the type of fish, these paired fins are used to stabilise the fish when swimming and also for braking. The pelvic fins are supported by the bones of the pelvic girdle which are anchored in the belly muscles.

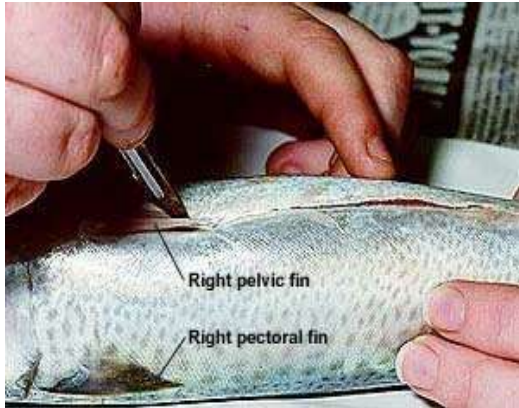
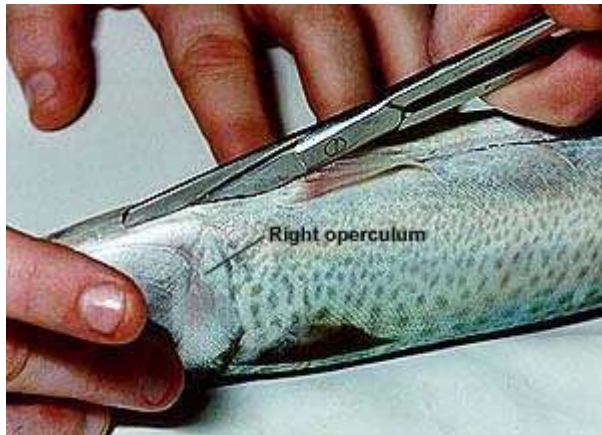


Fig.5

4. Cut along isthmus. Use scissors to cut anteriorly through the bones attached to the pelvic fins. Cut forward along the narrow, fleshy space beneath the head and between the gill covers. The gill covers (also known as operculae) are flaps which lie along both sides of the head and protect the underlying gills.



5. Body cavity. Pull apart the two walls of the body cavity and expose the internal organs (see next image for names). The neat incision now runs from the anus forward between the two pelvic fins and along the isthmus.



Fig.6

6. Internal organs. Some of the ventrally located internal organs: 1 heart, 2 Liver, 3 Pyloric caecae, 4 adipose (fatty) tissue

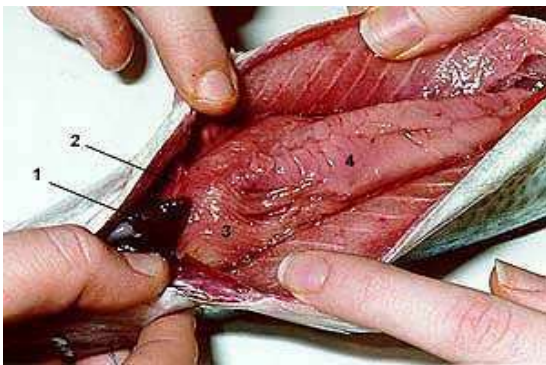


Fig.7

7. Pull aside gut. Here the adipose tissue (1) and gut (2) are pulled aside to expose the swim bladder (3), gonads (4) and kidneys (5). As a general rule, carnivorous fishes have short guts. Herbivorous fishes have much longer guts. The gonads and kidneys are paired. One of each can be seen on both sides of the swim bladder.



Fig.8

8. Cut posterior end of gut. The gut is severed at the posterior end of the body cavity, near the anus. The gut and other organs attached to it are pulled forward out of the way, or removed entirely.

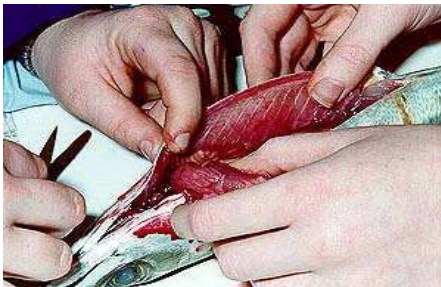


Fig.9

9. Pull gut forward. Pulling the gut forward exposes the swim bladder (1), gonads (2) and kidneys (3) in position dorsally (at the top) in the body cavity. A larger portion of the liver is now visible (4). The kidneys are paired organs located in the body cavity ventral to (below) the vertebral column. They are one of the organs involved in excretion and regulation of the water balance within the fish.

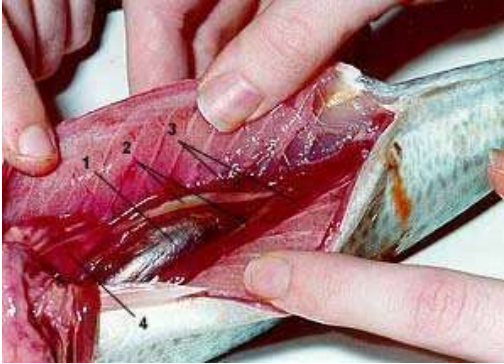


Fig.10

10. Swim bladder exposed. The other organs have been removed to expose the swim bladder at the top of the body cavity. The swim bladder (also called the gas bladder or air bladder) is a flexible-walled, gas-filled sac located in the dorsal portion of body cavity. This organ controls the fish's buoyancy and is used for hearing in some species.



Fig.11

11. Cutting operculum. Here, the right gill cover (operculum) is being removed to expose the underlying gills. Most bony fish have the characteristic of having a single opening behind each operculum (the branchial aperture). Water passes in through the mouth, over the gills and out through the branchial aperture. In contrast, the sharks and rays have five to seven branchial apertures on each side of the head.

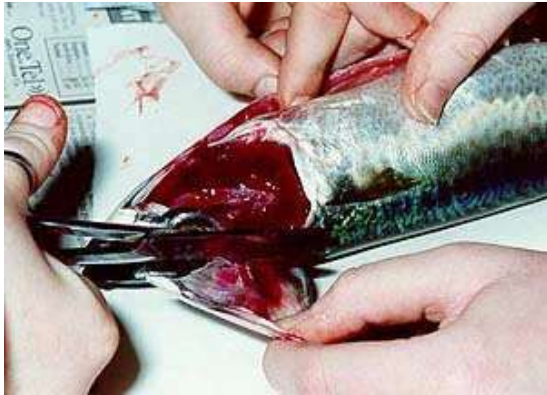


Fig.12

12. Gills exposed. Most gills consist of gill filaments (1), gill rakers (2) and gill arches (3). Gills of fishes are the sites where oxygen is absorbed and carbon dioxide is removed. In addition, the gills are responsible to a varying degree for regulation of the levels of various ions and the pH of the blood. Gill rakers are bony or cartilaginous projections that point forward and inward from the gill arches. They aid in the fish's feeding.

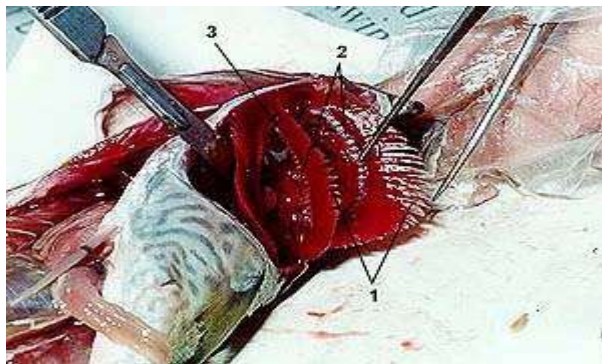


Fig.13



Self-check-1

Written test

Directions: Answer all the questions listed below. Use the Answer sheet provided in the next page:

1. Most gills consist of the following gills type where oxygen is absorbed and carbon dioxide is removed. Except? (3pts)
A. Gill rakers B. Gill arches C. Gill of pectoral D. Gills filament
2. A paired organs located in the body cavity ventral to (below) the vertebral column. (3pts)
A. Liver B. Lung C. Kidney D. Heart
3. Which of the following is ventrally located internal organs. Except? (5pts)
A. Dorsal fin B. Heart, C. Liver D. Pyloric caecae

Note: Satisfactory rating - 5 points

Unsatisfactory - below 5 points

You can ask you teacher for the copy of the correct answers.

Answer Sheet

Score = _____

Rating: _____

Name: _____

Date: _____

Short Answer Questions



3.1. Determining the sex of fish

Figuring out the sex of a specific fish can be quite difficult if you don't know much about fish anatomy, but it's definitely doable. To figure out the sex of a fish, you'll have to observe the fish's size, shape, appearance, and behavior. For more information on your fish, you can consult books, videos, and fish experts.

3.1.1. Compare the size of the fish during spawning season.

With many fish, like koi, females tend to be larger than the males. This is especially true during spawning time, when females have large abdomens. To check the size of a fish in the same species, you can look at them when they're near each other, take a picture of each one, or catch one in a net to quickly use a ruler to measure its length and width.

- This is often caused by the fact that the female carries the eggs in her abdomen. Once the eggs are laid during spawning season, the females and males can return to the same size.
- If you catch a fish with a net to measure it, try to keep the fish in the water and place the ruler in the water to measure it. You will likely be able to get a general idea of the length and width.

3.1.2. **Look for a bump on the forehead of the fish to identify a male.** Look carefully at the face of the fish just between the eyes and above the mouth. If it has a large, protruding bump, there's a good chance that the fish is a male. This bump is called a "nuchal hump," and its present on many types of fish, like the tilapia, angelfish, oscar, and discus.

- Some species of fish don't have a nuchal hump, but the presence of one is normally a great indicator that you have a male fish.

3.1.3. **Watch for designs and growths during mating season.**



Behavior shown by male during breeding period

- Body colour change
- Construct nest
- Chase female
- Tremble caudal fin to shed sperm

Behavior shown by female during breeding period

- Enlargement of belly/abdomen
- Rub the body against stone or aquatic vegetation
- Jump highly from the water to spawn/lay eggs
- Stay in nest or hole or cave silently for a long time without feeding

3.2. Differentiate male and female perch

Male perch are usually larger than females of the same age. To tell the difference between male and female fish, compare the illustrations in Fig. 2, which show the differences between the external appearances of the sex organs of a mature fish.

The **male** has two body openings situated just forward of the anal fins, of which one is the anus.

The other is the opening of the urethra, at the end of the genital papilla (an oval-shaped lobe just rearward of the anus), from which milt (sperm) and urine are discharged.

The **female** has three body openings, of which one is the anus. The genital papilla of the female has two openings. They are the urethra, which is hardly visible to the naked eye, and the opening of the oviduct (a crescent-shaped slit), from which eggs are released.

These features are more visible and identifiable when the fish have grown to 10–20cm in length and 100–150g in weight. Mature Nile perch can also be distinguished by their colouration under the jaw — reddish in males and greyish in females.

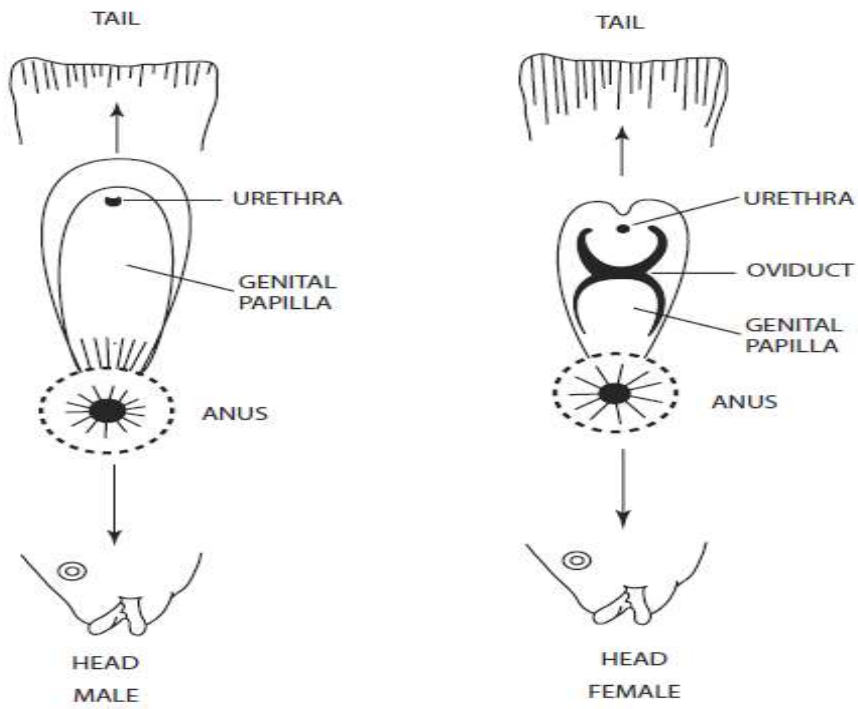


Fig. 2 Male (left) and female (right) sex organs of tilapia



Self-check-1

Written test

Directions: Answer all the questions listed below. Use the Answer sheet provided in the next page:

1. Which part of body can be observe to differentiate mature male fish from female?
(3pts)
2. Assume female fish has three body openings, anus and genital papilla used to determine sex. So, in what growth stage of length and weight to be visible?
(5pts)

Note: Satisfactory rating - 4 points

Unsatisfactory - below 4 points

You can ask you teacher for the copy of the correct answers.

Answer Sheet

Score = _____

Rating: _____

Name: _____

Date: _____

Short Answer Questions