

Scales act as:

- 1- gliding in swimming and movement.
- 2- Determine the age of fish.
- 3- protection of fish.

The body provide with fins

Fins are cutaneous structure used for maintenance fish in position, there are two type of fins

1- unpaired fin

- a- Dorsal fin located at mid line of dorsal line of body, its one or two depending on species it act as not roll over on to their side.
- b- Caudal fin(Tail fin) .found at end of body, it divided in two equal or vunequal parts,it used as propulsion to move the fish forward (peduncle)
- c- anal fin. Act stabilizer while swimming

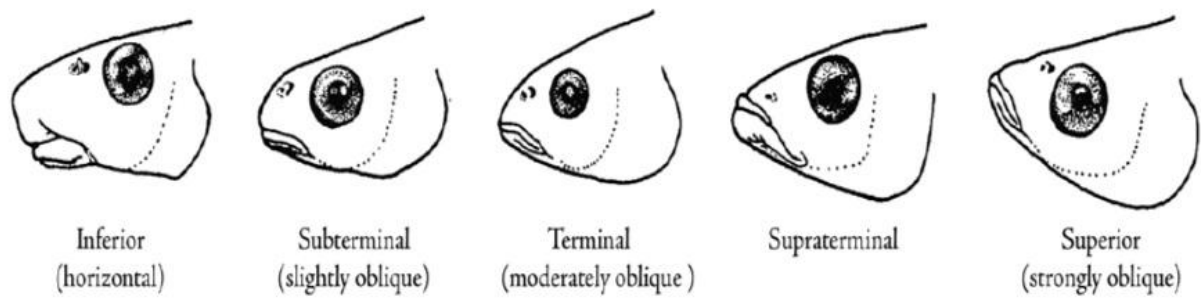
2- Paired fins

- a- Pectoral fin(Chest) behind the operculium.
- b- Pelvic fins(Hip) below the operculium at later line act stabilizer in movement.

Head contain:

Mouth: mouth shape depend on what the fish eat and

- how it eats
- anterior mouth , most of omnivorous
- inferior mouth , most of herbivorous
- superior ,most of carnivorous



Operculum Flexible bony plate protect sensitive the gill arch.

Gill are breathing apparatus and highly vascularized, it act sexchange of vgases (Inhalated) the O₂ from water and excreted CO₂ (carbon dioxide).the fi

Gill have five arches, four of them have gill racker and fifth one converted to pharyngeal teeth.

Barbules: projection from skin have sensory functions

Some have & some haven't depend on type of feeding habits.

Lateral line :- Sensory organ by which the fish sense water current and pressure.

Total length:- distance from tip of snout to end of caudal fins.

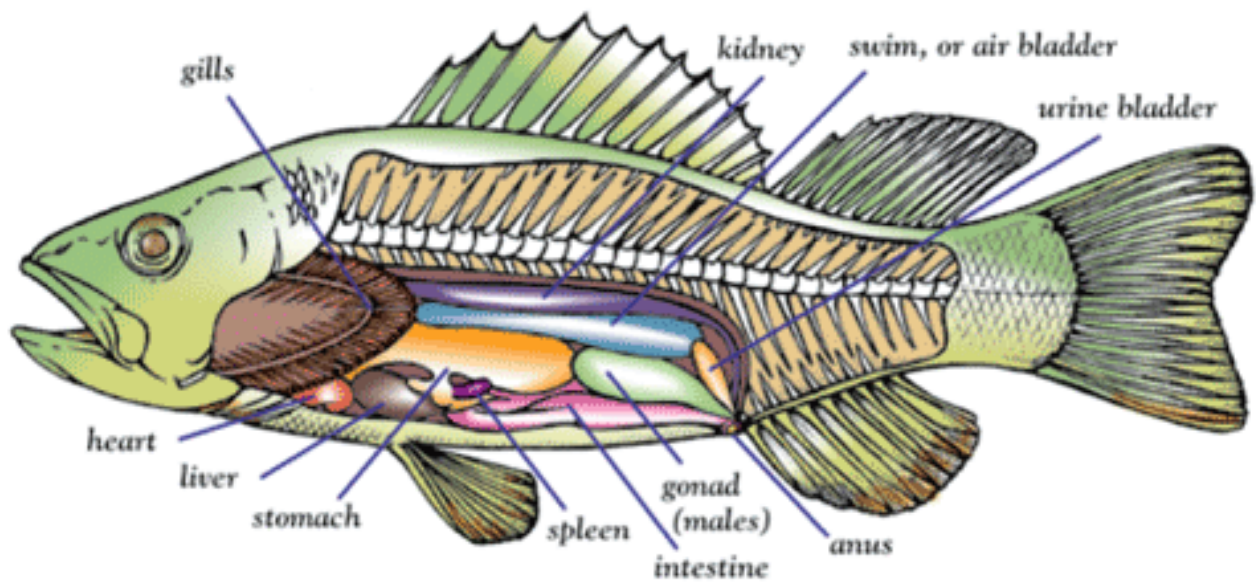
Fork length:- distance from tip of snout to diversion of tail.

Standard length:- distance from tip of snout to posterior of last vertebrate.

Fish have eyes, that good developed without eye lids.

Naris:- found on sides and good smell and detect odour in water

Vent or anus :- located at mid-line of body, it external opening to digestive, urinary and reproductive tract, it found in front of anal fin.



Air-bladder (swimming –bladder) : a hallow gas filled balance organ,- found in upper part of belly and act for flotation and breathing and produce voice.

Kidney:- filter liquid waste materials from the blood and also regulating water salt concentration in body fish.

Liver :- assist digestion by secret enzyme that break down fats, and storage of fat, carbohydrate.

Heart :- located behind gill, it consist of one atrium and one ventricle. atrium connect at dorsal site with sac called venosis sac.

Fish have one-way, single circulating pathway, through the heart, the blood leaving the heart passes of the gills and the capillaries of the body organs.

The blood transport Oxygen, nutrient to tissues and excrets CO₂ from them.

Blood cell are formed in kidney and spleen, lesser in liver.

- Erythrocytes are oval and nucleated ($1-3 \times 10^6$) ml.

Volume of blood in fish 2-4 ml./100 gm body weight.

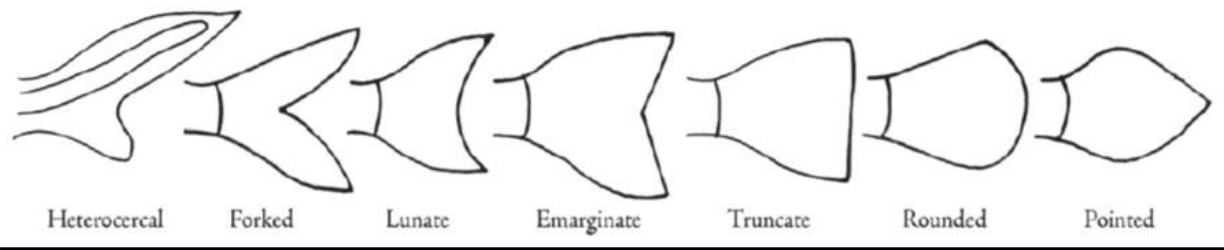
Count of R.B.Cs. $1.5-3 \times 10^6$ ml.

Count of W.B.Cs. $3-6 \times 10^3$ ml.

Collection of blood

- 1- heart :-insert syringe between pectoral fins and to left.
- 2- Caudal vein :-insert syringe vertically behind anal fin
- 3- tail ablation.

Tail:



Intestine:

- small such as carnivorous
- Large such as herbivorous
- Medium omnivorous

Fish Classification:

-kingdom - animal

-phylum - chordate

-subphylum - vertebrata

-super class – pieces

Order

Family

Genus