

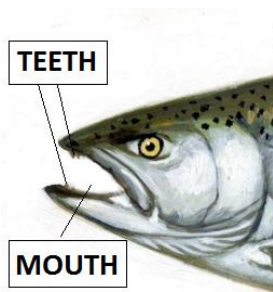
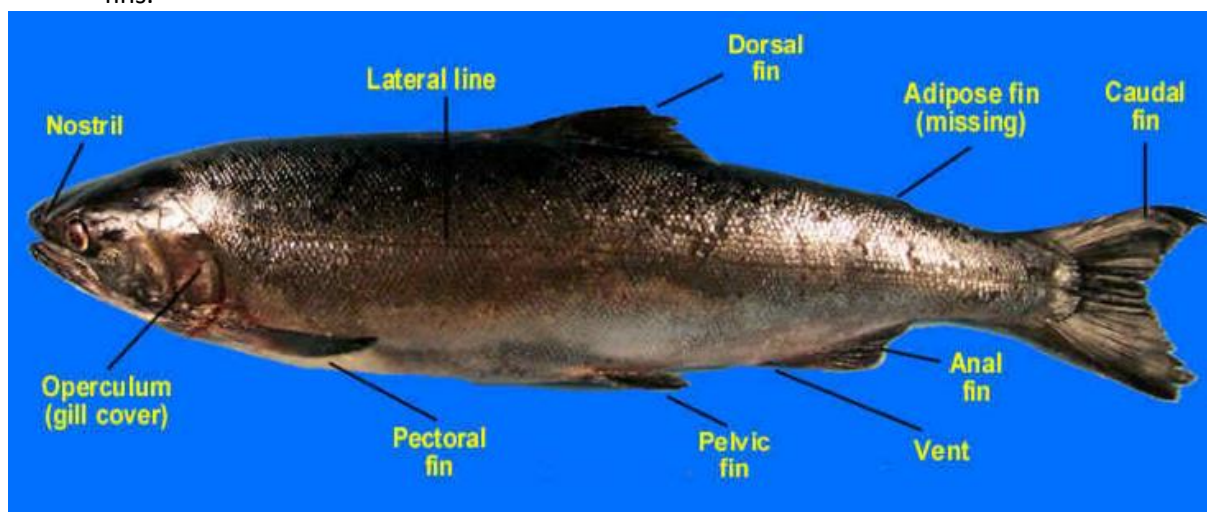
# Salmon Dissection

If you are unfamiliar with fish dissection, use this curriculum to guide you through the process.

Using the diagram provided, explain the external/ internal anatomy and physiology of the salmon.

○ **EXTERNAL:**

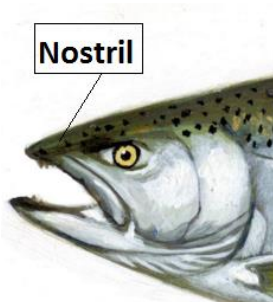
- Have the students feel the salmon. Why is it slimy?
  - *So the fish can more easily slip away from predators such as bears. The slime also serves as an anti-abrasive so the fish can easily slip over rocks. This slime lubricates the fish and makes it easier for it to swim through the water. It also works to protect the salmon against fungus, parasites, and disease.*
- Point out and discuss the mouth, eyes, nostril, operculum, lateral line, vent, and fins.



## MOUTH

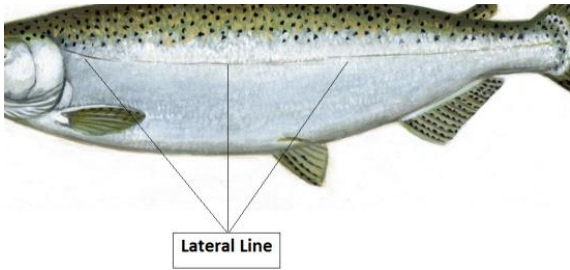
The mouth contains sharp, needle-like teeth which the salmon use to grab their prey. They do not use their teeth for chewing! Salmon have taste buds like humans and are thought to taste salt, sweet, bitter, and acid.

Salmon EYES are different from humans eyes. Salmon can swivel each eye independently to provide a wider field of vision. However, salmon do not have depth perception like humans do.



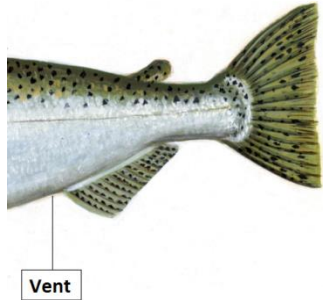
## NOSTRIL

Nostril is not attached to the mouth, and is not used for breathing. Salmon can smell small amounts of chemicals in the water and can detect pollution and to avoid potential threats. What else might salmon use their sense of smell for? This sense of smell is likely also used to help the salmon navigate back to their natal stream from the ocean. Salmon may be able to pick up on certain chemical "markings", such as mineral composition, of their native streams.



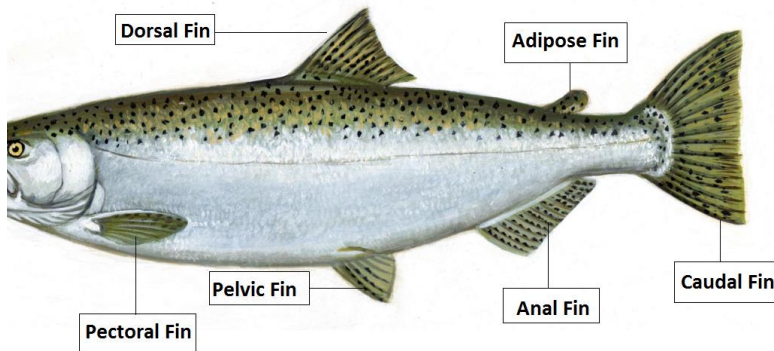
### LATERAL LINE

The lateral line is a specialized feature of fish that allows them to sense their environment. It functions sort of like the sense of hearing, sort of like the sense of touch, and sort of like the sense of sight. The series of organs along the line emit low level vibrations (kind of like sonar) and can detect changes to the environment, such as disturbances in the water and help the fish navigate through the water when they cannot see very well.



### VENT

The vent is a small opening on the underside of the salmon. This is where females lay their eggs from and where males release their milt. Both sexes eliminate waste from their vent.



### FINS

Salmon have eight fins, including their caudal fin or tail. They contain spines with a thin layer of skin between them.

The CAUDAL fin is the largest and most powerful fin. It pushes water to move the salmon forward.

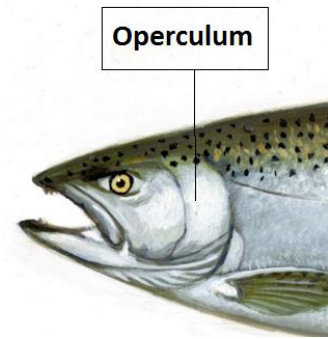
Think of the DORSAL fin like the keel on a ship. What does the keel do? It keeps

the ship upright and controls the direction on that ship moves in. The dorsal fin does this for the salmon.

The ANAL fin also helps keep the salmon stable and upright.

Salmon use their paired fins, PECTORAL and PELVIC, for steering and balance. They also use these fins to move up and down in the water column.

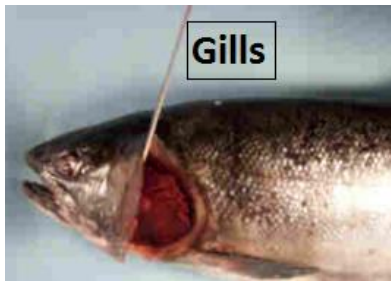
The ADIPOSE fin serves no known function. Sometimes at the hatchery, this fin is cut off to help differentiate these fish from wild salmon when they return or are caught.



### OPERCULUM

The operculum, or gill cover protects the gills. Salmon can open and close their operculum to let water pass over the gills. Why do salmon pass water over their gills?

- Pull back the operculum to reveal the gills



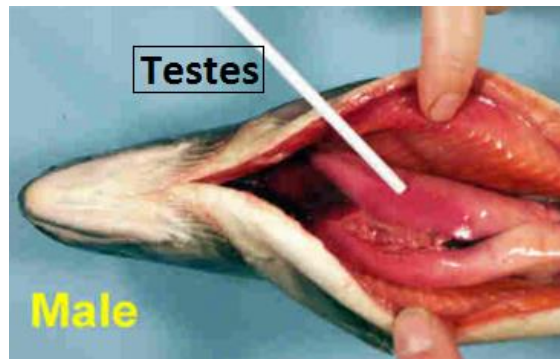
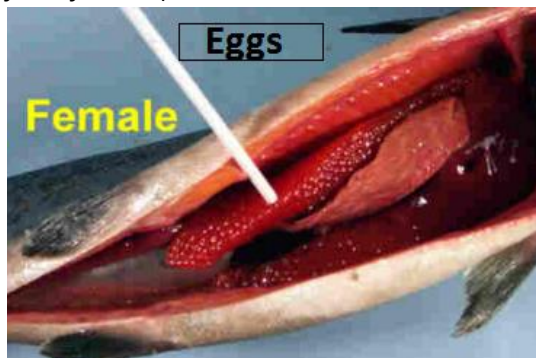
### GILLS

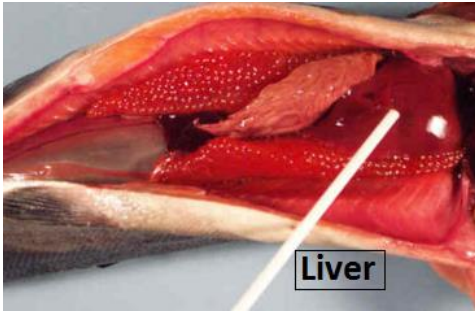
The gills are red because they are filled with blood. The gills are where salmon blood is oxygenated. Fish breathe by washing water over their gills, either by opening the operculum or by gulping water into their mouths and letting it run out through the gills. The gills look like thin branched structures in order to provide a large surface area for oxygen absorption.

**INTERNAL:** Point out and discuss the swim bladder, gills, kidney, heart, liver, stomach, and heart.

- Cut the salmon open but making an incision at the vent and cutting up towards the throat.
- Point out the eggs or testes present.
- If eggs are present, ask the students why there are so many.

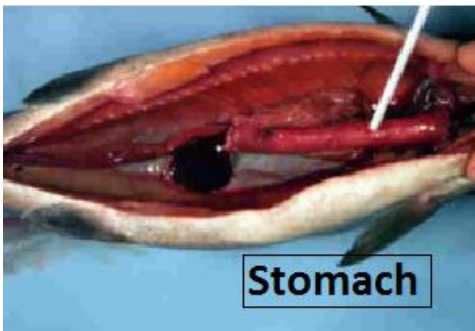
*Female salmon lay between 1,500 – 10,000 eggs, depending on the species. On average, only a few of these (0-10 will survive to adulthood).*





#### LIVER

The liver is the largest organ in the salmon body. Like in humans, the liver helps maintain the proper level of chemicals and sugars in the blood.



#### STOMACH

Like our STOMACHS, the salmon stomach breaks down food with digestive juices.



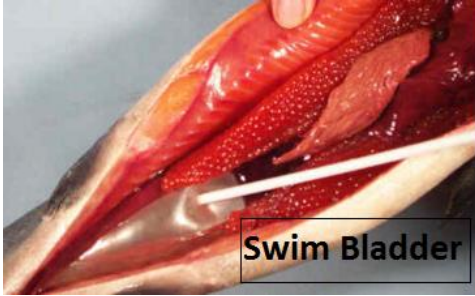
#### INTESTINES

After leaving the stomach, partially digested food passes into an organ that humans do not have, called the Pyloric ceca. You may be able to observe this organ in your dissection. It is a series of small finger-like pouches. Food is further digested here before it passes into the intestines. Like in humans, the digestion process is completed in the intestines.



#### HEART

The heart pumps blood through the body. It is close to the gills, where the blood can be recharged with oxygen. In humans, our hearts are close to our lungs for the same reason.



#### SWIM BLADDER

Salmon fill their swim bladder with air for buoyancy, allowing them to float in the water. The fish fill the swim bladder for the first time as fry. They can adjust the air in the swim bladder so they can move up and down and hover in the water.

"Do fish have lungs?" "Most, including salmon do not, so they use their GILLS to breathe."



Salmon KIDNEYS are crucial to smoltification. Salmon have two kidneys that are connected. Like our kidneys, the front one produces red blood cells, the back one cleans the blood.