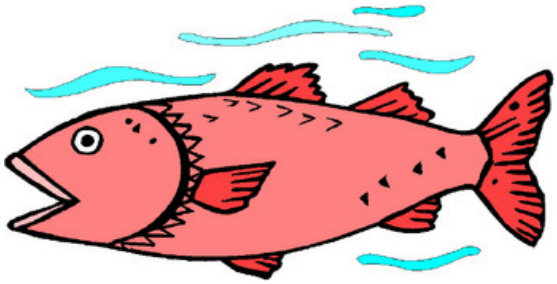
Passports
A Focus on Salmon
Resource Guide grades 6-8

Summary

A popular seafood choice is salmon. Many people do not know much about the life, history, or life cycle of these fish, nor do they know about the special threats to the fish. This presentation gives an overview of some of these factors for salmon. There are several species of salmon that belong to the *salmonid* family and they inhabit both the Atlantic and Pacific Oceans. *Salmonids* have an interesting life history: they live in both the fresh and saltwater environment, making them **anadromous**.

The life cycle includes:

1. egg
2. fry
3. smolt
4. parr; juvenile
5. adult
6. spawning adult stage



Salmon are **semelparous**, this means that they die as soon as they spawn. Many people like to eat salmon because it is highly nutritious, low in fat and high in protein. In order to meet the demand for salmon, aquaculture has increased the supply of salmon in the market. Some threats to wild salmon populations include habitat loss, human alterations to rivers, climate change and over fishing.

Vocabulary

Anadromous - fish that spend most of their life in the sea, but breed in fresh water

Semelparous - reproducing or breeding only once in a lifetime

Gill - an organ (as of a fish) for obtaining oxygen from water

Scales - a small rigid plate that grows out of an animal's skin to provide protection

Fin - the limbs of a fish used to steer through water

Dorsal fin - A fin located on the backs of fishes, whales, dolphins, and porpoises, as well as. Its main purpose is to stabilize the animal against rolling and to assist in sudden turns.

Habitat - the place where a particular species lives and grows

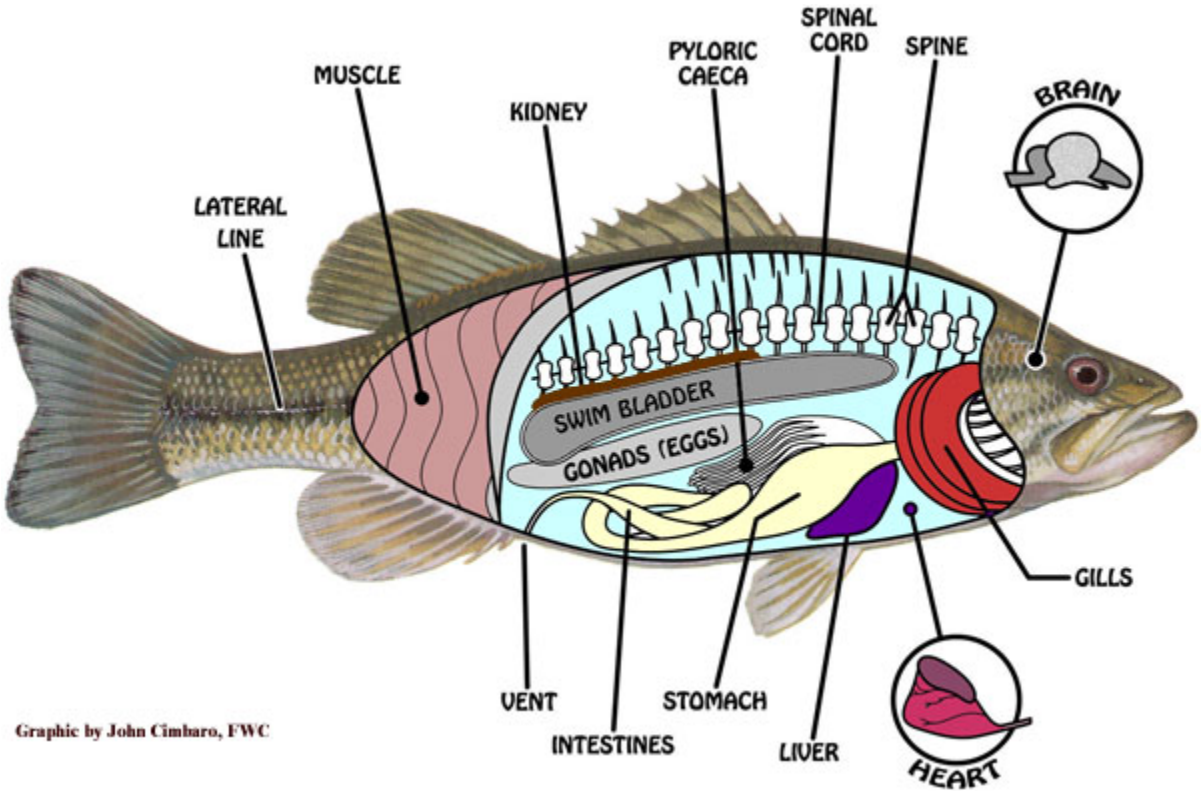
Swim bladder – internal organ that helps fish stay buoyant, or float, as well as ascend or descend without wasting energy swimming.

What is a fish?
This is a difficult question to answer because fishes have a huge variety of body forms. The popular concept of a fish as an animal that has fins and scales, and lives in water, is not strictly correct. Many species of fishes such as the clingfishes lack scales, and others such as some species of eels have no fins. Some fishes such as the lungfishes can spend considerable time out of water.

1. Using your own words, define a fish. You may want to work with a partner to brainstorm first.

Fish Anatomy

This illustration shows some of the common internal features of fish.



2. Write one sentence about each anatomical feature describing its function.
3. Which features are also part of the human body?

A swim bladder is a sac that fills with air to help the fish float without having to constantly swim.

4. What might humans use that would be like a swim bladder?

Salmon Eggs

This photo shows salmon eggs in different stages of development.

A. In some, only a few cells grow on top of the yolk,
B. in the lower right the blood vessels surround the yolk and
C. in the upper left the black eyes are visible, even the little lens

The female salmon digs a shallow depression called a redd to lay her eggs. She may lay 5000 eggs in one redd. She may create 7 different redds to lay all of her eggs.

1. How many eggs might a female salmon lay in one season?

2. How many of this salmon's eggs will survive to become smolts if only 10% of salmon make it to this stage?

3. What math computations did you use to determine the answer for each question?

Fry stage

The eggs (shown above) will hatch into *alevin* or *sac fry (left)*.

This picture illustrates a yolk that sticks out from the bottom of the alevins. This "sac" contains protein, sugar, minerals, and vitamins. As these alevins grow the sac disappears.

1. What do you think is the purpose of this sac?
2. Why do you think the sac disappears?
3. Salmon face dangers throughout their lives, but what vulnerabilities might a salmon face in this stage?

The fry quickly develops into *parr* (right) with camouflaging vertical stripes. The parr stay for one to three years in their stream in which they were born before becoming *smolts* which are distinguished by their bright silvery color. It is estimated that only 10% of all salmon eggs survive long enough to reach this stage. The smolt body chemistry changes, allowing them to live in salt water. Smolts spend a portion of their time in salty water, where their body chemistry becomes accustomed to the ocean.

1. Knowing that the vertical stripes act as camouflage, what might you determine about the parr's habitat?

Adult Salmon

The Chinook or King Salmon is the largest salmon in North America and can grow to 1.5 m (58 inches) in length and to 57 kg (125 pounds) in weight.

1. Using the information above, how long can a King Salmon grow in feet and inches?

2. What math computation must you use to determine the answer?

3. What prior knowledge about customary units of measure must you know to answer this question?

4. If a salmon grew to be 1 meter, how big would that be in feet and inches?

5. If a salmon grew to weight 50 kilograms, how many pounds would that equal?

Critical Thinking Questions

1. What physical features and characteristics of their life cycle, make salmon vulnerable to human alterations in the environment?

2. List three pros and three cons of aquaculture species of salmon.

3. If you had to propose a plan to increase the numbers of salmon, at what stage of the life cycle would you apply this plan?

Further Resources

www.fishbase.org

www.wildsalmoncenter.org

http://www.psmfc.org/habitat/fishfacts.html

http://www.enchantedlearning.com/subjects/fish/label/labelfish.shtml

http://www.amonline.net.au/fishes/what/what.htm

http://www.drhelm.com/aquarium/internalfish.html