

**Grade Level:**4<sup>th</sup> Grade**Time:**

85 Minutes

**Season:**

All

**Objectives:**

Students will be able to...

- Identify internal and external salmon anatomy
- Recall the function of anatomical features that are unique to fish.

**Key Concepts:**

- Salmon have anatomical features that are similar to humans while other features are unique to fish

# Salmon Anatomy : Dissection

Lesson 1 of 2

## Background & Summary

Many of the schools involved in our Salmon in the Classroom program have been able to expand their studies in many ways. One activity that has been well received by teachers and students is the salmon dissection activity. This is a lesson in comparative physiology and anatomy.

Take time to consider the physical arrangement of the room. Keep in mind that some children may find this activity somewhat stressful, so try to make everyone comfortable with participating in the activity. Arrange the room in a way that allows students to move in and out according to their curiosity and comfort level.

Be sure to be in a well-ventilated room and if possible, open the windows. The smell can be overpowering to some, so it's also important to provide everyone with a space where they can step outside the classroom or building to get some fresh air.

Safety is a top priority. Given the sharp tools required for this lesson, it's not recommended to attempt the dissection activity with less than a 1:4 volunteer to student ratio. The students should be split into groups of no more than four and a single salmon should be shared by no more than two students. Further, in addition to volunteers, it's helpful to have one to three "floaters" moving between groups in addition to the lead instructor.

During the dissection, it may be inappropriate to pass the parts around from student to student. Imagine what might occur if the part doesn't make it all the way, and it ends up in someone's pocket! Instead, it may be better to get a volunteer to help ensure that parts stay with the fish. This method could also be a relief for those kids who want to participate, but don't wish to get too close to the action.

Establish ground rules with your class before passing out the salmon. Suggested ground rules are:

- Respect the carcass. The animal was once a living organism, and its carcass is here for learning purposes. Do not use the dissection tools to deface, maim or otherwise disrespect the specimen.

Courtesy of Columbia River FWCO Information and Education, 2022



## Background & Summary (Continued)

- The tools provided should only be used for their intended use. Scissors should only be used for cutting and forceps should only be used for grabbing or holding parts of the specimen.
- Under no circumstances are any students allowed to use the scalpels or kitchen knives. These are sharp objects that can cause severe injuries and should only be handled by the adult volunteers in the room

This is a hands-on activity and it's guaranteed to get messy. Try to avoid doing the dissections in areas with carpet. It's a lot easier to clean fish guts from a laminate floor than a carpeted one. Make sure there is a sink near with lots of hand soap and paper towels for people to use at the end. Further, students may want to considering bringing a spare shirt in case they get dirty. The fish carcasses should be disposed of in an outdoor dumpster. Ideally you should freeze the fish until garbage day to avoid foul smells and scavengers looking for a seafood dinner. Under no circumstances should any part of the animal be consumed. The salmon may have been chemically anesthetized prior to spawning and consuming them may lead to accidentally poisoning.

## Procedure

### Warm-Up Activity: What is "Anatomy"?

1. Split students of into groups with no more than 4 students per group. Introduce the class to the lesson by asking them to share what they think of when they hear the word "anatomy". Encourage students to use humans as a reference for discussing anatomical features and their respective functions. Facilitate a discussion by having the class use the answers they provide to narrow down a collective definition of the word "anatomy". In the end, the consensus should be that anatomy describes the structure and function of an organism and its parts. (5 minutes)

### Human vs Fish Anatomy

#### Learning objectives:

- a. Compare and contrast human and fish anatomy
- b. The functional roles of basic internal and external fish anatomy

2. Pass out two "Salmon Anatomy Student Sheets" to each group. Use the prompts below to continue the discussion by having the class compare and contrast human and fish anatomy. The "Salmon Anatomy Cheat Sheet" lists the functions of the anatomical features found on the student sheet and interesting facts about salmon anatomy. (10 minutes)



## Procedure (Continued)

-What external features do human and fish have in common? What type of internal features?

-What internal (or external) anatomical features does one possess that the other doesn't?

-What anatomical features are unique to fish that aren't shown on the handout?

### Examples:

Scales- Protection from pathogens. Flexible cover to ease movement. Reduced drag.

Slime- Protection from pathogens. Chemical barrier for maintaining osmotic pressure.

Vent- Eliminate waste.

-What features do human and fish have in common that have structural similarities but functional differences?

### Examples

Nostrils- Breathing and smelling in humans, smelling in fish

Vent- Eliminate waste in humans, eliminate waste and reproductive function (eggs for females, milt for males) in fish

## Salmon Dissection

### Learning objectives:

a. Identify salmon anatomy

3. Provide each volunteer with a “Salmon Anatomy Cheat Sheet”, a “Salmon Dissection Guide” and a scalpel. Provide each pair of students with a salmon carcass, one pair of scissors and one pair of forceps. Starting with external anatomy, instruct students to work in pairs to find the anatomical structures listed on the “Salmon Anatomy Student Sheet”. The brain and otolith should only be removed by volunteers that have prior experience with fish dissections. (1 hour)

### Plan Ahead

Have volunteers familiarize themselves with the “Salmon Dissection Guide” in advance. They'll be able to better assist students with identifying and removing parts of the salmon.

Some structures, such as the gill arches, require a little precision to remove and keep them intact enough to show off anatomical features like gill rakers.

4. Conclude the activity by inviting students to share their thoughts and reactions to dissecting a salmon. The prompts below can be used to guide the conversation. (10 minutes)

-What did you enjoy the most? The least?



## Procedure (Continued)

- What are some things you observed about salmon anatomy?
- How were you able to determine the sex of your salmon?
- Ask students how many of them were able to find an organ of your choosing. Then ask the students to describe that organ (it's shape, texture, any features).
- Did anyone cut open the stomach to see the contents? What did you find?

### Extensions

#### Additional Activities

##### Aging Tree and Fish

Students examine a fish scale to determine the age. The instructions for this activity is included in the supplemental materials for this lesson plan.

##### Gyotaku: Fish Printing

Students make colorful prints of fresh, frozen or rubber fish. The instructions for this activity is included in the supplemental materials for this lesson plan. If you don't have the supplies for this activity, you may be able to borrow the kit from the Columbia River Fish and Wildlife Office.

##### Dig Deeper

##### Salmon Identification

A chart to identify salmon by species provided by the Alaska Department of Fish and Game. Included in the supplement materials for this lesson plan

##### Salmon Dissection Video

A recording of a salmon dissection provided by the South Sound Green program. Link here: <https://www.youtube.com/watch?v=i2esFr8drdQ>

## Vocabulary

Refer to "Salmon Anatomy Student Sheets".

## Materials

### Included:

- 10 – Salmon Dissection Guides (for volunteers and instructor)
- 16– Salmon Anatomy Student Sheets
- 10 – Salmon Anatomy Cheat Sheets (for volunteers and instructor)
- (Optional) Aging Tree and Fish Activity – See Extension Section
- (Optional) Gyotaku: Fish Printing Activity – See Extension Section
- (Optional) Salmon Identification Chart – See Extension Section



## Materials (Continued)

### Request to Borrow from Columbia River FWCO:

Note: Requests are pending availability and geographical location

- 14- Salmon for dissection (or 28 rainbow trout, one for each student since they are smaller than salmon)
- 14 – Forceps (or 28 if using rainbow trout)
- 14 – Dissection scissors (or 28 if using rainbow trout)
- 10 – Scalpels (for volunteers and instructor)

### Not Included:

- 4 to 7 – Kitchen knives (sharp and flexible)
- Bib paper or plastic (to cover dissection surface)
- Hand soap, water and paper towels (for washing up)
- Clorox or disinfecting wipes (for cleaning surfaces)
- Plastic bags (for waste)
- Plastic spoons (for scooping out the salmon kidney)

## Next Generation Science Standards

### Life Science

#### LS1 – From Molecules to Organisms: Structures and Processes

4-LS1-1: Construct an argument that plants and animals have internal and external structures that function to support survival, growth, behavior, and reproduction.

4-LS1-2: Use a model to describe that animals receive different types of information through their senses, process the information in their brain, and respond to the information in different ways.

## Common Core Standards

### Reading Standards

4.7: Interpret information presented visually, orally, or quantitatively (e.g., in charts, graphs, diagrams, time lines, animations, or interactive elements on Web pages) and explain how the information contributes to an understanding of the text in which it appears.

### Speaking and Listening Standards

4.1: Engage effectively in a range of collaborative discussions (one-on-one, in groups, and teacher-led) with diverse partners on grade 4 topics and texts, building on others' ideas and expressing their own clearly.



## Common Core Standards (Continued)

4.4: Report on a topic or text, tell a story, or recount an experience in an organized manner, using appropriate facts and relevant, descriptive details to support main ideas or themes; speak clearly at an understandable pace.

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