

# Learning Cycle 2:

## Meet the Salmon



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### Lesson Overview

In this lesson, students will learn about the physical features that distinguish the five species of salmon with whom we share our watershed. They will learn about how scientific drawings help scientists capture important details, and will create a scientific drawing of a salmon of their choice.

### Materials, Resources, & Advance Preparation

For each student:

- Drawing materials (pencil/paper)
- [Salmon observation forms for 5 salmon species](#) (\*may also be used per group)
- [Salmon outline](#) of their choice

For each group:

- One copy of the [salmon card sort](#) for each group.
- [Salmon images](#)

### Engage Phase

Ask students to take a minute to imagine what they think of when they hear “salmon”... Provide students with a pencil and paper. Ask students to draw what they think of. (You may want to set a timer and challenge students to provide as much detail as they can in about 3 minutes.) Students' drawings represent their thinking *before* the lesson, and will be revisited at the end as a sensemaking tool for reflecting on new learning.

Have students share their salmon drawing with a partner, conduct a ‘gallery walk’, or have students share their drawings in a whole-class discussion. Students may draw fish, but may also draw sushi, salmon filets, fishing for salmon, etc. These drawings provide you with insights into the students’ experiences with salmon in their daily lives and possible connections you can make to this throughout the unit.

Ask students whether they think salmon (fish) look *exactly* like their drawings and/or whether they think all salmon look alike. Students may be aware there are different types of salmon, but if not that is OK; Tell them that in the next activity, they will be looking at some photographs of salmon found in our watershed.

Teacher notes: *\*No salmon species names are introduced yet\* as this is just a time to gather students’ own ideas about salmon and what they look like. It’s perfectly fine if their drawings are more imaginative than realistic.*

## Exploration Phase

Provide each group a set of cards with [many different pictures of salmon](#). The students will be asked to sort the salmon into different groups based on what they observe in the photos. You may wish to focus students' attention on the physical characteristics of the fish themselves, though some may decide to sort the fish based on other things such as where the salmon is (underwater/out of water, caught or free, etc.)

Questions to ask students while they **observe**:

- What do you notice about \_\_\_\_\_? How does the \_\_\_\_\_ of this fish compare to the others? How are they alike or different?
  - Focus on color, pattern, shape of the mouth/nose, tail features, etc.

Questions to ask students while they **sort**:

- Why did you put these fish together?
- Why did you put these two fish in different groups?
  - Look for any cards that do not match the justification students provide

Ask groups to share/compare how they sorted the salmon in a Gallery Walk. When putting the salmon into groups, they should be able to provide evidence to justify their thinking.

Teacher notes: *\*No names of the species are introduced yet, only the photos. The students will not be told how many piles to make, and they may have different numbers of piles based on what features they focused on. Encourage students to use their own language and words when describing what they notice (e.g., tail) rather than introducing new academic language (e.g., caudal fin).*

At this point, students may have questions about the different kinds of salmon species in the photos— or may even know some names. Let students know that they will now work in groups to learn more about 5 species of Pacific Salmon.

## Explanation Phase

In this part of the lesson, students will learn about the common names, scientific names, nicknames, and physical characteristics of the 5 species of salmon with whom we share our watershed. This provides an opportunity for students to compare the characteristics they noticed and used to sort the salmon into groups in the card sort activity to how scientists have classified species such as salmon. The fact sheet will also serve as a reference for the students' scientific drawings later in the lesson.

The students will get [blank observation sheets with pictures of each salmon](#). Students will look critically at each salmon, to notice and complete the fact sheet per each salmon species with their observations. This allows them to compare and contrast the physical features that distinguish one species from another. The teacher may find it useful to draw students' attention to the following distinguishing traits of each type of salmon:

- Chinook: black spots and silver caudal fin, black gums black tongue (nickname blackmouth) The common name is from the Chinook peoples, while the scientific species

name is based on the Russian common name *chavycha* (чавыча).

- Coho: Silver in ocean, mouth hooked when returning as adult to spawn, white gums, black tongue, bright red for spawning
- Chum: fat bodies - not elongated, distinct blotchy streak patterns
- Sockeye: red bodies and green head, long mouth - not hooked
- Pink: smallest fish, the scientific name *gorbuscha* is Russian and means humpy, white mouth with black gums, huge hump in males, oval black spots on back and tail

Students may find the categories on the observation sheet vague; here are some suggestions for when a student is unsure how to observe one of the traits on the fact sheets:

- Pattern: spots, stripes, solid colors, etc.
- Nose features: shape (hooked or not), length, etc.
- Mouth features: length, teeth (size, appearance), etc.
- Caudal fin: Shape (flat end, crescent shaped, pointy), Height, if the pattern is different from the rest of the body, etc.

Connect to what students learned in third grade about inheritance of traits– salmon offspring of the same species share these distinguishing traits.

#### **Implementation options:**

- Model making detailed observations of one of the salmon species together. (If your class has raised a tank of salmon, you might want to choose that species.) Use this as an opportunity to introduce key terms (Caudal fin = tail) and promote the use of descriptive words. Be sure to inquire with students as to why the salmon might have the particular nickname it is given (most are based on physical features). Then, have students work together or independently to complete the remaining fact sheets.
- Provide each group with ONE of the fact sheets, then have students either 'jigsaw' with members of other groups, OR each group presents their findings to the whole class to compare/contrast the characteristics of each type of salmon.
- For multilingual learners, a comparative input chart (GLAD strategy) may be helpful to draw attention to key features that vary among the different salmon.

Revisit the photo card sort: Using their fact sheets, invite students to compare their groupings for the card sort– how were they alike/different to how scientists have classified types of salmon? Can they identify the types of salmon in each picture? This could be an opportunity for students to present their findings about what they noticed for each salmon.

Invite students to revisit their initial drawings– which feature(s) did they include in their original drawings of a salmon? Does their drawing align better with any particular salmon species?

**Teaching tip:** Here is a helpful hand trick to remember the five species names:

- Thumb - Chum
- Pointer finger/ point to your sock & eye - Sockeye
- Biggest finger - King/ Chinook
- Ring on your finger - Silver/ Coho
- Pinky finger - Pink

## Extension Phase

After learning about the salmon species and the differences between them, students will be ready to learn about how scientific drawings and art might differently depict those salmon. Show students examples of [artistic renderings of each of the five salmon species](#). Ask students to consider how/why people might use salmon as a subject for their art (e.g., it might have cultural significance, as with Indigenous art, be a logo for a company, a decoration, etc.).

**Teacher Tip:** You may have salmon art/artists in your community that you can highlight here as well! Below are two murals in Bellingham. See also the [Whatcom Creek Salmon Art Trail](#) and [Northwest Artists Against Extinction](#)



East Los Streetscapers (now gone)



Salmon Run by Jason LeClair & Gretchen Leggitt

Have students think-pair-share whether they think *scientists* might also make drawings of salmon. How might scientists' reasons for drawing salmon differ from why artists might draw salmon? After sharing, invite students to compare their ideas to this video in which students will learn about scientific illustrations: <https://www.youtube.com/watch?v=BixFe6AOGdc> **FROM 0:00 TO 2:10**

- After viewing the video, ask students to recall the ABCs of scientific drawings (Accurate, Big, Colorful, Detailed, Explained.)
  - Consider making a poster/ chart of these features of scientific drawings for students to reference
- Ask students to think-pair share about why it is important to include these features.

Provide students examples of scientific drawings (from their textbooks, a Google image search, or this [classroom blog](#), etc.) to model what scientific drawings look like and how they help a viewer understand key information through labeling, details, and annotations.

## Evaluation Phase

Students will be assigned or choose one of the five salmon species to create a scientific drawing

with the skills and knowledge they have just gained. As an optional scaffold, students can create their drawings by coloring in and labeling an [outline of a salmon](#), or they can freehand if they choose.

Students and the teacher will compare their final scientific (annotated) drawing to their original drawings. This is a great way to assess students' growth and the features they identify as important for distinguishing the salmon species they drew as well as emphasize the qualities of a scientific drawing. Each student should use their drawings to respond to the prompt: *I used to think.... Now I know....*

## References & Related Resources

Baxter, J., & Banko, W. (2018). [Drawing for Meaning: Students develop three-dimensional skills through scientific drawings](#). *Science and Children*, 55(6), 80-85.

Introduction to Scientific Sketching from California Academy of Sciences  
<https://www.calacademy.org/educators/lesson-plans/introduction-to-scientific-sketching>

ABCs of Scientific Illustration [video]  
<https://youtu.be/BixFe6AOGdc>

Science Magazine [Classroom Blog] Examples of students' scientific drawings of fish:  
<http://sciencemagazine-sheilabastian.blogspot.com/search?q=Studying+the+Anatomy+of+Fish>

## Connecting to the News

In the EXPLAIN phase, students learn about five species of salmon native to the Pacific Northwest. [NPR did a story about escaped Atlantic Salmon](#), which have been 'farmed' here in the Pacific Northwest, but that aren't native to the region. Smithsonian magazine also followed up on the story in 2018 with [Why Washington State is Phasing Out Atlantic Salmon Farming](#). Ask students to compare/contrast this salmon with the five in this region. Discuss how the presence of the Atlantic Salmon can impact native salmon.



**Atlantic Salmon**

## Connecting to Indigenous Knowledge and Since Time Immemorial (STI) Curriculum



The [Native Knowledge 360](#) project has a lesson to help students learn more about why salmon are important to the Native people and Nations of the Pacific Northwest, including the [Lummi Nation](#).

The activities in this lesson are complementary and support those in the Since Time Immemorial Pathway (3rd grade level): [STI Elementary Pathway 2: Honoring the Salmon](#). Specifically, this Pathway introduces students to the role of salmon in the history and culture of Indigenous People of this region. This is done through Tribal [stories like Salmon Boy](#), [celebrations like First Salmon Ceremony](#), and [games like salmoncatcher](#).

## Connecting to the Next Generation Science Standards

### Performance Expectation(s):

[4-LS1-1 Construct an argument that plants and animals have internal and external structures that function to support survival, growth, behavior, and reproduction.](#) *\*This learning cycle is one step towards meeting this performance expectation but does not help students fully meet the standard.*

[3-LS3-1. Analyze and interpret data to provide evidence that plants and animals have traits inherited from parents and that variation of these traits exists in a group of similar organisms.](#) [Clarification Statement: Patterns are the similarities and differences in traits shared between offspring and their parents, or among siblings. Emphasis is on organisms other than humans.] [Assessment Boundary: Assessment does not include genetic mechanisms of inheritance and prediction of traits. Assessment is limited to non-human examples.] *\*This learning cycle builds on third grade standards.*

### 3 Dimensions of Learning

### Activity Connections

#### Science and Engineering Practices

##### [Developing and Using Models](#)

Modeling in 3–5 builds on K–2 experiences and progresses to building and revising simple models and using models to represent events and design solutions.

- Develop a model using an example to describe a scientific principle.

##### [Engaging in Argument from Evidence](#)

Engaging in argument from evidence in 3–5 builds on K–2 experiences and progresses to critiquing the scientific explanations or solutions proposed by peers by citing relevant evidence about the natural and designed world(s).

- Construct an argument with evidence, data, and/or a model.

Students construct a scientific drawing to describe a species of salmon and highlight its defining physical characteristics.

Students use their scientific drawings to identify species of salmon shown in photographs and/or art.

## Disciplinary Core Ideas

### [LS1.A: Structure and Function](#)

Plants and animals have both internal and external structures that serve various functions in growth, survival, behavior, and reproduction.

Students learn about the external/physical features of the five species of Pacific Salmon– this is a first step towards understanding how these relate to salmon growth, survival, behavior, and reproduction.

### [LS3.A: Inheritance of Traits](#)

Many characteristics of organisms are inherited from their parents.

Students examine shared traits of salmon of the same species.

### [LS3.B: Variation of Traits](#)

Different organisms vary in how they look and function because they have different inherited information.

## Crosscutting Concepts

### [Patterns](#)

Patterns can be used as evidence to support an explanation.

Students look for patterns across salmon features to identify and differentiate the five species of Pacific Salmon.