

Learning Cycle 5

Healthy Salmon Habitats

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About this Lesson

In this lesson, students will learn what elements make up a healthy riparian ecosystem (salmon habitat) including different biotic/abiotic and human/cultural elements. Students will make observations of different environments and draw scientific conclusions to provide feedback for ecosystem restoration projects. Students will also explore ways humans make positive and negative impacts on salmon habitats, and how we can restore habitats that have been degraded by human influence. It is important for students to recognize our impacts on the environment, especially in our shared watersheds.

Materials, Resources, & Advance Preparation

- Collection of healthy & unhealthy ecosystem photos ([a set for each pair or group](#)) from the City of Bellingham's [Cemetery Creek & Salmon Park Habitat Restoration](#)
- Sticky notes
- Poster paper & markers
- Kendall Creek before and after photos ([a set printed for each student](#))
- [NSEA consultant sheet](#) (writing response) one for every student

Engage Phase

If students have been on the field trip:

- Ask students to recall what they saw and did on the field trip.
- Have students do a turn & talk and discuss-What did you see in the salmon habitat? What data did you collect? What would you expect to see in a healthy habitat?
- Have students write down initial ideas as they discuss
- Have students raise hands and share with the class

If students have not been on the field trip but have played Hooks & Ladders in LC #4

- Ask students to recall the game we played in the last lesson
- Have students turn & talk and discuss- then share out after each question; record ideas as they share.
 - What threats did you face as a salmon? What factors helped you survive as a salmon?
- Tell students that in this lesson, you are going to focus on the watershed and the habitat it provides for salmon.
 - In your story as a salmon, what did you see in your habitat? What kinds of things would you expect to see in a healthy salmon habitat?

Exploration Phase

Introduce the exploration by asking students if they have ever played “I spy”. Let students know that they will be examining photos of different environments for salmon, and writing everything they spy on post it notes. Model doing this for students for one object (e.g., fallen log). Define what an element is (elements are what makes up an ecosystem, everything you see in the ecosystem is an element, such as rocks, sand, plants). Students will be given think time to write down as many elements as they can (one per sticky note). *Note: Students may not readily identify human-made objects in the photos; as they work, circulate to draw attention to and ask about examples of human-made objects.*

- Give each group (3-4 students) the collection of unhealthy/unhealthy system photos (You do not need to explain which is healthy/unhealthy at this point).
- Ask students to write each element they see in the picture on a sticky note- **one per sticky note**
- Bring up any elements they may not have noticed, pointing out human influences such as netting to prevent erosion and litter.

Explanation Phase

After students are done, lead a round of “Guess my Rule” to guide students to categorize elements they identified as biotic (living), abiotic (non living) and human-made/cultural. On a whiteboard or chart, draw three column boxes (without the name of the categories). Ask for volunteers or “steal” 2-3 post-its to put in each category. Tell students that you have a rule about where each element goes. Their job is to watch where you place things and guess your rule.

Example:

??	??	??
Rocks dirt	Trees Grass	Old tire Fence

Invite students to ‘guess your rule’ (without revealing their guess) as you go– They can test their ideas about the rules by sharing an object they think belongs in the middle column, then watch to see if that is where you place it.

After filling in the chart to the extent students feel confident in their ideas, gather together and have a class discussion on what the rule may be.

Potential questions to ask during the class discussion:

- What are some of the things you noticed in each category?
- What is different about each category?
- What do you think each category represents? Why?
- Can you guess my rule?

Students’ categories might be in their own words; this is fine– Give students definitions for abiotic, biotic, and cultural elements in ways that link to their ideas. For example, students might say “man-made”, which you can link to “made by humans”

- Abiotic: Abiotic elements are any non living substances including soil, rocks, air, and water.

- Biotic: Biotic elements include any living or once-living things: plants, trees, decomposers, insects, birds, leaf litter, dead trees, and animals
- Cultural: Cultural elements include anything made or added to an environment by humans: houses, roads, telephone poles, bridges, etc

Tell students that in the next part of the lesson, they are going to think about which of these elements might be part of a healthy vs. unhealthy environment for salmon. *Save the post it notes for the next part of the lesson.

Extension Phase

Draw a T chart on the board or chart paper- Label one side healthy elements and one side unhealthy elements. Explain that we are going to sort the sticky notes into two sides- elements we think are healthy for the salmon habitat, and elements we think are unhealthy for the salmon habitat.

- Have students put each of their sticky notes on the side of the T chart they think it belongs to; students may opt to put a sticky note on the line spanning both.
- Group discussion
 - What do you notice about our T chart? What are your initial thoughts?
 - What elements do we have a lot of agreement on?
 - What elements do we have a lot of disagreement on?
 - Would anyone like to share their reasoning for where they chose to put this element?

For elements that can be healthy OR unhealthy, prompt students to think of examples and support their reasoning. It can be OK to assign groups different elements to do further research into to find out how they impact salmon habitats.

Evaluation Phase

Consulting for NSEA

- Explain to students we are now going to be consultants to give feedback to NSEA and make observations and recommendations to them for the restoration.
- Project and give each student or pair the **before only** pictures of the Kendall Creek Restoration
- Explain they can draw and write notes on the pictures if they would like to
- Hand out and review the [Consultant Form](#) and describe to students what they will be doing
 - Ask them to make observations about the picture in the first box, the second box should be what they would change to make it better for salmon. Then the last box will be why these changes make it better for the salmon.
- Have students study pictures and fill out the consultant form; Student consultants can meet with other student consultants, compare and contrast their reports

References & Related Resources

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 Units: [STI Elementary Unit 2: Living in Washington: Celilo Falls](#) and [STI Elementary Unit 3 Washington State History: Salmon Recovery & the Boldt Decision](#). Specifically, this lesson connects to the human-caused change of a habitat through the [storypath of Celilo Falls](#) and the effect that had on salmon and local Tribes. Additionally, the [Tribal History of Natural Resource Management](#) connects to Tribal Ecological Knowledge and conservation of salmon.

Connecting to the Next Generation Science Standards

Performance Expectation(s):

This learning cycle expands on third grade standards:

- [3-LS4-3 Biological Evolution: Unity and Diversity](#)
Construct an argument with evidence that in a particular habitat some organisms can survive well, some survive less well, and some cannot survive at all.
- [3-LS4-4 Biological Evolution: Unity and Diversity](#)
Make a claim about the merit of a solution to a problem caused when the environment changes and the types of plants and animals that live there may change.

It also prepares students for middle school science learning:

- [MS-LS2-4](#). Construct an argument supported by empirical evidence that changes to physical or biological components of an ecosystem affect populations. [Clarification Statement: Emphasis is on recognizing patterns in data and making warranted inferences about changes in populations, and on evaluating empirical evidence supporting arguments about changes to ecosystems.]

3 Dimensions of Learning

Activity Connections

Science and Engineering Practices

[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 use evidence gathered from observation to identify elements of a salmon habitat that can be healthy or harmful to salmon.

Disciplinary Core Ideas

LS2.C: Ecosystem Dynamics, Functioning, and Resilience

Ecosystems are dynamic in nature; their characteristics can vary over time. Disruptions to any physical or biological component of an ecosystem can lead to shifts in all its populations.

Students begin to work towards this middle level idea about changes in ecosystems and impacts on populations within the ecosystem.

Crosscutting Concepts

Cause and Effect

Cause and effect relationships are routinely identified, tested, and used to explain change.

Students identify elements that can cause harm to salmon habitat and hypothesize ways to create a more healthy habitat for salmon.

Systems and System Models

A system can be described in terms of its components and their interactions.

Students consider how the different elements in an ecosystem interact to provide habitat for salmon.