Science and Engineering Practices
Salmon Habitat Restoration

LESSON 5 - PERFORMANCE TASK
Salmon Stewardship Action

Problem Statement: How can our classroom take responsibility for stewardship actions that measurably improve the ecological conditions of our watershed address allowing both salmon and people to thrive?

Subject: Human Geography, Science, Engineering, Math, Civics, Common Core
Grade Level: Middle School or High School

DESCRIPTION

This is it! Apply your knowledge by implementing stewardship actions as an individual, class, or school community to care for salmon and the upstream habitat we share. These actions may be developed at a number of different scales.

The key is to develop a long-term stewardship action plan for a piece of our watershed address that is within walking distance of our school so that we can frequently visit the site, understand it, restore it, and take care of it over many years. Every site within our **watershed address** is upstream of salmon habitat. Yes, salmon spawn in the river, but all of our actions upstream on every square foot of the landscape has a downstream impact on the quality of the water that determines whether salmon can thrive or not.

In addition to adopting a stream, a site, or a spot, and taking care of it year after year, our classroom can pledge to **sign up for salmon habitat restoration events** that happen throughout the fall and spring.

- In the fall, we can plant trees so that their roots become established through the long rainy season.
- In the spring, we can root out invasive species when the soil is still moist and loose and the blackberries, and the ivy and morning glory have not leaped back to continue their invasive takeover.

Individuals, friends, and family can make a practice out of joining these volunteer habit restoration events which are coordinated and scheduled by **city, county, and non-profit partners**. Just bring your boots and work gloves!

5 Ways to Take Salmon Stewardship Action

Adopt-a-Stream: Our class could work with our city, the county, and local nonprofits to find and adopt a small, priority section of a local stream that needs our ongoing stewardship.

Adopt-a-Site: Our class could work with our city and school district to identify and adopt a nearby park, open space, or section of our own school campus that needs our ongoing stewardship.

Adopt-a-Spot: Our class could work with our city and other neighborhood groups, businesses, faith organizations, clubs, and other classrooms to adopt a series of individual spots like a street corner, park bench, campus parking lot, or playground, to remove plastic and styrofoam litter and keep public spaces clean. Our class could help maintain a map of all these spots!

Adopt-a-Storm Drain: Each member of our class could agree to clean out 3-5 storm drains in their neighborhood twice a year, especially just before the fall rains come and then again after most of the deciduous trees have lost their leaves. And we can map all of these so the city can visualize how we are helping reduce their maintenance costs.

Volunteer for Salmon! Outdoor volunteer opportunities are waiting for you. Sign up on one of these mailing lists now so you know the right seasons to help out, usual fall for tree planting and spring for removing invasive species. Find more super-local volunteer events scheduled on your city website.

- [Mid-Sound Fisheries Enhancement Group](#)
- [Forterra - Green City Partnerships](#)
- [Duwamish Alive!](#)
- [Earth Corps](#)
- [Miller and Walker Creeks Stewardship](#)
- [Salmon Monitoring Program - Community Salmon Investigation (CSI) for Highline](#)
- [Nature Consortium](#)
- [The Dirt: Calendar of hands-on volunteer opportunities in King County](#)
- [Seattle Parks Volunteers](#)
- [King Conservation District](#)
- [Mountains to Sound GreenWay](#)

ACTIVITY 1: Neighborhood Inventory Protocol

Students engage in sustainable systems thinking and geographic literacy by conducting a broad inventory of the current conditions of their neighborhood. This is a much bigger scope than just salmon stewardship, but it is a great way for students to begin to really see the landscape of their neighborhood, their watershed address, as a whole network of systemic interactions, all of which impact the integrity of our local ecosystem and therefore salmon in our streams and rivers. See: [Neighborhood Inventory CHECKLIST](#)

The Neighborhood Inventory Protocol asks us to reflect on three critical questions…

1. What was this landscape like for a kid my age who was a member of the indigenous people living right here prior to colonization?

2. How did this landscape get to be the way it is now? Based on what values? What decisions? Who was involved in making those decisions? Who was left out?

3. What is the most sustainable vision I can imagine for my neighbor in the year 2050 or 2100, in a time when my children and then my grandchildren will be the age I am now?

Walkabout: Take an informal walk around your neighborhood and determine the area that you will investigate. Identify the streets or natural features that will set the boundaries for your inventory. Use one of the following scales:

1. My street (name)
2. 10 blocks (names of streets defining the area
3. Half-mile radius with my house, apartment building, or school in the middle
4. 1-mile radius (like the one-mile maps of my school neighborhood)
5. My stream basin or watershed address. Go to mywater.world and pull up map layers for "Sub-Basin Boundaries" and also "Schools and Colleges"
6. My school service area. Go to your school district website and look up "School Boundary Maps."

You can work with the full Neighborhood Inventory CHECKLIST or take one section per month as it pertains to a course of study. We encourage you to work in phases over weeks, months, or even over different seasons of the year. Enjoy getting to know your neighborhood.

Here are all seven categories of the Neighborhood Inventory Protocol: The most useful entry points for systems that overlap with salmon stewardship might be categories 4-7. Where would you like to start? Get the CHECKLIST

1. Human Population and Land Use
2. Transportation Infrastructure
3. Food Access
4. Size and Condition of Green Spaces
5. Water Bodies, Description by Type and Conditions
6. Stormwater Infrastructure and Water Pollution
7. Tree Canopy Inventory
8. Solar Neighborhood Potential

ACTIVITY 2: Site Identification and Stakeholder Engagement

1. **Adopt-a-Stream**
2. **Adopt-a-Site**
3. **Adopt-a-Spot**
4. **Adopt-a-Storm Drain**

Students choose one or more scales of action and then zero in on specific sites within their watershed address that might need stewardship action. They reach out to local experts from city and county governments, non-profit partners, and environmental science and engineering firms to further refine site selection and prioritize possible actions.

Students build a **stakeholder engagement table** to identify the range of people or groups that either are already working on this issue, have an important stake in this issue (pro or con), or need to be informed and possibly influenced on the merits of this project. See Foundation Lesson; Engaging Stakeholders, especially the list of stakeholder categories to consider on page 9, the cool graphic organizers for stakeholder identification on page 12, and the final classroom Stakeholder Engagement Table (or spreadsheet) suggested on page 13.

ACTIVITY 3: Upstream Downstream

Students play a team game using a collection of 100 8x10 glossy images of different sites throughout their watershed address. They group the images upstream or downstream from the project site they have selected and assess the relative positive or negative impact of the land use choices shown in each image. If we are trying to assess whether salmon and people can thrive here, what does the density, diversity, and distribution of land use choices tell us? See also "Land Use Map Layer" at mywater.world.

How Land use choices impact salmon habitat in our watershed

GOAL: Students strengthen geographic literacy of the watershed where they live while applying systems thinking to consider how different land use choices impact salmon habitat.

Green Duwamish Watershed Collection of 100 Images

Create your own local set of photos! Engage students in submitting several hundred high quality, well composed photos of sites all around their watershed address. Then have a team of student photo editors pick the top 100 for the Upstream Downstream Game specific to your watershed address.

STEP ONE - Sorting 10 images in student pairs: Students work in paires to sort and sequence 10 random images from the collection of 100. This can be done with hard copy 8-10 image sets or in a digital folder or slide deck.

Possible prompts include:

1. How many of these places do you recognize? Have you been there?
2. Where is this place in the watershed? Upstream or downstream from our school, your home, the salmon stewardship site where we will be working?
3. Is this site near a creek or stream basin? How close is it to the main river?
4. How would you sort these images according to land use choices? What categories make sense? Students can refine their knowledge of where these sites are by reviewing map layers at mywater.world, especially the "Land Use" map layer.

   a. Single-Home Residential
   b. Multi-Family Residential
   c. Mixed-Use Commercial/Residential
   d. Commercial
   e. Light Industrial
   f. Heavy Industrial
   g. Park, Open Space, Public Institution Land
   h. School or College
   i. Forest
   j. Agriculture

STEP TWO - Sorting 30 images in combined groups: Students work through the same questions above, but this time with 3 sets of pairs combined for a small group of six. *Additional inquiry:*

1. Now that you have identified a range of different land use types, how would you characterize their impact, positive or negative, on salmon habitat in our watershed?

   a. Clean water
   b. Cool water
   c. Fast moving, broken water to insure oxygenation
   d. Tree cover for shade, hiding, resting, feeding
   e. Woody debris and log jams for hiding, resting, feeding, oxygenation
   f. Side channels for resting, hiding, feeding
   g. The right size gravel and riffling water for digging redds

STEP THREE - The whole watershed: Students work in the hallway, cafeteria, gym, or library to organize all 100 images in sequence from upstream to downstream according to where they belong in the watershed. *Possible prompts include:*

1. Where do each of these images go if we were to imagine one giant map of our watershed on the floor?
2. Which ones are upstream of our salmon stewardship site? Which are downstream?
3. Which are along the main river and which are along creeks and stream subbasins?

4. What is the relative proximity or distance among these locations?
5. Based on our distribution of images, where are the biggest challenges for improving salmon habitat?

STEP FOUR - Digital exploration - My Watershed Address: Students explore the tools and resources at My Watershed Address, ***Possible inquiries include:***

1. Find the names of streams and sub basins.
2. Find out where your school is in relation to streams and subbasins.
3. Click on the Land Use layer to find out more about the official designation of each type.
4. What can you learn from the Equity Demographic maps?
5. What about the Salmon Spawning Habitat and the Riparian Solar Analysis map layers?

ACTIVITY 4: Site Visit Assessment Protocol

Students travel to the selected site to conduct a site assessment based on elements pulled from the master CHECKLIST: Habitat Restoration Site Assessment

Impact Storytelling to Stakeholders - Part 1

Students apply science communication strategies, their own voice, and creativity, to share with project stakeholders the needs they have identified, their initial recommendations, and why it matters in the context of shared salmon recovery goals in the watershed. (See Impact Storytelling Tips)

ACTIVITY 5: Site Planning and Implementation

Depending on the scale and complexity of the project site, students work on their own, in teams, or as a class in collaboration with experts, to complete a Salmon Stewardship Plan. Elements of the plan may include the following:

Salmon Stewardship Plan Get the WORKSHEET

1. Project Name:

2. Team Members:

3. Teacher, Class, School, School DIstrict:

4. Project Summary Description:

5. Project Site Maps (Links):

6. Project Restoration Goal:

7. Site Assessment (Key Data)

8. Alignment with Salmon Recovery Goals: (See Lesson 2, Activity 4)

9. Stakeholders (Link to Stakeholder Engagement Table)
10. Implementation Plan (Timeline of action steps, experts to engage, other resources)
11. Impact Storytelling (See Impact Storytelling Tips)
12. Recommendations for Next Year's Class (Legacy Learning Design)

Impact Storytelling to Stakeholders - Part 2

Students collaborate on a final **Salmon Stewardship Report Stakeholder Update** that includes project goals, methods, actions taken, outcomes achieved to date, relevant data, alignment with Salmon Recovery Plans, recommendations, and ongoing needs. Emphasize photo essays, social media posts, and video storytelling with personal testimonials featuring a range of student voices. (See Impact Storytelling Tips)

Monitoring, Maintenance and Expansion - Legacy Learning

With the beginning of a new school year, each new academic cohort has the opportunity to review the work of the previous class and updatesthe project plan with an emphasis on monitoring the effectiveness of the restoration action and maintaining the site for sustainable benefits.

HELP IMPROVE THIS LESSON

1. What advice do you have for making this lesson better?
2. How would you teach parts of this lesson to younger students?
3. Are there broken links that we need to know about?
4. Did you find even better links in your research?
5. Would you like to share examples of your work so that other classrooms can learn by your example?

   CONTACT: info@sustainabilityambassadors.org

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