

SALMON STORY BRACELETS

(Adapted from dfg.ca/projectwild)

Objectives

Students will: (1) Describe the salmon life cycle and (2) Identify characteristics of salmon habitat, (3) Communicate ways that humans help and harm the ecosystem

Curricular Areas

Science, Language Arts, Art

Method Students create a salmon life cycle bracelet using eight to twelve different colored beads. Each bead represents a part of the cycle in a story they construct.

Materials

- (1) 50-minute class period
- Storybook: "Salmon Stream" by Carol Reed-Jones
- Medium sized pony beads - approx. 12 colors (multiples of some if possible) for each child
- Satin, leather cord, or pipe cleaners
- (1) Worksheet per student
- white board & markers (correspond to bead colors) (2 easels)
- Supporting graphics: Salmon life cycle poster; Salmon habitat poster, Life cycle photo series, Map

Background

The life cycle of a salmon begins when the female deposits eggs in a shallow gravel

depression. Once deposited, the male fertilizes the eggs. Newly hatched salmon, called "alevin," live in the gravel and survive by absorbing proteins from their yolk sacs. After a few weeks, the yolk sacs are gone and the small fish, known as 'fry,' emerge from the gravel to find food on their own. Some species remain in freshwater streams feeding and growing for many months or even years before migrating downstream to the estuary or the ocean. These small ocean-bound salmon are called fingerlings. Before the fingerlings enter the ocean they spend time in an estuary, an area where saltwater and freshwater meet and mix. In the estuary, the fingerlings' body changes in preparation for the ocean saltwater. This process is called "smoltification" and the salmon are now called "smolts." Smolts grow into adults in the Pacific Ocean. They'll spend 2-5 years in the ocean growing rapidly by feeding on other fish, shrimp and crustaceans. The salmon also encounter many dangers including sharks, killer whales, other marine mammals, and humans who are also fishing for salmon. After two to five years in the ocean, they begin the journey that guides them back to their birth site. Salmon have an inherent ability to return to their original streams. Juvenile salmon imprint or memorize the unique odors of their home stream. As returning adults they use their sense of smell to guide them upstream to where they hatched. Once in their home stream, salmon spawn and then die. The carcasses provide food for scavengers and nutrients to the forest around the stream.

Human Impacts: Increases in population and urbanization in our community have had a negative effect on water quality and quantity. Many streams in our community are no longer able to support

the healthy salmon populations they once did. Water flowing over impervious surfaces – roads, parking lots, driveways, and roofs – collects and carries contaminants such as gas, oil, lead, antifreeze, and pet wastes into the creeks and rivers. In residential areas, high levels of nutrients from lawn and garden fertilizers, and pesticides can seep into rivers and streams. Native plants and trees along stream corridors have been destroyed. Upstream migration to spawning areas has been blocked by culverts, and the gravel that salmon need for spawning has been clogged with sediment, or washed away by runoff from winter storms. Salmon habitats have been severely impacted.

Salmon Hatcheries are helping to restore salmon runs that have been impacted by habitat loss and other human impacts by reducing sources of mortality in the salmon's early life stages. The Salmon in the Schools SIS program helps foster an environmental stewardship ethic. Salmon eggs for the SIS program are provided by local tribal and State salmon hatcheries. The program is overseen by the Washington Department of Fish and Wildlife.

Procedure

Before class:

Create a salmon life cycle bracelet to use as an example.

During class:

Guest Presenters: Explain that you are there to thank them for helping raise the salmon and to celebrate the job they have done. Ask what the students have been studying this year in Science (e.g. Animals, Ecosystems, Plants, Land and Water, Microworlds)

and elicit connections to their salmon tank.

1. Engage the students in a discussion of where the salmon eggs in their tank came from and what species they are raising. Show **maps** and discuss hatcheries and the need for salmon supplementation in Seattle. Ask them if they know where their salmon will be released.
2. Ask the class **if they think that when the salmon are gone from the tank if their job taking care of them will be over?** See a show of hands how many think yes/no. Tell them you are going to do a lesson with them to help them learn/remember the salmon life cycle and what salmon need to survive. Tell them you are going to ask them again later about whether their job taking care of the salmon is over.
3. Explain that each student is going to create a story about the life of a salmon. Show the bracelet/ lanyard (you can mention that if they don't want to keep it on their wrist they can hang it off of their backpack or somewhere else). Explain that the bracelet forms a circle like the life cycle of the salmon. The bracelet, which is a form of art, can be used to tell a story about the salmon. Throughout time people of all cultures have used art to tell stories and to teach. Ask if anyone knows a culture that uses storytelling and/or art to teach. For example, house posts and cave paintings.
4. Explain that each bead will tell a part of the story about the salmon as it grows, changes, and travels and you will tell them the story of your bracelet later.
5. Ask the students what they know about the salmon life cycle. Ask if they

know about what salmon need in their habitat. As if the student have been to a hatchery or local creek and seen salmon? If the students don't have much background then read relevant parts of **Salmon Stream** (about 5-7 mins).

6. Worksheets: Using the age appropriate student worksheet (see choices below) and colored markers, students will designate colors for life cycle stages, habitat requirements or obstacles or hazards that the salmon encounter during its life. Explain to the students that the worksheets will help them build their stories and also help them remember what the colors in the bracelets mean. **Pass out the work sheets**, (for graphic version draw similar figure on the board). Ask what stages they have seen the salmon pass through in their tank. Elicit: **egg alevin, fry**. Ask if they know the rest of the stages of the life cycle. Use the poster and Photos to go through the **lifecycle** as they fill in words or look at/color the stages on the work sheet. Fill in words pictures on board as you go. (You can prescribe colors for K-1, older students can choose the bead colors later)
7. Ask the students what else they need to complete the stories about their salmon. ... elicit where they live, what's around them, what they eat,Ask the students if they know the word **Habitat** (A habitat supports the growth of many different plants and animals by meeting their basic needs of food, water, and shelter) and **Ecosystem** (An ecosystem includes plant and animal populations as well as nonliving resources.) Plants and animals depend both on each other and on the nonliving resources in their ecosystem to survive. Explain

that now they are going to add the Salmon's habitat /ecosystem into the worksheet for each of the stages. Ask them what they know about what salmon need in their habitat to survive. See what they can add at any of the stages. Elicit what the habitat was like in the tank... **Show the salmon habitat poster**. What was the temperature of the tank? Do salmon like warm or cold water is that one of their habitat requirements, draw or write "**cold water**". What keeps the water cool in a real stream? (**Shade: Trees**) Can the water be dirty? Add "**Clean water**" Was there gravel or rocks? Would there be **gravel** in a real stream what does a salmon nest look like? What is it called? Add these to the sheet..and the BOARD. Add food: When they were alevin or eggs did they need food (no? what did they eat -elicit yolk sak) they need food when they are fry- draw in "food" in the fry section of the sheet. Where do they go after they leave the stream (**Estuary, Ocean,**) Continue filling out the worksheet.

8. Ask them about threats and hazards in the salmon's ecosystem, (elicit pollution predators, people.) Ask if there need to be **people** in their salmon stories. Are the people helping or hurting the salmon? Specifically what things might people do that might **harm** the salmon in their habitat. elicit and list on board . Ask about what people can do to **help** salmon and list those in the appropriate section.
9. Tell the student that now they are going to use the salmon lifecycle and habitat elements to create their stories and make bracelets to help remember them. Walk them through the colors assigning each to a stage of

the life cycle and then the habitat/ecosystem features. They can fill in the bead colors on the worksheet as you go, so they can refer to it as they build their bracelet and stories. Show the students the sample bracelet and use it to tell them a salmon story.

10. Give students 8 to 12 beads of different colors to represent the elements they will use for their story. **(Make a plan for distributing beads** that will work for your classroom, for example, pass out cups then select students to help distribute beads). Hand out pipe cleaners or string. Beads need to go onto the bracelet in the order of the story
11. Have students share their stories first in small groups of 2 to 5, then solicit volunteers to share with the class. Encourage students to share the story bracelet with their family, or someone outside of school. Discuss why they should tell the story to others.
12. Revisit the over question: **Is your job taking care of the salmon over after the fry are released?** What else can kids do to help the salmon? Tell each student you will give them each a special bead to add to the bracelet to remind them that their job is not over, if they will make a specific pledge about what they will do to help the salmon. Ask for volunteers to share their pledge.

BEAD COLOR SUGGESTIONS:

Orange- salmon egg
Red - alevin
Yellow- fry
Purple- smolt
Silver/gray- ocean adult
Multi- spawner

Reflection

Optional: Have the student fill out the reflection sheets and send them back to us in the envelope provided

Extensions

Have students write out their salmon story and illustrate it. Use music or rhythm to add to the story. Create a life cycle puzzle. Provide each student with a copy of a large circle. Have students divide the circle into six equal parts (like slicing a pie). In each section have them write the word for one part of the salmon life cycle (spawning adults, eggs, alevins/fry, fingerlings, smolts, ocean salmon). Have students draw a picture to represent each stage. When drawings are complete, the circle can be cut out and the sections cut apart. Students can then assemble and reassemble this circle as a puzzle.

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Clear- fresh water
Dark Blue- ocean
Light Brown- gravel, rocks
Light blue- estuary
Dark Green - trees/shade
White- cool water temp
Black- people/human impacts
Special bead- pledge

Salmon Stories

Related WA State Science Content Standards and Performance Expectations*

EALR 4: Life Science- Ecosystems, Habitats

K-1 LS2B-C A *habitat* supports the growth of many different plants and animals by meeting their basic needs of food, water, and shelter and Humans can change natural *habitats* in ways that can be helpful or harmful for the plants and animals that live there.

- Identify the characteristics of a habitat that enable the habitat to support the growth of many different plants and animals (e.g., clean, cold water, trees and gravel are all part of the salmon habitat)
- List two or more things that humans do that might harm plants and animals in a given habitat (e.g., litter, pet waste and chemicals from cars can get into the stream through storm drains and harm salmon fry or make it hard for adults to find their way back).
Communicate ways that humans protect habitats and/or improve conditions for the growth of the plants and animals that live there (e.g., people plant trees near creeks to make shade and keep the water cool for salmon).

EALR 4: Life Science- Structures and Functions of Living Organisms, Life Cycles

2-3 LS1B -Animals have lifecycles... the details are different for different animals

- Describe the *life cycle* of a *common* type of animal (the salmon start as eggs and change to alevin, fry, smolt, adults and spawners).

EALR 4: Life Science- Ecosystems, Changes in Ecosystems

2-3 LS2D- humans impact ecosystems in both positive and negative ways

- Describe a change that humans are making in a particular *ecosystem* and *predict* how that change could harm or improve conditions for a given type of plant or animal (when people build cities they cut down the trees that provide shade and prevent erosion in the creek).

EALR1 Systems- Role of each part in a system

2-3 SYSB A whole object, plant, or animal may not continue to *function* the same way if some of its parts are missing.

- Predict what may happen to an object, plant, or animal if one or more of its parts are removed (e.g., the ecosystem that supports the salmon includes the salmon and its habitat. If the creeks are damaged by flooding or pollution the salmon will not have a place to spawn and lay their eggs).

EALR 4: Life Science- Ecosystems, Changes in Ecosystems

2-3 LS2D humans impact ecosystems in both positive and negative ways

- Describe a change that humans are making in a particular *ecosystem* and *predict* how that change could harm or improve conditions for a given type of plant or animal (e.g. people build cities; storm drains carry untreated polluted runoff from streets and yards to creeks and lakes and Puget Sound impacting aquatic organisms like salmon).

EALR1 Systems- Complex Systems

4-5 SYSD One defective part can cause a subsystem to malfunction, which in turn will affect the system as a whole

- Predict what might happen to a system if a part in one or more of its subsystems is missing, broken, worn out, mismatched, or misconnected (e.g. the watershed is a system. In cities, rain water that feeds the creeks washes over streets and yards and into storm drains that lead directly to the creeks. Pollution in urban runoff can kill aquatic species or make them ill and can impair salmon's ability to navigate to home stream. High flows due to impervious surfaces can cause erosion and damage to creek habitat or salmon redds).

EALR 4: Life Science – Ecosystems, Food Webs

4-5 LS2E-F Plants and animals change the ecosystem where they live. Sometimes the change reduces the ability of another to survive there. People affect ecosystems both positively and negatively

- *Describe* how one *population* may affect other plants and/or animals in the *ecosystem* (e.g. people build cities. Storm drains carry polluted runoff from streets and yards to creeks and lakes and Puget Sound impacting aquatic organisms like salmon).
- *Describe* ways that humans can improve the health of *ecosystems* (e.g., stencil storm drains to educate people about preventing pollution , raise salmon in schools, plant trees to prevent flooding and *erosion*).
- *Describe* ways that humans can harm the health of *ecosystems* (e.g., overuse of garden chemicals, littering, car leaks...runoff carries pollution to storm drains which lead to creeks and waterways)

* <http://standards.ospi.k12.wa.us/ContentListByGrade.aspx?subject=10,PE&gl=28>

LIFE CYCLE OF THE SALMON - STUDENT WORKSHEET

Directions: Think about what you have learned about salmon and what it takes for them to hatch, grow into juveniles, and return to spawn as adults. Consider the salmon ecosystem and all of the different habitats they depend on during their life cycle. Also consider the human impacts that have made many of our streams uninhabitable to salmon.

Now, think about representing the salmon life cycle and their environment as a bracelet, with different colored beads representing different stages of the life cycle, different habitats the salmon lives in, and other events that might play a part in the story of a salmon's life. For example, the color red might represent the "redd" where salmon eggs are laid. You may either use real beads to make your bracelet, or design it on paper using colored markers. Use the chart below to tell what the colors of your beads mean.

	Color	Meaning
1)		
2)		
3)		
4)		
5)		
6)		
7)		
8)		
9)		
10)		

Using your bracelet, tell your story to someone else in your class. Take home your bracelet and tell someone in your family the story of your salmon.

Write your reflections about the bead chart and salmon story activity:

Does this help you to remember the salmon life cycle? Why or why not?

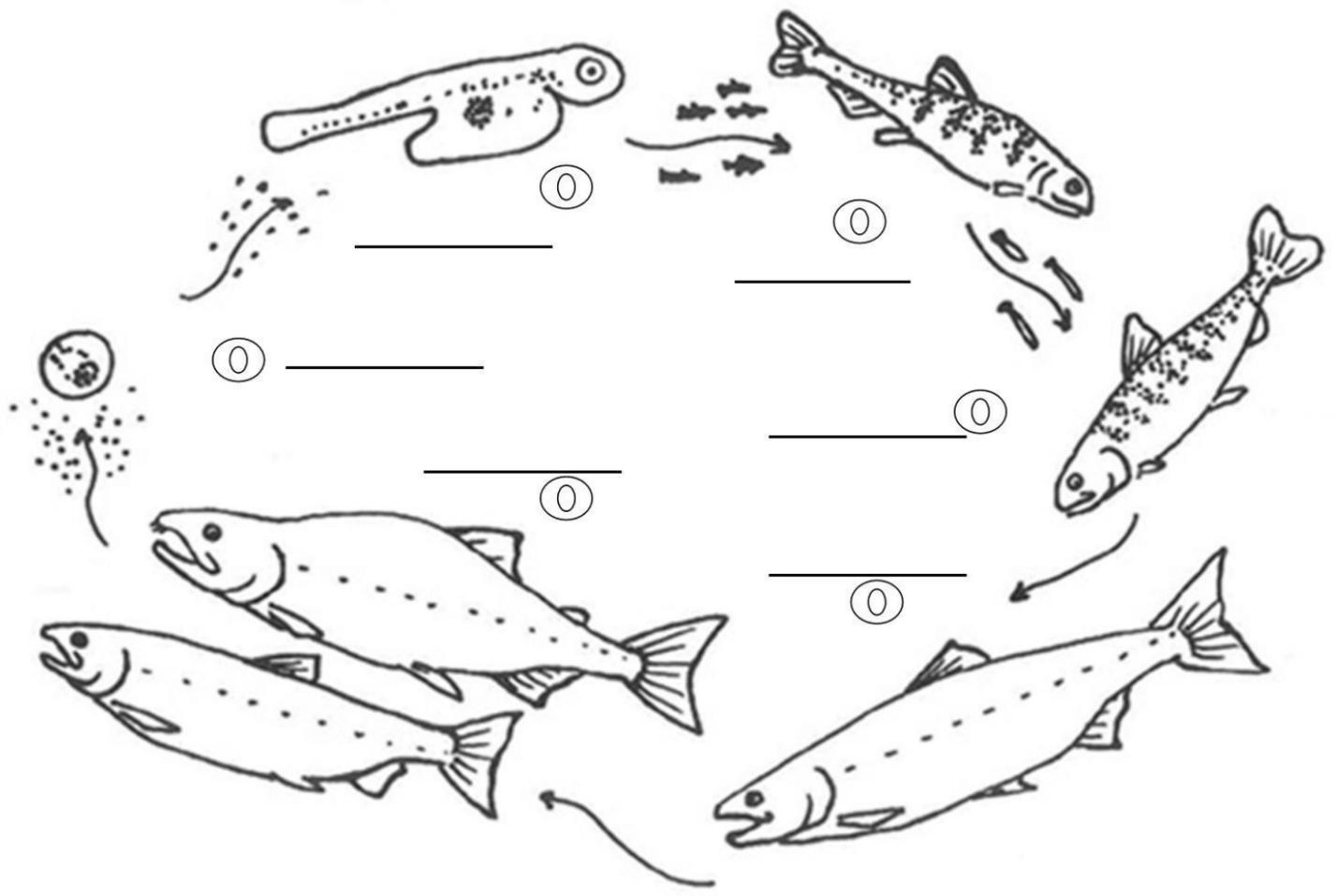
Will you tell your story differently next time? What will you change and why?

Who will you tell your story to?

What was your favorite story from your classmates and why?

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