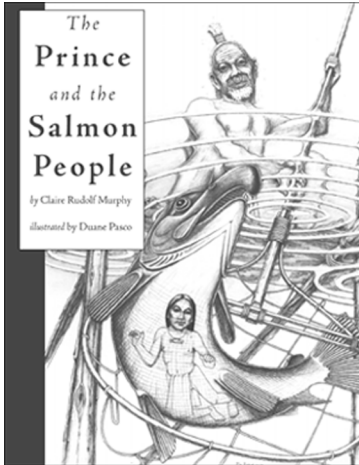


The Prince and the Salmon People Study Guide

DEVELOPED BY PAUL HAEDER AND CLAIRE RUDOLF MURPHY

“A world where the salmon cannot live may be a world in which man cannot live either.”

Anthony Netboy, *The Salmon: Their Fight for Survival*



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Different versions of the Salmon People legend have been told for centuries by many tribes of Northwest Coast Indians. Though the tellings may differ in detail from tribe to tribe and era to era, all versions express the Indian belief that animals have spirits, like people, and can move freely between animal and human realms, choosing to feed humans when we approach them with proper respect and ceremony. Claire Rudolf Murphy's thought-provoking tale about the interdependence of humans and animals is based on anthropologist Franz Boas' accounts and on interviews with Tsimshian elders and craftsmen. Acclaimed Northwest Coast artist Duane Pasco enlivens the myth with his striking drawings. Beyond this, *The Prince and the Salmon People* offers a rare look at the Northwest Coast as it was before the logging, the cities, and the flood of European peoples washed it all away. Recommended for all library and bookstore young adult, children's fiction and NW Native American history sections.

SCIENCE

A NOSE FOR FINDING HOME : SALMON AND THE HANSEL AND GRETEL MYSTERY

Like the crumbs Hansel and Gretel left in the woods to find their way home, salmon have clues to find their way home. Salmon use their sense of smell to travel thousands of miles in the oceans and rivers to find their home spawning ground. Salmon can detect a smell in one part per trillion. That's one drop of orange juice in 500,000 barrels worth of apple juice. Try this activity to understand better their amazing skill.

- Set up 7-8 stations with different aromatic scents (peppermint, oregano, or other herbs) in containers or vials around the classroom.
 - Set up barriers to replicate the path of a river.
 - Students pair off. One is blindfolded and taken to their home scent station. After the student smells the scent, he or she is taken outside the classroom. Using their sense of smell, the blindfolded student has to find each scent station along the river path, just like the salmon has to find his spawning ground. Can the student form some mental river path, from beginning to end, noting each smell along the route?
 - After each student has had a turn, all go into another room and try to map out on paper the route they took to find their scent. Make notes on the barriers faced and other smells encountered. When finished, the students can return to the river route and compare notes with the actual scent station locations.
 - Go outside and try and find where scents like incense come from across a football field.
- Now you are getting closer to the world of a salmon.

COMMUNITY IN A FISH BOWL: UP CLOSE AND PERSONAL

Set up an aquarium in the classroom or school hallway. Consult one of many books available on the subject for details. (*Setting Up a Freshwater Aquarium* by Gregory Skomal, Simon and Schuster, 1997.)

By observing fish life up close in an aquarium, students can learn many things about the life of salmon and all fish. All water systems are fragile and affected by the different kinds of species living in the environment, as well as the light, nutrients, chemicals and wastes in the waters.

After learning about and observing life in the aquarium, students can compare the aquarium to the salmon's world of the ocean and river.

Look for:

- basic chemistry of water
- how animals hide
- dominance of fish and pecking order of animals
- how colors change
- feeding schedules and methods
- how each species survives in the aquarium or ocean and river

FISH AS FERTILIZER

When salmon spawn, their bones and flesh become a food source for plants and animals in the rivers and forests. For thousands of years, Native Americans have used fish remains as fertilizer for their plants. They even taught the Pilgrims how to use fish remains to fertilize the corn.

- Set up a scientific experiment to determine the best fertilizer. Grow a group of strawberry plants or other vegetable plants. Strawberries are easier to grow and bear fruit more quickly—in about ten weeks.
- Set up three groups of plants with grow lights.
 1. Control group with no fertilizer
 2. Second group fertilized with fish heads. Ask your local grocery store or meat/fish market to save them for you. When you pick them up, ask the butcher what types of fish they sell and where they come from. (See the activity on farm and wild salmon.)
 3. Third group is fertilized with Miracle Grow per the instructions. Research the ingredients in Miracle Grow and how they affect the plants.
 4. Sketch the plants at each stage and keep a log noting how each group grows and bears fruit. Which group has the most dramatic results? Why?
 5. Invite a guest speaker (science teacher or biologist) to discuss the changes in the three control groups and reasons why.

FISH DISSECTION

Cold-blooded fish, like the salmon, are highly evolved for their lifestyle but not as complex as mammals. Study of any cold-blooded fish will demonstrate this. In small groups dissect a perch, trout, or any available bony fish. Wild salmon are too expensive for this project.

- Study the exterior parts of the fish—scales, eyes, and fins. Sketch it.
- Cut open the fish from the gill area on the belly side to the tail fin.
- Identify the major organs by consulting a reference book.
- Sketch and label the insides.

Great scientists are usually good artists because they are observant.

VIDEO VIEWING

Watch the one-hour video *Empty Oceans, Empty Nets* (www.pbs.org)

This movie shows fisheries around the world and their attempts to harvest our oceans. Humans' appetite for fish has increased dramatically over the past 100 years because the world population has exploded from 2.5 billion in 1950 to 6.2 billion today. More than 70% of the population lives within 50 miles of the ocean.

Questions for discussion or journaling:

1. What did you learn you didn't know before about human consumption of fish?
2. Is there anything you can do about the crisis?
3. When you have your all-you-can eat shrimp meal at a local restaurant, entire cultures and countries are being negatively affected by shrimp aquaculture. Investigate this environmental mystery.

Watch *Kamchatka: Land of the Abundant Salmon* video (www.pbs.org)

1. How do the bodies of the various salmon species change during spawning?
2. How do the salmon find their home rivers?
3. What are the struggles salmon experience when returning to their spawning grounds?
4. What is their return journey like?

To read the excellent article, "A Natural History of the Pacific Salmon" by Jim Lichatowich and Seth Zuckerman, log onto www.salmonnation.com and follow the link to Zuckerman.

HATCHERY FISH & FARM SALMON: AN AQUACULTURE

Wild salmon are spawned in rivers and streams where their parents came from. They eventually grow and swim back to the ocean. Because of the dams and erosion of natural salmon habitat, aquaculture techniques have been developed to raise hatchery and farm salmon. Hatchery fish are bred from wild stock salmon, which produce hundreds of eggs. These eggs are removed by humans and raised in labs and later moved to cement ponds. When fully grown, they are deposited in the river where they eventually return to their hatchery grounds in the ocean. Farm-fish are raised in huge ocean farming stations which hold millions of salmon in nylon nets offshore. They are fed vitamins and chemicals to cut down on diseases. After eighteen months, millions of adult salmon are harvested and processed as fresh or canned meat. More than 60% of the salmon sold worldwide is farmed. Hatchery and farm salmon can create problems for wild salmon through disease and competition for ocean food.

HATCHERY AND FARMING FACTS

- Hatchery fish contain fewer healthy fats
- They have antibiotics and pesticides in their flesh that contribute to ocean pollution because much of their feed ends up on the bottom of the ocean.
- 2,332,000 tons of ocean fish are used to produce 737,000 tons of farmed salmon.
- Seals and other marine mammals invade salmon corrals and are killed.
- Adult hatchery-bred salmon interbreed with wild salmon, producing less hardy offspring.
- Each river and tributary has a distinct strain of fish best suited to that location and resistant to the parasites and diseases of their native streams. Wild salmon pass on their genes to the next generation.
- Hatchery salmon have been genetically altered to grow bigger in a shorter period of time.

SUGGESTED ACTIVITIES

- Visit a local fish hatchery
- Research the type of salmon sold in your local stores. Is it hatchery or wild salmon? Is there a price difference? Do they differ in size?
- Make a chart showing the differences in hatchery and farm salmon.
- Invite guest speakers to present their opinions on wild salmon and hatchery salmon. Afterwards, write up your opinion on the subject based on class research and the presentations. What is one step you could take in support of your opinion?

FOR MORE INFORMATION

Time, November 25, 2002, special Time Bonus section on Global Business, "Fishy Business: Seafood Farms are Growing Fast but Only a Few Take Pains to Keep the Environment Clean," by Terry McCarthy.

Crisis in the World's Fisheries: People, Policies by James R. McGoodwin, 1990.

<http://www.salmonnation.com/>

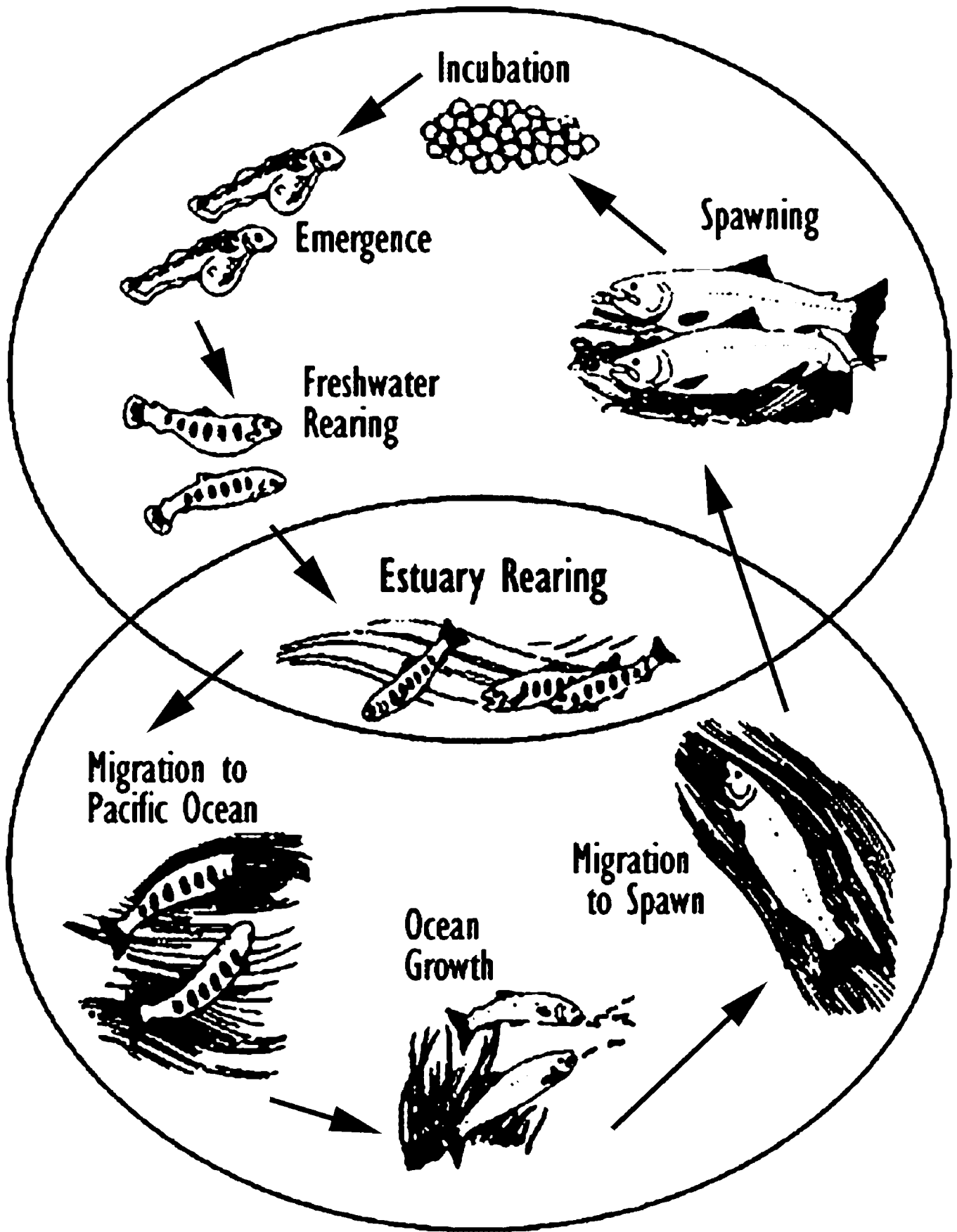
www.salmonnation.com/hatcheries.cfm

To learn about the healthiest salmon to eat, check out

www.montereybayaquarium.org

www.davidsuzuki.org

Life Cycle of the Salmon



Life Cycle of the Salmon

1. Life for salmon begins in the fresh water of a riverbed. Spawning occurs two to three weeks after the male and female adult salmon return from the ocean to their home river or stream. They usually arrive during winter and early spring because predators cause less danger then.
2. The females dig small eighteen-inch trenches called *redds*, piling up gravel on both sides. Then they deposit several hundred eggs in the redds and the males fertilize them. Afterwards the parent salmon die, leaving behind rich food for countless birds, plants mammals, and aquatic life.
3. The eggs, or *alevin*, incubate for up to nine weeks. The cold, clean oxygen-rich water helps them grow. They live off their egg sacs during the winter and early months when there is less danger from predators .
4. When the eggs hatch, they are called *fry* and remain in the gravel for another thirty days until they absorb the yolk sac.
5. Now called *parr*, they feed in fresh water outside the protection of the redd. As they travel downriver to the sea, they transition from freshwater to saltwater fish.
6. Now a year old, the *smolts* have adapted to the marine environment. Herons, eagles, and ospreys eat them up by the millions as they work their way downstream to the sea. Before dams, the trip to the ocean took only two to three weeks
7. The *fingerlings* are one to two years old and considered adult salmon, spend two to five years at sea before returning to spawn.
8. On their return journey, salmon make a direct voyage to their spawning grounds, swimming up to 10,000 miles in the ocean, to the mouth of their home river. Scientists believe they navigate by detecting the earth's magnetic field or by using the solar or sonar systems. During this trip, their sleek, silver bodies transform into humpbacked mottled fish.
9. When they enter their home river, they must be aggressive through swift and then shallow waters. Their new colors camouflage them and ward off predators. Finally they spawn in the patch of riverbed or lake bottom from which they emerged many months or years earlier.

QUESTIONS

- ★ Which animals benefit from the salmon, both the young salmon traveling to the ocean and the spawned out salmon dying in the river system?
- ★ How do the salmon replenish the forest?
- ★ How do other animals (pigeons, whales, wolves etc.) find their way?

SOCIAL STUDIES

MAP SKILLS

Learn about the salmon spawning site closest to your school. For help, log onto your local, regional, or state Fish and Game website, the geographical information system (GIS) for your state or the U.S. Geological Survey's web site for maps of your area (<http://mapping.usgs.gov>) or contact the fishery department at a nearby college or university.

- Find out where in the ocean the salmon travel from and mark the route on a map.
- List the obstacles the salmon face in order to get home. This will include roads, farms, CAFO's (concentrated agricultural feeding operations), industries, cities, and fishing and ski resorts that alter the physical paths and biology and chemistry of nearby creeks and rivers by their pollutants .

SALMON CULTURE

Salmon has been the food of nourishment for both ancient and modern cultures in the northern parts of the world, including the western and eastern coasts of the United States, Alaska, Canada, Iceland, Greenland, New Brunswick, and Nova Scotia. Across the Atlantic Ocean, Ireland, Great Britain, France, Germany, northern Spain and Portugal, Russia, Norway, Denmark, and Sweden depended on the salmon.

- Pick one of these countries or cultures and find out if salmon still thrive there today. Do they have any traditional stories about the salmon? Do they raise farm or hatchery salmon? New Zealand has salmon, but this species is not natural to the country. They have been imported and artificially bred in farming/hatchery programs.
- Write a report or give an oral presentation on the information and stories you discovered.

All species of fish in rivers and oceans worldwide are crucial to the survival of the human race. Choose your local community or any culture around the world and research how fishing and river or ocean navigation have made and/or broken the society. Aquatic life such as seas, sea lions, otters, sharks, whale, eels, halibut, crayfish, dolphins, and tuna are important sources of both food and spirituality:

Some examples of fishing stories are: rivers in Montana as shown in the movie and book, *A River Runs Through It* by Norman McLean, the fishing industry in Maine as revealed in the book and movie the *Perfect Storm*. Movies like the *Secret of Roan Inish* set in Ireland and stories like *The Prince and the Salmon People* reveal the importance of giving back to the ocean or rivers. Science videos include *Savage Seas: Rescue* about Alaska crab fishery and *Riches from the Sea* explain the physical and biological characteristics of seas and oceans.

- Share what you learned with the class.
- Invite a Native American tribal member to speak to the class about his or her native customs and beliefs involving animals and rivers, especially the salmon if applicable. Ask him or her to share their people's traditional stories. Record if possible. Students can read up on local native culture beforehand and prepare questions.
- Research what your school's property was used for before the school was built. Did people farm the land? What animals lived there? Did native people ever live on it? Afterwards create a totem pole to celebrate the different uses for this land and display it in or in front of the school. (See art activity)

Language Arts

EXPOSITORY WRITING

Send a salmon card to your local council members, mayor, state representatives, governor, U.S. senator and/or U.S. representatives, and even the president of the United States. As a class, determine which people would be most effective to contact. For more information, check out www.sierraclub.org or www.wildsalmon.org.

Students can combine art and writing by creating a salmon mural with information on wild salmon recovery programs or information on how dams or polluted rivers are impeding the return of spawning salmon,

Include the local and national media (newspapers, magazines, radio and television stations, and web sites) by sending them cards or inviting them to view the mural.

CREATIVE WRITING

- Each group or individual writes out on slips of paper and deposits in separate salmon cups, words related to the salmon:
 - two action verbs
 - one smell
 - one sound
 - one feeling or emotion
 - one physical characteristic of salmon — i.e. snout
 - first thing that comes to mind when hearing the word “dam”
- Each group or individual then picks one slip from each cup and works with the words, forming a poem. Words can be added or discarded as desired.
- Read the salmon poems to the class and discuss the power of words for the salmon journey.

ART

See the section on aquarium. After studying the fish, students could try:

- Fish prints from natural history fossils
- Watercolor painting based on observations
- Fish mask making
 - Check out these books:
 - Masks (World Craft)* by Meryl Doney
 - Paper Mask Making* by Michael Grater
 - Masking* by Carole Sivin
- Digital photography to capture the dissection process or fish in the aquarium.
- Interpretive dance demonstrating the characteristics of a particular fish. Information is obtained from observation and further research.
- Create a totem pole with symbols representing how the school property has been used over the years. Create a painted or carved pine wood pole made out of biodegradable materials, (i.e. plants), so the totem will return to nature.

SUGGESTED RESOURCES

Banister, Keith. *The Encyclopedia of Aquatic Life*

Deans, Nora, et al. *Sea Searcher's Handbook*

Love, Milton. *Probably More Than You Want to Know About the Fishes of the Pacific Coast*

Williams, Brian. *World Books Looks at the Sea and Its Marvels*

[http:// www.getaway.net/j3tropical/anatomy.htm](http://www.getaway.net/j3tropical/anatomy.htm)

www.marinebiology.org/fishes.htm (marine systems)

www.seaworld.org/fishes/anatomy.html

www.state.ak (salmon)

www.pbs.org/anyplacewild/episode5and9/sb4.html

Cooking & Eating Salmon

Salmon flesh provides humans with very beneficial protein and fats. Omega 3 and 6 fats are found in abundance in many salmon species. Omega 3 fat has been linked to helping cut down on high cholesterol and fight heart disease. Northwest Indian tribes have long relied on salmon as a primary food source. They prepared it in many ways.

- * Broiling—cut lengthwise in three slabs. One slab from each side of the fish and middle back portion containing the spine. Bake in oven uncovered.
- * Baked in ashes
- * Boiled in watertight baskets
- * Dried on scaffolds or smoked over fire for winter consumption.
- * Fishmeal is formed by squeezing, kneading, drying in sun, pounding into mortar, and finally ramming tightly into baskets, weighing 100 to 150 pounds. More than 100 salmon produced this one basket of fish that lasted for months. This fishmeal food saved tribes when there were no salmon runs or animals were scarce during the winter.

EXTENDED ACTIVITIES

- * How do you prepare fish or salmon at your house?
- * Look up salmon recipes and share one with the class.
- * Try cooking a fish recipe as a class.