

Festival Activity: What's Hatching?

Subject: Science

Concept: Salmon life cycle

Key Vocabulary

- Fish culturist

Skills

- Listening
- Investigating
- Observation

Materials

- None

A Leavenworth National Fish Hatchery **fish culturist** (a person that cultures or raises fish) will help your students investigate the nursery environment, understand how the salmon's needs are met at the hatchery, and see approximately 1.2 million salmon eggs, fry and fingerlings.

Grade Level Expectations (GLEs) or Evidence of Learning

Science

1.2.6 Understand that organisms can be a single cell or many cells that form parts with different functions.

1.2.7 Understand the life cycles of plants and animals and the differences between inherited and acquired characteristics.

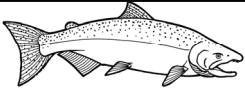
3.2.2 Understand that people have invented tools for everyday life and for scientific investigations.

3.2.3 Understand how knowledge and skills of science, mathematics, and technology are used in common occupations.

Objectives

Students will: 1) investigate the nursery environment of Leavenworth National Fish Hatchery, and 2) observe different stages of the salmon's life cycle.





Pre-Work: Which Came First, the Salmon or the Egg?

Subject: Science

Concept: Salmon life Cycles

Key Vocabulary

- Eggs
- Alevin
- Fry
- Parr
- Smolt
- Adult
- Anadromous
- Fertilization
- Fingerling
- Fish culturist
- Hatchery
- Life cycle
- Migration
- Redd
- Spawn
- Spawner
- Yolk sac

Skills

- Identifying cycles in nature
- Application
- Visualization

Materials

- Student Worksheet, "Complete the Cycle, Your Cycle" - one per student
- Teacher Reference, "Guided Imagery"
- Teacher Reference, "Salmon Life Stages - Eggs, Alevin, Fry or Parr, Smolt, and Adult"
- Teacher Reference, "The Salmon Cycle"
- Student Worksheet, "The Salmon Cycle" one per student

During the Salmon Festival, your students will be invited behind the scenes of the Leavenworth National Fish Hatchery to take a peek at our new arrivals in the nursery, hold a salmon egg up to the light to see the fish inside, and watch the yearling salmon eat lunch.

Grade Level Expectations (GLEs) or Evidence of Learning

Science

1.2.6 Understand that organisms can be a single cell or many cells that form parts with different functions.

1.2.7 Understand the life cycles of plants and animals and the differences between inherited and acquired characteristics.

3.2.2 Understand that people have invented tools for everyday life and for scientific investigations.

Objectives

Students will: 1) understand the concept of life cycles, and, 2) use key vocabulary words to describe the salmon life cycle.

Suggested Procedure

1. Introduce students to the concept of **life cycles**. Stress that life runs as a circle, because usually by the time an animal dies, it has already produced young.
2. Ask students to complete the Student Worksheet, "Complete the Cycle, Your Cycle." Have the students draw pictures of their life cycle. Ask the students, "do you look the same now as you did five years ago?" "Eight years ago?"
3. Lead a guided imagery activity for your students using Teacher Reference, "Guided Imagery". Explain that students should close their eyes and imagine that the events in the story are happening to them.
4. After reading vocabulary words in the story, ask students to name the different stages of the life cycle.
5. Make overheads or flash cards using Teacher Reference, "Salmon Life Stages - Eggs, Alevin, Fry or Parr, Smolt, and Adult" depicting salmon life stages to help illustrate and explain vocabulary words. Be sure to

explain the definitions of each vocabulary word on the board. See Teacher Reference, "The Salmon Cycle."

6. Have students complete the Student Worksheet, "The Salmon Cycle."

7. Vocabulary study

- a. Ask students to write a story from a salmon's point of view, using five of the vocabulary words.
- b. Have students draw pictures to illustrate some of the vocabulary words.
- c. Instead of a "spelling bee", have a "spelling sea", where all of the words to be spelled relate to salmon and include vocabulary words.
- d. Incorporate some of the vocabulary words into your weekly spelling lesson.
- e. Act out each vocabulary word.

Vocabulary Words

Eggs - salmon begin life as orange-red eggs in shallow gravel beds in freshwater streams and rivers. The eggs incubate in the gravel while cold, clean water washes the eggs and brings them oxygen. Eggs remain in the gravel through the winter, as the embryos develop.

Alevin - in late winter, young fish with protruding eyes, called alevins, hatch from the gravel. Alevins hide in the gravel and live off their orange yolk sac that is attached to their bellies. As the fish grows, it feeds on the nutrients in the sac, and the yolk sac gets smaller until the fish has "buttoned up" or absorbed the entire sac.

Fry - in late spring, the small fish, now called fry, emerge from the gravel. Fry begin to forage for food along the edges of pools where the current is slow.

Parr - when the young fish reach about two inches in length, they are known as parr, or fingerlings. They become intense feeders on plankton, small insects, and worms. Parr are most easily recognized by the development of dark bars along their sides called "parr marks."

Smolt - a stage in the salmon's life when its body changes to prepare it for migration and living in salt water. As the parr marks disappear, most young salmon begin a physiological change that triggers their downstream migration and adaptation to the saltwater environment. This transformation is called smoltification. Juvenile salmon undergoing these changes are referred to as smolts. Smolts let the current carry them downstream, tail first. Much of their traveling is done at night to avoid predators.

Adult - the age of an animal or plant when it is able to reproduce. Salmon migrate to the ocean where they reach sexual maturity. In the ocean there are better feeding conditions and more space to grow than in freshwater. Upon entering the ocean, salmon will search out feeding grounds. They feed heavily on such prey as anchovies, herrings, smelt, and squid. Time spent at sea ranges from one to five years.

Anadromous - fish that migrate from fresh water to salt water.

Fertilization - the process of mixing eggs and sperm to make a new fish.

Fingerling - a young fish, about the size of a finger; a salmon less than one year old.

Fish Culturist - a person that cultures or raises fish.

Hatchery - a place where people spawn fish and raise young fish.

Life cycle - stage of development that an organism goes through from egg to adult; the way that plants or animals are born, live, reproduce, and die.

Migration - movement by animals from one area to another to find food, or a new habitat or other animals of their kind.

Redd - a nest dug in gravel by a female salmon to put her eggs in.

Spawn - laying eggs and fertilizing them (verb).

Spawner (salmon) - a word used to describe salmon that are ready to spawn. Salmon return to their natal streams to spawn and produce offspring. The males and females of some species get humped backs, hooked jaws, and sharp teeth. The female salmon will choose an area with just the right combination of clean gravel and good flow to provide oxygen for the eggs. The female digs her nest, called a redd, by using her tail to sweep gravel downstream. The male joins the female in the redd as she releases her eggs, and then the male releases his milt to fertilize the eggs. Salmon die after spawning. In the Pacific Northwest, much of the nutrients for riparian plants and animals, as well as juvenile salmon, come from the carcasses of adult salmon.

Yolk sac - the food supply for newly hatched fry.

* (Note: Salmon words in Spanish can be found in the reference section)

Extensions

Create a salmon life cycle mobile using graphics from the "Complete the Circle" activity. Have students bring a clothes hanger from home. Hang their illustrations from the straight bottom portion of the hanger or mold the hanger into a circular shape.

Life cycle website: <http://www.cf.adfg.state.ak.us/geninfo/research/genetics/kids/salstory.php>

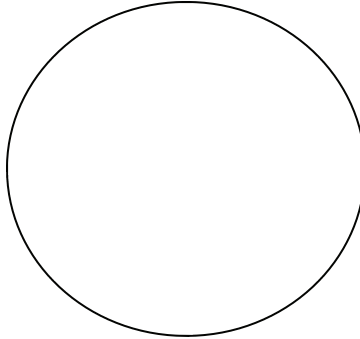


Student Worksheet: Complete the Cycle, Your Cycle

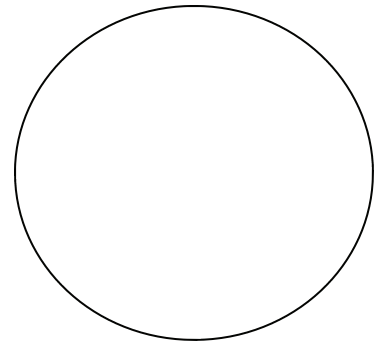
Name _____

Draw a picture of your life cycle. Arrange the pictures of yourself from youngest to oldest (what you will look like as an adult) by drawing them in a circle. Draw arrows to connect the pictures. This circle is your LIFE CYCLE!

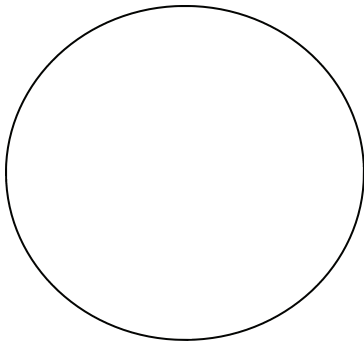
New Born Baby



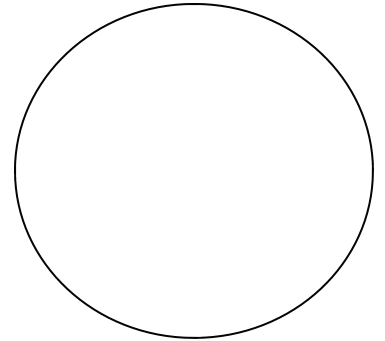
5 Years Old



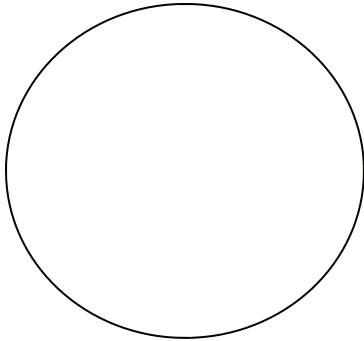
Adult, 80 Years Old



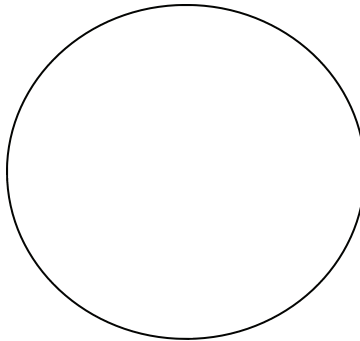
Present Age



Adult, 40 Years Old



Teenager, 16 years Old



Teacher Reference: Guided Imagery

A Salmon's Life

I will be reading a story about salmon. Try to imagine that the things in the story are happening to you . . . you become a salmon and see what the salmon sees, feel what the salmon feels, do what the salmon does. Get comfortable. Close your eyes.

It's dark. You hear water gushing above you. You are so tiny that when you curl up, you could fit inside a pea. You can feel cool, clear water seeping through your white eggshell and the water tastes sweet. Once in a while, the water rushes past your eggshell a little faster and rocks you gently back and forth. Rest.

One day, as you are wiggling inside your eggshell, your head pops through the shell! You're a **fry**, a tiny little salmon! You can see other shapes in the dim light...you are surrounded by gravel and your thousands of brother and sister salmon. They are just hatching too! Cool water slips and glides through your **gills** when you breathe. You get food from the big, soft, orange **yolk sac** attached to your belly.

You have used up all the food in your yolk sac . . . your body is growing bigger. Now you have strong fins. But you're hungry, and it's time to find something to eat. Wiggle and squeeze to move between the pieces of gravel and towards the light. Suddenly, you are above the gravel! It's very bright, and the water pushes you backwards.

You get pushed into a dark area, the water is shallow and you can rest. You like it here. Soon, you learn to swim out from your hiding spot, quickly grab a tiny bug floating by, and rush back to your hiding spot. It seems like you're always hungry; always eating, then hiding, eating, then hiding. As you get bigger, you become a **fingerling**, a salmon as big as a person's finger.

Many of your brothers and sisters are not so good at hiding. Once, a flash of blue and white feathers appears from the top of the water, with a long black beak. The kingfisher swims around underwater until it catches and eats many salmon fingerlings.

The days begin getting shorter; the water gets colder, and you don't feel like swimming around and playing too much. Eventually the water freezes during winter, but you don't mind. You just rest in your hiding spots mostly, and get something to eat once in awhile.

Slowly, the days get longer, the water becomes warm, and you start feeling like exploring again. It's fun to watch those bugs float towards you, and then feel them crunch in your mouth. But tiny bugs aren't enough to fill you up anymore. You like to eat other fish smaller than you. You wait behind a log, because you are too big for your old hiding places. You wait and a small fish swims towards you, chasing tiny bugs. Suddenly, you use your muscles to surge out from behind the log. The small fish sees you, and tries to swim away, but you catch the fish with your teeth, and swallow it in one bite!

You have lived in the stream almost a year now, and the colors on your body are changing. You used to be a dark green color, with large black spots on your side. Now you notice that the spots are fading, and the green is becoming a bright silver color. What a pretty **smolt** you have become! You decide to swim downstream, because that is what smolts do. The stream joins another stream, and then a river. The water flows over smooth, round rocks, past tree roots and old logs. The river gets wider and deeper as you keep swimming downstream.

Finally, the huge river opens up to a new kind of place. You can hear waves rolling up onto the beach. The water begins to taste salty. The water smells different. You notice thousands of small fish swimming around . . . just the right size to eat! You like it here. You see strange, whitish bells floating through the water. They're called jellyfish. Crabs with skinny long legs walk along the sandy bottom. You see many new and strange animals; you don't have to worry because most of them are too small to eat you. You stay in the area for a few months, eating as much as you can.

You have grown faster this summer than ever before. As you get bigger, you get more and more curious about the rest of the ocean. You decide to explore deeper water, and look for more food. You swing your tail muscles back and forth, which make you swim fast. When you go further out into the ocean, you find new kinds of food. Sometimes you chase white squid. They are slippery to swallow, but you like to eat them, 10 legs and all! Mostly, though, you like to eat small, shiny fish called herring.

But some animals like to eat you, too. You hear a deep, sweeping noise behind you. It gets closer. You turn around to see what it is and a big, black and white orca whale is swimming right at you, with its mouth open to eat you! You see hundreds of white teeth in that big mouth, and you turn around quickly to get away. You swim as hard as you can, and just barely escape.

On another day, you feel something moving through the water towards you, but you can't quite see what it is. You see lots of fish moving through the water, but they look like they are being pushed instead of swimming. You decide to swim away; something doesn't seem right. As you watch, you see other salmon being swept up into a big net. The net gets pulled towards a boat, and then, all the salmon get pulled out of the water. Luckily, you didn't get caught in the net, but thousands of other salmon did.

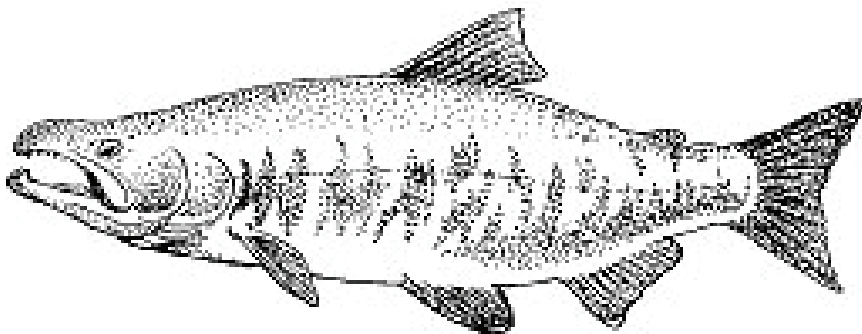
You have many adventures as an **adult** salmon during your three years in the ocean. You weigh 50 pounds! It's time for you to move again. You swim back through the ocean, back to the river you left three years ago. When you get back to the river, it smells familiar. The water is fresh and sweet, not salty. There are many salmon swimming with you. You swim upstream, against the current. The big river pushes against you and makes it hard to swim. You swim past the rocks, past the trees, past other streams. You come to another stream on the side of the river. You smell the water. It smells like home, so you swim up that stream. Soon, you recognize a river bend, the rocks look like what you remember, and there are some of your old hiding places. The water is getting very shallow.

You are so big now that your back sticks out of the water.

Ahead of you, a female salmon **spawner** is making a nest in gravel, called a **redd**. She lays thousands of bright orange eggs in the nest and a male salmon **spawner** adds white, cloudy sperm to fertilize the eggs. You have taken a long, long journey to reach the spawning grounds.

You have completed the life cycle of salmon. You are very tired and your body rolls over on its side. You think about the bright orange eggs in the nest, how they will hatch and then grow up in the stream where you grew up.

Remember the favorite things you saw during your salmon life, remember the places you visited, remember the sounds you heard, the smells you smelled, the way you felt. When you have remembered and thought about all those things and you feel ready, you may open your eyes . . . Be quiet, some salmon are still remembering . . .

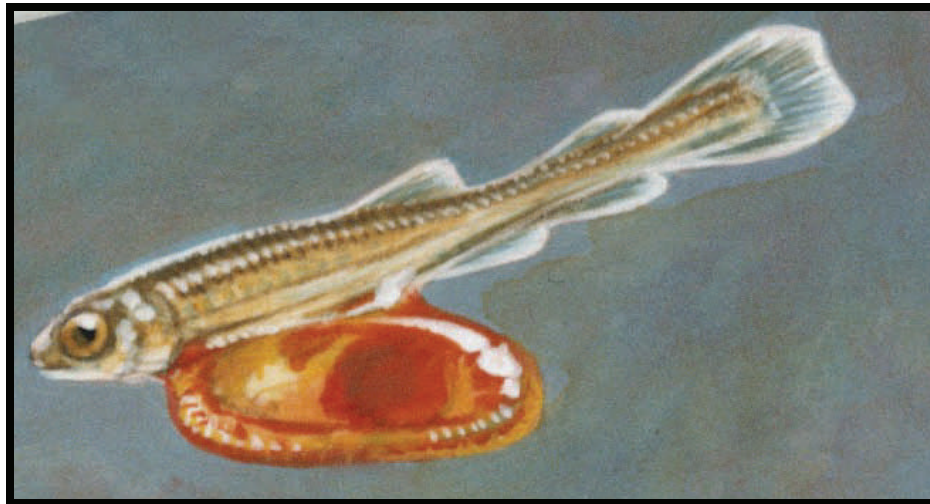


Teacher Reference: Salmon Life Stages, Eggs



© Shari Erikson

Teacher Reference: Salmon Life Stages, Alevin



© Shari Erikson

Teacher Reference: Salmon Life Stages, Fry or Parr



© Shari Erikson

Teacher Reference: Salmon Life Stages, Smolt



© Shari Erikson

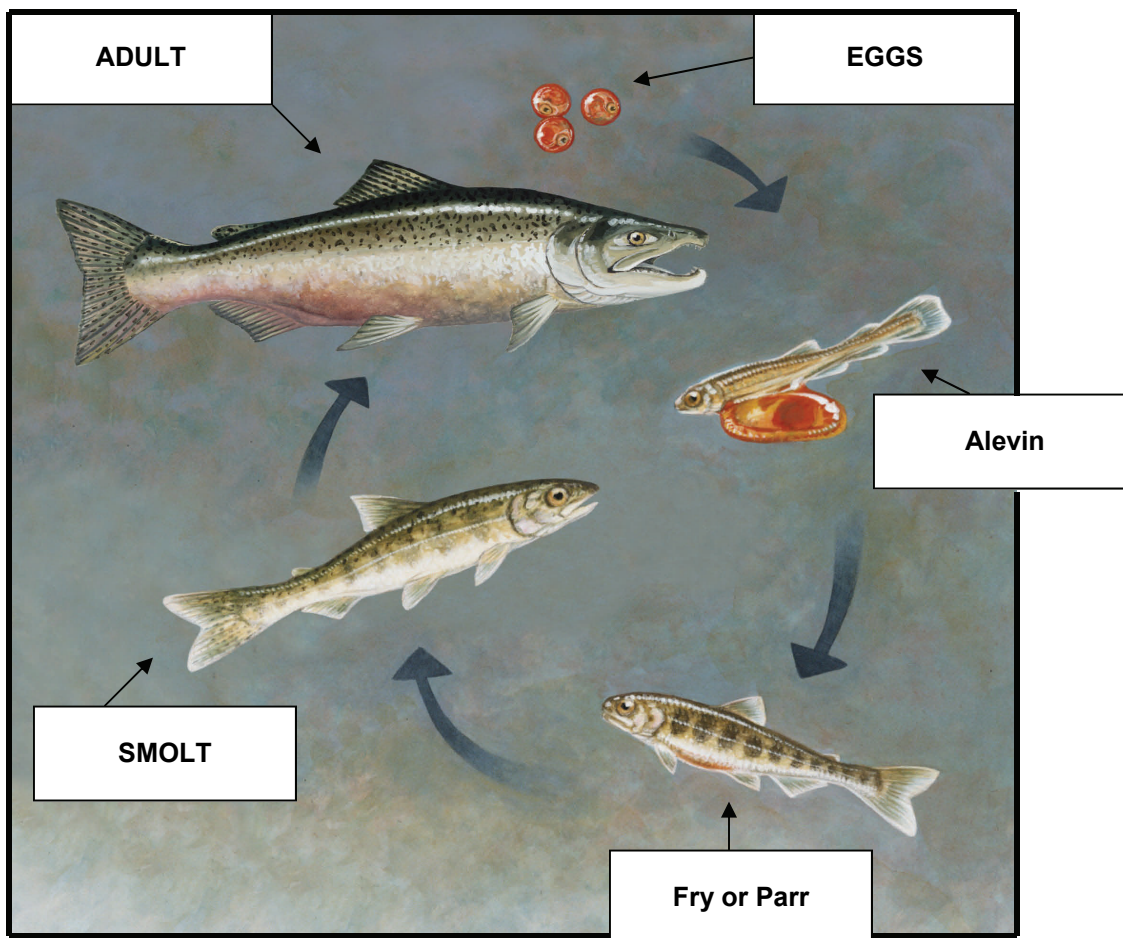
Teacher Reference: Salmon Life Stages, Adult



© Shari Erikson

Teacher Reference: The Salmon Cycle

Label the drawing of the salmon LIFE CYCLE. Fill in the boxes with the names of the salmon stages of development.

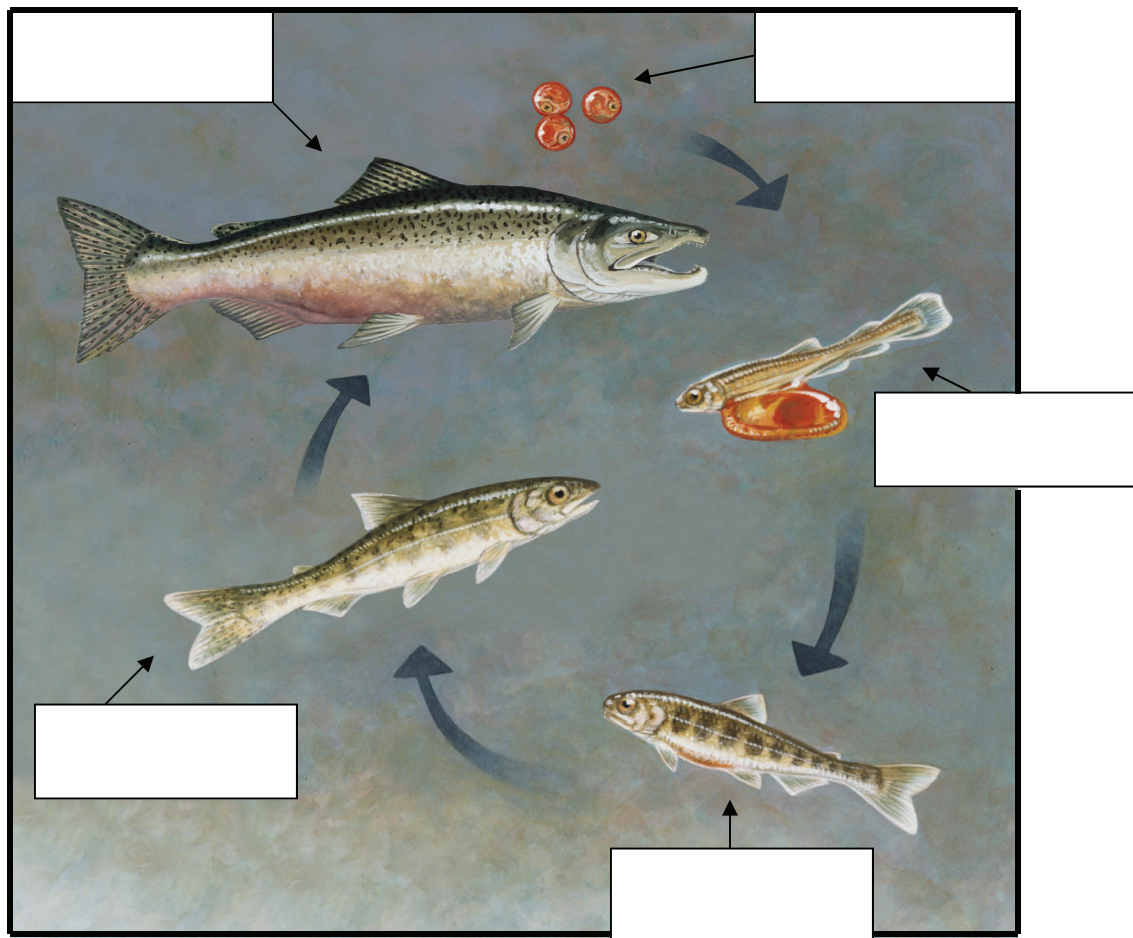


© Shari Erikson

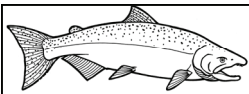
Student Worksheet: The Salmon Cycle

Name _____

Label the drawing of the salmon LIFE CYCLE. Fill in the boxes with the names of the salmon stages of development.



© Shari Erikson



Post-Work: Anadromous Adventures

Subject: Science

Concept: Salmon life cycle

Key Vocabulary

- Erosion
- Dam turbines
- Irrigation
- Pollution

Skill

- Identifying cycles in nature
- Analysis

Materials

- One sheet of 2' x 3' poster board per game
- One brad per game
- Glue
- Scissors
- A hole punch
- One copy per game of the spinner, game board diagram and clues
- 20 energy chips per player (poker chips work well, or you can keep score on a sheet of paper)
- A token for each student or team (can be anything)
- Teacher Reference, "Anadromous Adventures Game Board"
- Teacher Reference, "Game Clues"
- Teacher Reference, "Spinner"
- Teacher Reference, "Salmon Health Chart"

Students will follow the life cycle of a salmon and become aware of some of the threats it faces as it migrates from spawning grounds to the ocean and back again.

Grade Level Expectations (GLEs) or Evidence of Learning

Science

1.2.7 Understand the life cycles of plants and animals and the differences between inherited and acquired characteristics.

1.3.10 Understand that an organism's ability to survive is influenced by the organism's behavior and the ecosystem in which it lives.

Objective

Students will identify the natural and man-made threats to salmon during their life cycle.

Background

The salmon life cycle begins as an egg buried in loose gravel in a cool stream with lots of oxygen. When the salmon first hatch they are called **alevins**. They wait in the gravel until they finish the last of their yolk, then hurry to the surface for a quick gulp of air to fill their swim bladders.

The little salmon, now called **fry**, are whisked downstream with the current towards the ocean. Some species hang out in their native streams for months or even years, hiding in snags and other slack waters and feeding. Others ride the current to estuaries where they will wait while their bodies go through necessary changes for life in the salty oceans.

As the young fry near the estuary (a partly enclosed body of water where sea water and fresh water meet and mix), they become **smolts**. Their scales grow, they become more silvery to help blend into the ocean environment. The smolts feed like mad in the estuary, trying to become as big as they can before braving the treacherous waters of the Pacific Ocean.

Salmon at sea might migrate thousands of miles or they may stay right off the coast. They may spend anywhere

between 2 and 8 years feeding in the ocean before returning to their native rivers and streams to spawn. Their homing abilities are legendary and not entirely understood.

On the way back salmon make another stop in coastal estuaries. Like last time, their bodies go through chemical changes so they can survive in the freshwater of their home streams. This time they also stop eating and adopt their flashier, spawning colors. Males may get hooked snouts and humped backs. The journey home is a daunting one, only the strongest will survive to reproduce.

Those salmon who make it will go through the final task of their lives. The females will build gravel nests with their tails called redds. The males will fight for the opportunity to fertilize the females eggs. Although some steelhead and cutthroat will live to spawn again, most **anadromous** salmon will die after spawning. Their bodies feed the stream environment.

Perils of the journey

The journey to and from the spawning grounds is dangerous indeed. Not even the egg is safe. Some **predators** prefer eggs because they are high energy sources of food. Careless hikers, unleashed dogs and other disturbances can destroy redds and either crush eggs or loose them to drift downstream. Too much **erosion** can cause silt to smother the redds and suffocate the eggs. Streamside vegetation and responsible forestry can help reduce this hazard.

When the fry emerge from the gravel they are very vulnerable to predators. They are small and need to learn very quickly how to hide. Predators are natural but around dams predators gather to await salmon fry that are spilled over the top or rocketed through bypasses. Young salmon must also be wary of **dam turbines** and **irrigation** water diversions. When the plant life along the streamside is removed the temperatures in the stream increase, the flow is reduced and there are fewer insects to eat. **Pollution** from cities and farms also takes its toll.

At sea, adult salmon must deal with not only the larger oceanic predators like sharks and killer whales, but also with commercial fisheries. The trip back upstream can be even more dangerous. Adults have to face natural predators like bear and eagles plus both commercial and recreational fishers. Dams block the path of migrating salmon. Those who make it up the fish ladders may become confused or even sick in the warmer slack waters above the dam. Pollution, erosion, and water diversions play key roles in preventing adults from successfully spawning by destroying good salmon spawning habitat.

Vocabulary Words

Erosion - the gradual wearing away of rock or soil by physical breakdown, chemical solution, and transportation of material, as caused by water, wind, or ice.

Dam turbines - rotating blades in which a moving fluid such as steam acts upon the blades of a rotor to produce rotational motion that can be transformed to electrical or mechanical power.

Irrigation - to bring a supply of water to a dry area, especially in order to help crops grow.

Pollution - damaging substances such as chemicals or waste products.

Suggested Procedure (Before Class)

1. Before class, copy the spinner, arrow, game board and game clues for each game you will be making (4-6 students per game).
2. Cut out the spinner and arrow. Glue them onto the poster board or laminate them. Punch a hole in the center of the spinner and the arrow and insert a brad. Adjust the brad so that the arrow spins.
3. Enlarge the game board if needed and glue the game board onto a piece of poster board.
4. Cut out the clues and glue them near the corresponding number on the game board.
5. Choose tokens for use in the game and give one to each student. Students could draw or create their own salmon game tokens with their name on them.

Suggested Procedure (During Class)

1. Divide your students into groups of 4-6.
2. Explain the following directions to the class:
 - a. Put your token on **B** and read the introduction. Each player starts with 20 energy chips.
 - b. All players move to the first space and read the clue.
 - c. After you have read the clue, have each player spin the spinner and follow the directions.
 - d. Now all students move to the next space.
 - e. Continue taking turns until you reach your spawning grounds again.

Summary

With your students, discuss the following questions:

1. What natural hazards did you, as a salmon, face?
2. What human-made hazards did you face?
3. What are a salmon's basic needs? How are they threatened by human activity?
4. When did you lose chips compared to when you didn't? What was happening to you as a fish?
5. How many in the class ended up as "Sickly Salmon", "Weak Salmon", "Average Salmon", and "Super Salmon"? Tally up the results and have students graph results.

Extensions

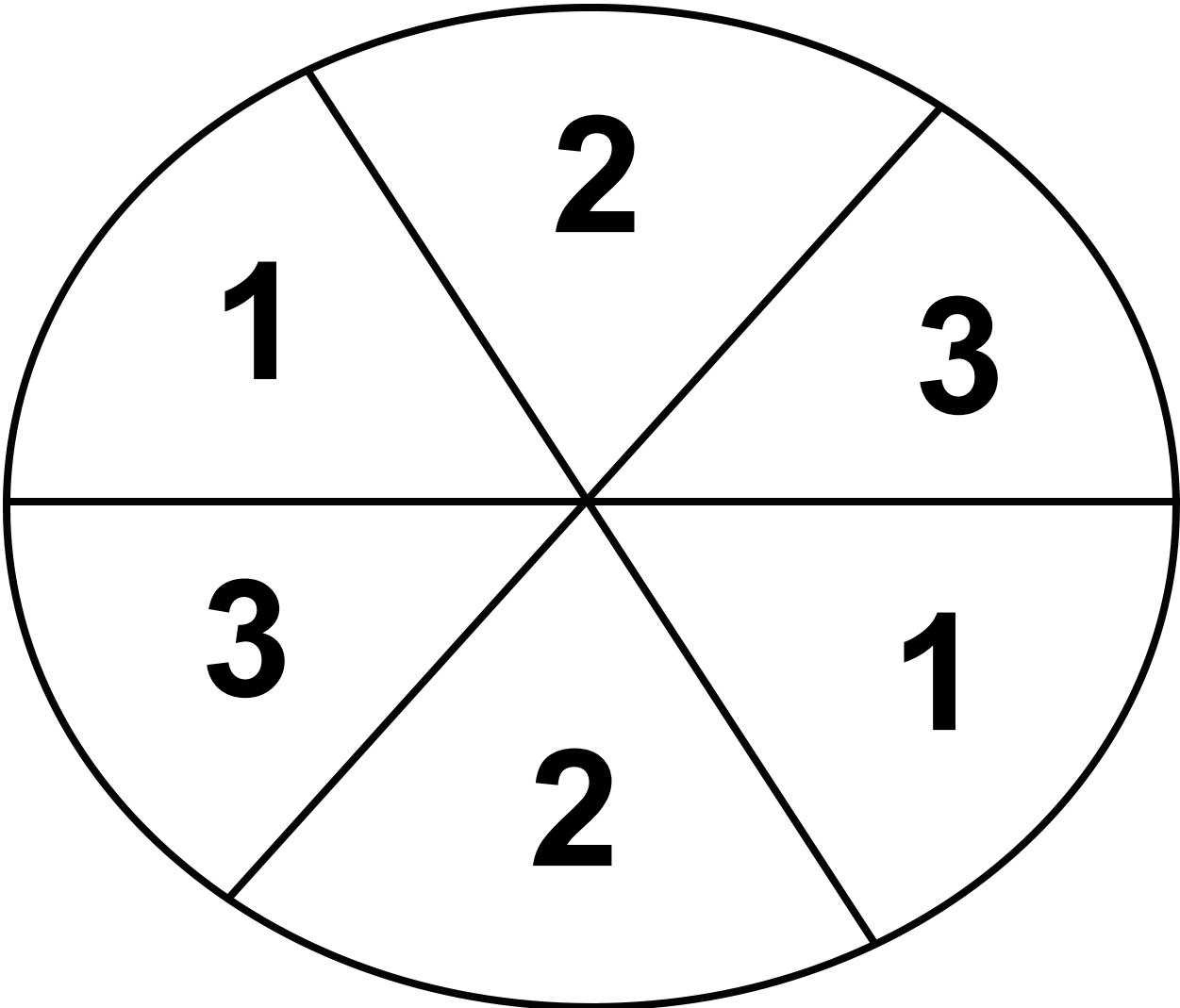
Remove all the human-made hazards and play again. Now how do your salmon score?

Research other fish and animal life cycles. Compare them to a salmon's.

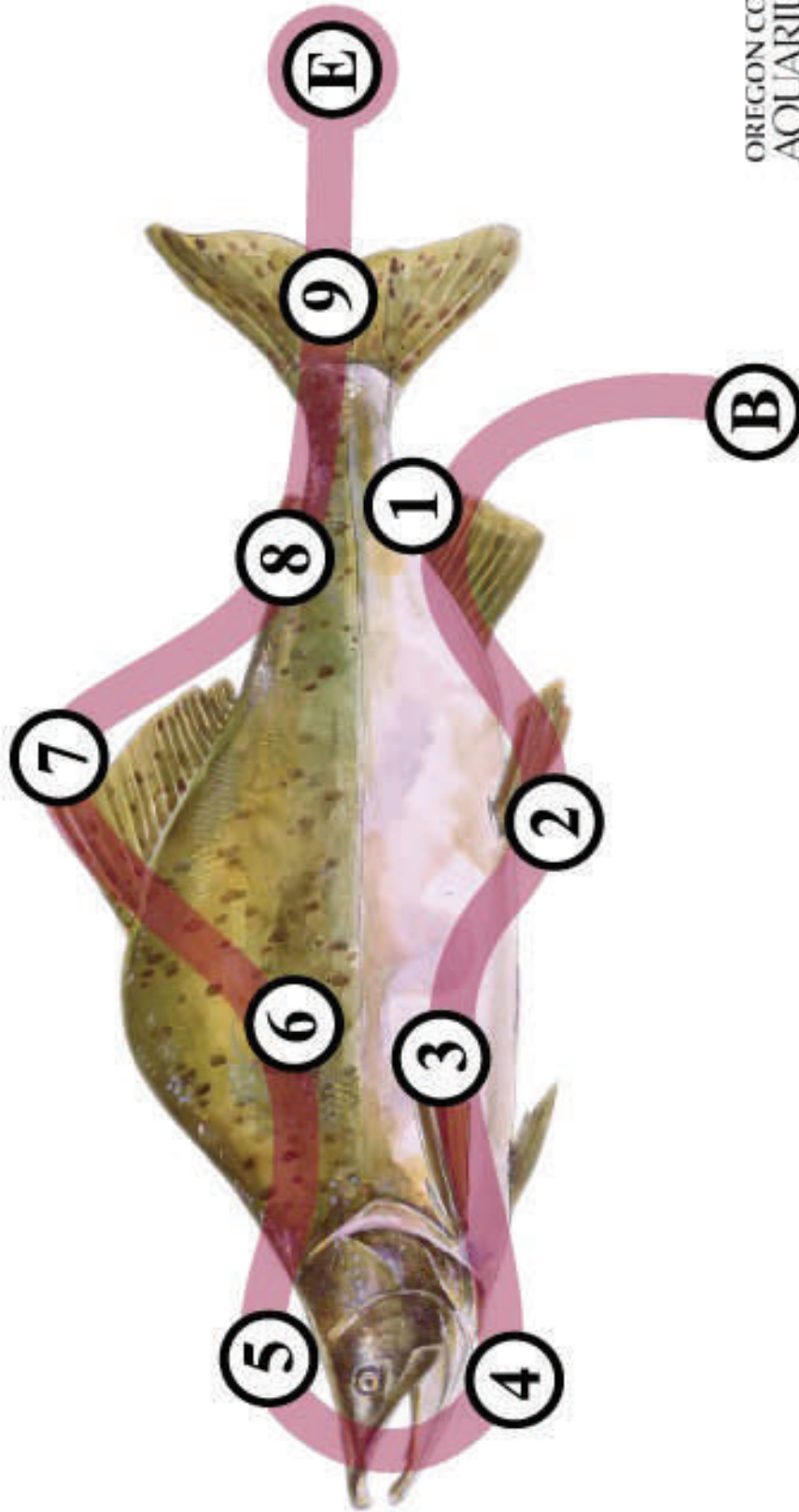
Brainstorm about what your class can do to make the salmon's migration easier.

Research local salmon runs. What percent of salmon actually return to their home waters?

Teacher Reference: Spinner



Anadromous Adventures



Teacher Reference: Game Clues

<p>Introduction: Coho salmon eggs are laid in the gravel at the bottom of a stream during the late fall. The salmon embryos develop in the eggs over the winter. It is now early spring and the eggs have hatched. You are a young salmon called an alevin. It is time to begin your journey to the ocean.</p>	<p>1 - A yolk sac attached to your belly is your food for the first couple of months. You hide under rocks to keep from getting eaten. Spin.</p> <ol style="list-style-type: none"> 1. You are healthy. Lose 0 chips. 2. You are in an area where the water flows too slowly and you don't get enough oxygen. Lose 1 chip. 3. A hikers steps through your redd. Lose 2 chips.
<p>2 - Later in the spring, you swim out from the rocks. You are now called a fry. You begin to eat tiny plants and insects. A shaded stream with places to hide would be the best spot for you. Spin.</p> <ol style="list-style-type: none"> 1. Farm fertilizers run into the stream, you are weakened by pollution. Lose 2 chips. 2. Your stream has no shade because cattle have eaten all the plants around it. The warmer water has less oxygen and fewer insects to eat. Lose 2 chips. 3. You live in a healthy stream and have plenty to eat. Lose 0 chips. 	<p>3 - After a year in your stream, you head towards the sea. Your body goes through changes to prepare for the switch from fresh to salt water. These changes are called "smolting" and you are now called a smolt. You face many dangers. Spin.</p> <ol style="list-style-type: none"> 1. You saved energy by catching a quick current downstream. Lose 0 chips. 2. You approach a dam where the water moves much slower. You must use more energy to swim. Lose 2 chips. 3. You were caught by a fisherman and almost mistaken for a trout, but he throws you back. Lose 3 chips.
<p>4 - Think of some problems you could have while swimming downstream. Dams create pools of still or slow moving water. Water pollution could weaken you or reduce your food supply. Irrigation and other water diversions take water from you stream and make the trip more difficult. Spin.</p> <ol style="list-style-type: none"> 1. You must swim to escape a larger fish waiting in a still pool near a dam. Lose 2 chips. 2. You are slowed by still water near the dam. Lose 1 chip. 3. You make it through a turbine bypass okay. Many fish are sucked into the turbine and die. Lose 0 chips. 	<p>5 - You finally come to the estuary, a place where fresh and salt water mix. Your scales have become larger and silvery. Your belly becomes lighter so that fish in the ocean environment won't be able to see you very well from below. You'll stay here a little while until your body gets used to the salt water. Spin.</p> <ol style="list-style-type: none"> 1. You have been swept downstream by a flood and reach the estuary before you are ready. Lose 2 chips. 2. You reach the estuary safely. Lose 0 chips. 3. You are grabbed by a hungry heron but you get away. Lose 2 chips.

Teacher Reference: Game Clues, continued

<p>6 - You'll eat a lot at the estuary. If you can get big before heading out to sea, you'll have a better chance to survive. You may be migrating hundreds or even thousands of miles across the ocean. Spin.</p> <ol style="list-style-type: none"> 1. You get tangled in a fisherman's net and lose energy escaping. Lose 3 chips. 2. Your estuary is polluted; it's harder to find food. Lose 2 chips. 3. You are a big salmon and ready to head out to sea. Lose 0 chips. 	<p>7 - You'll live in the ocean for up to seven or eight years. A signal known only to salmon will tell you it's time to go home. You are guided by electromagnetic signals, the moon and stars, and the smell of your home stream. Spin.</p> <ol style="list-style-type: none"> 1. You are weakened by an oil spill. Lose 2 chips. 2. You are sick and lose your ability to navigate. Lose 3 chips. 3. You are headed in the right direction. Lose 0 chips.
<p>8 - When you enter fresh water again, you stop feeding, even if your river journey is 1,000 miles. You will change your color, your stomach will shrink, and you will get sick more easily. Your stored fat and muscle must last until you breed. Spin.</p> <ol style="list-style-type: none"> 1. A dam's fish ladder slows you down. The water on the other side is warm and disease spreads easily here. You become sick. Lose 2 chips. 2. A landslide partially blocks your way. Lose 1 chip. 3. You make it to your home stream safely. Lose 0 chips. 	<p>9 - You have reached your home stream. It is now time to breed. If you are a female, you will be making a nest called a redd to lay your eggs in. If you are a male, you will be fighting to fertilize those eggs. Count your chips and move ahead to E and check the chart below to see how successful you will be at breeding.</p>

Teacher Reference: Salmon Health Chart

Female Salmon

0-5 Chips	Sickly Salmon	After reaching your home stream, you are extremely sick and weak. You die before you can make your nest.
6-10 Chips	Weak Salmon	You reach your home stream and are too weak to make a good nest. You lay a few eggs and then you die.
11-15 Chips	Average Salmon	You find your home stream with little trouble and have enough energy to make a good nest and lay many eggs. Like most salmon, you die after laying your eggs.
16-20 Chips	Super Salmon	After making your nest and laying your eggs, you have enough energy to stay and defend your nest. You will die shortly like all coho.

Male Salmon

0-5 Chips	Sickly Salmon	You reach your home stream and are too weak to compete with any other males for females. You die.
6-10 Chips	Weak Salmon	You are killed by a stronger salmon while fighting over a female.
11-15 Chips	Average Salmon	You are defeated by another male while fighting for females but manage to sneak in and fertilize some eggs anyway.
16-20 Chips	Super Salmon	You fight successfully to become a dominant male. You lay with the female until she releases her eggs then you fertilize them. You die shortly after.

Used by permission. © 1999 Oregon Coast Aquarium.
All rights reserved.

