

## 2.2 Salmon Life Cycle

### Subject

Life Science

### Objectives

The students will:

- Learn the stages of the salmon life cycle
- Be able to fill in the life cycle diagram correctly

### Materials

- *Students for Salmon Journal*
- Art supplies—crayons, markers, pencils

### Size/Setting/Duration

Entire class/classroom/~45 minutes

### Background

In Whatcom County there are five Pacific salmon species. They are part of a larger *Salmonidae* family (generally referred to as salmonids) that include other salmon and trout species. For this lesson, we will focus on the five Pacific salmon species: Chinook, chum, coho, pink, and sockeye.

The salmon life cycle is similar for all salmonids. However, the length of time spent in freshwater and saltwater varies to some extent for each species. Salmon are **anadromous**; this means that salmon are born in freshwater, spend most of their life in the ocean, and return to freshwater to spawn.

Salmon return from the ocean and enter the stream in the summer or fall to **spawn**. When spawning, the female lays her **eggs** in the streambed and the male fertilizes her eggs with **milt** (sperm). The eggs are laid in the gravel nest, called a **redd**, and hidden from predators and direct sunlight. Each female deposits approximately 3,000 eggs in the gravel. The eggs remain hidden in the streambed for two to four months before they “hatch” into **alevins**. The alevins acquire nutrients from the yolk sacs that are attached to their bodies, growing rapidly in the gravel for one to three months. It is very important during the egg and alevin stages of the salmonids' life cycle to have clean, clear, cold, flowing water and a clean gravel substrate. Clean gravel is imperative; the eggs and alevins will suffocate if there is too much suspended sediment in the stream.

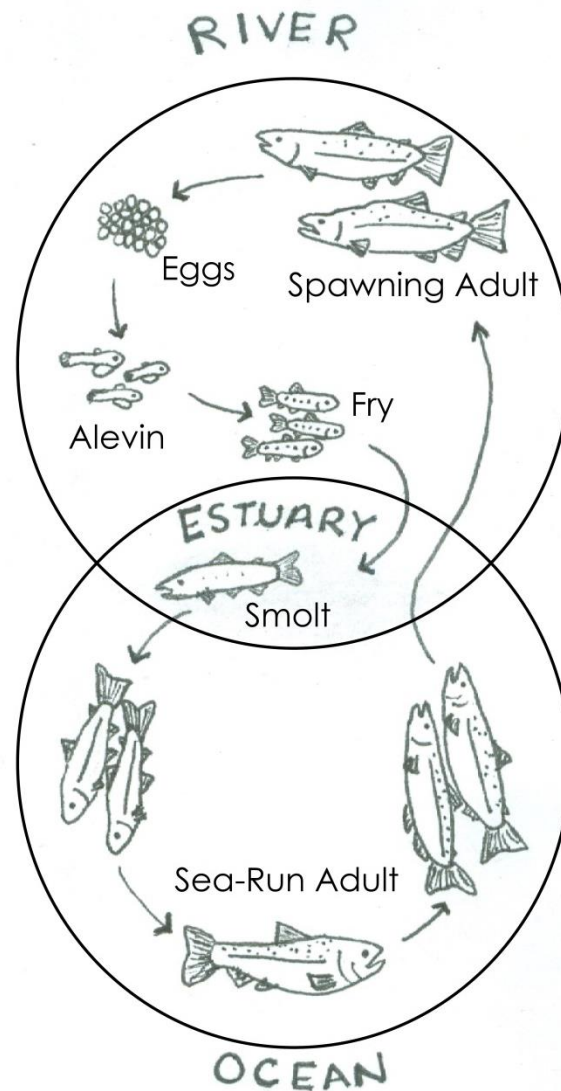
Once the alevins have absorbed their yolk sacs, they surface from the gravel in spring and early summer as **fry**. Fry nourish themselves by feeding on plankton and small insects (**macroinvertebrates**) in the stream. At this stage of life it is important for the fry to have good streamside cover for protection from predators and to keep water temperatures cool. Different species spend differing

time in the freshwater streams. Chum and pink salmon migrate to the ocean very soon after emerging from the gravel. Coho and sockeye remain in the stream for at least one year. Chinook are in the stream for three to eighteen months before migrating towards the ocean.

After spending time in fresh water, the juvenile salmon head downstream and undergo changes that allow them to live in saltwater. This process is called **smoltification**. The young salmon, called **smolts** at this stage, acclimate to the saltwater by staying in the **estuary** for one to three months. Here, the smolts feed on zooplankton, insects, shrimp, and small fish in the estuary. Once the adjustment from fresh water to saltwater is complete the smolts move into the open ocean. Ocean life for salmonids lasts one to seven years, depending on the species. During this stage of life, the **sea-run adults** grow large and feed on zooplankton (tiny animals), insects, and small fish such as herring.

When they're fully mature and strong (2-5 years depending on species), the Pacific salmon migrate from the ocean back to their natal stream (the stream where they were born) using their sense of smell. Once they've returned to the freshwater streams, we call them **spawning adults**, they swim upstream to reproduce, and the cycle begins again. Salmon usually spawn within 100 yards of the redd that they hatched from.

After the salmon have spawned, they die. Their bodies decompose and give nutrients to the animals and plants along the stream. These nutrients are very important to the health of the riparian zone, as well as the animals that eat dead salmon (macroinvertebrates, bears, eagles, bacteria, etc.).



### Procedure

1. Continue your lecture by starting to demonstrate the salmon life cycle with spawning salmon and carry on with eggs, alevin, fry, smolt, and ocean-phase salmon. Have your students take notes. It would be helpful to demonstrate the salmon life cycle on the board along with your students.
2. Once you bring your lecture to a close, and the students have completed their notes on the salmon life cycle, the students should fill out the *Salmon Life Cycle Chart* from the *Student Journal*. Under the circle labelled "Drawing," include a drawing of the lifecycle stage (students could also add some of the habitat elements related to that stage, such as gravel, LWD, hiding places, etc.).

## Extensions

Additional exercises to enhance student understanding of the salmon life cycle could include artwork, such as dioramas, posters, paintings, puppets, skits, and stories.

Create a salmon life cycle book. Describe each of the six stages of the salmon life cycle using one page for each stage. Include a drawing or picture for each (egg, alevin, fry, smolt, sea-run adult, spawning adult).

Create a song or a dance to explain or represent the salmon life cycle.

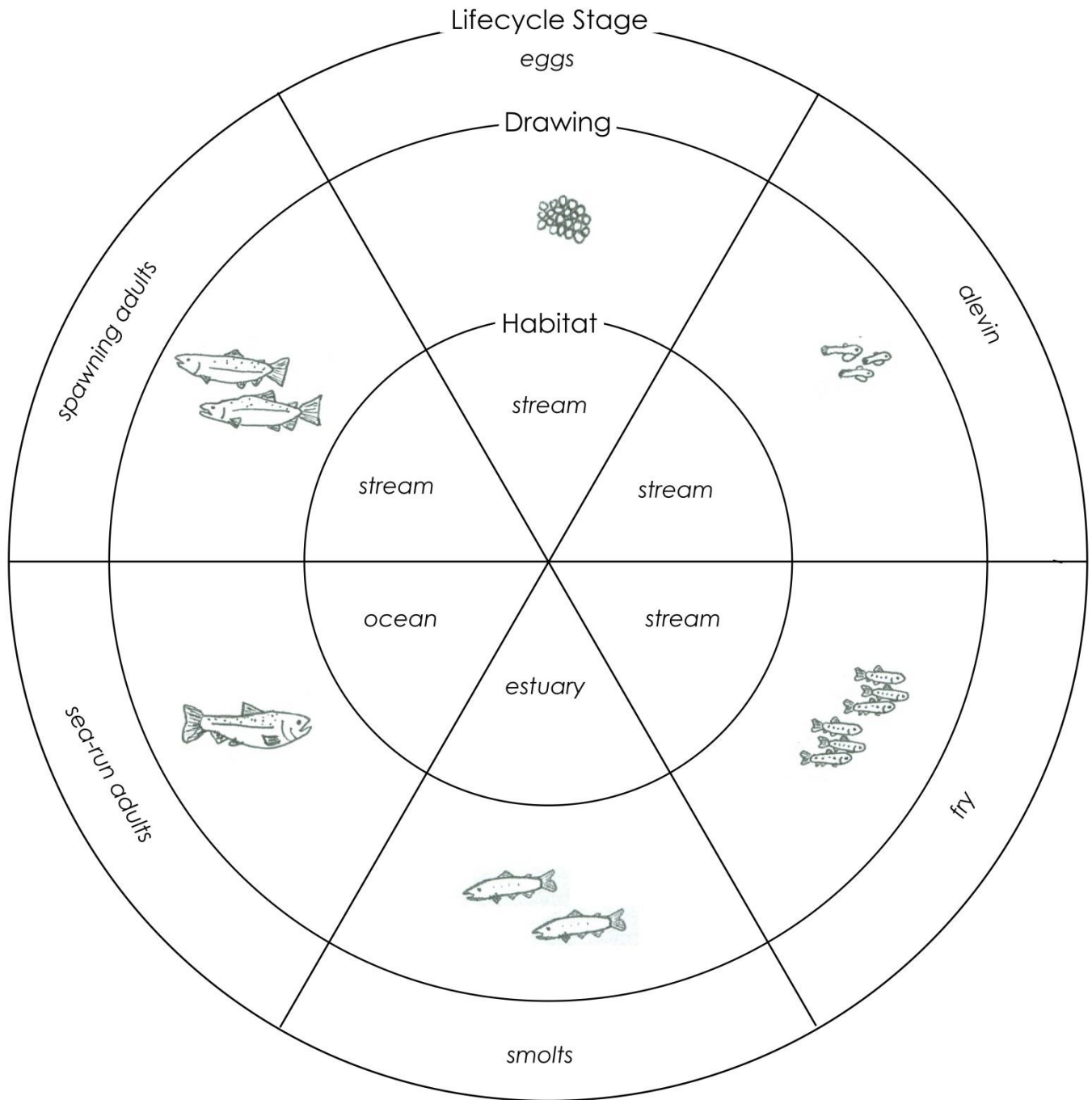
## Next Generation Science Standards

### **Performance Expectation**

**3-LS1-1:** Develop models to describe that organisms have unique and diverse life cycles but all have in common birth, growth, reproduction, and death.

Scientific and Engineering Practices	Disciplinary Core Ideas	Crosscutting Concepts
<ul style="list-style-type: none"> <li>▪ Developing and Using Models</li> </ul>	<ul style="list-style-type: none"> <li>▪ LS1.B: Growth and Development of Organisms</li> </ul>	<ul style="list-style-type: none"> <li>▪ Patterns</li> </ul>

# Salmon Life Cycle Diagram - Answer Key





# Salmon Life Cycle Diagram

