

Salmon Cycle Graphing Activity

Subject: Science & Math	Grade: 3-6	Duration: 2 hour+
Lesson Overview	This lesson plan introduces students to the salmon life cycle and different vocabulary associated with it. Students will incorporate math and graphing and research into learning more about salmon.	

Curriculum Ties (in addition to satisfying multiple core competencies):

- Grade 1 Science:
 - Living things have features and behaviours that help them survive in their environment.
 - Names of local plants and animals - general classification of the animals.
- Grade 3 Science:
 - Biodiversity in the local environment
- Grade 4 Science:
 - Big Ideas: All living things sense and respond to their environment.
- Grade 5 Science:
 - First Peoples knowledge of sustainable practices
- Grade 1 Math:
 - Numbers to 20 represent quantities that can be decomposed into 10 and 1s.
 - Concrete graphs help us to compare and interpret data and show one-to-one correspondence

- Grade 2 Math
 - Concrete items can be represented, compared, and interpreted pictorially in graphs.

- Grade 4 Math:
 - Regular patterns can be identified and represented using tools and tables.

- Grade 5 Math:
 - Data represented in graphs can be used to show many-to-one correspondence

Content Objectives

Students will be able to:

- Explain and classify the life cycle of a salmon
- Describe a salmon's journey from the Fraser River to the ocean and back
- Identify types of salmon near you
- Use graphing techniques to interpret data about salmon

Materials & Equipment Needed

<p>Consumables:</p> <ul style="list-style-type: none"> • Printouts of salmon life cycle stages • "From the Mountains to the Sea: We Are a Community" book • Post-it notes, pencils, blank graphs, salmon type profiles 	<p>Non-Consumables:</p> <ul style="list-style-type: none"> • BC coast and river maps • Access to computers/tablets for research (optional) • Scissors, rulers
---	--

Lesson & Activity

Lesson Stages	Learning Activities
<p>Introduction</p>	<ul style="list-style-type: none"> • Begin by learning about the salmon cycle. • Here are some great starter resources: <ul style="list-style-type: none"> ○ Life Cycle of The Pacific Salmon Life Cycle of the Pacific Salmon - YouTube ○ Salmon Spawning The Salmon's Life Mission Destination WILD - YouTube • This activity works the best if you can go out to a spot with salmon! Or take a field trip to a salmon spawning centre. <ul style="list-style-type: none"> ○ Here are some areas to view them around Vancouver Where to spot salmon: Metro Vancouver and Sea-to-Sky « Pacific Salmon Foundation (psf.ca) • Read Aloud: From the Mountains to the Sea: We Are a Community or a related book <ul style="list-style-type: none"> ○ https://www.strongnations.com/store/5833/from-the-mountains-to-the-sea-we-are-a-community • This book is a Coast Salish First Nations example of life cycles and connections to the land. Keep that in mind when reading the story. <ul style="list-style-type: none"> ○ Prepare for questions about Coast Salish people, connections to the land, and why it's important to know. • “What do you think the story was trying to say?” Turn and talk. • “Why do you think the story focuses on salmon in particular?” Turn and talk. <ul style="list-style-type: none"> ○ Listen for uses as food, when and how they were caught

	<p>(ties into the seasonal chart)</p> <ul style="list-style-type: none">○ Encourage discussion if students decide to explore their own thoughts about the story. <ul style="list-style-type: none">● Post a picture of the salmon life cycle on the board and hand out 'Post-it' notes and pencils<ul style="list-style-type: none">○ “This is the same picture as in the book we just read. Do you notice anything about how a salmon grows?”○ “Write down a question you have about the salmon cycle on the Post-it. We will review as many as we can today. If we can’t get to some, we will do more tomorrow.”○ “Would anyone like to share their question now?”○ Prepare for discussions of:<ul style="list-style-type: none">■ The differences and similarities as salmon grow■ Non-metamorphic life cycles■ Where salmon go to spawn■ Where salmon go in the ocean (have BC coast map ready for this)■ How long salmon leave before returning to the rivers■ Different types of salmon■ Introduce Halq’eméylem vocabulary● Introduce Stó:lō Seasonal Chart<ul style="list-style-type: none">○ Stó:lō means river. The Stó:lō people are the “People of the River”○ Look at when fishing was done○ Consider why the Stó:lō year was done according to animal cycles (salmon specifically).○ Discuss:<ul style="list-style-type: none">■ Which times of year each salmon returned (in relation to the name of the month/season)
--	---

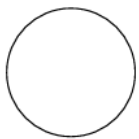
■ Connections between humans and salmon in the past and present

- Split students into groups. Ask them to draw their own life cycle of a salmon using what they learned today.
- Have copies of a fill-in-the-blank life cycle sheet they can colour available as an option, but drawing is encouraged.
 - Prepare for students to inquire about Halq'eméylem words. The list in the attachment can be used to adapt the lesson.

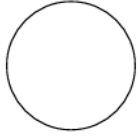
Example:

Salmon Life Cycle

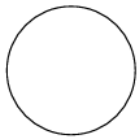
Directions: Write the name of the salmon life cycle stage and a short description about each stage. In the circle, draw a simple picture about the salmon life cycle stage.



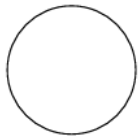
Stage 7: _____
Description: _____



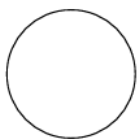
Stage 1: _____
Description: _____



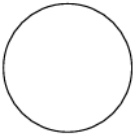
Stage 2: _____
Description: _____



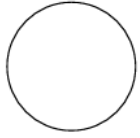
Stage 6: _____
Description: _____




Stage 3: _____
Description: _____



Stage 5: _____
Description: _____



Stage 4: _____
Description: _____

Handout: Salmon Life Cycle  www.fisheries.noaa.gov

From: [Outreach & Education | NOAA Fisheries](#)

- Have students look at maps of British Columbia to determine the route the salmon would have to swim.
 - For older grades you can have them read the map and try to determine how far of a distance the salmon would have to swim in the Fraser River to get to the ocean and back.

Have students fill this out as they learn:

Animal Life Cycle

Life Cycle Stage	Draw or Describe
Reproduction	
Birth	
Growth	
Death	

Activity

For grades 1-3:

The worksheet contains six categories with ten rectangles per category that can be used for graphing the results of each spin by your students. Results will vary, so the worksheet can be completed in different ways.

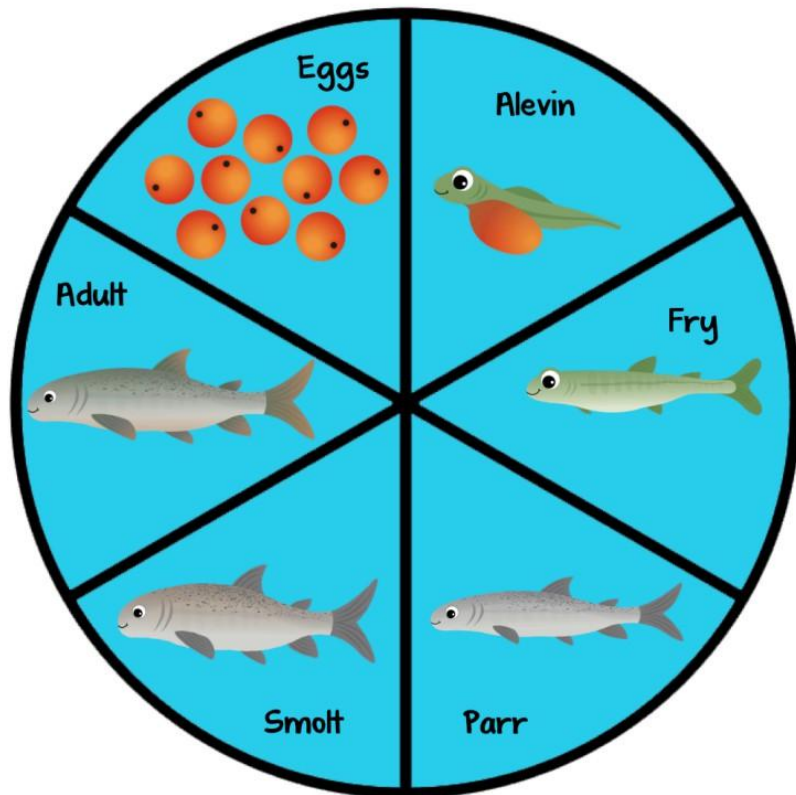
- It can be done as a timed exercise - use 10 mins. To have students spring and graph results.
- It can be a race to 10 - once a single category has been completed, the exercise can be paused.
- Limited spins - spin the wheel 10,20 etc. times.

Salmon Life Cycle

Directions: Spin the wheel and record the result of each spin by coloring a rectangle on the graph. When finished, add the totals for each category (Eggs, Alevin, Fry, Parr, Smolt, Adult) and answer the questions based on your results.

Spinner Wheel

The wheel and spinner can be printed on construction paper or card stock and laminated to make it more sturdy. A brass fastener can be used to attach the wheel to the spinner.



	<ul style="list-style-type: none"> ○ Chum ● Students will do research to determine how many of that type of salmon have been recorded for each year dating back to 1990 (or whatever date you choose). This can be done just in your region, or country, or around the world. ● They will then take the population data and graph it. ● After graphing, they will make observations. <ul style="list-style-type: none"> ○ Has the population increased, decreased? ○ Was there a year where it didn't do well? ○ Why do you think that is? <p>Here is a good website for exploring this data in BC Pacific Salmon https://www.salmonexplorer.ca/#!/vancouver-island-mainland-inlets</p>
Closure	<p>Students share graphs and observations in small groups or gallery walk</p> <p>Reflection prompts:</p> <ul style="list-style-type: none"> ● What did you learn about the salmon cycle? ● What challenges do salmon face? ● How are salmon connected to people in BC?
Step Ups & Step Downs	<p>Step Down</p> <ul style="list-style-type: none"> ● Use matching card games or structured coloring sheets to help students identify and sequence salmon life cycle stages ● Conduct a simple, teacher-led graphing activity using pre-collected class data ● Focus on one species of salmon and one graphing format <p>Step Up</p> <ul style="list-style-type: none"> ● This is a great opportunity to involve Indigenous Perspectives. Students can learn about how Indigenous Peoples catch and use salmon. ● Depending on where the educator who teaches this lesson is located, an Elder, Knowledge Holder or knowledgeable and

respected community member can use this lesson to compare to their own traditional methods of food gathering.

- Do they have salmon? If not, what kind of traditional food source is available? What is the local language vocabulary the students can use for this food source?
- You can also have students do a research project into how fish farming is done. What are the pros and cons of it? Can they propose a better way for us to farm fish?
- Do an art lesson involving indigenous art about the salmon



Background Knowledge

Salmon Life Cycle and Seasonal Fishery Planning

The life cycles of salmon and steelhead along the West Coast are amazingly intricate. Understanding these complexities is important for predicting and reconstructing salmon and steelhead populations and is vital for the management of seasonal fisheries.

Pacific salmon and steelhead have a diverse life cycle that begins in the rivers of Washington, Oregon, California, and Idaho where salmon spawn, or lay their eggs. Juveniles travel from freshwater to the Pacific Ocean and move great distances up and down the West Coast of North America.

Salmon can spend up to several years at sea and cross international borders as they grow and mature. Some salmon are caught in ocean [fisheries](#), some are caught in inland marine and freshwater fisheries, and some salmon complete their journey back to their freshwater [spawning grounds](#) to reproduce and begin the life cycle again. The migration

pathways and return times vary between different salmon species and [stocks](#). These differences are considered when estimating the returns of salmon and steelhead, and play an important role in planning for timing, type, location, and size of fisheries.

Knowledge of the different life cycles of Pacific salmon and steelhead can assist fishery managers in estimating the amount of [harvest](#) and developing management plans for each fishery. Co-managers of fisheries use information, such as the age when adult salmon return from the ocean to freshwater, to assess how many fish can be caught, how many fish could return, and to predict the vulnerability and resilience of these fish to environmental stressors.

Life Cycle of Salmon

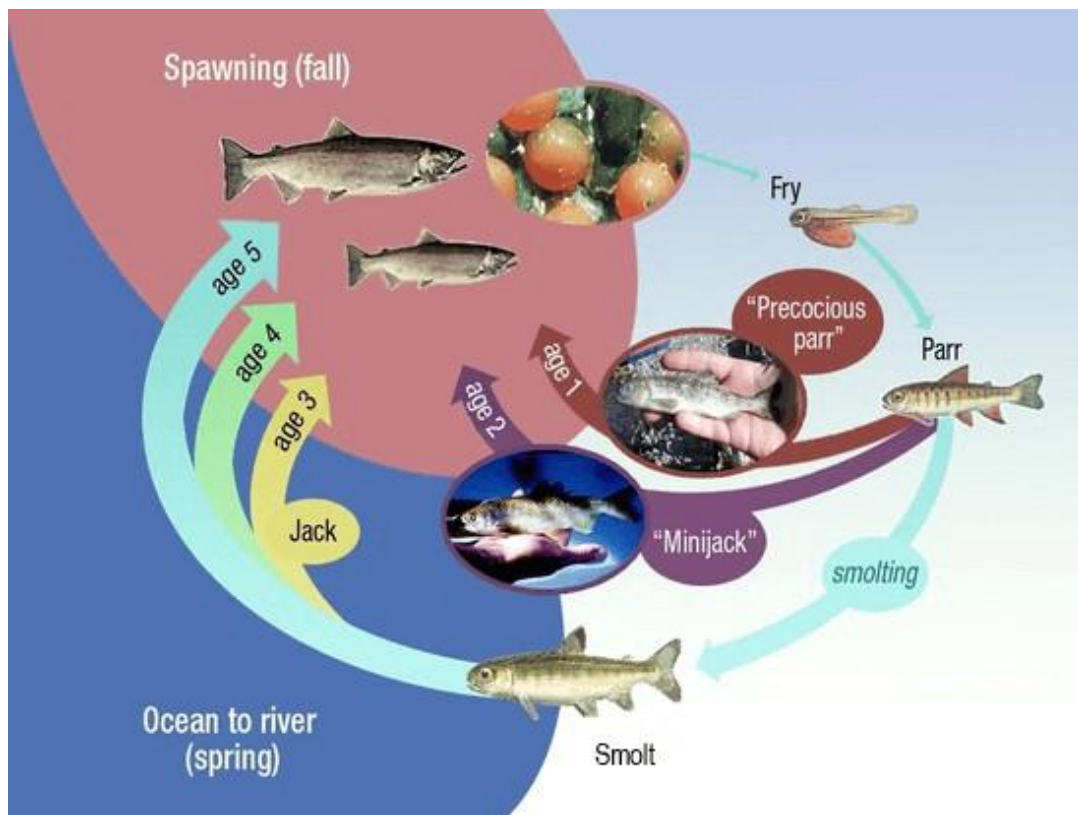
The life histories of different salmon stocks along the West Coast is diverse and complex. While all salmon exhibit the same general life cycle components, different types or stocks of salmon can vary widely in how those components actually occur, or for how long.

Adult salmon spawn in freshwater, where female salmon lay thousands of eggs that are fertilized by male salmon. [Spawning](#) can occur in spring, summer, fall, or winter and depends on the salmon species. After spawning, adult salmon die and their bodies provide nutrients for the freshwater ecosystem. Eggs are buried in gravel nests, called “redds,” and salmon can stay in their eggs for several weeks to months until they hatch.

Once eggs hatch, the juvenile fish, called “fry,” can stay in the gravel nest to feed for 3-4 months. As juvenile salmon grow, they may remain in the freshwater rivers anywhere from a few hours to several years, depending on the species and other environmental factors. As juvenile salmon swim towards the ocean, they begin the process called [smoltification](#)—transitioning from living in freshwater to living in saltwater. The “[smolts](#)” may stay in estuaries from a few days to several weeks to feed, adapt, and prepare to enter the ocean.

Species of salmon can spend from 1 up to 6 years in the ocean as they mature and grow into adults. While in the ocean growing, salmon feed on small fish, squid, eels, and shrimp. When salmon are ready to reproduce, they migrate from the ocean back

into freshwater rivers and streams to their spawning grounds. On their journey, they may encounter rapids, waterfalls, predators, and hydroelectric dams. Once salmon reach their freshwater spawning grounds, females dig a gravel nest, and the life cycle begins again.



Considerations in Fishery Plans

Learning about the life cycles of salmon and steelhead, the different ages of when they return, times of year and migration patterns, can help fishery managers target specific stocks and forecast the abundance of fish available in each fishery. Different salmon and steelhead life histories require different methods to estimate their abundance. The estimated abundance is used to regulate salmon fisheries and accurately plan the management of fisheries to ensure salmon stocks are managed sustainably.

The variety of movement and ages of salmon and steelhead can make them more vulnerable to environmental changes and stressors at different times of year, impacting their survival. Salmon and steelhead species with diverse life histories, with multiple ages returning to spawn, may be more resilient to climate and habitat changes because the generations of their species are spread over several years. In contrast, salmon species, such as coho and pink salmon, that return at consistent ages, may be more susceptible and impacted by catastrophic events, leading to the loss of whole generations of fish. With an understanding of salmon and steelhead reaction to stressors, management plans can be created that consider the size of fisheries, and aim to balance ecological and economic objectives.



Reference: Salmon Life Cycle and Seasonal Fishery Planning | NOAA Fisheries

Additional Resources

- <https://www.fisheries.noaa.gov/search?q=map>
- <https://www.fisheries.noaa.gov/west-coast/sustainable-fisheries/salmon-life-cycle-and-seasonal-fishery-planning#life-cycle-of-salmon>
- https://s3.amazonaws.com/media.fisheries.noaa.gov/dam-migration/an_incredible_journey_-_2019626_-_508_compliant.pdf
- <https://psf.ca/learn/salmon-facts/>