

The Case of the Salmon Famine

Objective:

The learner will use evidence of interdependence to predict how changes in a community may affect other organisms in the community. (*Ohio Fifth Grade Life Science: Ecosystems*)

The Mystery:

“The year is 2017. When Silverwood, WA officials heard about your ecosystem expertise and keen intellect, we rushed to fly you in to investigate our local mystery. Each fall, the rivers of Silverwood are usually full of salmon swimming upriver to spawn (lay their eggs). Except this year. This year, the salmon populations were so much smaller than usual that tens of thousands of dollars in the fishing and tourism industry were lost. Rumors are spreading that the beautiful rivers of Silverwood have been poisoned—if Silverwood loses its reputation as a prime fishing and vacation destination, it would be our ruin!

Please help solve the case of the salmon famine before it’s too late!”

Your Mission:

Salmon populations in Silverwood rivers are far smaller this year than before. **Why?** Find the culprit and recommend what Silverwood officials should do to save their salmon!

Introductory Script:

“Hello, all, and thank you for flying in on such short notice to help solve our mystery. My name is Dr. Flo Banks [or Dr. Eddy Rivers] and I’m the director of Silverwood’s Department of Natural Resources. I’m here to provide any resources you may need to solve our mystery. Did you have a chance to review on your flight over the materials we sent regarding our case? Okay, please take a moment to do so now.

“You’ve been divided into teams of four with a randomly selected team captain. Throughout the game, the team captain and the team captain only may come to me to request clues. Your team’s goal is to be the first to solve the mystery! Our hope is that the competition will create a sense of urgency matching what we feel about the loss of our salmon populations! Naturally all the material I may share with you is top secret and strictly confidential, and you are expected to treat it as such. I will now give each team captain a **top-secret folder** containing the first riddle to test your ecosystem expertise and teamwork. You will need to solve each of these riddles to obtain your clues. Ready? Go!”

Interactive Supplies:

1. 1 answer sheet and mystery card per learner
2. 2 manila folders marked “top-secret” per group, one empty and the other containing a color copy of each of the **clues** (see below)
3. 1 manila envelope containing 8 **riddles**

Clues:

1. Local message board with different commenters advancing theories about reasons for the salmon famine, including the idea that the water is poisoned and that the trees are sick.
2. Salmon catch size bar graph for the last 30 years
3. Silverwood food chain diagram
4. Water test results for the last 30 years
5. Salmon life cycle diagram
6. Poster from a debris removal initiative 4 years ago
7. Ribbon Cutting for recently built factory, Caliente Corp
8. "Bear scare" news clipping from 10 years ago describing a tragic encounter between fishermen and bears and the local business' calls to use adverse conditioning to keep the bears away from Silverwood rivers.
9. Newspaper clipping from 8 years ago detailing success of bear conditioning and celebrating higher yields for fishermen
10. Research clipping about how decomposing salmon bodies fertilize the forest

Game Play:

Small groups of learners, each with a specific role, work together to solve riddles. When a group brings Dr. Banks the solution to the first riddle, she gives them clues to solve the mystery of the salmon famine as well as the next riddle, which they must solve to earn more clues. They then put together these clues to solve the mystery.

Sample Learner Roles per Group:

1. Chief Investigator: Presents correct solutions to the riddle to Dr. Banks
2. Investigative Liaison: Asks Dr. Banks any questions
3. Director of Evidence: Collects, organizes and shares riddles and evidence from Dr. Banks

Solution:

The salmon population dropped because the Silverwood community prevented bears from reaching the local rivers, and removed brush from the streams. In a healthy ecosystem, the bears bring partially eaten adult salmon to the forest, which fertilizes the trees by river. The trees in turn provide shade and cover for salmon fry so that they survive to adulthood and can return to the river to be caught by human fishers. Without the bears, the forest suffered and once brush was removed, the stream became a significantly less safe place for salmon fry.

Works Cited:

CPAWS Education Programs, *Grizzly bears forever! Senior high guide*, Retrieved 2017, Jan 27 from http://cpaws-southernalberta.org/upload/Ecosystem_Enigma.pdf

Levi T, Darimont CT, MacDuffee M, Mangel M, Paquet P, Wilmers CC (2012). Using grizzly bears to assess harvest-ecosystem tradeoffs in salmon fisheries. PLoS Biol 10(4): e1001303. doi:10.1371/journal.pbio.1001303

Mckenzie L, Nelson R. Retrieved 2017, Jan 27 from <http://www.encountersnorth.org/wildexplorer/salmon/forest-and-sea-salmon.html>

Roheim K, Knapp G, Anderson J L (2007). The great salmon run: Competition between wild and farmed salmon. Retrieved 2017, Jan 27 from http://www.iser.uaa.alaska.edu/people/knapp/personal/pubs/TRAFFIC/The_Great_Salmon_Run.pdf