



Science Unit: *Pacific Salmon and Mountain Pine Beetle*

Lesson 3: *Salmon Migration*

School year: 2007/2008

Developed for: Irwin Park Elementary School, West Vancouver School District

Developed by: Erika Eliason (scientist), Jenny Murdie and Wendy Newport (teachers)

Grade level: Presented to grade 2; appropriate for grades 1 – 4 with age appropriate modifications.

Duration of lesson: 1 hour and 20 minutes

Objectives

1. Learn how Pacific salmon find their way to their home stream during their spawning migration
2. Explore some of the different migratory challenges that Pacific salmon face
3. Discover the different ways humans can affect Pacific salmon migration

Background Information

Adult Pacific salmon must migrate upriver, back to their natal stream in order to spawn (reproduce). Pacific salmon only spawn once and then they die. Pacific salmon that spawn in the Fraser river of British Columbia swim continuously and can travel 20-40 km a day, covering distances of over 1000 km. Once the salmon enters the Fraser river, it usually only has 20-30 days to reach its spawning ground. Pacific salmon use their sense of smell and chemical cues in the water to find the right stream. There are many challenges that face Pacific salmon during their upriver spawning migration. Some of these are natural (predators like bears and eagles, rough rapids etc) while others are man-made (global warming, fisherman etc).

Vocabulary

migration: Moving from one area to another for a specific purpose. For example, to find food or to breed.

stock: A group (or population) of fish from the same species that is migrating to the same particular stream. Each natal stream has its own stock of fish.
e.g. Weaver Creek sockeye are a particular stock of sockeye salmon (sockeye are a particular species of Pacific salmon) that migrate to Weaver Creek – located 30 min past Mission, B.C.

natal stream: The stream where the salmon was born. Pacific salmon migrate back to their natal stream in order to spawn.

spawn: The process of reproducing. Females lay eggs in the water which are fertilized by the males.

fish ladder: A man-made structure to help fish up a barrier.

Materials

- Scent cups
- cones
- skipping ropes
- various scents: vanilla,
- gym mats (small mats for
- chairs



SCIENTIST IN RESIDENCE PROGRAM

coffee, cinnamon, mint
mouthwash, garlic etc

- Kleenex
- vinegar
- signs for hazards & tape
- candies

summersaults and large high
jump mat to climb over)

- benches
- basketball and hoop
- dice (10+)
- coins (20+)

- bean bag
- Pacific salmon life cycle poster
- copies of the diagram of the set-up
-

In the Classroom

Introductory Discussion

1. Hold up a poster of the life cycle of Pacific salmon
 - Who knows what happens when the adult salmon is ready to spawn?
 - Has anyone heard of the word “migration”? What does it mean?
 - How does the salmon know which river to go to? What senses do salmon have (sight, hearing, touch, smell, taste, lateral line)? Which sense does it use to find its way to the right stream (smell)?
 - Class Brainstorm: What dangers might the salmon encounter during its migration?
2. Briefly describe science experiment/activity.
 - The students will be divided into 4 different salmon stocks and work through an obstacle course in the school gym to find their natal stream using their sense of smell.
3. Briefly describe safety guidelines.
 - No running or yelling

Science Activity/Experiment

Activity Title: Salmon Migration

Purpose of Activity:

- To discover how fish find their way back to their natal stream and explore the challenges fish experience along the way.

Methods and Instructions:

Set-up prior to experiment:

- Set up the migration obstacle course in the gym. See below for diagram.
1. The students are going to pretend that they are adult migrating Pacific salmon. Divide students into 4 “stocks” of fish. Each stock needs to find their own natal stream by following their particular scent.
 - Rule #1: The students can only go up a stream that has their scent.
 - Rule #2: Students must work together and proceed through the course as a stock. This is not a race!



SCIENTIST IN RESIDENCE PROGRAM

2. Have each stock sit in a row at the front of the gym. Pass their scent cup along their row so each student knows their particular scent. The scent cup is just a large plastic cup with some vanilla, coffee, mint mouthwash, garlic or cinnamon at the bottom. Place a few Kleenex on top of the scent so that the students can't just look in and see what they smell.
3. Have the students go through the migration obstacle course until they reach their natal stream. The students should sit against the gym wall and eat their candy while they wait for the others stocks to finish.
4. Come back as a group and briefly discuss what challenges the "fish" faced.
5. Have the students sit back in their stock rows and switch the scents around. Then repeat the course.
6. Come back as a group. What was different? Were some routes easier than others?
7. Add man-made challenges to the course. Have the students switch scents again and then try the course again. This time, some students **will not** make it to the spawning ground! Have those students sit at the front of the gym. Keep track of how many students make it to the spawning ground and how many don't. NOTE: depending on the age of the students, you can have some students not make it to the spawning grounds during earlier rounds as well (due to bears, eagles, disease, parasites etc). It's good to make sure all the students make it at least once though!

Closure Discussion

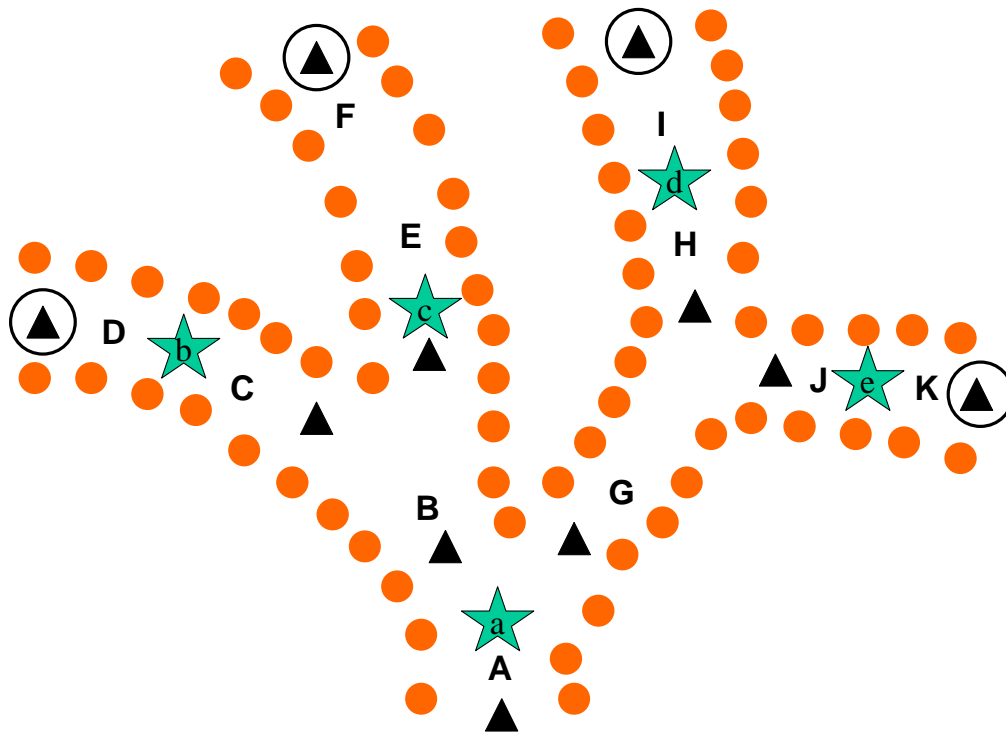
1. What challenges did you face as a migrating fish?
2. What can we do to make our streams safer for the fish?

References

1. Groot, C., Margolis, L. 1991. Pacific salmon Life Histories. UBC Press.
2. Salmonids in the Classroom: Primary. Fisheries and Oceans Canada. Also available online: <http://www.salmonidsintheclassroom.ca/index.html>



Diagram of Set-up



Orange circles = cones

White circles = natal spawning stream (hula hoop with jubejubes or other candies)

Black triangles = scent locations (scent cups specific to that stock should be at each triangle)

Capital letters = “natural” hazards (place a sign with instructions at each location)

A: rough rapids = do 20 jumping jacks

B: rough rapids = climb over gym mats, jump up and down until everyone arrives and then do 10 sit-ups or push-ups

C: bear attack = roll dice, a 6 is a bear attack! Roll another 6 to get away

D: fish ladder = “tire run” (tires or hoops on ground) Kids run through, alternating legs

E: eagle attack = flip a coin, heads is under attack! Flip 2 tails in a row to get away

F: log jam = score a basket in the basketball hoop to proceed (if the students are young, have each student take a shot and then once someone makes it, proceed with the migration)

G: rough rapids = walk along bench in single line, jump up and down until everyone arrives and then skip rope for 2 min

H: illness = do 4 summersaults and make a leap-frog line with all the students

I: low water level = hula hoop for 2 minutes

J: narrow channel = climb through the legs of a row of chairs

K: parasite = twirl around 10 times and throw a ball or bean bag through a hula hoop

Star with lowercase letters = “man-made” hazards (place a sign with instructions at each location)

a: fishing = roll the dice, if you get a 6, you were caught by a fisherman



SCIENTIST IN RESIDENCE PROGRAM

- b: global warming = flip a coin, heads = you died, tails = you live
- c: pesticides = smell is masked by vinegar, you can't make it to your natal stream
- d: logging = if your birthday is between Jan and June, you didn't get to spawn
- e: big dam = only the 2 tallest and the 2 shortest students make it to the stream