

SNIFFING SALMON (Adapted from Project Wild Aquatic)

STUDENTS WILL USE THEIR SENSE OF SMELL TO MIMIC THE JOURNEY OF A MIGRATING SALMON "UPSTREAM" BY FOLLOWING ONE PARTICULAR SCENT.

6th NGSS correlations:

- [MS-LS1-8](#): Gather and synthesize information that sensory receptors respond to stimuli by sending messages to the brain for immediate behavior or storage as memories.

Pre-Trip Resources:

- [How do We Smell? Video \(4:19\)](#) or [How Does the Sense of Smell Work? Video \(1:51\)](#)
- [How Do Salmon Find Their Way? Video \(2:20\)](#)

Materials:

- Labelled jars with essential oil soaked cotton balls
- Tributary tokens
- Extra oil, jars, and cotton balls (for replacements)

Introduction;

Salmon have an amazingly acute sense of smell. During the early stages of their life (egg, alevin, and fry) they memorize the scent of their home stream (or natal stream). Years later, after migrating to the ocean and spending 2-4 years in the salt water, they use their sense of smell to find their way home to the very same stream where they were born in order to reproduce.

In one study, a small flake of human skin cells containing a protein that is "offensive smelling" to salmon was dissolved in water (80 *billion* parts of water to one small flake of skin cells). This water was then dumped into a river where salmon were migrating. The offensive scent was enough to stop the migration for half an hour.

Humans do not have nearly as acute a sense of smell as salmon and in this activity, we're going to put our sense of smell to the test. Each of you are going to be a salmon from one of the tributaries to the San Joaquin River. A **tributary** is a smaller river or stream that flows into a larger river. The San Joaquin has several tributaries that are major rivers themselves, including the **Merced, Stanislaus, and Tuolumne rivers**. Each of those rivers has its own tributaries (usually creeks or streams) that feed into them.

Imagine your forearm is a river system. Each of your fingers is a different creek, and your arm is the larger river they all flow into. If each tributary has its own unique scent, the water in the main stem of the river would contain a mix of all 5 scents! As salmon, you're going to memorize the scent of your natal stream and then try to follow that scent back to the tributary where you were born.

Activity:

- Assign each student a natal stream by randomly passing out the tributary tokens.
- Go through each of the possible tributaries and ask which students have that token. Have them come up and spend a few seconds smelling the corresponding labelled jar. Encourage them to try to find something unique or a characteristic of the scent to remember later on. (E.g. is it spicy? Earthy? Bright? Deep?).

- Explain that all students are adult salmon ready to migrate back to their home stream. They are currently in the San Joaquin River, and now must find their way back to their natal stream using their sense of smell.
- Explain that there are three major tributaries (Merced, Stanislaus, and Tuolumne) in front of them. They will first need to use their sense of smell to figure out which major tributary to enter. Then, they will need to find their exact natal stream. Once they think they have found their natal stream, they should place their token next to it on the table and then move to the side of the activity space. They should also try to remember the number on the jar that they think is their home stream.
- Once all students have been assigned a stream and have “memorized” the scent, start having 3 students at a time begin searching for their stream. Each time one places their token down and moves to the side, send in another student.
- Once all students have placed their token, go through each number and reveal its true identity. Note where lots of people got things wrong, where everyone got things right, etc.

Discussion:

- What types of things made this easy? What made it a challenge?
- What, if anything, would you do differently if you could do it again?

MERCED RIVER

1 – Sunrise Creek (Lemon)

2 – Tenaya Creek (Grapefruit)

3 – Yosemite Creek (Orange)

4 – Cascade Creek (Lemongrass)

TUOLUMNE RIVER

5 – Tuolumne South (Rose)

6 – Tuolumne North (Lavender)

7 – Cherry Creek (Chamomile)

8 – Clavey River (Jasmine)

STANISLAUS RIVER

9 – Rose Creek (Rosemary)

10 – Angels Creek (Pine)

11 – Black Creek (Cedar)

12 – Stanislaus North (Juniper)

Post Trip Activities:

- Read '[Can you pass this smell \(and taste\) test?](#)' NewsELA 6th Grade and discuss how the ability to smell pheromones and other chemicals benefits animals.
- Research the number of olfactory genes present in different animal species, compare and contrast physical characteristics of those species, and discuss how genetics and physiology work together to perform certain functions.

1	2	3	4	5	6	7	8	9	10	11	12
13		14		15		16		17		18	
19				20				21			