

## Taking the Pulse of the Fraser

### Background Information on the Fraser River:

The Fraser River was named after Simon Fraser (1776-1862) who explored the river in 1808 on behalf of the North West Company in search of a navigable route for fur trading. Simon Fraser believed that he was traveling on the Columbia River to its ocean outlet. It was another explorer, David Thompson, who later named the river after Simon Fraser.

First Nations people had lived along the Fraser River for thousands of years before Simon Fraser's arrival. Some of the archaeologists estimate up to 9000 years before. (A site under the Alex Fraser Bridge has been dated back that far).

The Fraser River starts as a trickle at Mount Robson (Headwaters) and ends in the Strait of Georgia in the Pacific Ocean. There are many tributaries that add water to the Fraser, including the Thompson River (22% of the total water flow).

The Fraser River is 1 375 kilometers long. If it was stretched out across Canada, it would span the distance between Vancouver and Regina, Saskatchewan. The Fraser River is the fifth largest river in Canada. It is less than 15 000 years old.

The characteristics and landscapes of the Fraser River change from the beginning of its journey to its end. As you exit the Headwaters and enter the Upper Basin region, the river's sediment load increases creating more turbulent waters with the water appearing grey or brown in colour. The river then passes through the Drylands with low vegetation as a result of little rainfall and hot temperatures. In the Canyon, the river is squeezed between the Coast and the Cascade mountain ranges increasing the speed and creating many impressive rapids.

The point at which the fresh water of the Fraser River meets the salty water of the Pacific Ocean is called the estuary, (also sometimes called "between land" by the First Nations people because as the tides ebb and flow, the estuary changes from land that is covered with water to dry land). Other estuaries include the mouths of great rivers such as the Amazon, the Nile and the Mississippi.

The Fraser River Estuary is as rich in its biodiversity as it is an ideal habitat for many organisms. A habitat can be defined as a place where an organism can get food, water and shelter. The major habitat types along the Fraser River include: brackish and freshwater marshes, salt marshes, tidal flats, sloughs, and flood-plain forests among others.

The Fraser River watershed is also home to 60% of BC's population, approximately 2.7 million people. S watershed is an area of land that drains all the water into one main river. The Fraser River watershed is also called a drainage basin, since it collects so much water and drains such a large area (25% of BC's area).

## Program Overview:

Students follow the scientific method to conduct a water quality investigation of the Fraser River to test whether the temperature, turbidity, and pH of their sample fall within the acceptable levels for salmon.

The two-hour program begins outside along the river where students can observe their surroundings and take a sample of the river. They will do background research to allow them to make hypotheses of their expected results. Students will be able to determine the health of the river water by testing its pH and turbidity.

## Program Objectives

- To examine the conditions necessary for salmon survival
- To acknowledge the importance of salmon to BC
- To be able to compose hypotheses using background research and observation
- To understand the difference between an acid and a base
- To carry out tests on the water that will lead them to their experiment results

## Helpful Vocabulary

**Effluent:** liquid waste or sewage discharged into a river or the sea.

**Freshet:** the flood of a river from heavy rain or melted snow.

**Hypotheses:** a supposition or proposed explanation made on the basis of limited evidence as a starting point for further investigation.

**Litmus:** a dye obtained from certain lichens that is red under acid conditions and blue under alkaline conditions.

**pH:** is a measure of how acidic or basic a solution is. "potential hydrogen". It is a measure of the activity of hydrogen (H<sup>+</sup>) ions in solutions.

**Ro-ro:** vessels designed to carry wheeled cargo, such as cars

**Secchi disk:** an opaque disk, typically white, used to gauge the transparency of water by measuring the depth (Secchi depth) at which the disk ceases to be visible from the surface.

**Sediment:** matter that settles to the bottom of a liquid; dregs.

**Trade:** the action of buying and selling goods and services.

**Turbidity:** the cloudiness or haziness of a fluid caused by large numbers

**Watershed:** an area or ridge of land that separates waters flowing to different rivers, basins, or seas.

## In- class activities:

### Pre-visit:

1. Students should be able to recognize the Fraser River on a map. Have students identify the major cities and tributaries found along the Fraser River. What kinds of industry along the river could affect water quality?
2. During your program you will test the water to determine if pH, Temperature, and Turbidity are at optimal levels for salmon survival. What steps do you think you will have to take before actually testing the water?
3. What are some actions you could take to help improve water quality in the Fraser River?
4. Do you think water quality of the Fraser River has improved or declined in the last 10 years? Conduct online research to determine if you are correct.

### Post visit:

1. Search through newspapers, magazines, and books and the internet to research 3 ports along the Fraser River. For each port find out the following;
  - What are the main goods brought through the port? Do they all import and export the same goods?
  - What countries these goods are going to/ coming from?
  - How are these goods important to Canada or to you in particular?
2. What role do you play in water quality of the Fraser River? Think about your relationship to the items brought into and out of the country through this river. Does our connection to these items tell us anything about our own contribution to water quality?
3. What are some companies or campaigns in the area designed to improve or protect water quality in the Fraser River? (i.e. water treatment plants, advocacy groups, laws, companies funded to provide response in emergencies, etc.)

## Complete the following Word Search

G	P	B	Q	N	I	T	J	Z	C	J	U	Y	I	G	D	E
D	K	A	V	F	R	E	S	H	E	T	L	T	G	O	W	O
D	P	S	C	X	W	X	A	Y	T	I	D	I	B	R	U	T
C	H	I	B	K	S	I	D	I	H	C	C	E	S	M	C	K
I	B	C	D	F	L	R	O	L	C	I	D	I	C	A	W	I
U	N	O	I	T	A	V	R	E	S	N	O	C	F	H	P	J
H	N	O	S	B	O	R	J	J	A	J	S	A	L	M	O	N
I	G	K	H	W	W	S	U	M	T	I	L	T	G	C	M	R
I	G	D	E	Z	J	O	N	I	S	A	B	R	E	V	I	R
C	N	T	T	L	Q	C	O	X	W	I	U	K	I	P	D	V
D	N	R	Y	E	S	S	I	S	E	H	T	O	P	Y	H	R
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F	L	V	L	A	R	T	U	E	N	M	Q	J	G	P	D	A
V	M	K	E	Y	S	T	O	N	E	C	F	S	N	B	D	F

litmus  
acidic  
basic  
conservation  
dredging  
freshet  
hypothesis

neutral  
pH  
River basin  
Robson  
salmon  
Secchi disk  
temperature