Taking the Pulse of the Fraser

Background Information on the Fraser River:

The Fraser River starts as a trickle of melted snow at the top of Mount Robson which is in the Rocky Mountains, sitting on the border of British Columbia and Alberta. The river travels 1,375 kilometers through BC and empties into the Pacific Ocean. There are many tributaries (a river or stream that flows into a larger river or lake) that add water to the Fraser as it travels through BC. The Fraser River is longest river in BC, and one of the largest in all of Canada.

The landscapes of the Fraser River change from the beginning of its journey to its end. As you exit the headwaters on Mount Robson the water is crystal clear, shallow, and extremely cold. The middle portion of the river is called the Fraser Canyon, where the river is squeezed between 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. Because estuaries have access to both riparian (river) and marine nutrients, they are home to an incredible diversity of life. The lower mainland is located in the estuary portion of the Fraser River.

Indigenous people have been living in what we now call Canada for time immemorial, meaning that Indigenous communities have no stories of arriving here. They have always been here. There are many different First Nations along the River; each group is unique, with their own language or dialect, specific traditions, particular relationships with the landscape, stories, etc. The river has been used by Indigenous communities for thousands of years and they have specialized technologies, traditions and celebrations related to the river, nature, and biodiversity. Hul'q'umi'num', Halq'eméylem, and hən'q'əmin'əm' are Indigenous language dialects spoken in the lower portion of the Fraser River. In Halq'eméylem, the language dialect spoken in the upper portion of the lower Fraser, the word for river is Stolo. In hən'q'əmin'əm' , a language dialect spoken in the lower portion of the lower Fraser, the word for river is stalə' w'. Indigenous communities throughout BC speak other languages and dialects and will have other names for the river.

The Fraser River Discovery Centre is located on the traditional and unceded territory of the hən'q'əmin'əm' and Halq'eméylem speaking peoples. Territory acknowledgement is one small part of Reconciliation. We ask you take a moment to think of other ways you can participate in Reconciliation with Indigenous communities.

The River is also now known as the Fraser River, named after Simon Fraser, a European fur trader and explorer who led an expedition in 1808 along the river, establishing trade routes for what is now called the Hudson Bay Company.

The Fraser River Basin is an extremely biodiverse region, with hundreds of species of plants, animals, and fungi. 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 3 million people. A watershed is an area of land that drains all the water into one main river. You could imagine this as the watershed being a sink, and the Fraser River the drain; anything poured along the sides of the sink will end up in the drain, just like all the rivers and streams around the watershed end up in the Fraser River.

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 and 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 with 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; could stand for "potential hydrogen"; it is a measure of the activity of hydrogen (H+) ions in solutions
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
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:

Here are some ideas to help prepare your class for the program, and to continue the learning back in the classroom.

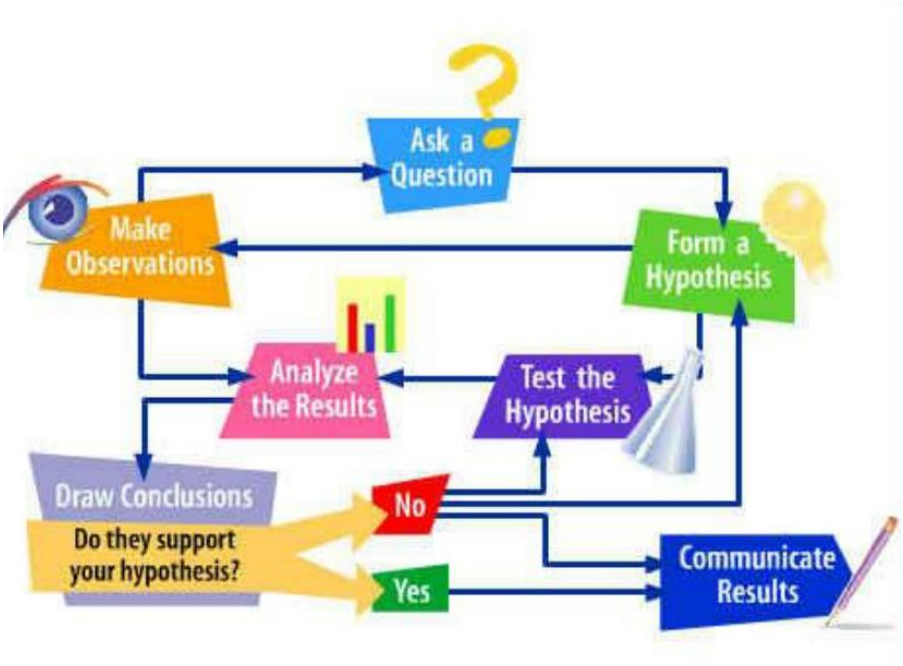
Pre-visit:

1. In this program we'll be talking about pH, turbidity, watersheds, and the scientific method. If you'd like an intro to any of these, try these short videos.
    a. Turbidity
        i. A short intro to turbidity and the effect of urban runoff.
            1. https://www.youtube.com/watch?v=igqfFKGi9tg
    b. pH
        i. A short intro to pH and pH testing.
            1. https://www.youtube.com/watch?v=ckbsHM2igT0
        ii. A parody of Meghan Trainor's "All About That Bass", about bases and acids. Perhaps not useful as a stand-alone introduction, but a clever song!
            1. https://www.youtube.com/watch?v=IAJsZWhj6GI
    c. Watersheds or basin
        i. https://www.youtube.com/watch?v=QOrVotzBNto
    d. Scientific method
        i. https://www.youtube.com/watch?v=yi0hwFDQTSQ

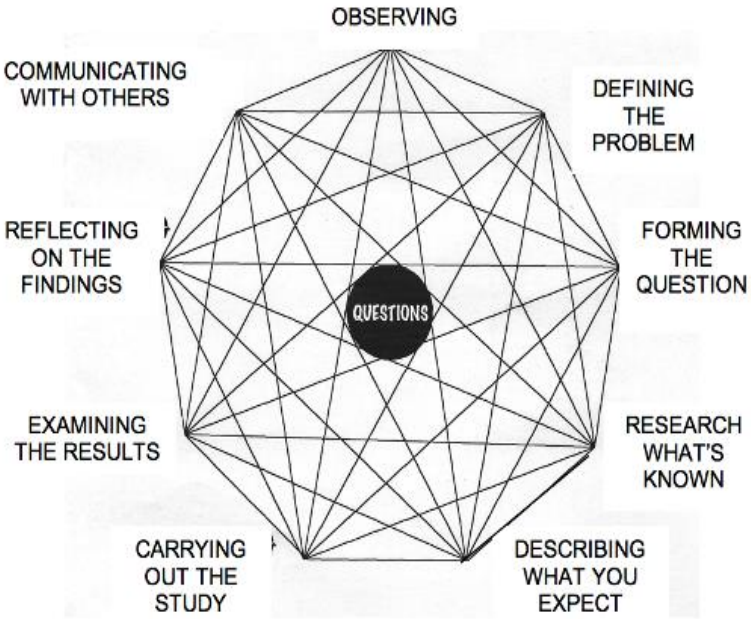
Post visit:

1. Continue learning about urban pollution with *Solve a Pollution Mystery* (pages 1-17), from the Georgian Bay Biosphere Reserve. This activity challenges students to identify the source of pollution, using clues revealed to them through the activity.
    a. https://www.gbbr.ca/wp-content/uploads/2019/04/Grade-5-Water-Protection-1.pdf
2. In the program, we used a linear model of the scientific method. Spend some time with your class discussing how science is more often non-linear, iterative, generating more questions as it goes and leading back to previous steps. Below are two models of inquiry, or a non-linear science method.

a.



b.



i. https://www.curriki.org/oer/What-is-inquiry-vs-the-scientific-method-