

# INTRODUCING INDIGENOUS ISSUES IN GRADE 9 SCIENCE

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## Introducing Indigenous Issues in Grade 9 Science

This guided inquiry activity is structured to allow students the freedom of their own pacing while practising observations and collaborating to find the cause of Minamata Disease in Japan, and then exploring how it has affected a Canadian Indigenous population. Students will become engaged with chemistry and ecology, and their new knowledge will serve as a reference to which they can relate further learning in the chemistry unit.

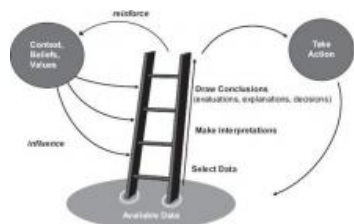
**Time Required:** About 2 x 75-minute periods

### **Materials and Resources:**

Chart paper or white boards (enough for each group, if your class is split into groups of 3 or 4), markers, case study materials, projector or devices to watch YouTube videos, textbook or digital resource, Ladder of Inference template.

### **Set up:**

First, divide your class into groups of 3 or 4. Each group should receive a large paper or white board, a different coloured marker for each student and a template for the Ladder of Inference (<https://static1.squarespace.com/static/576825875016e1c8148e66a4/t/57c09583197aea879e39a13a/1472238980231/Cf+Ladder+of+Inference+v2.pdf>)\* which will be copied onto the large paper, although you may choose to do this ahead of time.



([https://connex.stao.ca/sites/default/files/media/slide\\_6\\_ladder\\_of\\_inference.jpg](https://connex.stao.ca/sites/default/files/media/slide_6_ladder_of_inference.jpg))

### **Tags:**

inference observation ladder decisions (/tags/inference-observation-ladder-decisions)

### **Scenario for Inquiry Part 1: Minamata, Japan**

You will explain to your students that they are about to become scientists trying to identify the cause of some strange activity in a small town in Japan called Minamata. You'll give them one piece of evidence or reading at a time, starting with the Minamata Times newspaper dated April 1955. Each group member will take turns reading aloud, as the other members add pieces of data (ie. observations) to the data pool on their big sheet. *Note that the articles and materials provided are all prepared by me from research, and are not translations of actual newspaper articles of the time.*

When the groups are finished reading through the first article, stop to make sure everyone understands the problem (i.e. what is causing the strange events in Minamata Bay, Japan?). This is a good assessment of understanding of the task. Have each group briefly share the contents of their data pool with the class. This will also give you a chance to praise the groups that have the most colourful and messy data pools, since this means that everyone in the group was participating.

Now that everyone knows what to do, you will hand each group a copy of the second piece of evidence: a hospital report. Students will repeat the same procedure as they did with the newspaper article, continuing to fill in the data pool. Circulate and when a group is finished with their material, stop to ask them what they think is going on and have a short discussion before giving them the next piece of evidence.

Groups will work at their own pace, slowly filling up the data pool as they are presented more and more evidence. The last article given to them gives away that the scientists studying the problem believe Minamata disease is caused by a heavy metal. At this point, they will begin moving up the Ladder of Inference into the selecting data stage. In this case study, the data pool will serve as the information provided, and each group will circle or underline those which are the most relevant to solving this case. You will then give them a set of Heavy Metals information cards. By going through each description of the metal, its uses and signs and symptoms of exposure, students will begin to work towards which heavy metal is the cause of Minamata. They should present their conclusion as a statement at the top of the Ladder of Inference.

At the end of this portion of the activity, groups may have differing points of view. Some groups will believe that the circumstances and symptoms best match with lead, some with barium, and yet others with the true culprit, mercury.

Once they have focused in on it, you might choose to show them a short summary of the events in Minamata. Here is a link to a brief video found on YouTube (<https://youtu.be/ihFkyPv1jtU>) that explains what happened. A warning that some of the images and events are disturbing. I take a few moments to explain that each student may react differently, and giggling or laughter might be a sign of discomfort, but that we should all be respectful of the people, animals and circumstances they are about to see.

After viewing the video, allow some time for some discussion and to explain what happened after the Chisso Corporation was found to be the one dumping mercury into the water. Students are then asked to read about bioaccumulation and biomagnification, and show in a diagram how the mercury may have got from the factory to the animals and people in Minamata Bay. Give feedback on each diagram to ensure understanding.

### **Scenario for Inquiry Part 2: Indigenous Issues**

The next piece is linking this mystery to our First Nations people in Grassy Narrows, Ontario. I show my students a video that was made by teenagers in Grassy Narrows about their water situation. It's a great music video, and a catchy tune and gets them interested in reading more about it. (<https://youtu.be/EgaYz8YWsO8>) Then they get an article from CBC (attached to this file as "CBC article Mercury Poisoning in Grassy Narrows") about the effects of mercury poisoning on the people of Grassy Narrows and their culture. Students read and answer some literacy questions to assess their understanding.

As an introduction to chemistry, this activity hits home. You could reach further and have students watch the movie "After the Last River" (<http://www.afterthelastrivermovie.com/>) (<http://www.afterthelastrivermovie.com/>) which explains how Attawapiskat Ontario is affected by mercury poisoning, read up on the Flint, Michigan water disaster or follow up with what is happening currently with Grassy Narrows. Students should be encouraged to follow their own interests.

I use the students' interest in the subject matter to move into chemistry, first looking at mercury as an element, and then moving to how different mercury compounds have different properties. Students might do water testing for different substances to gain an understanding of how indicators work and the chemical properties of different compounds and molecules. This inquiry activity can also serve to bridge different curricula, for instance having English classes write news articles or geography classes discuss the diamond mining in Attawapiskat and its relationship to Minamata in that community as well.

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▶ N'we Jinan Artists - "HOME TO ME" // Grassy Narrows First Nation ([//www.youtube.com/embed/EgaYz8YWso8?width=800&height=450&iframe=true](https://www.youtube.com/embed/EgaYz8YWso8?width=800&height=450&iframe=true))

 CBC News article Minamata in Grassy Narrows ([https://connex.stao.ca/sites/default/files/mercury\\_poisonng\\_at\\_grassy\\_narrows\\_2019.pdf](https://connex.stao.ca/sites/default/files/mercury_poisonng_at_grassy_narrows_2019.pdf))

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