

LESSON OVERVIEW

Name: Sara Stephenson **Grade:** 10 **Subject:** Science **Location:** Woodstock, Ontario, Canada

Context & Purpose:

This lesson was done near the beginning of an inquiry cycle where students studied the impacts of climate change on the world around them with a specific focus on human health. The purpose of using this primary source was to initiate conversation and in depth learning about the causes and effects of increasing global temperatures. The QFT on this primary source provided some background information and removed common misconceptions on climate change.

Lesson Procedure:

1. Students will observe and discuss [different images of situations](#) that have resulted from the increase in global temperatures, which will help reveal students' pre-existing knowledge and create a direction for the QFT.
2. Students will complete a digital lesson on "Natural Climate Change" (via [Hyperdocs](#)) to look at the natural processes that impact the earth's climate at home.
3. Students will observe and infer about the primary source (i.e. What do you see? What do you think?)
4. Student will complete a QFT on the primary source.

Next Steps (i.e. how student questions will be used after the QFT):

- Students will do an internet search to answer one of their priority questions and share it in a [class slide deck](#).
- From the information collected, the class will extract any ideas, words, or phrases that need further investigation
- Students will look at the causes and effects of climate change in more detail for homework and create short 3-5 minute informative videos that highlight how climate change can negatively impact human health.

LESSON OUTCOME

Question Focus*:



[River 1, position 16, altitude 707 m, Greenland ice cap melting area](#)

<https://www.loc.gov/pictures/item/2011660360/>

*Permission to display this image in this course given by the photographer, Olaf Otto Becker.

Student Question Examples:

- How cold is the water?
- Is there any animals there? or people?
- Why did the water melt in a cold area?
- How much water is there?
- **How might global warming affect the glacier?**
- How warm/cold is it?
- **Why didn't the snow melt with the water?**
- Has the temperature changed a lot?
- How much has the temperature changed?
- Why is their snow if the ice is melting?
- Is the ice melting?
- How fast does the ice melt?
- If there is water, how come there's still snow?
- Is the change in temperature the cause of the ice melting?
- **How long does the water go for?**
- Is this natural?
- Where was this picture taken?
- Is the water getting deeper?
- Or does it drain somewhere?
- Is this a cold place?
- Is this in Canada?
- Do things grow their?
- **What is the black stuff?**
- How dense is the atmosphere there?
- Did it always look like this?
- Did anything change?
- How long does it take to melt?
- Does this river go to the ocean?
- What time of year is this?
- Is it ever sunny out?
- How thick is the glacier?
- Does it get thinner when it melts?
- What is the average temperature?
- Are there rocks under the ice?
- Is the environment dying?
- **What is the average temperature for each month?**
- **Where does the water lead to?**
- **How fast is it melting?**
- **Is the ice melting?**
- **What is under the ice?**
- **How does ice melting affect humans?**

TEACHER REFLECTIONS

Reflect on your QFocus. This might include the process through which you decided, or it might speak to how students responded.

The process I used during this lesson was more teacher centered than I would normally use for a QFT, since I had a limited time with the students and really wanted to make sure I went in the direction I needed to go to cover my curriculum. Since I wanted to focus on climate change (a unit of study in our course) I laid more detailed groundwork before the QFT to shift the mindset of the students towards this topic. For example, we had some preliminary discussions looking at other images of how our planet is being impacted by rising global temperatures. We looked at that iconic starving polar bear picture, a field of drought, and at a graph of the increasing global temperatures, among others. Then we did an observe and infer technique on the QFocus itself to get them started thinking about the idea. I find I get much deeper questions when we've zoned in on the topic first, before starting the QFT. After that introduction, when we looked at the QFocus image of the glacier, it wasn't a very surprising image to them. They had already seen other images of receding glaciers, so for this one they wanted to know very specific pieces of information about it. It would have been interesting to see if their questions would have gone in that direction using the primary source without the initial discussions about the images on the first few slides in the presentation.

Which student questions stood out to you? Why?

Does it get thinner when it melts? - I really liked this question because it indicates that the student was trying to understand HOW the glacier melts. This is what science is about! Trying to understand the world around you. This would be a great question to turn into a testable question and plan an investigation to find the answer to.

Why didn't the snow melt with the water? - This was another interesting question because again, it shows the student is trying to make sense of the image. Logically, if the ice is melting so should the snow.

Speak to the role of student questions in subsequent lessons, or in the next steps you took after the QFT.

After the students pick their priority questions, I consolidate all of them. Often, I have students write their own priority questions on sticky notes and post them on the wall. My goal is to have a priority question per pair of students, so that a pair or group of students can come up to the wall and take a sticky and do some research. If they don't like the stickys, they can pick one of their own questions. In this lesson, I gave them about 20 minutes in class to research a priority question (we talk about using good internet sources) and then they put the answer in a class slide deck. I do this because I want everybody to have the same background knowledge when we move forward. At school, the class examined the information collected as a result of researching the priority questions. We extracted any ideas, words or phrases that we felt needed further investigation to solidify student understanding of the situation and their research material. As part of their at-home learning that week, students looked into the causes and effects of climate change in more detail. At the conclusion of the QFT, students worked on creating short 3-5 minute informative, documentary-style videos that highlighted how climate change can negatively impact human health. This task was a project that culminated their learning from the QFT process and what they had previously studied about the interactions of the human body systems.

How did you tailor the standard QFT process, if at all? Describe.

During the QFT process, once students have started to slow down with asking questions, I introduce a Question Matrix ([Slide 21](#)). This matrix was originally created to promote the asking of higher order thinking questions and label some questions as better than others. To support the criteria of "No judgement" during the QFT, I remove these labels and only show the grid. I encourage students to use the grid to help them start their question. I also encourage them to look at their existing questions and see if they can change the first two words to create a new question. I only show them this grid and give these instructions once they seem stuck and need boost to keep asking questions.

Overall, what did you learn from this experience?

One of the reasons I love using a QFT is because it acts both as a diagnostic activity and lays groundwork for our next steps in a way that is very student-centered. I find that the nature of the questions that students ask is very indicative of what they already know about the topic. Using their priority research as a starting point for investigations and learning activities ensures that they are truly learning new things.