Water Quality, Climate Change and Alberta's Glaciers

Objectives

Students will:

- learn about water quality in Alberta
- identity what watershed you live within
- understand basic glacier terminology
- describe the effect of climate change on Alberta's glaciers
- Be introduced to the impact of forest fires on glaciers
- Become aware of the importance of water policy in dealing with the effects of climate change
- consider the impact of our activities on climate change and Alberta's glaciers

Materials

Projector and Speakers
Student Worksheet

Video Link
Internet Connection

Overview

Part A: Complete the first part of the worksheet

Part B: Watch the webinar

Part C: Complete the worksheet

Part D: Take action

Time Required

120 min

Alberta Curriculum Connections:

Grade 5 Science: Wetland Ecosystems
Grade 7 Science: Interactions and Ecosystems
Grade 8 Science: Freshwater and Saltwater Systems
Grade 9 Science: Environmental Chemistry
Grade 10 Science: Energy Flow in Global Systems
Biology 20: Energy and Matter in the Biosphere
Science 14: Investigating Matter and Energy

Part A: Begin the Worksheet
Provide your students with the Webinar Student Worksheet. Complete the beginning portions.

Part B: Watch the Webinar:
The webinar was recorded on May 27th, 2020. The recording can be found in the videos section of Alberta Tomorrow (you must be a registered user to access the videos). It can also be found on here on Youtube.

Part C: Complete the Worksheet
Revisit the worksheet

Part D: Take the Action Challenge

STUDENT WORKSHEET: Name:_____

PART A: What are ice cores and why do we take them?

Video: What we learn from ice cores?

1. What is Paleoclimate?
2. What does Dr. Criscitiello's research look at?

3. Look up the definition of an Isotope:

Video: piccaro

4. What does the Piccaro machine measure?

5. What is the difference between Oxygen 16 and 18?

6. What do they tell us?

Video: measuring isotopes

7. What does the ratio of Oxygen 18 to 16 tell us?

8. What kind of activities does Dr. Criscitiello mean when she refers to "anthropogenic"?

9. What else can the Picarro machine do?

Review the water cycle in this video:

10. What processes in the water cycle allow water to move from say the oceans to the atmosphere to glaciers?

Watch this video that explains the circulation of oxygen isotopes.

11. So, glacier ice would have a higher concentration of which isotope?

12. Fossilized animals would have higher concentration of which isotope?

13. Look up what an anion and cation is
    Anion:
    Cation:

Video: ion chromatograph

14. What does the ion chromatograph do?

15. What does Dr. Criscitiello do with it?

16. What can she learn from this machine?

Part B: Climate Change and water quality

Watch this video.

17. What determines our water quality?

Watch Dr. Cristiciello talk about what she finds when she analyses ice cores
Video: How do atmospheric chemicals get into the water?

18. Research what CFCs are. Why are they a problem?

19. Look up a definition for persistent chemicals?

Video: Persistent chemicals

20. What does Dr. Criscitiello say about the replacement compounds to CFC's?

21. How did something like DDT get in the ice?

22. What are the impacts of melting glaciers on the levels of DDT released into the environment?

Video: Endocrine disruptors

23. Research what endocrine disruptors are. Why are they dangerous?

24. Why don't we want them in our drinking water?

Part C: Extension

Go out into your watershed. Use the www.albertatomorrow simulator to look at the landuses surrounding your local body of water to understand what may be affecting that water quality.

Measure parameters you have test kits for: dissolved oxygen, phosphates, nitrates, turbidity, etc and record your findings in the "observations" section of the Alberta Tomorrow simulator.