Love it or Lose it: Alberta Glacier Edition

Objectives

Students will:

- identify the location of glaciers in Alberta
- observe change in the glaciers over time
- Investigate how climate change is affecting the Alberta's Glaciers
- be challenged to develop an action plan of how they can help prevent further loss of the glaciers

Materials

Projector and Speakers
Student Worksheet

Video Links
Internet access

OVERVIEW

Part A: Where were they?

Part B: Where are they today?
Part C: Where may they be tomorrow?
Part D: Actions for our future

Part E: Extension

Time Required

30 min + Project Time

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Alberta Curriculum Connections:
Grade 4 Social Studies: Alberta: A Sense of the Land
Grade 5 Social Studies: Physical Geography of Canada
Grade 5 Science: Wetland Ecosystems
Grade 7 Science: Interactions and Ecosystems
Grade 8 Science: Freshwater and Saltwater Systems
Science 10: Energy Flow in Global Systems
Biology 20: Energy and Matter Exchange

Overview:

Part A: Where were they?
Students will use the website http://mountainlegacy.ca/ to look at various images of glaciers and how they have changed over time. They will watch a few videos (provided in the google folder) that talk specifically about the Athabasca Glacier.

Part B: Where are they today?
Using a series of maps, students will find the location of various glaciers in Alberta.

Part C: Where may they be tomorrow?
Students will view a simulation of the projected loss of the Columbia Icefield

Part D: Actions for our future
Students will develop a resource that can be used to teach others about the shrinking Columbia Icefield.

Part E: Extension:
See Lesson Going Going Gone

Resources:
"Alberta WaterPortal." Alberta WaterPortal, albertawater.com/glaciers-overview.
GLIMS Viewer, www.glims.org/maps/glims.
Canadian Glacier Inventory Project, cgip.wikifoundry.com/page/1. Rocky Mountain Introduction.
http://cgip.wikifoundry.com/page/1.+Rocky+Mountain+Introduction
"Dynamics of Alberta's Water Supply." Glacier Inventory and Ice Volume Estimation, albertawater.com/dynamics-of-alberta-s-water-supply/44-learn/source/glacier-inventory-and-ice-volume-estimation .https://albertawater.com/docs-work/projects-and-research/dynamics-of-albertas-water-supply/18-alberta-glacier-inventory-and-ice-volume-estimation-marshall-et-al/file
Ommanney, C.S.L.. (2002). Glaciers of the Canadian Rockies. US Geological Survey Professional Paper. J199-J289.https://pubs.usgs.gov/pp/p1386j/canadianrockies/canrock-lores.pdf

LOVE IT OR LOSE IT: ALBERTA GLACIER EDITION

STUDENT WORKSHEET

NAME:_____

PART A: WHERE WERE THEY?

Go to:http://mountainlegacy.ca/ and scroll up on the picture. You can see where the Athabasca glacier used to be and where it is now. Scroll down to "start exploring" and Find Mount Columbia. Use the Comparison tool to explore 3 different areas.

Record:

Image Name	Earliest Year	Latest Year	Observations:

Watch:
Video: Every year it's farther to get to work.
Video: Where will the glacier be in 30 years?

Part B: WHERE ARE THEY NOW?

Glaciers in Alberta are found in the Rocky Mountains along the western border. The Canadian Rocky Mountains were formed over 120 million years ago as compressive forces produced a series of folds and parallel ridges in the rock. During the last 2 million years, erosion and glaciation has formed rugged peaks that are separated by wide valleys (Ommanney, 2002) See Figure 1.

1. Look at Figure 1: Glaciers of Canada
   a. Find and Circle the Columbia Icefield
      The Columbia Icefield actually contains about 30 glaciers, the two biggest being the Athabasca and Saskatchewan. It has the greatest accumulation of snow and ice in the Rocky Mountains with a depth of 365 m.

   b. Find and circle the following glaciers:
      i. Athabasca
      ii. Saskatchewan
   c. Circle any other glaciers you have visited in the Rocky Mountains

2. Look at Figure 2:
    a. Which Glacier appears to be the largest on the Columbia Icefield?

    b. Now find and circle the following big Glaciers:
        i. Athabasca
        ii. Saskatchewan
        iii. Columbia
        iv. Dome
        v. Stutfield

Part C: Where may they be tomorrow?

View this projected future of the Columbia Icefield: https://guardiansoftheice.com/the-columbia-icefield/

Watch:
Video: Growth and Attrition of Glaciers

3. What determines whether a glacier grows or recedes?

Video: Where was the glacier in 1982?
Video: Where was the glacier in 2006?

4. What has been happening to the Athabasca Glacier?

Video: Where might the glacier be in 30 years?

5. If current trends continue, where might the glacier be in 30 years?

Video: Why should we protect glaciers?
Video: Why should we protect glaciers?

6. Why should we protect the glaciers?

Video: Are people affecting the glaciers?

7. What should we be doing to protect the glaciers?

Part D: Actions for the future:

Watch What can we do to stop the melting of glaciers?

How can you help? Here's where you come in.

Challenge 1: Come up with an Action Plan to help fight climate change and its effects on Alberta.

Challenge 2: Make an infographic for your class, home or community about the effects of climate change on ALberta. Post it in your community, school or on social media

Challenge 3: Get a group of students together and create a list of actions to reduce carbon emissions. Create a pledge for individuals or classes to take action on climate change.

SHARE your work by creating an observation and uploading it on www.albertatomorrow.ca,
on Facebook at https://www.facebook.com/AlbertaTomorrow/
or Instagram at www.instagram.com/alberta_tomorrow/
or Twitter at https://twitter.com/AlbertaTomorrow

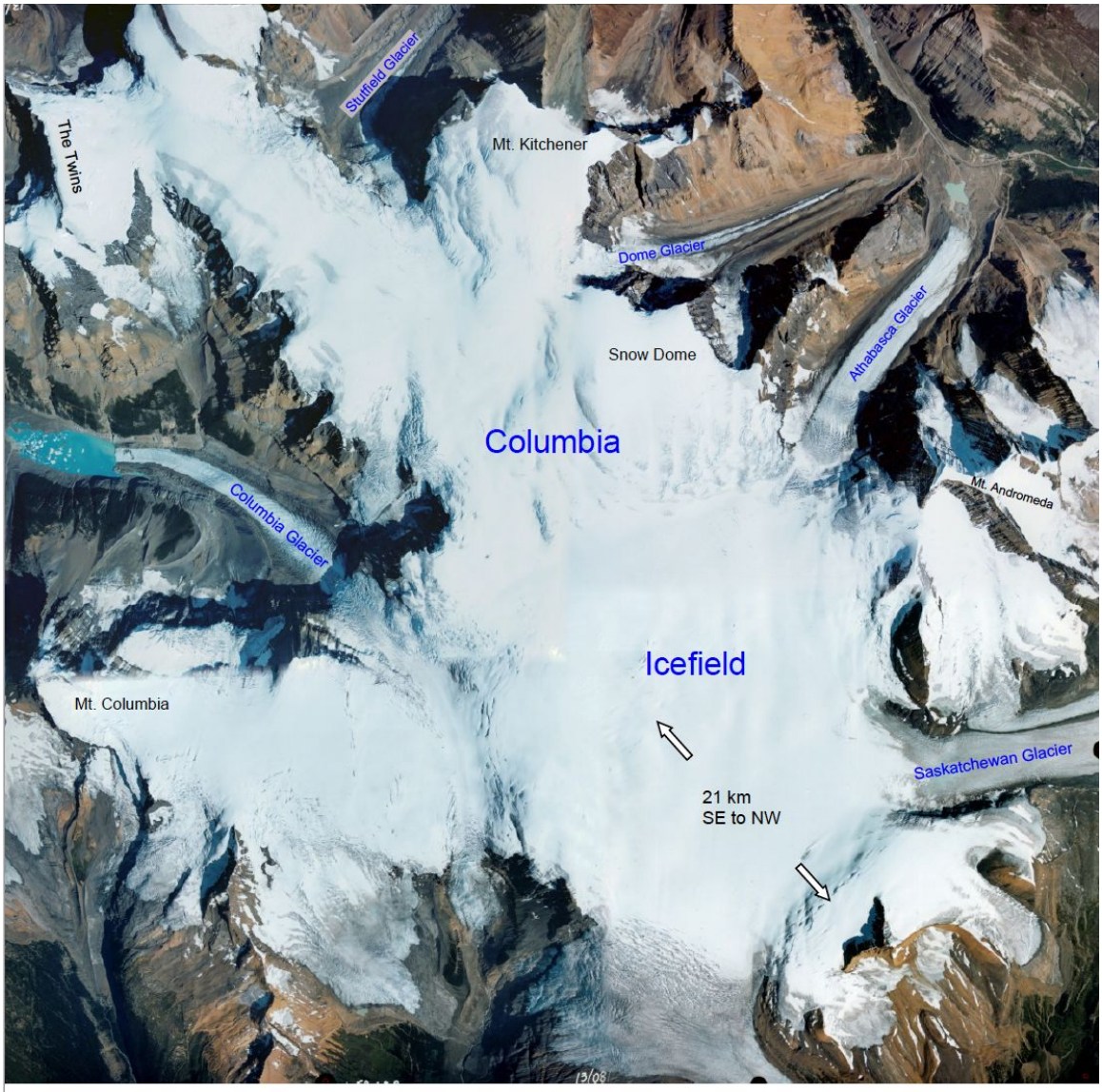
Part E: Extension

Check out the Lesson "Going Going Going Gone" Climate Change and the Columbia Icefield.

Figure 1: Glaciers of the Canadian Rocky Mountains (Ommanney, 2002)


Grande Cache
WILLMORE WILDERNESS PROVINCIAL PARK
Resthaven Icefield
Reef Icefield
MOUNT ROBSON PARK
JASPER NATIONAL PARK
Jasper
Braithwaite Icefield
Hooker Icefield
Mt. Brown Icefield
HAMBER PARK
Chaba Icefield
Clemenceau Icefield
Kinbasket Lake
Athabasca Glacier
Columbia Icefield
Saskatchewan Glacier
Wilson Icefield
Lyell Icefield
Mons Icefield
Campbell Icefield
Freshfield Icefield
Wapta Icefield
Ram Glacier
Peyto Glacier
Molar Icefield
Hector Glacier
Drummond Icefield
YOHO
Waputik Icefield
BANFF NATIONAL PARK
Golden
Lake Louise
Bonnet Icefield
Washmawapta Icefield
KOOTENAY NAT. PARK
Banff
MT. ASSINIBOINE PARK
Invermere
Windermere
PETER LOUGHEED PROV. PARK
Pétain Glacier
ELK LAKES PARK
WHITESWAN LAKE PARK
TOP OF THE WORLD PARK
BRITISH COLUMBIA
ALBERTA
ROCKY MOUNTAINS
COLUMBIA MOUNTAINS
Canoe River
Columbia Reach
Columbia River
Kootenay River
N
0
100 km

Figure 2: The Columbia Icefield (Courtesy Peter Lemieux)



The Columbia Icefield and Surrounding Glaciers

Composite image produced from six aerial photographs taken August 29, 1992.
Images courtesy National Air Photo Library, Canada
Composite courtesy Peter Lemieux, Athabasca Glacier Icewalks

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