

# CANADIAN GEOGRAPHIC IN THE CLASSROOM

**Article** 'Volcano Alley – British Columbia's hidden secret'  
**Issue** March/April 2019



## Focus Question

What have researchers found regarding the possibility of a volcanic eruption in the “Volcano Alley” along the southwest coast of British Columbia?

## Time

1-3 days (depending on depth of lesson development and summary project chosen.)

## Subject/topic

Geography/ Social Studies

## Grade level

8-12

## Learning Goals

- Students will learn about “Volcano Alley” by reading the article in *Canadian Geographic* magazine (March/April 2019) on pages 42-49, written by Andrew Findlay.
- Students will complete a worksheet focusing their reading on the geography standards of Spatial Significance, Patterns and Trends, and Geographic Perspectives.
- Students will conduct research to gain deeper knowledge of the Garibaldi Volcanic Belt, especially the Mt. Meager region.
- Students will conduct research to learn about geography-related careers.
- Students will learn about the importance of technology at Mt. Meager.

## Materials Needed

- 1 or more copies of the March/April 2019 issue of the *Canadian Geographic* magazine
- [Large wall map of Canada](#) (e.g. Can Geo Education's tiled map of Canada's provinces and territories and/or British Columbia)
- Access to [Google Tour Builder](#)
- Computer lab or individual student devices (for summary product)

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## Connection to the Canadian Geography Framework

### Concepts of Geographic Thinking

- Patterns & Trends
- Interrelationships
- Geographic Perspective
- Spatial Significance

### Inquiry Process

- Formulating questions
- Gather and organize
- Interpret and analyze
- Evaluate and draw conclusions
- Communicate

### Geospatial Skills

- Foundational elements
- Spatial representations
- Technology

## Lesson Description

- **Minds on:** Students will brainstorm and record their knowledge (e.g., by creating a word wall) of tectonic plate boundaries and volcanos in the western part of North America, especially in British Columbia.
- **Action:** Students will read the March/April 2019 *Canadian Geographic* magazine article "Volcano Alley" (pg. 42-49). Students will use a note-taking worksheet (provided below) to focus on Geographical Standards. Students will brainstorm their knowledge of careers related to the study of volcanoes. A class discussion/debrief will expand student understandings.
- **Conclusion:** After developing their notes, students will have a choice on how they wish to consolidate their learning:
  - ▷ Inquire about: previous volcanic eruptions in the Cascade Mountains, geography-related careers, technologies used to investigate volcanoes, emergency preparedness plans in British Columbia and Washington state for a volcanic eruption.
  - ▷ Students will give a brief oral presentation on the 5-7 things they found most interesting and/or surprising during their research on Volcano Alley.
- **Alternative summary product:** Create a "tour" of the Garibaldi Volcanic Belt using Google Tour Builder or another format. This summary product should provide a geological background of the region and the volcanic eruption history of the Garibaldi Volcanic Belt and surrounding area. Students should also describe the topography, biomes, flora and fauna of the region.

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## Lesson Implementation

### Minds on

- Create a Word Wall with your students by using the following discussion points:
  - ▷ Ask the class to write down the different types of tectonic plate boundaries and provide examples of world locations for each.
  - ▷ Focus on the western coast of North America, what types of volcanoes are common in the region? Name some of the volcanoes in this region. What are the geological processes that formed these volcanoes?
  - ▷ Did anyone mention Mt. Garibaldi or Mt. Meager? (They are two of the volcanoes located north of Whistler and, although less well known than the volcanoes located in Washington and Oregon, both volcanoes could have significant impacts on the southwest coast of British Columbia).

### Action

- Using the March/April 2019 *Canadian Geographic* magazine article "Volcano Alley" (pg. 42-49). Have students use the worksheet provided to make notes as they read the article.
- After reading the article, debrief using the worksheet with students.
  - ▷ What did the students find most interesting/surprising?
  - ▷ What patterns and trends did the students notice?
  - ▷ Discuss some of the geographical clues that researchers are using to determine the potential danger(s) of Mt. Meager.
  - ▷ What is the current theory put forward by experts to explain the recent activity associated with Mt. Meager?
  - ▷ What are some geographical characteristics that make this portion of British Columbia geographically unique?
  - ▷ Why has research been limited in this area compared to the volcanoes in Washington and Oregon?
  - ▷ Why would Natural Resources Canada (NRCan) be interested in funding research at Mt. Meager?
  - ▷ What does NRCan hope to do with the research results regarding the human population in the region?
  - ▷ What is the cause and significance of the base of Plinth Peak moving at a rate of up to 30 cm per month during the summer?
  - ▷ What is the role of climate change in the earth movements on Plinth Peak and Mt. Meager?
  - ▷ Discuss the role of technology as it relates to the Volcano Alley article.
  - ▷ What strategies could Canada use to protect people in the area?
  - ▷ Ask students to brainstorm a list of geography-related careers – add these to the word wall.
  - ▷ What types of careers might be involved in the research of volcanoes?

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## Conclusion and Consolidation

**Assignment:** Allow students to choose one of the following assignments and present their findings in a format of their choosing:

- Write a brief “day in the life” of volcanologist Kelly Russell. Describe what he would see, hear, smell, touch and wonder about during his day. Use specific excerpts from the article.
- Investigate geography-related careers relevant to the Mt. Meager site (e.g., writer, helicopter pilot, volcanologist, geologist, cartographer, GIS technician).
- Research technologies being used at Mt. Meager that could also be used to assist geographers in other locations. Discuss the significance of the technology at the Mt. Meager and its impact on volcano research.
- Research the emergency plans that are in place in case of a major eruption of Mt. Garibaldi in British Columbia, or Mt. Baker in Washington state.
- Students will give a brief oral presentation on the 5-7 things they found most interesting and/or surprising during their research on Volcano Alley.

## Extending Your Geographic Thinking

- Research natural hazards that are a threat to your community. Describe your community's emergency plans if a disaster were to occur.
- Develop an emergency preparedness plan for a family living in an area where a natural hazard might occur.
- Create a Google Tour or a travel brochure to the Garibaldi Volcanic Belt that includes the following information:
  - ▷ Best time of year to travel there—explain your criteria.
  - ▷ Transportation from your home town (time, cost, time zones)
  - ▷ Hotels (locations, costs)
  - ▷ Provide geological background and volcanic eruption history of the Garibaldi Volcanic Belt and surrounding area.
  - ▷ Describe the topography, biomes, flora and fauna.
  - ▷ Include other possible activities and sites to see while in the area.

## Modifications

- Use a document camera or equivalent to display the article on the board for students to follow along while reading.
- Assign the article to students to read the night before, allowing them to review the article ahead of time.
- Instead of an oral presentation, students can write down and submit the 5-7 things they found most interesting and/or surprising during their research on Volcano Alley.
- Reduce the number of interesting/surprising things students need to provide from their research.
- Students may create a public service announcement or other method to demonstrate their understandings of Volcano Alley.

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## Assessment Opportunities

- Assess student learning based on their participation in class discussions after the article has been read.
- Students can assess their own understanding of the article based on the notes they made while reading the article.
- Students can self-reflect on what they learned by participating in the class discussion and on their summary product.
- Teacher will assess the summary product – the assessment rubric will depend on the type of product submitted by each student.

## Sources and Additional resources

- [chis.nrcan.gc.ca/volcano-volcan/can-vol-en.php?wbdisable=true](http://chis.nrcan.gc.ca/volcano-volcan/can-vol-en.php?wbdisable=true)
- [opentextbc.ca/geology/chapter/4-6-volcanoes-in-british-columbia](http://opentextbc.ca/geology/chapter/4-6-volcanoes-in-british-columbia)
- [sfu.ca/geog/geog351spring09/group06/Volcano/2volcanofact.htm](http://sfu.ca/geog/geog351spring09/group06/Volcano/2volcanofact.htm)
- Google Tour Builder: ([tourbuilder.withgoogle.com](http://tourbuilder.withgoogle.com))

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**Note-taking Worksheet: "Volcano Alley" March/April 2019 issue of Canadian Geographic (pages 42-49)**

Geographic Standard (Topic)	Your Notes
<p><b>Spatial Significance</b></p> <p><i>What does the map on page 45 tell us about the location of volcanoes on the western coast of North America?</i></p> <p><i>What is the relationship between the volcanoes and the locations and types of tectonic plate boundaries in the region?</i></p> <p><i>What is the distribution of urban areas compared to the volcanoes?</i></p> <p><i>What potential issues might arise due to this spatial distribution?</i></p>	
<p><b>Patterns and Trends</b></p> <p><i>What are the natural/physical characteristics of the region?</i></p> <p><i>What pattern(s) can you see in the locations of volcanoes?</i></p> <p><i>When was Mt. Meager's most recent eruption?</i></p> <p><i>Describe what happened during the first phase of the eruption.</i></p> <p><i>Describe what happened during the second phase of the eruption.</i></p> <p><i>How is Mt. Meager changing over time?</i></p> <p><i>What are the implications of these changes?</i></p>	
<p><b>Interrelationships</b></p> <p><i>What data did researchers gather regarding the gasses being emitted from the fumaroles near Mt. Meager?</i></p> <p><i>What conclusions did they develop regarding a potential eruption?</i></p> <p><i>What did researchers discover about this portion of the Mt. Meager complex?</i></p> <p><i>What is the role of climate change?</i></p> <p><i>Describe some of the technologies used by researchers at Mt. Meager?</i></p> <p><i>What are the concerns regarding Garibaldi Lake?</i></p>	

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Geographic Standard (Topic)	Your Notes
<p><b>Geographical Perspective</b></p> <p><i>What were the social, economic and environmental costs of the Mount St. Helens eruption in the state of Washington?</i></p> <p><i>What social, economic, environmental and political impacts could the eruption of Mt. Meager have on British Columbia?</i></p> <p><i>What factors need to be considered when allowing communities to be built in areas susceptible to volcanic activity?</i></p> <p><i>What ethical responsibilities do individuals and governments have regarding allowing communities to be built in areas susceptible to volcanic activity?</i></p>	
<p><b>Applying Geography Skills</b></p> <p><i>What educational background did the helicopter pilot (Hannibal Preto) have that allowed him to recognize the volcanic activity occurring at Mt. Meager?</i></p> <p><i>What types of geography-related careers have been involved with the Mt. Meager research?</i></p> <p><i>What geographic tools are being used with the Mt. Meager research?</i></p> <p><i>What technologies are being used at Mt. Meager?</i></p>	
<p><b>Other</b></p> <p><i>What did you find interesting or surprising? Is there anything you were left wondering about?</i></p>	