Natural Disasters in Canada	Grade 9 Physical Geography and Physical Processes in Canada

Natural Disasters in Canada

Learning Outcomes

Students will identify examples of various natural disasters that occur in Canada.

Students will understand that landform and climatic regions are related to various natural disasters.

Students will recognize where certain natural disasters are more likely to occur.

Students will analyze the impact that natural disasters have on the physical features and ecosystems.

Ontario Curriculum website

Specific Expectations

B1. Characteristics of Canada's Natural Environment and the Impact of Physical Processes
describe various characteristics of the natural environment and the spatial distribution of physical features in Canada, and analyze the role of physical processes, phenomena, and events in shaping them

B2. Interactions between the Natural Environment and Human Activities
analyze interrelationships between physical processes, phenomena, and events and the ways in which various communities in Canada respond to and interact with them

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Description

Students will have the opportunity to learn about a variety of natural disasters that can occur in Canada. They will be able to make connections between the different landform and climate regions of the provinces and their link to the natural disasters that occur in those areas. This lesson is best taught after students have learned about the landform and climate regions in Canada.

Materials

- PowerPoint Presentation "Natural Disasters in Canada"
- Handout 1.1 - PowerPoint Reflection Questions
- Handout 1.2 - Matching Activity
- Handout 1.3 - Labeling Natural Disasters in Canada

Introduction

Natural disaster can occur in many parts of Canada, and they are typically related to landform and climate regions. This lesson is designed to allow students to observe and reflect on how

these disasters occur and use their critical thinking skills to make connections between these natural events and Canada's geological features.

Action

Step 1:
Begin this lesson with the Natural Disasters in Canada PowerPoint. Each slide depicts a different natural disaster. Students are asked to reflect on what they think happened in the image, what caused the event to happen and where in Canada do they think the natural disaster occurred. This can be discussed through conversation in the classroom, or the teacher could use Handout 1.1 - "PowerPoint Reflection Questions" where students can jot down their ideas and share at the end of the presentation.

Step 2:
Next, Handout 1.2 - "Matching Activity" gives students the opportunity to match 8 different natural disasters to their correct definition. Take up the worksheet once they are finished.

Step 3:
The last worksheet, Handout 1.3 - "Labelling Natural Disasters in Canada", provides students with the opportunity to label the provinces and use their knowledge of landform and climate regions of Canada to identify by letter where they believe that these events could occur.

Step 4:
Revisit the PowerPoint and provide students with the following information about each of the 8 natural disasters. Students could also do their own research online using the websites in the Additional Resources section.
Throughout this conversation and/or research, students can add to their handout with the reflection questions (Handout 1.1) and their map of Canada (Handout 1.3) to identify the areas prone to each of the disasters.

PowerPoint Presentation Disasters

Disaster #1: Floods

Floods can occur in many parts of Canada, but they are most common in coastal areas as well as areas of flat terrain, mountainous areas where snow melts rapidly in the spring and low-lying areas near rivers. New Brunswick and other coastal Atlantic communities, Quebec, Ontario, Alberta, Manitoba, Saskatchewan, British Columbia are all areas that are prone to floods. Northern communities where there is melting permafrost and extreme weather are also susceptible. One of Canada's most expensive natural disasters was the Southern Alberta flood

in 2013 that destroyed several communities. It cost $6 billion dollars in damage and killed 5 people.

Disaster #2: Earthquakes

Earthquakes occur in a few areas of Canada but mostly near the edges of tectonic plates. British Columbia has a high-risk value due to the boundaries of the plates and the Yukon and Northwest Territories are at high to moderate risk. At moderate risk of earthquakes are Quebec, the Ottawa Valley and southern Ontario mostly from fault lines. The worst earthquake in Canadian history was in 1949 in Haida Gwaii, formerly known as the Queen Charlotte Islands off the coast of British Columbia. It had a magnitude of 8.1 and generated a tsunami.

Disaster #3: Tornados

Most tornadoes in Canada occur in Southern Ontario in an area that is known as Tornado Alley. Southern and Central Quebec as well as the Southern Prairie Provinces are also susceptible. These areas have wide, flat terrain and are prone to intense summer storms caused by warm, moist air mixing with the cold fronts from the Great Lakes. The worst tornado in Canadian history was in Regina in 1912 where 28 people died, a couple hundred people were injured and many more lost their homes. The tornado was an F-4 on the "Fujita scale" where wind speeds measured 332-418 km/h and the damage was considered devastating.

Disaster #4: Wildfires

Wildfires can occur in most places in Canada where there are large, forested areas, dry conditions and lightning. They occur in all provinces but are at lower risk in Atlantic Canada where there are wetter conditions. The costliest forest fire was in Fort McMurray, Alberta in 2016. In 2021, wildfires in Ontario led to the evacuation of several First Nations communities. And, in 2023, record breaking wildfires in Quebec affected air quality across most of North America.

Disaster #5: Severe Storms

Severe thunderstorms occur mostly in spring and summer in Southern and Central Canada where warm, moist air collides with colder air masses. Severe storms also include hailstorms, ice storms and blizzards in winter among others. Southern Ontario, the Southern Prairies, Atlantic Canada, Quebec and British Columbia have experienced intense storms. The most destructive ice storm in Canadian history was in 1998 in Eastern Ontario and Southern Quebec where millions of people were without power, 1000 people were injured and many more were displaced.

Disaster #6: Tsunamis

Tsunamis are rare in Canada but have occurred on the Pacific Coast of British Columbia where undersea fault lines are found and cause underwater earthquakes. The Atlantic Coast of Newfoundland

and Nova Scotia could also experience tsunamis however, they are rare. Canada's deadliest tsunami was in Newfoundland where 28 people were killed and significant damage occurred. Nunavut, Northwest Territories and the Yukon are also at low risk due to landslides and glacial activity.

Disaster #7: Heatwaves

Heatwaves are more common in the southern parts of Canada. Ontario, Quebec and the Prairie Provinces are particularly prone to intense hot temperatures. Due to climate change, these weather events are becoming more common and longer lasting. The southern interior of British Columbia is also affected by heatwaves which is where in 2021, record breaking temperatures were measured and over 600 heat related deaths occurred. Wildlife suffered, agriculture crops were destroyed and wildfires sparked because of the intense heat.

Disaster #8: Avalanches

Avalanches occur in mountainous areas of Canada. Most commonly in the coastal mountains of British Columbia and Rocky Mountains of British Columbia and Alberta. Steep slopes, deep snow and changing temperatures increase the risk of avalanches. Remote areas of the Yukon have experienced avalanches as well as in Quebec, Newfoundland and Labrador. The 1910 Rogers Pass Avalanche was the worst in Canada's history where 58 railroad workers died.

Consolidation/Extension

To build onto this lesson, students can conduct research on how each of these disasters could potentially change/impact the natural landscape in the different regions?

Students could also look at the impact climate change has on rising temperatures, increase of floods, wildfires and severe storms and come up with different strategies on how Canadians can reduce the likelihood of these events from happening and how communities could be better prepared if they do occur.

Additional Resources

Governmental of Canada – Natural Hazards
https://www.canada.ca/en/services/policing/emergencies/hazards.html
The Canadian Disaster Database
https://www.publicsafety.gc.ca/cnt/rsrcs/cndn-dsstr-dtbs/index-en.aspx

Both sites above are available in French and English