Oak Ridges Moraine: Southern Ontario's Sponge

Lesson Overview

Students will examine the location and the importance of the Oak Ridges Moraine and investigate ongoing conflicts concerning its development.

Grade Level

7/8

Time Required

Approx. 80 minutes (one or two periods)

Curriculum Connection

Ontario Geography Grade 7

Themes of Geographic Inquiry - investigate current local, national, or global environmental issues and events to extend their understanding of these themes (in geography)

Natural Resources - demonstrate an understanding that people use renewable, non-renewable and flow resources in a variety of ways to meet their needs.

Link to Canadian National Geographic Standards:

Essential Element #5 (Grades 6 to 8) - Environment and Society
- Effects of human modification of the physical environment
- Limits and opportunities of the physical environment for human activities
- Watershed management

Essential Element #6 (Grades 6 to 8) - the Uses of Geography
- Role of multiple points of view on contemporary policies and issues

Geography Skill # 1 (Grades 6 to 8) - Asking Geographic Questions
- Identify geographic issues, define geographic problems and pose geographic questions.

Geography Skill # 2 (Grades 6 to 8) - Acquiring Geographic Information
- Use maps to collect and/or compile geographic information

The Canadian Atlas Resources

Pg. 26-27 - Mixedwood Plains map – see Oak Ridges Moraine on the map and in the text box.
Additional Resources, Materials and Equipment

- 2 desks, 2 empty pails, 1 container of water, 1 tablespoon, 1 paper towel, 4 one cm cubes, 1 tablespoon
- The Canadian Atlas
- Computer lab with internet access and printer
- Outline map of Southern Ontario where Oak Ridges Moraine could be located and indicated
- Oak Ridges Moraine website - [www.stormco.org](http://www.stormco.org)
- Oak Ridges Trail Association website - [www.interlog.com/~orta](http://www.interlog.com/~orta)
- *Outline map of Southern Ontario - Regional Municipal Boundaries*, Brock University Map Library, Software Edition, St. Catherine’s, ON 2004

Main Objective

The primary goal is to introduce students to the concept that the physical environment provides limits and opportunities for human activities.

Sometimes opinions about the use of the environment are in conflict.

Learning Outcomes

By the end of the lesson, students will be able to:

- Indicate the location and the extent of the Oak Ridges Moraine in Southern Ontario on an outline map
- Present and defend a point of view on how a resource should be used
- Use the following appropriate geography vocabulary:
  - watershed
  - surface runoff
  - groundwater
  - moraine
  - aquifer
  - kame
  - kettle lake
# The Lesson

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| - conduct demonstration on water flows /storage. (see demonstration sheet – Introduction) | - make predictions about the outcome  
- observe the demonstration  
- share predictions and reasoning |
| **Lesson Development** |                      |
| - describe the concepts of an aquifer, groundwater and surface run-off  
- divide the class into 2 groups and provide the worksheets  
- encourage volunteers to present their arguments.  
- acknowledge that both sides have merit.  
- discuss the concept of environmental conflicts and techniques for conflict resolution. | - follow instructions to complete worksheets – either A or B.  
- prepare their arguments to support their team  
- have volunteers present their arguments. |
| **Conclusion**       |                      |
| - refer to the Oak Ridges Moraine on page 27 of the Atlas of Canada.  
- read the text accompanying the map on the OMR. | - create a map showing the location and extent of the Oak Ridges Moraine. Use the accompanying map of southern Ontario.  
- develop a vocabulary list for the terms: Watershed  
Surface run-off  
Groundwater  
Moraine  
Aquifer  
Kame  
Kettle lake |
Lesson Extension
Follow up by having the students investigate “The Big Pipe” (a sewer pipe from York region to Lake Ontario) and what impact it could have on the Oak Ridges Moraine.

Assessment of Student Learning
• Students are attentive to the demonstration, make predictions and are able to explain their reasoning (Level 1-4)
• Students are focused on the task and contribute to the development of the argument for their groups (Level 1-4)
• Students complete meanings for the vocabulary words on the worksheet (Level 1-4)
• Students complete a map of Southern Ontario, accurately showing the location and extent of the Oak Ridges Moraine; map complies with geographic standards (includes title, compass rose, legend, scale) (Level 1-4)

Introduction - Demonstration Instructions
The teacher may wish to conduct the demonstration him/herself or allow selected students to introduce the lesson.

Equipment:
• Two desks
• Four 1 cm cubes (or equivalent)
• Two empty pails
• One container of water
• One sheet of paper towel, folded once corner to corner
• One tablespoon

Procedure:
1. At the front of the class, beside each other and about 30 cm apart, place two desks with the short edges toward the class.
2. Position 1 cm cubes (or some other convenient objects) under the back edge of each desk so the surface slants toward the class. Note - it is important that the desks have the same incline.
3. At the lower (front) edge of the desks, place pails to catch the water streams.
4. On the first desk about 1/3 of the way down from the high edge, tape the paper towel to the desk with the folded edge facing the top and the points toward the pail at the front. Label this desk #1.
5. On the other desk, leave a plain, smooth surface. Label this desk #2.
6. In their notebooks, have the students predict how many spoonfuls of water each desk will require before the water reaches the lower edge and drips into the pails.

7. Pour one tablespoon full of water at a time onto the top edges of the desks. Begin with #1 (the towel desk) and alternate until water finally has dripped into both pails.

**Observations:**

When the demonstration is complete, allow students to share the accuracy of their predictions and their reasoning.

Ask the students how the demonstration might reflect a real life geographic situation. What might the bare desk represent? What might the paper towel represent?

Make the distinction between surface runoff and groundwater. Explain that the under the ground water storage areas are known as aquifers and why groundwater and aquifers are so important.

Separate the class into two groups. Provide Worksheet A to one group and Worksheet B to the other.

Allow time for the students to read the Background and to develop their arguments.
Student Worksheet A

Name: __________________________________________

Background:
You are part of a group of citizens who desire to build new homes and businesses in a certain area in Southern Ontario because:
  • It is scenic with rolling hills, verdant forests, wildlife, wetlands, marshes and streams
  • It is close enough to travel to the Greater Toronto corridor easily
  • Real estate is more reasonably priced than in central Toronto.

Task:
As a member of this team of land developers, building contractors, business owners, and home-seekers, you must develop a strong argument to convince the local politicians to allow new residential and commercial development in the area.

Follow-up activity:
After the presentations, your teacher will provide you with the name of the area you have been discussing.
Using your favorite search engine, collect information about this unique area.
Include in your notes, a copy of a map that shows the location and the extent of the ________________________________, which has also been called a ‘geological sponge’ and the ‘rain barrel of Ontario’.
In your research, find the meaning and the significance of the following geographic terms:
  • Watershed
  • Surface runoff
  • Groundwater
  • Moraine
  • Aquifer
  • Kames
  • Kettle lakes
Student Worksheet B

Name: __________________________________________________

Background:
You are part of a group of citizens trying to prevent the building of new homes and businesses in a certain area in Southern Ontario because:
  • It is scenic with rolling hills, verdant forests, wildlife, wetlands, marshes and streams
  • It is considered to be the most important aquifer (underground water-storage location) in Southern Ontario, which feeds some 65 rivers and streams
  • In this area, there are several conservation areas, fishing streams, hiking trails and unique species of plants and animals

Task:
As a member of this team of environmentalists, naturalists, recreational groups, hydrologists, and geologists, you must develop a strong argument to convince the local politicians to prevent new residential and commercial development in the area.

Follow-up activity:
After the presentations, your teacher will provide you with the name of the area you have been discussing.
Using your favorite search engine, collect information about this unique area.
Include in your notes, a copy of a map that shows the location and the extent of the _________________________________________________________________, which has also been called a ‘geological sponge’ and the ‘rain barrel of Ontario’.
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