Theme Twelve: Land Use

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<th>Grade</th>
<th>Strand and Topic</th>
<th>Expectations</th>
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<td>7</td>
<td>Science: Earth and Space Systems The Earth’s Crust</td>
<td>• identify the factors that must be considered in making informed decisions about land use and explain their importance</td>
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<tr>
<td>7</td>
<td>Geography: Patterns in Physical Geography</td>
<td>• locate relevant information from primary sources (aerial photographs, satellite images)</td>
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<td>• demonstrate an understanding of how physical patterns affect human activity</td>
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Overview

The Geoscape “Land Use” theme consists of lessons that will enable students to investigate different scenarios and make informed recommendations.

At the end of these lessons, students will be able to:

- identify relationships between geological conditions and human activity
- identify risk factors and make informed decisions and recommendations

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<th>Suggested Lessons</th>
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<td><strong>Nice View, But...</strong> Worksheet presenting students with different scenarios for house sites and asking their advice.</td>
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**List of related web sites and resources**

- City of Ottawa web site: [http://www.ottawa.ca/index_en.html](http://www.ottawa.ca/index_en.html)

Funding for this project came from Natural Resources Canada and the government of Ontario
Changing Times: Changing Use

Early settlements in the Ottawa-Gatineau area were defined by:

- early transportation routes (rivers and canal)
- logging in 19th century
- development of farms in lowlands
- mining in the Gatineau Hills

As population increases, urban areas have expanded, taking over:

- natural forested areas
- agricultural land

Ottawa’s Greenbelt:

- needed to shape Ottawa’s growth and protect the environment
- 20,000 hectares of publicly owned lands
- consists of farms, forests, wetlands, recreational areas
- no urban development permitted

Decisions Can Be Hard!

Building a house close to a river or on a bluff overlooking a river in the Ottawa-Gatineau area may be hazardous due to possible landslides or flooding. Development is either prohibited or subject to rigorous testing prior to municipal approval in the following areas:

- Clay slopes (landslides)
- Organic soils (bogs, marshes)
- Floodplains
Students take notes: **Geology and Agriculture**

What makes land suitable for agriculture is the quality of the soil. Soil must not only be rich in nutrients but also must retain moisture well and have proper drainage.

<table>
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<th>Productive Soils</th>
<th>Silt and Clay</th>
<th>Nutrient-rich Drainage ditches may be required to improve drainage</th>
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<tr>
<td></td>
<td>Till</td>
<td>Nutrient-rich Retains moisture well</td>
</tr>
<tr>
<td>Poor Soils</td>
<td>Sand</td>
<td>Low in nutrients Does not hold moisture</td>
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* The **Larose Forest** is a public recreation forest, owned by the Ontario government. Farms, abandoned due to dry sandy soils, have been returned to pine forests.
ACROSS
1. land which is commonly wet
3. very fine grain size (< 1/256mm)
7. green space where building is prohibited or restricted
8. land in the countryside, rather than in the city
10. sediment deposited by a glacier

DOWN
2. low-lying, relatively flat geographic area, with very little change in elevation
4. the finer grain sizes in a mixture of varying grain sizes
5. the process of becoming a densely populated area or a city
6. fine grain size (1/256 to 1/16mm)
9. a steep cliff or bank
Key Word Game Solution

Land Use: Solution

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+-------+-------+-------+-------+-------+-------+
| W      | E      | T      | L      | A      | N      |
|        |        |        |        |        |        |
| O      |        |        |        |        |        |
| W      |        |        |        |        |        |
| C      | L      | A      | Y      | M      |        |
| U      | A      |        |        |        |        |
| G      | R      | E      | N      | B      | E      |
| T      |        |        |        |        |        |
| A      |        |        |        |        |        |
| N      | B      |        |        |        |        |
| T      | I      | L      |        |        |        |
| Z      | U      |        |        |        |        |
| E      | F      |        |        |        |        |
|        |        |        |        |        |        |
|        |        |        |        |        |        |
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Key Words: Wetland, Ow, Clay, Mass, Greenbelt, Rural, Talent
12.1 Lesson 1 What has geology to do with landuse!

Brief Description
Students examine maps and satellite image to investigate how geology influences landuse.

Suggested Materials

Duration 40 min

Instructions

1. Teacher reviews the major geological regions (Precambrian Shield, Paleozoic Lowlands, Quaternary sediments)

2. Teacher explains “Simple Geology Map”. It shows what is at the surface and students may have to interpret what is underneath. (e.g. The sand deposits shown on the map are a sand delta on the surface of the Champlain Sea sediments. It is likely that Leda clay underlies area of these areas of sand.) (Note: the eastern part of the geoscape is not covered by this map.)

3. Teacher reviews the satellite image, indicating the major rivers, urban areas, farmland, forested areas, bogs on the image.

4. Teacher distributes handouts and worksheets and reminds students to also check the various maps on the Geoscape poster or website.

5. Students use handouts to complete the worksheet.

Landsat TM (5/7) Shaded Relief Fusion (Landsat TM 7.)
Data collected by USGS/EROS Data Center and provided courtesy of Canada Centre for Remote Sensing.
Geological Map of the Ottawa-Gatineau Region

- Precambrian: marble, quartzite, granite, gneiss
- Paleozoic: limestone, sandstone, shale
- Quaternary: till, gravel, sand, silt, clay
Simple Geology Map of Ottawa-Gatineau

Source: Urban Geology of the National Capital Area, Online Maps
http://gsc.nrcan.gc.ca/urbgeo/natcap/geoserv_e.php
**Student Worksheet**

**What has geology to do with landuse?**

1. Using the satellite image for guidance, on the blank map, create a legend and shade the areas covered by:
   - Larose Forest (Several tracts of land)
   - Mer Bleue Bog
   - Alfred Bog
   - Farmland
   - Rugged, tree-covered land

2. Compare your shaded areas of farmland and rugged, tree-covered land with the map of geological regions. What is the relationship? Explain why.

3. Compare your map of Larose Forest with the simple geology map. What underlies the Larose Forest? What underlies the surrounding farmland?

4. Compare your map of bogs with the simple geology map. What underlies the bogs? Why did a wetland develop there?

5. On your map, place the appropriate letter label on a site where you would likely find the following problems:
   - A. landslide
   - B. hazards
   - C. flood
   - D. poor drainage
   - E. dry soil
   - F. rocky soil

6. On the map, place the appropriate label on the site where you would like to have a cottage. Explain your choice.
12.2 Lesson 2 Nice View, But...

Brief Description
Worksheet presenting students with different scenarios for house sites and asking their advice.

Suggested Materials
Student worksheets

Duration 20 min

Lesson Instructions

1. Students complete handout
**Student Worksheet  **  

**Nice View, But...**

In this activity, you will play the role of a geologist or a geotechnical engineer in the Ottawa-Gatineau area. Below are various situations on which you will give advice. From what you know about geology and land use, write a recommendation for each.

**Situation A**
Mr. And Mrs. Lucky have just won $1,000,000 and want to build their dream house. They have chosen a location on a hill overlooking the Gatineau River. Below are a top view and a side view of their home. What do you suggest and why?

![Diagram of property and Gatineau River](image1)

**Situation B**
Mr. Hopeful is putting an offer on a beautiful house in Rockland. The house is on a slope and provides a beautiful view of the countryside. He has only visited the property on dry hot summer days. How would you advise him?

![Diagram of property and River](image2)
Situation C
Mrs. Sunny would like to build a cottage near the Ottawa River. She would like her property to have a waterfront. What suggestions would you make?