Land Cover Lesson Plan – Lesson Description

Lesson Overview

This lesson introduces teachers and students to the resources available from the Atlas of Canada. Students will be able to analyse satellite imagery from the Atlas' printed Land Cover Poster-map and from a related interactive map on the Atlas of Canada Web site. Next, students will use the Atlas' interactive map of Terrestrial Ecozones Map to collect additional information about the Land Cover regions. At the end of the lesson students will be required to account for differences in land cover for two different locations in Canada using all the information they have researched. Discussion questions and evaluation ideas are also provided.

Grade Level

This lesson fits very well with Geography and Social Studies curriculum for Grades 9 to 12 in many provinces and territories. It could also be modified to suit students from Grades 7 to 8.

Time Required

- Two class periods of approximately 45 minutes each are recommended to complete the exercise**.**
- Parts 1 and 2 could be completed in the first session, Part 3 in the second session. Part 3 requires student access to the Internet.
- Part 4 is not accounted for in this timeline.

Materials Required

- Access to the Internet (Part 1 – teachers only, Part 3 – student access required)
- Land Cover Poster-map – Canada's Land Cover (Part 2)

Main Objective

Students will use the online Atlas of Canada and promotional poster-map to successfully interpret maps that use satellite imagery and other thematic information. They will identify the dominant types of land cover in Canada and will compare two different classifications using information from the interactive Terrestrial Ecozone Map.

Lesson Sequence

Part 1: Teacher and Student Resources

This section highlights the learning resources available to teachers from the Atlas of Canada Web site to find and prepare an introductory session for students about the Land Cover Poster-map and the data used to produce it. A sample note and worksheet is included.

Part 2: Canada's Land Cover Using the Atlas of Canada Poster-Map

Using the Land Cover Poster-map, students work in groups to identify the types of land cover for specific locations across the country. First, they will use a standard atlas to identify the province/territory for each location on the map. They will record this information in an organizer.

Part 3: Land Cover and Terrestrial Ecozones Maps Using the Online Atlas of Canada

Students will use interactive maps in the online Atlas of Canada to verify the land cover classification for each location in their organizer. They will also use the Terrestrial Ecozones Map to identify the ecozone, physiography, climate and soil for each location. This information will be added to their organizer. Finally, students will choose two different types of land cover from their organizer and explain the differences using information collected throughout the exercise.

Part 4: Extension & Evaluation Ideas

Included in this section are discussion questions to conclude the exercise and ideas for evaluating student work.

Part 1: Teacher and Student Resources

Introduction

The Atlas of Canada Web site has many learning resources available to teachers and students. For this lesson, we recommend using some of the background information available online as an introduction to students before they begin working with the poster-map or online maps.

Steps

- Go to the Atlas of Canada Web site at: **atlas.gc.ca**
- Select **Environment** from the left hand side of the page, under the title **Explore Our Maps**
- Choose **Land** from the pop-out menu that appears
  (In this section of the Web site, you can access the **Land Cover Map** and detailed information about it.)

Information Available to Introduce the Land Cover Poster-map From the Land Section Above

- Find a definition for land and other information about how the land is used by different groups of people
  (Select **Read more about Land** to find this list.)
- View the online **Land Cover Map**
  (Click the map title to go to the map.)
- Access detailed information about the **Land Cover Map**
  (Select **Read about this map** beside the map title to find this information. This information can also be accessed by clicking the same links on and around the map.)

Part 2: Canada's Land Cover Using the Atlas of Canada Poster-Map

Introduction

Using the **Land Cover Poster-map**, students work in groups to identify the types of land cover for specific locations across the country. First, they will use a standard atlas to identify the province/territory for each location on the map. They will record this information in a **Land cover Organizer**.

Materials

- The **Land Cover Poster-map**
- Teacher Note and Overhead – Introduction to Land Cover
- Student Worksheet – Introduction to Land Cover
- Copies of the organizers: Groups A to D

Steps

- One strategy might be to brainstorm the definition and how we use the land with students first and then reveal the answers from the Web site using an overhead note.
- The teacher could also distribute a handout for students to review or pre-read before the exercise begins.
- If computer access is readily available, you may want students to use the Web site to find this information themselves.
- Introduce students to the concept of land cover using resources from Part 1.
- Divide the class into groups. Each group will be responsible for **identifying** the **province or territory** and type of **land cover** for specific places across Canada. For the purposes of this lesson, we have divided the places on the map into 4 groups, with 8 places in each group.
- Students use the **Land Cover Poster-map** to begin completing the organizer (see sample organizers below). They will use the poster map and a paper atlas to complete the first two columns of information.

Part 3: Land Cover and Terrestrial Ecozones
Using the Online Atlas of Canada

Introduction

- Students use the interactive **Land Cover Map** in the Atlas of Canada Web site to verify the types of land cover and note the characteristics for each location in their organizer.
- They will also use the interactive **Terrestrial Ecozones Map** to identify the ecozone, physiography, climate and soil for each location. This information will be added to their organizer.
- Finally, students will choose **two** different types of land cover from their organizer and explain the differences using information collected throughout the exercise.

Materials

- Student access to the Atlas of Canada Web site
- Land Cover Organizers

Steps for Using the Interactive Land Cover Map

- Go to **atlas.gc.ca**
- Select **Environment** from the left hand column under the title **Explore Our Maps**.
- Choose **Land** from the pop-out menu that appears.
- Choose **Land Cover Map** under the title **Land Maps**.
- Use the **Zoom In** tool to find each location listed in your organizer. Verify that you have chosen the best type of land cover from the poster-map by zooming in until the location you want to see is very clear (To do this, select the **Zoom In** tool, then select the location on the map that you want to see and click on it.) The cities are not identified on the interactive map so you will have to compare the poster-map carefully with the interactive map
- Use the legend, to the right of the map to identify the exact type of land cover for each location.
- Remember, this map has 31 different types of land cover. The poster only has 9.

Steps for Using the Interactive Terrestrial Ecozones Map

- Select **Environment** in the left hand menu under the title **Explore Our Maps**.
- Choose **Ecology** from the pop-out menu that appears.
- Choose **Ecological Framework** under the **List of Topics**.
- Select the **Terrestrial Ecozones Map** under the title **Ecological Framework**.
- Identify and record the ecozone for each place in your organizer.

Now you need to find information about the physiography, climate and soil for each location based on the ecozone. To do this:

- Select the **Get Info from Map** tool above the map, and then choose the ecozone in which each place is located. (For example, Vancouver is located in the Pacific Maritime ecozone. Choose **Get Info from Map**, then select the Pacific Maritime ecozone on the map.)
- A table of information will open. Record the information about physiography, climate and soil for this ecozone. Think about how that affects land cover.
- Repeat these steps for each place in your organizer.

Part 4: Extension & Evaluation Ideas

Introduction
Collect and evaluate the organizer and comparison for completeness and accuracy.

Discussion Questions
- What other factors influence the types of land cover found within different regions of Canada?
- What are the advantages and disadvantages of using an online atlas versus a paper atlas?

Essay Question
Why is Canada's land cover important to monitor and map?

Project Extension
Students choose one type of land cover and investigate the physical and human factors that affect this classification. They will present their findings in a poster presentation.

Teacher Note/Overhead – Introduction to Land Cover

Definition of Land

The land represents the solid, exposed parts of the globe and combines with water bodies and air masses to form the Earth.

How do we use the land?

Landscape diversity is a product of the land's many aspects. Like a puzzle, a landscape is a mosaic of countless features that mean something different to everyone:

- A geologist may be interested in how glacial and fluvioglacial materials were deposited in a certain area.
- An agrologist will look at the same area and interpret its features in terms of the processes that formed a given type of soil (such as chernozem or podsol).
- A tourist will notice the area's overall relief.
- A politician will view the particular land as a nation or an administrative region.
- Demographers and sociologists will study it as the backdrop of life, of populated places, or a setting for rural activities.
- The forester and the farmer will view it as a medium in which plant life grows.

Canadians use, measure, manage and develop land. It is where we move, live and build.

Classifying Types of Land Cover Using Satellite Imagery

- There are 9 different types of land cover shown on the Atlas of Canada Poster-map.
- The online map uses 31 classifications and is much more specific.
- Each type of land cover can be identified by its unique spectral signature. A spectral signature refers to the distinct appearance of each land cover class as seen by the satellite. This means that each type of land cover reflects a specific wavelength of light and this unique signature is identified by a specific colour on the map. A general colour guide to identify land cover classes is shown below.

Colour Guide:

- Green and dark brown colours generally represent coniferous forests.
- Medium brownish colours portray transition treed shrubland.
- Yellow/orange to reddish colours stand for broadleaf forests.
- Pink and red colours represent mixed forests.
- Light greenish yellow to beige represents cropland.
- Bluish and grey colours in the north stand for tundra.
- Purple in the south represents grassland.
- White stands for snow and ice.
- Bright green in the North and mid latitudes represents wetland and shrubland

Student Worksheet – Introduction to Land Cover

Definition of Land

_____

_____

How do we use the land?

Landscape diversity is a product of the land's many aspects. Like a puzzle, a landscape is a mosaic of countless features that mean something different to everyone. Canadians use, measure, manage and develop land. It is where we move, live and build.

How would each of the following people use the land?

- A geologist: _____
- An agrologist: _____
- A tourist: _____
- A politician: _____
- Demographers and sociologists: _____
- Foresters and Farmers: _____

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What types of land cover are associated with the colours below?

- Green and dark brown: _____
- Pink and red: _____
- Light greenish yellow to beige: _____
- Medium brown: _____
- Bluish and grey: _____
- Purple: _____
- Yellow/orange to reddish: _____
- White: _____
- Bright green: _____

Land Cover Organizer – Group A

Place	Province/Territory	Type of Land Cover	Ecozone	Physiography	Climate	Soil
Vancouver						
Cambridge Bay						
Kuujuaq						
Halifax						
Edmonton						
Winnipeg						
Montréal						

The Atlas of Canada / L'Atlas du Canada

Land Cover Organizer – Group B

Place	Province/Territory	Type of Land Cover	Ecozone	Physiography	Climate	Soil
Yellowknife						
Québec						
Churchill						
Happy Valley-Goose Bay						
Charlottetown						
Calgary						
Vancouver						

The Atlas of Canada / L'Atlas du Canada

Land Cover Organizer – Group C

Place	Province/Territory	Type of Land Cover	Ecozone	Physiography	Climate	Soil
Fredericton						
Thunder Bay						
Whitehorse						
Québec						
Saskatoon						
Victoria						
Rankin Inlet						

Land Cover Organizer – Group D

Place	Province/Territory	Type of Land Cover	Ecozone	Physiography	Climate	Soil
Iqaluit						
Inuvik						
Prince George						
Toronto						
Regina						
Ottawa						
St. John's						