

Adult Basic Education  
**Science**

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# Science 2100C

## A Global View of Ecosystem Sustainability and Weather

# Study Guide

**Prerequisites:** Science 2100A and Science 2100B

**Credit Value:** 1

**Text:** *Nelson Science 10: Concepts and Connections*; Nelson Thomson Learning; 2002.

**Science Courses [General College Profile]**

Science 2100A

Science 2100B

**Science 2100C**

Science 3101

Science 3102

Science 3103

Science 3104

Science 3105

Science 3106



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## To the Student

### I. Introduction to Science 2100C

This course is intended to help expand upon the knowledge that you gained through completing the first two science courses in the General College Profile and to apply that knowledge to some of today's major global environmental issues.

The course is divided into two units. The first unit, “*Sustaining Ecosystems*”, introduces the terrestrial biomes in Canada. It examines the concept of sustainable development and how it applies to ecosystems. Using acid precipitation as an example, you will examine the extent of a major ecological problem, its causes, and possible solutions.

The second unit, “*A Global Weather Model*”, discusses two of the factors that are responsible for weather and climate on a global scale: winds and ocean currents. You are then given the opportunity to describe and explain the formation of some extreme weather events. You finish the unit by investigating the causes and impacts of climate change.

**Science 2100A and Science 2100B are prerequisites to this course.**

The textbook for this course is *Nelson Science 10: Concepts and Connections*; Nelson Thomson Learning; 2002.

**\*Note:** You cannot receive credit for this course if you already have credit for Biology 1101 and/or Earth Systems 1109.

## To the Student

### II. Use of Science Study Guides

Before beginning this course, ensure you have the text and any other resources needed (*see the information in the Introduction to this course for specifics*).

As you work through the Study Guide, you will see that it is divided according to the Units listed in the Table of Contents. When you open a unit it will have the following components:

#### **Reading for this Unit:**

Here you will find the chapters, sections and pages of the text you will use to cover the material for this unit. Skim the sections of the textbook, look at the titles of the sections, scan the figures and read any material in the margins. Once you have this overview of the unit, you are ready to begin. Do not be intimidated by the content. You will work through the text, section by section, gaining knowledge and understanding of the material as you go.

References and Notes	Work to Submit
<p>This left hand column guides you through the material to read from the text. Read any highlighted notes that follow the reading instructions. The symbols   direct you to the questions that you should complete when finished a reading assignment..</p>	<p>You come across three (3) headings in this right hand column.</p> <p><b>Writing:</b> This section comprises your notes for the unit. Here you will find either written questions or references to specific questions or problems from your text. You may want to write out each question followed by the answer. This material should be checked by your instructor before moving on to the next unit. Mathematical problems should have their solutions checked <u>as you go</u>.</p> <p><b>Laboratory:</b> This section indicates if there is a Core Lab that should be completed for the unit. Let the instructor know in advance that you will be ready for the lab. A lab report should be submitted for each Core Lab. Your instructor will provide guidelines as to how s/he wants the report written.</p> <p><b>Assignment:</b> This section indicates if there is an assignment that should be completed for the Unit. The information in the “References and Notes” column will indicate how you obtain the assignment. These assignments frequently relate the science content to technology, society and the environment.</p>

### **III. Recommended Evaluation**

Written Notes	10%
Labs/Assignments	20%
Test(s)	20%
Final Exam ( <i>entire course</i> )	<u>50%</u>
	100%

**The overall pass mark for the course is 50%.**



## Unit 1 - Sustaining Ecosystems

To fulfill the objectives of this unit, students should complete the following:

**Reading for this unit:** Section 1.3, page 15;  
Sections 1.13 - 1.19, pages 42 - 55.

References and Notes	Work to Submit
<p><i>Read page 15 and refer to the glossary to answer question 1</i> </p>	<p><b>Writing:</b></p> <p>1.1 Define biogeography.</p>
<p><i>Read pages 42 - 44 and look carefully at Figures 1 to 5 before you answer questions 1.2 - 1.6</i> </p>	<p>1.2 Define biome.</p>
<p><b>Note:</b> Remember from Science 2100A that <b>ecosystem</b> is a term used to describe the relationships among the many species living in an area and their relationships with the non-living components of the environment.</p>	<p>1.3 What are some factors that encourage some species and discourage others in an ecosystem?</p> <p>1.4 Name the four main land biomes in Canada.</p> <p>1.5 For each of the four main land biomes in Canada, name the abiotic factors and some of the representative plant and animal species. (Note that the plant and animal species are listed as <i>Communities</i> in the text.)</p>
<p><i>Read pages 50 - 51 before you answer questions 1.7 - 1.9</i> </p>	<p>1.6 a) Which biome would include the island of Newfoundland and most of Labrador? b) Which biome would include the northern part of Labrador?</p>
	<p>1.7 Explain why forests are important?</p> <p>1.8 Explain what is meant by clear cutting and selective cutting.</p>

## Unit 1 - Sustaining Ecosystems

References and Notes	Work to Submit
<p><i>See your instructor to get a copy of Assignment 1, the required assignment for this unit</i>  </p> <p><b>Note:</b> The mark you get for the assignment will be used to help determine your final mark for the course.</p> <p><i>Read pages 52 - 53 before you answer questions 1.10 - 1.13</i> </p> <p><b>Note:</b> pH is the measure of how acidic (<math>pH &lt; 7</math>) or basic (<math>pH &gt; 7</math>) a substance is. Substances that have a <math>pH = 7</math> are neutral. It is important to understand that small changes in pH value indicate very large changes in level of acidity. Each decrease of 1.0 on the pH scale means a ten-fold increase in the amount of acid present. For example, a solution with <math>pH = 3</math> is 10 times more acidic than one that has <math>pH = 4</math> and 100 times more acidic than one that is <math>pH = 5</math>.</p>	<p>1.9 Describe the potential ecological impact that a large scale clear-cut logging project could have in an area.</p> <p><b>Assignment:</b> Complete Assignment 1 as outlined by your instructor and pass it in for marking.</p> <p><b>Writing:</b></p> <p>1.10 Define acid precipitation.</p> <p>1.11 Explain how the technologies that produce acid rain can be seen as a “double edged sword”.</p> <p>1.12 Describe the effects of acid precipitation on each of the following:</p> <ul style="list-style-type: none"><li>i) man-made materials</li><li>ii) humans</li><li>iii) ecosystems</li></ul> <p>1.13 What is the greatest threat to the environment from acid rain? Why is this problem getting worse?</p>

## Unit 1 - Sustaining Ecosystems

References and Notes	Work to Submit
<p><i>See your instructor to get a copy of the Report that is required for the Investigation, “<b>The Effects of Acid Precipitation</b>”. Refer to pages 54 - 55 of the text to carry out the investigation  </i></p> <p><b>Note:</b> This is the end of Unit 1. You should check with your instructor to see if there is review work or any other additional work for this unit.</p>	<p><b>Laboratory:</b></p> <p>Complete Investigation 1.19 as outlined. Complete the Report and submit it to your instructor.</p>

## Unit 2 - A Global Weather Model

To fulfill the objectives of this unit, students should complete the following:

### Reading for this unit:

Sections 4.14 - 4.20, pages 230 - 243.

References and Notes	Work to Submit
<p><i>Read pages 230 - 231 before you answer questions 2.1 - 2.4 ▶▶</i></p> <p><b>Note:</b> You should examine Figure 3 on page 231 carefully to see where the jet stream and the prevailing winds move.</p> <p><i>Make sure that you can locate as closely as possible where St. John's, NL and London, England are on the globe.</i></p>	<p><b>Writing:</b></p> <p>2.1 What is the jet stream? In which direction does the jet stream move?</p> <p>2.2 a) Define prevailing winds. b) What are the two prevailing winds between North America and Europe? In which direction does each move?</p> <p>2.3 What causes jet stream winds? How fast do jet stream winds move?</p> <p>2.4 What are the two factors that cause prevailing winds to blow in a particular direction?</p>
<p><i>Read pages 232 - 233 before you answer questions 2.5 - 2.9 ▶▶</i></p> <p><b>Note:</b> Take a close look at Figure 1 on page 232. Make sure you locate Newfoundland and Labrador and the currents that affect this province.</p>	<p>2.5 If you were a pilot flying from St. John's, NL to London, England, what could you do to shorten the flight time as much as possible? Why?</p> <p>2.6 Define ocean currents.</p> <p>2.7 What are the three main factors that are responsible for causing ocean currents?</p> <p>2.8 What are the two main currents that affect weather and climate in this province?</p>

## Unit 2 - A Global Weather Model

References and Notes	Work to Submit
<p><b>Note:</b> Make sure you understand that there is no single event that creates weather and climate. Instead, weather and climate are influenced by many factors which are summarized in Section 4.16 of the text. Read through this section paying particular attention to (d) <b>Jet Streams</b>, (e) <b>Prevailing Winds</b>, and (f) <b>Ocean Currents</b>.</p>	<p>2.9 Why is the average winter temperature in St. John's 12°C warmer than the average winter temperature in Ottawa, even though Ottawa is further south?</p> <p><b>Writing:</b></p> <p>2.10 Why do the Burin and Avalon Peninsulas get a lot of rain and fog?</p>
<p>Read page 236 before you answer question 2.11 <input type="checkbox"/> <input checked="" type="checkbox"/></p> <p><b>Note:</b> If you have internet access, visit the Environment Canada weather office website at: <a href="http://weatheroffice.ec.gc.ca/canada_e.html">http://weatheroffice.ec.gc.ca/canada_e.html</a> and check for watches, advisories or warnings today.</p>	<p>2.11 Explain the difference between weather watch, weather advisory and weather warning.</p> <p>2.12 Describe the main features of the following extreme weather events and explain how to protect yourself during each:</p> <ul style="list-style-type: none"><li>(i) thunderstorms</li><li>(ii) tornadoes</li><li>(iii) hurricanes</li><li>(iv) blizzards</li><li>(v) floods</li></ul>

## Unit 2 - A Global Weather Model

References and Notes	Work to Submit
<p><i>See your instructor to get a copy of Assignment 2, the assignment that is required for this unit  </i></p> <p><b>Note:</b> <i>The mark you get on the assignment will be used to help determine your final mark for the course.</i></p> <p><b>Note:</b> <i>This is the end of Unit 2. You should check with your instructor to see if there is review work or any other additional work for this unit.</i></p>	<p><b>Assignment:</b></p> <p>Complete Assignment 2 as outlined by your instructor and pass it in for marking.</p>