

Adult Basic Education
Science

Science 2100B

Weather

Study Guide

Prerequisites: None

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

Table of Contents

To the Student	iv
Introduction to Science 2100A	iv
Use of Science Study Guides	v
Recommended Evaluation	vi
Unit 1 - Local Weather	Page 1
Unit 2 - Global Weather	Page 5

To the Student

I. Introduction to Science 2100A

Since weather affects everyone, knowing about weather and weather patterns helps us make many decisions in our lives, from what to wear to when and where to take our vacations. This course will help you understand the factors that create weather systems. It will also help you understand patterns in local and global weather conditions and how to forecast local weather patterns.

The course is divided into two units. The first unit, *Local Weather*, gives you the opportunity to examine some weather lore. It looks at some of the instruments used in forecasting and what factors they measure. You will examine how weather systems develop in North America and learn how to read weather maps.

The second unit, *Global Weather*, helps you understand that weather patterns are different in different parts of the world. You will examine the atmosphere and hydrosphere and look at factors that affect weather such as the angle of the earth to the sun and the rotation of the Earth. You will be introduced to some of the technology used by meteorologists to forecast weather globally.

This is a 1 credit course and, along with Science 2100A, is a **pre-requisite for Science 2100C**.

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 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

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..

Work to Submit

You come across three (3) headings in this right hand column.

Writing: 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 as you go.

Laboratory: 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.

Assignment: 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.

To the Student

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 - Local Weather

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

Reading for this unit:

Getting Started, pages 198 - 199,
Sections 4.1 - 4.5, pages 200 - 211.

References and Notes

Read through pages 198 - 201 in the text before you begin the written work for this unit.

See your instructor for a copy of Activity I, “Forecast Sayings”. Follow the instructions and discuss your answers with the instructor when you have completed the activity.

See your instructor for a copy of Activity II, “Interpreting Weather Maps”. Follow the instructions and discuss your answers with the instructor when you have completed the activity.

Note: You may need to refer to pages 270 - 272 in your text to help you with the “Interpreting Weather Maps” activity.

Work to Submit



Writing:

- 1.1 Complete Activity I, “Forecast Sayings”.



- 1.2 Complete Activity II, “Interpreting Weather Maps”.

Unit 1 - Local Weather

References and Notes

Read pages 202 - 205 before you answer questions 1.3 - 1.5  

Note: A *rain gauge* is not mentioned in section 4.2. It is a tool which collects and measures the amount of rainfall.

Read pages 206 - 207 before you answer questions 1.6 - 1.10  



Work to Submit

Writing:

- 1.3 Explain the function of the following weather instruments used in a weather station:
- a) thermometer
 - b) hygrometer
 - c) barometer
 - d) wind vane
 - e) anemometer
 - f) rain gauge
- 1.4 Define each of the following terms:
- a) warm front
 - b) cold front
 - c) relative humidity
- 1.5 Complete questions 2, 3 and 4 in “*Understanding Concepts*” on page 205.
- 1.6 Define weather system.
- 1.7 Define air mass.
- 1.8
- a) Name the four types of air masses.
 - b) Describe each air mass as being warm or cool and moist or dry.
 - c) Describe the weather brought by each air mass.
- 1.9 Define front.
- 1.10 Describe how each of the following fronts form and give the type of weather associated with each:
- i) cold front
 - ii) warm front
 - iii) occluded front
 - iv) stationary front



Unit 1 - Local Weather

References and Notes

Read carefully through the **Case Study** on pages 208 - 209 and then complete 1.11  

Note: You should refer to section G3, “Interpreting and Creating Weather Maps”, in the Skills handbook on pages 270 - 272 of the text to help you with the Case Study.

Note: The work you do for the Case Study should be passed in to your instructor for marking.

Read pages 2.10 - 2.11 before you answer questions 1.12 - 1.17  

Note: See your instructor for a demonstration of **convection currents** before you start question 1.12.

Note: **Ocean-effect snow** is more common than **lake-effect snow** in this province. Both are formed in the same way.

Work to Submit

Writing:

- 1.11 Complete Case Study 4.4, “*Three Days of Canadian Weather*”, answering questions (a) to (j) as you go. (Make sure you get a copy of the map of Canada from your instructor for (j).)

- 1.12 Explain how winds are caused by convection.

- 1.13 Define thermal.

- 1.14 Define sea breeze and explain how it forms.

- 1.15 Define land breeze and explain how it forms.

- 1.16 Describe the formation of lake-effect (ocean-effect) snow.

Unit 1 - Local Weather

References and Notes

Ask your instructor for a copy of the assignment, “**Newfoundland and Labrador Climate**”. Read carefully through the assignment, then complete 1.17



Note: 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.

Work to Submit

Assignment:

- 1.17 Answer questions 1 - 6 in the Analysis section of the assignment.


Unit 2 - Global Weather

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

Reading for this unit:

Sections 4.6 - 4.10, pages 212 - 221.

References and Notes

Read pages 212 - 213 and study Figure 1 before you answer questions 2.1 - 2.3 

Work to Submit

Writing:

- 2.1 Define hydrosphere.
- 2.2
 - a) Give a definition for the water cycle.
 - b) Explain how the water cycle works (Include an explanation of evaporation, condensation, and precipitation in your explanation).
- 2.3 Describe each of the following forms of precipitation and explain how each forms:
 - i) drizzle
 - ii) rain
 - iii) freezing rain
 - iv) snow
 - v) hail
 - vi) dew
 - vii) frost

Unit 2 - Global Weather

References and Notes

Read pages 214 - 215 before you answer questions 2.4 - 2.6 ▶▶

Read pages 218 - 219 before you answer questions 2.7 - 2.12 ▶▶

Work to Submit

- 2.4 Explain what is meant by relative humidity.
- 2.5
- Define dew point.
 - What is the relative humidity when dew point is reached?
- 2.6 Explain each of the following:
- Why perspiration sometimes tends to stick to you.
 - Why many people say their skin feels dry in the winter.

Writing:

- 2.7
- What do meteorologists study?
 - How do meteorologists carry out their work?
- 2.8 Give several reasons why weather forecasting accuracy has improved in recent years.
- 2.9
- What are weather satellites?
 - Briefly describe how weather satellites function to collect weather data.
- 2.10 What are weather balloons and what do they do?
- 2.11
- What is radar used for in weather forecasting?
 - How does radar work?

Unit 2 - Global Weather



References and Notes	Work to Submit
<p>Read pages 220 - 221 before you answer questions 2.13 - 2.16 ▶▶</p> <p><i>Read pages 222 - 225 before you answer questions 2.17 - 2.18</i> ▶▶</p> <p><i>Read pages 226 - 227 before you answer questions 2.19 - 2.20</i> ▶▶</p>	<p>2.12 Describe the role weather satellites, weather balloons and radar play in improving long term weather forecasts.</p> <p>2.13 Explain the difference between weather and climate.</p> <p>2.14 Define each of the following terms: i) latitude ii) wind iii) elevation</p> <p>2.15 Answer questions (a), (b) and (c) on page 220 and (d), (e) and (f) on page 221.</p> <p>2.16 Answer question #1 in “<i>Understanding Concepts</i>” on page 221.</p> <p>2.17 Define atmosphere and air pressure.</p> <p>2.18 a) What type of weather could you expect when the air pressure is high? b) What type of weather could you expect when the air pressure is low?</p>
	<p>Writing:</p> <p>2.19 What are the 2 factors that cause the seasons on Earth?</p>



Unit 2 - Global Weather

References and Notes

Note: Remember that the Earth **rotates** (spins on its axis) every **24 hours** and it **revolves** (moves around the sun) every **365 days**.

Note: The Earth is divided into 2 halves. The line that divides it is the equator. The 'top' half is the Northern Hemisphere and the 'bottom' half is the Southern Hemisphere. Which hemisphere are you in?

See your instructor to get a copy of the Report that is required for the Investigation, "**Earth's Tilt and the Seasons**". Refer to pages 226 - 227 of the text to carry out the investigation  

Read pages 228 - 229 before you answer questions 2.21 - 2.23  

Note: 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

Work to Submit

- 2.20
- a) Explain why summer starts in the Northern Hemisphere on June 21.
 - b) Explain why winter starts in the Northern Hemisphere on December 21.
 - c) On what date does spring start in the Northern Hemisphere?
 - d) On what date does fall start in the Northern Hemisphere?

Laboratory:

Complete Investigation 4.12 as outlined. Complete the report and submit it to your instructor.

Writing:

- 2.21 Starting with water at ground level, describe how most clouds form.
- 2.22 Name and describe the two general shapes of clouds.
- 2.23
- a) What is fog?
 - b) Explain how fog can form.