

Adult Basic Education
Level II Science

**Science 2015
Earth Science**

Study Guide

Suggested Resources: *Discovering Science 7*

Level II Science Courses

Science 2011 Life Science

Science 2012 Physical Science

Science 2013 Chemical Science

Science 2014 Electricity

Science 2015 Earth Science



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To the Student

Introduction to Science 2015

This course is intended to help you acquire the basic knowledge of Earth Science that will prepare you for study in one of the Level III profiles (Degree and Technical, Business-Related College and General College).

You may/may not have to complete all ABE Level II Science courses. You are only required to complete sufficient Level II Science courses to ensure success in one of the Level III graduation profiles. For example, if you intend to complete the Degree-Technical Profile (Academic) in Level III, you may need to complete more Level II Science courses than if you intend to complete the General College Profile (General) in Level III.

Science 2015 Earth Science is divided into two units. The outcomes for this course are given below. By completing the **Required Work** in this Study Guide, you will fulfill the outcomes for this course.

The first unit, *The Earth's Crust*, will cover the following course outcomes:

- 1.01 Define the term “mineral” using examples.
- 1.02 Define the term “rock”.
- 1.03 Define “igneous rock” and describe their formation.
- 1.04 Differentiate between magma and lava.
- 1.05 Differentiate between intrusive and extrusive igneous rocks using examples.
- 1.06 Define the term “sedimentary rock” using examples.
- 1.07 Describe the formation of metamorphic rocks.
- 1.08 Sketch and label a diagram of the rock cycle.
- 1.09 Recognize the relationship between various types of rocks (igneous, sedimentary, and metamorphic).
- 1.10 Describe the characteristics of the Earth’s crust and some of the technologies which have allowed scientists to study geological features in and on the Earth’s crust.
- 1.11 Sketch and label a model of the Earth’s layered interior. Include: inner core, outer core, mantle, and crust.
- 1.12 Describe the Theory of Plate Tectonics.
- 1.13 Describe the Continental Drift Theory.

The second unit, *Geological Formations and Processes*, will cover the following course outcomes:

- 2.01 Define the term “earthquakes”.
- 2.02 Explain why earthquakes occur using the concept of plate tectonics.
- 2.03 Define the term “volcano”.
- 2.04 Explain where volcanoes form.
- 2.05 Explain the process of mountain formation.
- 2.06 Describe the geological time scale in terms of the four main eras. Include: Precambrian, Paleozoic, Mesozoic, and Cenozoic.
- 2.07 Differentiate between weathering and erosion.
- 2.08 List the basic types of soil. Include: clay, sand, and gravel.
- 2.09 Identify positive and negative effects of enriching soil.

To the Student

Use of Science Study Guides

Before beginning this course, ensure you have the text(s) and any other resources needed.

Your Study Guide is organized as follows:

Required Work	Suggested Resources/Notes
<p>The left-hand column guides you through the material you must complete in order to successfully complete the course. You will see three headings in this left-hand column:</p> <p>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.</p> <p>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.</p> <p>Assignment: This section indicates if there is an assignment that should be completed for the Unit. The information in the “Suggested Resources/Notes” column will indicate any additional information you need to complete the assignment. These assignments frequently relate the science content to a practical application.</p>	<p>This right-hand column provides you with information on the resources needed for the course. It also draws your attention to assignments and core labs that will be evaluated as part of your final course mark. Other notes may be included here such as helpful suggestions, safety precautions, etc.</p>

To the Student

Recommended Evaluation

Written Notes	20%
Labs/Assignments/Test(s)	30%
Final Exam (entire course)	<u>50%</u>
	100%

The overall pass mark for the course is 50%.

Note: The evaluation scheme recommended above is presented as a suggestion. Institutions may choose an alternate evaluation scheme in order to meet the individual needs of adult learners.

Unit 1: The Earth's Crust

Required Work	Suggested Resources/Notes
<p>Writing:</p> <p>1. Read pages 316-321 in <i>Discovering Science 7</i>, and then complete the following items:</p> <ul style="list-style-type: none">a) Define the term “mineral”. Give two examples of minerals.b) What is the scale used for measuring the hardness of a mineral?c) What are three types of luster? Give an example of a mineral for each type of luster. <p>2. Read pages 327-329 in <i>Discovering Science 7</i>, and then complete the following items:</p> <ul style="list-style-type: none">a) Define the term “rock”. What are the three families of rocks?b) How are igneous rocks formed?c) Where is intrusive rock formed?d) Where is extrusive rock formed?e) What is the difference between magma and lava?	<p>The Glossary on pages 481-490 may be helpful in defining terms.</p> <p>The Glossary on pages 481-490 may be helpful in defining terms.</p>

Unit 1: The Earth's Crust

Required Work	Suggested Resources/Notes
<p>3. Read pages 330-331 in <i>Discovering Science 7</i>, and then complete the following items:</p> <ul style="list-style-type: none">a) What is sediment?b) Define the term “sedimentary rock” and give two examples.c) Create an illustration showing layers of sedimentary rock.	<p>The Glossary on pages 481-490 may be helpful in defining terms.</p> <p>See Figure 10.11. This figure shows layered sedimentary rock on Bell Island.</p>
<p>4. Read pages 332-333 in <i>Discovering Science 7</i>, and then complete the following items:</p> <ul style="list-style-type: none">a) What is a metamorphic rock?b) What are three conditions that can form metamorphic rock?c) What are two examples of metamorphic rocks and their parent rocks?	<p>The Glossary on pages 481-490 may be helpful in defining terms.</p>
<p>5. Read pages 340-343 in <i>Discovering Science 7</i>, and then complete the following items:</p> <ul style="list-style-type: none">a) What is meant by the “rock cycle”?b) Explain how igneous and metamorphic rocks become sedimentary rocks.c) How do igneous and sedimentary rocks become metamorphic rocks?d) How do metamorphic rocks become igneous rocks?	

Unit 1: The Earth's Crust

Required Work	Suggested Resources/Notes
<p>e) Draw the flowchart in number 7 on page 351 of the text into your notebook and fill in the boxes with the correct term.</p> <p>f) Sketch and label the rock cycle. Figure 10.17B on page 343 of the text will help you with this item.</p> <p>6. Read pages 356-359 in <i>Discovering Science 7</i>, and then complete the following items:</p> <p>a) What are the four main layers of the Earth? Briefly explain each one.</p> <p>b) Sketch and label a model of the Earth's layered interior. Include the four main layers you identified in item a) above. Figure 11.1 on page 358 of the text will help you complete this item.</p> <p>6. Read pages 360-362 in <i>Discovering Science 7</i>, and then complete the following items:</p> <p>a) Who was Alfred Wegener and what is the Theory of Continental Drift?</p> <p>b) What could Wegener not satisfactorily explain about continental drift?</p>	<p>See Figure 10.17B, p. 343.</p>

Unit 1: The Earth's Crust

Required Work	Suggested Resources/Notes
<p>7. Read pages 367-369 in <i>Discovering Science 7</i>, and then complete the following items:</p> <ul style="list-style-type: none">a) What is the Theory of Plate Tectonics?b) Draw a diagram to show how convection currents occur in the Earth's crust and how they cause plate movement. Figure 11.12 on page 369 of the text will help you complete this item.	<p>Figure 11.12, p. 369.</p>
<p>Assignment 1</p> <p>Read <u>11-1D: Evidence from the Sea Floor</u> on page 366 of the text. You can read the section "Evidence from the Sea Floor" on pages 364-366 of the text if you would like more background information. Complete the following items:</p> <ul style="list-style-type: none">a) What is the age of the oldest rock and the youngest rock on the graph?b) How far would you have to travel east or west from the Mid-Atlantic Ridge before you found rocks that are 60 million years old?c) Write a sentence that states the relationship between the age of rocks in the Atlantic Ocean and the distance they are from the Mid-Atlantic Ridge.d) What does this evidence suggest is happening to the sea floor? Explain your answer.	<p>This assignment will be submitted to your instructor and is part of the evaluation for this course. It will be used to determine your final mark.</p> <p>Ask your instructor for assistance if you are unsure about how to read the graph.</p> <p>Ask your instructor if you do not know where The Mid-Atlantic Ridge is located.</p>

Unit 2: Geological Formations and Processes

Required Work	Suggested Resources/Notes
<p>1. Read pages 376-379 in <i>Discovering Science 7</i>, and then complete the following items:</p> <ul style="list-style-type: none">a) Define the term “earthquake”.b) How are earthquakes measured?c) What is a fault?d) Explain why earthquakes occur using the concept of plate tectonics. The visuals and notes in Table 12.2, on page 377 of the text, can help you complete this item.e) Why do you think Newfoundland and Labrador has far fewer earthquakes than British Columbia? <p>2. Read pages 380-384 in <i>Discovering Science 7</i>, and then complete the following items:</p> <ul style="list-style-type: none">a) Define the term “volcano”.b) Most volcanoes form along plate boundaries. Identify the three environments where volcanoes can be found. Give an example of a volcano found in each environment.	<p>Although the reading for this section begins on page 376, you may find the introductory material on pages 374-375 interesting. This material contains information and a photograph connected with the 1929 tsunami on the Burin Peninsula.</p> <p>The Glossary on pages 481-490 may be helpful in defining terms.</p> <p>See Figure 11.18 on page 379 of the text. This figure shows where earthquakes commonly occur in Canada.</p>

Unit 2: Geological Formations and Processes

Required Work	Suggested Resources/Notes
<p>3. Read pages 390-392 in <i>Discovering Science 7</i>, and then complete the following items:</p> <ul style="list-style-type: none">a) Draw and label an example of a fold mountain showing how it was formed.b) Draw and label an example of a fault block showing how it was formed.	<p>Figure 11.29A-B, p. 391 can help with a).</p> <p>Figure 11.30A-B, p. 392 can help with b).</p>
<p>4. Read pages 395-398 in <i>Discovering Science 7</i>, and then complete the following items:</p> <ul style="list-style-type: none">a) What is the “geological time scale”?b) Name the four main eras in the Earth’s history.c) What is an example of life from each of the major eras in the Earth’s history?	<p>The Glossary on pages 481-490 may be helpful in defining terms.</p>
<p>5. Read pages 408-412 in <i>Discovering Science 7</i>, and then complete the following items:</p> <ul style="list-style-type: none">a) What is “weathering”?b) Describe an example of weathering that you have observed in your community.	<p>Note: You can mention mechanical or chemical weathering. These terms, along with examples, are mentioned in your reading.</p>
<p>6. Read pages 422-427 in <i>Discovering Science 7</i>, and then complete the following items:</p> <ul style="list-style-type: none">a) What are the three main parts of the soils profile?b) List and briefly explain the three main types of soil.c) Why do you think there is relatively little farmland in Newfoundland and Labrador?	

Unit 2: Geological Formations and Processes

Required Work	Suggested Resources/Notes
<p>7. Read pages 434-443 in <i>Discovering Science 7</i>, and then complete the following items:</p> <ul style="list-style-type: none">a) What is the intended positive effect of using fertilizers?b) What is the intended negative effect of using fertilizers?c) Why might you choose to not use chemicals to help your lawn grow?	
<p>Laboratory 1</p> <p>Read <u>12-1B: Rocks that Fizz</u> on page 416 of the text, and then complete the following items:</p> <ul style="list-style-type: none">a) Follow the procedure as outlined in the “What to Do” section. Record all observations and fill in the table of observations. Make sure you give the table a title.b) What was the manipulated variable (the feature you changed)?c) What was the responding variable (the feature that you observed changing)?d) Which rocks were affected by chemical weathering?e) How could you tell which rocks were affected by chemical weathering?	<p>Note: This lab uses acid. If acid gets on your skin, immediately wash the area with lots of cool water. Also, wear the protective clothing as indicated by the symbols on page 416.</p>