

Adult Basic Education  
**Level II Science**

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**Science 2015  
Earth Science**

**Curriculum 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 Instructor

### **Introduction to Science 2015**

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

Students may/may not have to complete all ABE Level II Science courses. Students are only required to complete sufficient Level II Science courses to ensure success in one of the Level III graduation profiles. For example, a Level II student intending to complete the Degree-Technical Profile (Academic) in Level III may need to complete more Level II Science courses than a student intending 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, students 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.

Students are required to complete one assignment and one core lab in this course. Instructors have flexibility to substitute another assignment and/or core lab if it is felt that the ones included in the Study Guide are inappropriate. The recommended resources for this course contain additional labs and assignments which may be used.

There are a number of Blackline Masters (BLM's) contained on the website accompanying the text that can be useful in conducting lab activities. Instructors are encouraged to preview this material and to exercise professional discretion in how to use it in the ABE classroom. Also, a number of these BLM's may be appropriate for use as assignments, unit reviews and for test/exam construction.

## To the Instructor

### Curriculum Guide

Each new ABE Level II Science course has a Curriculum Guide for the instructor and a Study Guide for the student. The Curriculum Guide includes the specific curriculum outcomes for the course. Suggestions for teaching, learning and assessment are provided to support student achievement of the outcomes. Some suggestions for teaching, learning and assessment will be repeated in the curriculum guides for the science courses when appropriate. Each course is divided into units. Each unit is presented in the Curriculum Guide as a **two-page layout of four columns** as illustrated in the figure below.

### Curriculum Guide Organization The Two-Page, Four-Column Spread

Unit Number – Unit Title		Unit Number – Unit Title	
<b>Outcomes</b>	<b>Notes for Teaching and Learning</b>	<b>Suggestions for Assessment</b>	<b>Resources</b>
Specific curriculum outcomes for the unit.	Suggested activities, elaboration of outcomes, and background information.	Suggestions for assessing students' achievement of outcomes.	Recommended resources that address outcomes.

### Study Guides

The Study Guide provides the student with the name of the text(s) required for the course and specifies the sections and pages that the student will need to refer to in order to complete the **Required Work** for the course. It guides the student through the course by assigning relevant reading and providing questions and/or assigning questions from the text or some other resource. Sometimes it also provides important points for students to note. The Study Guide is designed to give students some degree of independence in their work. Instructors should note, however, that there is material in the Curriculum Guide in the *Notes for Teaching and Learning* and *Suggestions for Assessment* columns that is not included in the Study Guide and instructors will need to review this information and decide how to include it.

## To the Instructor

### Resources

Recommended student resources for this course:

- *Discovering Science 7*. McGraw-Hill Ryerson. 2008. <http://www.mcgrawhill.ca>
- *Website (www.discoveringscience.ca)*
  - Provides links to sites that support Internet Connect, Explore More Features, and Integrated Research Investigations in the textbook.
  - Links to interesting educational and entertaining sites that support the curriculum.

Recommended instructor resources:

- *Teacher's Resource* (print)
- *Teacher's Resource* (CD-ROM)
  - Contains complete text of print Teacher's Resource in PDF format.
  - Contains modifiable Blackline Masters in both English and French.
  - Contains assessment checklists and rubrics.
- *Computerized Assessment Bank* (CD-ROM) in both English and French
  - Contains 1200 questions
  - Contains a variety of question types
  - All answers are provided
  - User-friendly ExamView software
- *Website (www.discoveringscience.ca)*
  - Contains additional interactive on-line resources for instructors.
  - Contains additional links for instructors.

**Note: Instructors may have to adapt the content of these instructor resources to meet the needs of their individual ABE students.**

The *Discovering Science* series of texts is a brand new science resource for Newfoundland and Labrador. The student and teacher resources contained in this series are designed to provide 100% alignment with Newfoundland and Labrador's intermediate science curriculum, on which the ABE Level II Science curriculum is based. These resources have been reviewed by Newfoundland and Labrador educators for their usefulness, content, design, relevancy and readability.

The *Teacher's Resource* for this series contains valuable resources for instructors. Like the texts, these resources were developed with the Newfoundland and Labrador intermediate science curriculum in mind as well as the principles of scientific literacy. Instructors are encouraged to utilize the *Teacher's Resource* and have the flexibility to adapt any material contained in the resources to better meet the needs of adult learners.

### **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. The Department of Education has no requirement that a final exam must be given in this course. Instructors/institutions can decide if a final exam is necessary based on their own policies and procedures.

**Unit 1: The Earth’s Crust—Suggestions for Teaching, Learning and Assessment**

<b>Outcomes</b>	<b>Notes for Teaching and Learning</b>
1.01 Define the term “mineral” using examples.	<ul style="list-style-type: none"> <li>• Instructors may encourage students to read “A Tour of Your Textbook” located on pages x-xvi of the student textbook. This tour explains in detail the key structural features of the textbook.</li> </ul>
1.02 Define the term “rock”.	<ul style="list-style-type: none"> <li>• Instructors may point out the <b>Internet Connect</b> feature of the textbook. This may be helpful for students. This feature uses <b>www.discoveringscience.ca</b> to learn more about the topic being studied.</li> </ul>
1.03 Define “igneous rock” and describe their formation.	<ul style="list-style-type: none"> <li>• The password and username for <b>www.discoveringscience.ca</b> are in the accompanying <i>Teacher’s Resource</i>.</li> </ul>
1.04 Differentiate between magma and lava.	<ul style="list-style-type: none"> <li>• Instructors are encouraged to read and become familiar with pages TR-1 to TR-17 in the <i>Teacher’s Resource</i>. Although the information contained in these pages are written for intermediate science teachers, there is sufficient information presented in these pages to be of use to ABE instructors as well.</li> </ul>
1.05 Differentiate between intrusive and extrusive igneous rocks using examples.	<ul style="list-style-type: none"> <li>• The <i>Teacher’s Resource</i> contains notes for teaching and learning. Instructors can read through this material for information to supplement their teaching. Instructors can use their professional judgment in determining what information is useful.</li> </ul>
1.06 Define the term “sedimentary rock” using examples.	<ul style="list-style-type: none"> <li>• Students will be introduced to many new terms throughout this course. Instructors may wish to have students start a vocabulary list and add to it regularly as they work through this unit. The <b>Glossary</b> can be useful to provide definitions.</li> </ul>
1.07 Describe the formation of metamorphic rocks.	<ul style="list-style-type: none"> <li>• Students can be encouraged to prepare Key Word Concept Maps.</li> </ul>
1.08 Sketch and label a diagram of the rock cycle.	<ul style="list-style-type: none"> <li>• Instructors may wish to encourage students to keep work organized, neat and legible. Although not mandatory, students can be encouraged to type all written response work on a computer if resources allow.</li> </ul>
1.09 Recognize the relationship between various types of rocks (igneous, sedimentary, and metamorphic).	



**Unit 1: The Earth's Crust—Suggestions for Teaching, Learning and Assessment**

Outcomes	Notes for Teaching and Learning
<p>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.</p> <p>1.11 Sketch and label a model of the Earth's layered interior. Include: inner core, outer core, mantle, and crust.</p> <p>1.12 Describe the Theory of Plate Tectonics.</p> <p>1.13 Describe the Continental Drift Theory.</p>	<ul style="list-style-type: none"> <li>• <b>www.discoveringscience.ca</b> contains the following BLM's under the <i>Discovering Science 9</i> link (Note that instructors need to be registered in order to access this material. Register by following the prompts and provide all required information):             <ul style="list-style-type: none"> <li>○ Unit Summaries</li> <li>○ Key Terms</li> <li>○ Mapping Minerals and Their Uses</li> <li>○ A Mineralogist's Mystery</li> <li>○ Mineral Identification Quiz</li> <li>○ Birthstone Research</li> <li>○ Birthstone Chart</li> <li>○ A Mineral Identification Story</li> <li>○ Write About Rocks</li> <li>○ Two Groups of Igneous Rocks</li> <li>○ Processes in the Rock Cycle</li> <li>○ A Rock Cycle Model</li> <li>○ Research the Resource</li> <li>○ Rocks and Minerals Crossword Puzzle</li> <li>○ Igneous Rocks</li> <li>○ The Rock Cycle</li> <li>○ Rock Cycle Word Search Puzzle</li> <li>○ Chapter 10 Review</li> <li>○ A Model of Earth</li> <li>○ Pangaea Map</li> <li>○ Biological Evidence—Fossil Locations</li> <li>○ Geological Evidence—Rocks and Rock Layers</li> <li>○ Pangaea Puzzle</li> <li>○ Evidence from the Sea Floor</li> <li>○ A Mission on the Alvin</li> <li>○ Convection Currents</li> <li>○ <b>Note: Instructors may have to adapt some of this material. Use of this material is at the discretion of the instructor.</b></li> </ul> </li> </ul>

## Unit 1: The Earth's Crust—Suggestions for Teaching, Learning and Assessment

### Suggestions for Assessment

- Instructors should ensure that students understand the reading material presented in the text. Although the text is written for students at a junior high reading level, adult learners may have some difficulty understanding the language.
- The *Teacher's Resource* provides an explanation concerning the relationship between assessment and evaluation. Instructors may wish to read page 2 in the *Teacher's Resource* for information on this relationship.
- Instructors should review all written responses completed by students based on the **Required Work** in the Study Guide. Ideally, this should be reviewed prior to students writing any tests/exams. Instructors may discuss both strengths and weaknesses based on this review. It is suggested that instructors allow students to re-do any items that may be incorrect or incomplete.
- Instructors are encouraged to become familiar with the assessment tools provided in the *Teacher's Resource*. Instructors can exercise professional judgement in determining how to integrate these assessment tools in their teaching practice. These assessment tools include such things as rubrics, checklists, observation notes, and self-assessment. These tools are also available on the accompanying website and CD and website.
- Instructors will find answers to some of the written work assigned in the Study Guide contained in the *Teacher's Resource*.
- Instructors will find Blackline Masters (BLM's) on the website [www.discoveringscience.ca](http://www.discoveringscience.ca). Instructors will have to register in order to gain access to the teacher resources on this site. Follow the prompts and complete all required fields. Instructors can exercise professional judgement in determining how they wish to integrate these BLM's into their teaching.

### Recommended resources that address outcomes

- Many of the written response items contained in the Study Guide are based on the **Reading Check** exercises from the text. Instructors may use the **Checking Concepts** and **Understanding Key Ideas** sections in the text for supplemental and evaluation material.
- See page 2 in the *Teacher's Resource* for information on the relationship between assessment and evaluation.
- See page 6 in the *Teacher's Resource* for information on some suggested assessment methods.
- See page 7 in the *Teacher's Resource* for material on assessment tools.
- Page 11 in the *Teacher's Resource* contains a sample recording keeping tool that instructors may find helpful.
- The password and username for [www.discoveringscience.ca](http://www.discoveringscience.ca) are in the accompanying *Teacher's Resource*.

**Unit 2: Geological Formations and Processes—Suggestions for Teaching, Learning and Assessment**

Outcomes	Notes for Teaching and Learning
<p>2.01 Define the term “earthquakes”.</p> <p>2.02 Explain why earthquakes occur using the concept of plate tectonics.</p> <p>2.03 Define the term “volcano”.</p> <p>2.04 Explain where volcanoes form.</p> <p>2.05 Explain the process of mountain formation.</p> <p>2.06 Describe the geological time scale in terms of the four main eras. Include: Precambrian, Paleozoic, Mesozoic, and Cenozoic.</p> <p>2.07 Differentiate between weathering and erosion.</p> <p>2.08 List the basic types of soil. Include: clay, sand, and gravel.</p> <p>2.09 Identify positive and negative effects of enriching soil.</p>	<ul style="list-style-type: none"> <li>• Same general comments as for Unit 1.</li> <li>• <a href="http://www.discoveringscience.ca">www.discoveringscience.ca</a> contains the following useful BLM’s under the <i>Discovering Science 9</i> link (Note that instructors need to be registered in order to access this material. Register by following the prompts and provide all required information):             <ul style="list-style-type: none"> <li>○ Unit Summaries</li> <li>○ Key Terms</li> <li>○ Three Types of Faults</li> <li>○ Earthquakes in One Month in Canada</li> <li>○ The Ring of Fire</li> <li>○ Seismic Stories</li> <li>○ Shake It</li> <li>○ Pattern in Earthquakes and Volcano Locations</li> <li>○ Converging Plates</li> <li>○ Major Mountain Ranges</li> <li>○ Geological Time Scale</li> <li>○ Building a Mountain-Building Theory</li> <li>○ Chapter 11 Review</li> <li>○ Weathering and Erosion Quiz</li> <li>○ Rocks that Fizz</li> <li>○ Weathered Lettering</li> <li>○ Comparing Dirt and Soil</li> <li>○ From Weathered Rock to Soil</li> <li>○ Layers of Soil</li> <li>○ Major Factors that Determine How Soil Develops</li> <li>○ Be a Soil Sleuth</li> <li>○ Land Use and Soil Loss</li> <li>○ Chapter 12 Review</li> <li>○ Unit 4 Review</li> <li>○ BLM’s Answer Keys</li> <li>○ <b>Note: Instructors may have to adapt some of this material. Use of this material is at the discretion of the instructor.</b></li> </ul> </li> </ul>

**Unit 2: Geological Formations and Processes—Suggestions for Teaching, Learning and Assessment**

<b>Suggestions for Assessment</b>	<b>Recommended resources that address outcomes</b>
<ul style="list-style-type: none"><li>• Same general comments as for Unit 1.</li></ul>	<ul style="list-style-type: none"><li>• Same general comments as for Unit 1.</li><li>• The password and username for <b>www.discoveringscience.ca</b> are in the accompanying <i>Teacher's Resource</i>.</li></ul>