

**MODULE ENM1010: OVERVIEW OF ALBERTA GEOLOGY**

<b>Level:</b>	Introductory
<b>Theme:</b>	Social and Cultural Perspectives
<b>Prerequisite:</b>	None
<b>Module Description:</b>	Students describe the nature and origin of Alberta’s energy and mineral resources, explain their significance in society, and identify related career opportunities.

**Module Parameters:** Access to geological maps available from relevant government agencies and professional associations (e.g., Natural Resources Canada, Alberta Geological Survey, Alberta Energy Utilities Board).

Access to samples of hydrocarbon bearing rocks and/or minerals available from local industry.

Access to a science laboratory, an outdoor geological site where earth layers are exposed (e.g., river bank, recovery site) and a museum of natural history (e.g., Tyrrell Museum).

**Curriculum and Assessment Standards**

Module Learner Expectations	Assessment Criteria and Conditions	Suggested Emphasis
<p><i>The student will:</i></p> <ul style="list-style-type: none"> <li>describe the nature and origin of Alberta’s energy and mineral resources within the North American geological context</li> </ul>	<p><i>Assessment of student achievement should be based on:</i></p> <ul style="list-style-type: none"> <li>a geological time chart for North America that illustrates:               <ul style="list-style-type: none"> <li>relative geological eras and time</li> <li>major atmospheric and life events.</li> </ul> </li> </ul> <p><i>Assessment Tool</i>  <i>Assessment Criteria: Geological Time Charts, ENM1010–1</i></p> <p><i>Standard</i>  <i>Complete time chart to a standard of 1 on the rating scale</i></p>	50

**MODULE ENM1010: OVERVIEW OF ALBERTA GEOLOGY** (continued)

Module Learner Expectations	Assessment Criteria and Conditions	Suggested Emphasis
<p><i>The student will:</i></p>	<p><i>Assessment of student achievement should be based on:</i></p> <ul style="list-style-type: none"> <li>• constructing drawings/models that depict:               <ul style="list-style-type: none"> <li>– the formation and current topography of the western sedimentary basin in relation to Alberta</li> <li>– vertical cross-sections of northeastern, central and southern Alberta, each showing hydrocarbon-bearing formations, mineral deposits and surface resources.</li> </ul> </li> </ul> <p><i>Assessment Tool</i>  <i>Assessment Criteria: Diagrams and Technical Drawings, ENMDRA</i>            Our Petroleum Challenge, Into the 21st Century (pp. 26–27)</p> <p><i>Standard</i>  <i>Complete drawings/models to a standard of 1 on the rating scale</i></p> <ul style="list-style-type: none"> <li>• identifying and mapping:               <ul style="list-style-type: none"> <li>– four nonrenewable sources of energy in Alberta</li> <li>– six metallic and/or nonmetallic minerals found in Alberta.</li> </ul> </li> </ul> <p><i>Assessment Tool</i>  <i>Task Checklist for Mapping, ENMMAP</i></p> <p><i>Standard</i>  <i>Complete mapping activities to a standard of 1 on the rating scale</i></p> <ul style="list-style-type: none"> <li>• conducting laboratory and/or field-based investigations that determine:               <ul style="list-style-type: none"> <li>– physical characteristics of three hydrocarbon-bearing rocks and six metallic/industrial minerals</li> <li>– porosity and permeability of hydrocarbon-bearing rock structures.</li> </ul> </li> </ul> <p><i>Assessment Tool</i>  <i>Lab Investigations: Rock Structures, ENM1010–2</i></p> <p><i>Standard</i>  <i>Perform investigations to a standard of 1 on the rating scale</i></p>	

**MODULE ENM1010: OVERVIEW OF ALBERTA GEOLOGY** (continued)

Module Learner Expectations	Assessment Criteria and Conditions	Suggested Emphasis
<p><i>The student will:</i></p> <ul style="list-style-type: none"> <li>explain the social, economic and environmental significance of energy and mineral resources in Alberta</li> </ul>	<p><i>Assessment of student achievement should be based on:</i></p> <ul style="list-style-type: none"> <li>given current news articles on two energy and/or mineral developments, an analysis of the impacts of each development on the environment and people who live there. <i>Assessment Tool</i> <i>Issue Analysis: Impacts of Energy/Mineral Development, ENM1010-3</i> <i>Standard</i> <i>Analyze the impacts of two energy/mineral developments to a standard of 1 on the rating scale</i></li> <li>given a specific energy or mineral resource, a presentation or report that describes: <ul style="list-style-type: none"> <li>major uses of the resource within Alberta's residential, commercial, industrial and transportation sectors</li> <li>how development of the resource has affected social/cultural values, historical development/settlement and economic viability within a region of Alberta. <i>Assessment Tool</i> <i>Presentations/Reports: Introductory Level, ENMPRE-1</i> <i>Standard</i> <i>Achieve a minimum rating of 1 on the rating scale for Presentations/Reports</i></li> </ul> </li> </ul>	<p>30</p>
<ul style="list-style-type: none"> <li>identify career opportunities relevant to the field of geology</li> </ul>	<ul style="list-style-type: none"> <li>given current resources on career opportunities within the field of geology, completing a research project on one or more related careers. <i>Assessment Tool</i> <i>Career Search: Introductory Level, ENMCAR-1</i> <i>Standard</i> <i>Conduct research to a standard of 1 on the rating scale</i></li> </ul>	<p>20</p>
<ul style="list-style-type: none"> <li>demonstrate basic competencies.</li> </ul>	<ul style="list-style-type: none"> <li>observations of individual effort and interpersonal interaction during the learning process. <i>Assessment Tool</i> <i>Basic Competencies Reference Guide and any assessment tools noted above</i></li> </ul>	<p>Integrated throughout</p>

**MODULE ENM1010: OVERVIEW OF ALBERTA GEOLOGY** (continued)

Concept	Specific Learner Expectations	Notes
<p>Alberta's Energy and Mineral Resources</p>	<p><i>The student should:</i></p> <ul style="list-style-type: none"> <li>• define and compare renewable and nonrenewable energy resources</li>   <li>• describe and locate on a map known reserves of nonrenewable energy resources in Alberta; e.g.:               <ul style="list-style-type: none"> <li>– oil</li> <li>– natural gas</li> <li>– coal</li> <li>– nuclear fuels</li> </ul> </li>   <li>• describe and locate on a map the major types of minerals found in Alberta; e.g.:               <ul style="list-style-type: none"> <li>– metallic</li> <li>– nonmetallic</li> </ul> </li>   <li>• identify and describe the physical characteristics of basic hydrocarbon bearing rocks; e.g.:               <ul style="list-style-type: none"> <li>– dolomite</li> <li>– limestone</li> <li>– sandstone</li> <li>– shale</li> </ul> </li>   <li>• identify and describe the physical characteristics of metallic and nonmetallic minerals; e.g.:               <ul style="list-style-type: none"> <li>– coal</li> <li>– copper</li> <li>– iron</li> <li>– limestone</li> <li>– magnesium</li> <li>– sulphur</li> </ul> </li>   <li>• draw or construct a historical account of the western sedimentary basin that explains Alberta's current topographical features</li>   <li>• draw or construct a vertical cross-section of any part of Alberta showing the location of hydrocarbon-bearing formations, mineral deposits and surface resources.</li> </ul>	<p>Contact Natural Resources Canada and request its map (produced annually) of energy and mineral developments in Canada.</p> <p>Request the <i>Mineral Deposits and Occurrences in Alberta</i> map available from Alberta Geological Survey.</p> <p>For example, gold, iron, sulphur, peat, quartz, salts, sodium sulphates, limestone, sand and gravel.</p> <p>Collect, identify and display rock and mineral samples.</p> <p>The historical account can encompass topography prior to the formation of the Rocky Mountains, and also present land features established as a result of the last ice age.</p>

**MODULE ENM1010: OVERVIEW OF ALBERTA GEOLOGY** (continued)

Concept	Specific Learner Expectations	Notes
<p>Economic, Environmental and Social Significance</p>	<p><i>The student should:</i></p> <ul style="list-style-type: none"> <li>• identify and describe major energy and mineral use sectors in society; e.g.:               <ul style="list-style-type: none"> <li>– residential</li> <li>– commercial</li> <li>– industrial</li> <li>– transportation</li> </ul> </li> <li>• explain how the energy and mineral industries influence the local and national economy</li> <li>• describe the flow of energy and mineral resources between Canada and other nations; e.g.:               <ul style="list-style-type: none"> <li>– import partners</li> <li>– export partners</li> </ul> </li> <li>• identify and describe environmental issues associated with the development of Alberta’s energy and mineral resources.</li> </ul>	<p>Consider applications of:</p> <ul style="list-style-type: none"> <li>• renewable and nonrenewable energy</li> <li>• metallic, nonmetallic and structural materials.</li> </ul> <p>Conduct a personal inventory of energy and mineral use.</p> <p>Discuss trends in energy/mineral markets, and competition from raw material substitutes.</p> <p>Research Canada’s contribution to the world energy supply.</p> <p>Obtain the <i>Canadian Minerals Yearbook</i> (available from Natural Resources Canada).</p> <p>Consider the impact of energy/mineral industries on material and conservation goals, and other quality of life factors.</p>
<p>Career Opportunities</p>	<ul style="list-style-type: none"> <li>• research career opportunities and the range of occupational opportunities within the field of geology; e.g.:               <ul style="list-style-type: none"> <li>– professional</li> <li>– technical</li> <li>– labour-based</li> </ul> </li> <li>• gather employment statistics within one or more employment sectors; e.g.:               <ul style="list-style-type: none"> <li>– types of careers</li> <li>– number of workers</li> <li>– employment trends</li> </ul> </li> <li>• predict career opportunities and trends from employment statistics.</li> </ul>	<p>Contact the “Career Information Hotline” (Alberta Advanced Education and Career Development).</p> <p>See the National Occupational Classification System (NOC) in Section H: Linkages/Transitions.</p> <p>Plan for individual/group research and presentations.</p> <p>Arrange/facilitate:</p> <ul style="list-style-type: none"> <li>• information interviews</li> <li>• work study/work experience</li> <li>• job shadowing.</li> </ul> <p>Make predictions about energy/mineral industries in the future, and resulting careers.</p>

