

## BIG IDEAS

### Earth Materials

Minerals and rocks are the foundation of the rock cycle and can be used as resources that drive industry and global economies.

### Geologic Time

Geologic time is preserved in Earth's rock record as fossils and reflects profound changes in the history of life on Earth.

### Plate Tectonic Theory

Tectonic plates are in constant motion and their interactions produce earthquakes, volcanoes, and characteristic landforms on the Earth's surface.

### Deformation and Mapping

Geological maps and models are tools used to represent surface features and subsurface structures.

### Surface Processes and the Hydrosphere

Weathering and erosion processes shape landscapes through the interaction of the geosphere and hydrosphere.

## Learning Standards

Curricular Competencies	Content
<p><i>Students are expected to be able to do the following:</i></p> <p><b>Questioning and predicting</b></p> <ul style="list-style-type: none"> <li>• Demonstrate a sustained intellectual curiosity about a scientific topic or problem of personal, local, or global interest</li> <li>• Make observations aimed at identifying their own questions, including increasingly abstract ones, about the natural world</li> <li>• Formulate multiple hypotheses and predict multiple outcomes</li> </ul> <p><b>Planning and conducting</b></p> <ul style="list-style-type: none"> <li>• Collaboratively and individually plan, select, and use appropriate investigation methods, including field work and lab experiments, to collect reliable data (qualitative and quantitative)</li> <li>• Assess risks and address ethical, cultural, and/or environmental issues associated with their proposed methods</li> <li>• Use appropriate SI units and appropriate equipment, including digital technologies, to systematically and accurately collect and record data</li> <li>• Apply the concepts of accuracy and precision to experimental procedures and data:               <ul style="list-style-type: none"> <li>– significant figures</li> <li>– uncertainty</li> <li>– scientific notation</li> </ul> </li> </ul>	<p><i>Students are expected to know the following:</i></p> <p><b>Earth Materials</b></p> <ul style="list-style-type: none"> <li>• minerals can be classified and <b>grouped</b> based on their <b>properties</b> and composition</li> <li>• rocks can be compared and classified based on their properties and processes of formation:               <ul style="list-style-type: none"> <li>– <b>igneous</b></li> <li>– <b>sedimentary</b></li> <li>– <b>metamorphic</b></li> </ul> </li> <li>• <b>resource deposits</b> within BC and globally:               <ul style="list-style-type: none"> <li>– origin and formation</li> <li>– <b>economic, environmental, and First Peoples considerations</b></li> </ul> </li> </ul>

Learning Standards (continued)

Curricular Competencies	Content
<p><b>Processing and analyzing data and information</b></p> <ul style="list-style-type: none"> <li>• Experience and interpret the local environment</li> <li>• Apply First Peoples perspectives and knowledge, other ways of knowing, and local knowledge as sources of information</li> <li>• Seek and analyze patterns, trends, and connections in data, including describing relationships between variables, performing calculations, and identifying inconsistencies</li> <li>• Construct, analyze, and interpret graphs, models, and/or diagrams</li> <li>• Use knowledge of scientific concepts to draw conclusions that are consistent with evidence</li> <li>• Analyze cause-and-effect relationships</li> </ul> <p><b>Evaluating</b></p> <ul style="list-style-type: none"> <li>• Evaluate their methods and experimental conditions, including identifying sources of error or uncertainty, confounding variables, and possible alternative explanations and conclusions</li> <li>• Describe specific ways to improve their investigation methods and the quality of the data</li> <li>• Evaluate the validity and limitations of a model or analogy in relation to the phenomenon modelled</li> <li>• Demonstrate an awareness of assumptions, question information given, and identify bias in their own work and in primary and secondary sources</li> <li>• Consider the changes in knowledge over time as tools and technologies have developed</li> <li>• Connect scientific explorations to careers in science</li> <li>• Exercise a healthy, informed skepticism and use scientific knowledge and findings to form their own investigations to evaluate claims in primary and secondary sources</li> <li>• Consider social, ethical, and environmental implications of the findings from their own and others' investigations</li> <li>• Critically analyze the validity of information in primary and secondary sources and evaluate the approaches used to solve problems</li> <li>• Assess risks in the context of personal safety and social responsibility</li> </ul>	<p><b>Geologic Time</b></p> <ul style="list-style-type: none"> <li>• the geologic time scale sequences the <b>major events in Earth's history</b></li> <li>• <b>the fossil record:</b> <ul style="list-style-type: none"> <li>– <b>evidence of evolution</b></li> <li>– <b>methods of fossil formation</b></li> <li>– <b>fossil deposits in BC</b></li> <li>– First Peoples perspective on the fossil record</li> </ul> </li> <li>• dating methods of rocks and events: <ul style="list-style-type: none"> <li>– <b>relative dating</b></li> <li>– <b>absolute dating</b></li> </ul> </li> <li>• Earth's past can be reconstructed by correlating fossils and rock strata</li> </ul> <p><b>Plate Tectonic Theory</b></p> <ul style="list-style-type: none"> <li>• earthquakes are a result of plate motion: <ul style="list-style-type: none"> <li>– <b>properties</b></li> <li>– <b>measurement</b></li> <li>– <b>hazards</b></li> </ul> </li> <li>• the origins of magma and volcanism are related to plate tectonic theory: <ul style="list-style-type: none"> <li>– <b>within Earth</b></li> <li>– <b>at the Earth's surface</b></li> </ul> </li> <li>• First Peoples knowledge of geologic events</li> <li>• various <b>sources of evidence</b> support a layered model of Earth</li> </ul>

Learning Standards (continued)

Curricular Competencies	Content
<p><b>Applying and innovating</b></p> <ul style="list-style-type: none"> <li>• Contribute to care for self, others, community, and world through individual or collaborative approaches</li> <li>• Co-operatively design projects with local and/or global connections and applications</li> <li>• Contribute to finding solutions to problems at a local and/or global level through inquiry</li> <li>• Implement multiple strategies to solve problems in real-life, applied, and conceptual situations</li> <li>• Consider the role of scientists in innovation</li> </ul> <p><b>Communicating</b></p> <ul style="list-style-type: none"> <li>• Formulate physical or mental theoretical models to describe a phenomenon</li> <li>• Communicate scientific ideas, information, and perhaps a suggested course of action, for a specific purpose and audience, constructing evidence-based arguments and using appropriate scientific language, conventions, and representations</li> <li>• Express and reflect on a variety of experiences, perspectives, and worldviews through place</li> </ul>	<p><b>Deformation and Mapping</b></p> <ul style="list-style-type: none"> <li>• rock strata can behave in a plastic or brittle manner, depending on <b>internal and external influences</b></li> <li>• <b>faulting and folding</b> are characteristic of specific tectonic environments and forces:             <ul style="list-style-type: none"> <li>– compressional</li> <li>– tensional</li> <li>– shear</li> </ul> </li> <li>• <b>geologic maps</b>, cross-sections, and block diagrams can be used to represent surface and subsurface structures:             <ul style="list-style-type: none"> <li>– geologic history</li> <li>– resource exploration</li> </ul> </li> </ul> <p><b>Surface Processes and the Hydrosphere</b></p> <ul style="list-style-type: none"> <li>• <b>weathering and erosional processes</b> modify the Earth's surface and produce characteristic features</li> <li>• periods of glaciation produce characteristic <b>erosional and depositional</b> features and landforms:             <ul style="list-style-type: none"> <li>– causes of glaciation</li> <li>– local landscapes within BC</li> <li>– First Peoples knowledge of landforms over time</li> </ul> </li> <li>• running water (streams and rivers) produces characteristic erosional and depositional <b>features and landforms</b></li> <li>• <b>groundwater</b> is a renewable resource whose quality and quantity are <b>affected by human activities</b> locally and globally</li> <li>• causes and controls of mass wasting</li> </ul>