

## BIG IDEAS

### Earth Materials

Earth materials are changed as they cycle through the geosphere and are used as resources, with economic and environmental implications.

### Plate Tectonic Theory

Plate tectonic theory explains the consequences of tectonic plate interactions.

### Atmospheric Science and Climate

The transfer of energy through the atmosphere creates weather and is affected by climate change.

### Oceanography and the Hydrosphere

The distribution of water has a major influence on weather and climate.

### Earth within the Solar System

Astronomy seeks to explain the origin and interactions of Earth and its solar system.

## 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>• Earth materials can be identified and classified based on their properties:               <ul style="list-style-type: none"> <li>– <b>minerals</b></li> <li>– <b>igneous rocks</b></li> <li>– <b>sedimentary rocks</b></li> <li>– <b>metamorphic rocks</b></li> <li>– <b>geologic resources</b></li> </ul> </li> <li>• the rock cycle explains how rocks are formed, destroyed, and transformed:               <ul style="list-style-type: none"> <li>– <b>surface processes</b></li> <li>– <b>internal processes</b></li> </ul> </li> <li>• economic and environmental implications of geologic resources within BC and globally:               <ul style="list-style-type: none"> <li>– First Peoples perspectives</li> <li>– <b>economic feasibility</b></li> <li>– <b>exploration methods</b></li> <li>– <b>extraction methods</b></li> <li>– <b>site remediation</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>Plate Tectonic Theory</b></p> <ul style="list-style-type: none"> <li>• plate tectonic theory unifies evidence from: <ul style="list-style-type: none"> <li>– continental drift theory</li> <li>– distribution of mountain ranges, volcanoes, and earthquake epicentres</li> <li>– sea-floor spreading and hot spots</li> </ul> </li> <li>• convection of <b>heat</b> within Earth's interior drives <b>plate motion</b> and creates unique <b>features</b> at different <b>plate boundaries</b></li> <li>• plate tectonic settings within BC and local geological terrains: <ul style="list-style-type: none"> <li>– features and processes</li> <li>– First Peoples knowledge</li> </ul> </li> </ul> <p><b>Atmospheric Science and Climate</b></p> <ul style="list-style-type: none"> <li>• the hydrologic cycle is driven by the <b>transfer of energy</b> within the atmosphere and hydrosphere</li> <li>• the atmosphere is divided into <b>layers</b> that have unique <b>properties</b></li> <li>• the <b>composition</b> of the atmosphere has changed over time: <ul style="list-style-type: none"> <li>– <b>evidence of change</b></li> <li>– <b>impacts on the carbon cycle</b></li> </ul> </li> <li>• the interaction of water, air, and energy creates <b>weather</b></li> <li>• solar radiation interacts with the atmosphere, hydrosphere, and geosphere and has <b>impacts on the energy budget</b></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>Oceanography and the Hydrosphere</b></p> <ul style="list-style-type: none"> <li>• the hydrologic cycle is driven by the transfer of energy within the atmosphere and hydrosphere</li> <li>• First Peoples perspectives and knowledge of ocean processes</li> <li>• water is a unique resource and is found in many forms on Earth:             <ul style="list-style-type: none"> <li>– <b>fresh water</b></li> <li>– <b>salt water</b></li> <li>– <b>environmental concerns</b></li> </ul> </li> <li>• use of remote sensing and direct observation to determine the properties of the ocean and <b>ocean floor</b></li> <li>• <b>ocean currents</b> are dependent on salinity, temperature, and density</li> <li>• oceans and lakes influence <b>local</b> and <b>global</b> climates</li> <li>• <b>water sources are affected by climate change</b></li> <li>• First Peoples knowledge of climate change and interconnectedness as related to environmental systems</li> </ul> <p><b>Earth within the Solar System</b></p> <ul style="list-style-type: none"> <li>• the nebular hypothesis explains the origin of the formation of solar systems:             <ul style="list-style-type: none"> <li>– formation of planets and moons</li> <li>– composition of planets</li> <li>– density of planets</li> <li>– spacing of planets</li> </ul> </li> <li>• <b>Earth is a unique planet</b> within its solar system</li> <li>• stars are the centre of a solar system and can be <b>classified</b> based on their <b>characteristics</b></li> <li>• impacts of the <b>Earth-moon-sun system</b></li> <li>• <b>application of space technologies</b> to study changes to Earth and its systems</li> </ul>