Area of Learning: SCIENCE — Earth Sciences

BIG IDEAS

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

Plate tectonic theory explains the consequences of tectonic plate interactions.

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

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

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

Learning Standards

Curricular Competencies

Students are expected to do the following:

Questioning and predicting
- Demonstrate a sustained intellectual curiosity about a scientific topic or problem of personal, local, or global interest
- Make observations aimed at identifying their own questions, including increasingly abstract ones, about the natural world
- Formulate multiple hypotheses and predict multiple outcomes

Planning and conducting
- Collaboratively and individually plan, select, and use appropriate investigation methods, including field work and lab experiments, to collect reliable data (qualitative and quantitative)
- Assess risks and address ethical, cultural, and/or environmental issues associated with their proposed methods
- Use appropriate SI units and appropriate equipment, including digital technologies, to systematically and accurately collect and record data
- Apply the concepts of accuracy and precision to experimental procedures and data:
  - significant figures
  - uncertainty
  - scientific notation

Content

Students are expected to know the following:

- properties of earth materials:
  - minerals
  - igneous rocks
  - sedimentary rocks
  - metamorphic rocks
  - geologic resources
- surface and internal processes of the rock cycle
- economic and environmental implications of geologic resources within B.C. and globally
- evidence that supports plate tectonic theory
- factors that affect plate motion
- First Peoples knowledge of local plate tectonic settings and geologic terrains
- the hydrologic cycle
- changes in the composition of the atmosphere due to natural and human causes
- weather as the interaction of water, air, and energy transfer
- solar radiation interactions and impacts on the energy budget
## Area of Learning: SCIENCE — Earth Sciences

### Grade 11

#### Learning Standards (continued)

<table>
<thead>
<tr>
<th>Curricular Competencies</th>
<th>Content</th>
</tr>
</thead>
</table>
| **Processing and analyzing data and information** | • evidence of climate change  
  • First Peoples knowledge of climate change and interconnectedness as related to environmental systems  
  • **water as a unique resource**  
  • First Peoples knowledge and perspectives of water resources and processes  
  • **properties of the ocean and the ocean floor**  
  • local and global **ocean currents**  
  • influences of large bodies of water on **local and global climates**  
  • **effects of climate change** on water sources  
  • the nebular hypothesis (explanation of the formation and properties of our solar system)  
  • **Earth as a unique planet** within its solar system  
  • **stars** as the centre of a solar system  
  • impacts of the **Earth-moon-sun system**  
  • application of space technologies to the study of changes in Earth and its systems |
| Experience and interpret the local environment | • Use knowledge of scientific concepts to draw conclusions that are consistent with evidence  
  • Analyze cause-and-effect relationships |
| Apply First Peoples perspectives and knowledge, other ways of knowing, and local knowledge as sources of information | • Evaluate their methods and experimental conditions, including identifying sources of error or uncertainty, confounding variables, and possible alternative explanations and conclusions  
  • Describe specific ways to improve their investigation methods and the quality of their data  
  • Evaluate the validity and limitations of a model or analogy in relation to the phenomenon modelled  
  • Demonstrate an awareness of assumptions, question information given, and identify bias in their own work and in primary and secondary sources  
  • Consider the changes in knowledge over time as tools and technologies have developed  
  • Connect scientific explorations to careers in science  
  • Exercise a healthy, informed skepticism and use scientific knowledge and findings to form their own investigations to evaluate claims in primary and secondary sources  
  • Consider social, ethical, and environmental implications of the findings from their own and others’ investigations  
  • Critically analyze the validity of information in primary and secondary sources and evaluate the approaches used to solve problems  
  • Assess risks in the context of personal safety and social responsibility |
| Seek and analyze patterns, trends, and connections in data, including describing relationships between variables, performing calculations, and identifying inconsistencies | • Construct, analyze, and interpret graphs, models, and/or diagrams  
  • Use knowledge of scientific concepts to draw conclusions that are consistent with evidence  
  • Construct, analyze, and interpret graphs, models, and/or diagrams  
  • Construct, analyze, and interpret graphs, models, and/or diagrams |
| • Construct, analyze, and interpret graphs, models, and/or diagrams | • Construct, analyze, and interpret graphs, models, and/or diagrams  
  • Construct, analyze, and interpret graphs, models, and/or diagrams  
  • Construct, analyze, and interpret graphs, models, and/or diagrams  
  • Construct, analyze, and interpret graphs, models, and/or diagrams |
| • Use knowledge of scientific concepts to draw conclusions that are consistent with evidence | • Construct, analyze, and interpret graphs, models, and/or diagrams  
  • Construct, analyze, and interpret graphs, models, and/or diagrams  
  • Construct, analyze, and interpret graphs, models, and/or diagrams  
  • Construct, analyze, and interpret graphs, models, and/or diagrams |
| • Construct, analyze, and interpret graphs, models, and/or diagrams | • Construct, analyze, and interpret graphs, models, and/or diagrams  
  • Construct, analyze, and interpret graphs, models, and/or diagrams  
  • Construct, analyze, and interpret graphs, models, and/or diagrams  
  • Construct, analyze, and interpret graphs, models, and/or diagrams |
| • Use knowledge of scientific concepts to draw conclusions that are consistent with evidence | • Construct, analyze, and interpret graphs, models, and/or diagrams  
  • Construct, analyze, and interpret graphs, models, and/or diagrams  
  • Construct, analyze, and interpret graphs, models, and/or diagrams  
  • Construct, analyze, and interpret graphs, models, and/or diagrams |
| • Construct, analyze, and interpret graphs, models, and/or diagrams | • Construct, analyze, and interpret graphs, models, and/or diagrams  
  • Construct, analyze, and interpret graphs, models, and/or diagrams  
  • Construct, analyze, and interpret graphs, models, and/or diagrams  
  • Construct, analyze, and interpret graphs, models, and/or diagrams |
| • Use knowledge of scientific concepts to draw conclusions that are consistent with evidence | • Construct, analyze, and interpret graphs, models, and/or diagrams  
  • Construct, analyze, and interpret graphs, models, and/or diagrams  
  • Construct, analyze, and interpret graphs, models, and/or diagrams  
  • Construct, analyze, and interpret graphs, models, and/or diagrams |
| • Construct, analyze, and interpret graphs, models, and/or diagrams | • Construct, analyze, and interpret graphs, models, and/or diagrams  
  • Construct, analyze, and interpret graphs, models, and/or diagrams  
  • Construct, analyze, and interpret graphs, models, and/or diagrams  
  • Construct, analyze, and interpret graphs, models, and/or diagrams |
| • Use knowledge of scientific concepts to draw conclusions that are consistent with evidence | • Construct, analyze, and interpret graphs, models, and/or diagrams  
  • Construct, analyze, and interpret graphs, models, and/or diagrams  
  • Construct, analyze, and interpret graphs, models, and/or diagrams  
  • Construct, analyze, and interpret graphs, models, and/or diagrams |
| • Construct, analyze, and interpret graphs, models, and/or diagrams | • Construct, analyze, and interpret graphs, models, and/or diagrams  
  • Construct, analyze, and interpret graphs, models, and/or diagrams  
  • Construct, analyze, and interpret graphs, models, and/or diagrams  
  • Construct, analyze, and interpret graphs, models, and/or diagrams |
| • Use knowledge of scientific concepts to draw conclusions that are consistent with evidence | • Construct, analyze, and interpret graphs, models, and/or diagrams  
  • Construct, analyze, and interpret graphs, models, and/or diagrams  
  • Construct, analyze, and interpret graphs, models, and/or diagrams  
  • Construct, analyze, and interpret graphs, models, and/or diagrams |
| • Construct, analyze, and interpret graphs, models, and/or diagrams | • Construct, analyze, and interpret graphs, models, and/or diagrams  
  • Construct, analyze, and interpret graphs, models, and/or diagrams  
  • Construct, analyze, and interpret graphs, models, and/or diagrams  
  • Construct, analyze, and interpret graphs, models, and/or diagrams |
### Area of Learning: SCIENCE — Earth Sciences

**Grade 11**

#### Learning Standards (continued)

<table>
<thead>
<tr>
<th>Curricular Competencies</th>
<th>Content</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Applying and innovating</strong></td>
<td></td>
</tr>
<tr>
<td>• Contribute to care for self, others, community, and world through individual or collaborative approaches</td>
<td></td>
</tr>
<tr>
<td>• Co-operatively design projects with local and/or global connections and applications</td>
<td></td>
</tr>
<tr>
<td>• Contribute to finding solutions to problems at a local and/or global level through inquiry</td>
<td></td>
</tr>
<tr>
<td>• Implement multiple strategies to solve problems in real-life, applied, and conceptual situations</td>
<td></td>
</tr>
<tr>
<td>• Consider the role of scientists in innovation</td>
<td></td>
</tr>
<tr>
<td><strong>Communicating</strong></td>
<td></td>
</tr>
<tr>
<td>• Formulate physical or mental theoretical models to describe a phenomenon</td>
<td></td>
</tr>
<tr>
<td>• Communicate scientific ideas and 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</td>
<td></td>
</tr>
<tr>
<td>• Express and reflect on a variety of experiences, perspectives, and worldviews through <strong>place</strong></td>
<td></td>
</tr>
</tbody>
</table>