

# GEOLOGY 12 CURRICULUM CORRELATION FORM

Note: Please complete one form per resource

**Title:** \_\_\_\_\_ **Series Title:** \_\_\_\_\_

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**Instructions:** Please indicate in the boxes below (✓) the degree of curriculum fit and provide specific unit, chapter or page references.

Prescribed Learning Outcomes	Degree of Curriculum Fit	Unit, Chapter or Page References
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**Grade 12**

*Earth Materials*

*Igneous Rocks and Processes*

<ul style="list-style-type: none"> <li>· describe and demonstrate factors affecting cooling rate and crystal size</li> </ul>	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	<hr/> <hr/> <hr/> <hr/> <hr/> <hr/> <hr/> <hr/>
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<ul style="list-style-type: none"> <li>· relate texture to rate of crystallization for extrusive (volcanic) and intrusive (plutonic) igneous rocks</li> </ul>	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	<hr/> <hr/> <hr/> <hr/> <hr/> <hr/> <hr/> <hr/>
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<p>· identify and classify igneous rocks according to their texture (coarse or fine grained, vesicular, glassy, fragmental-pyroclastic) and composition (felsic, intermediate, mafic)</p>	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	<hr/> <hr/> <hr/> <hr/> <hr/> <hr/> <hr/> <hr/>
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<p>· describe the features of and identify the following igneous rocks: - granite, diorite, gabbro, peridotite (ultramafic), andesite, tuff, rhyolite, basalt, volcanic breccia, obsidian, pegmatite, pumice, porphyry</p>	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	<hr/> <hr/> <hr/> <hr/> <hr/> <hr/> <hr/> <hr/>
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<p>· describe and explain the order of crystallization of minerals from a magma (Bowen's reaction series)</p>	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	<hr/> <hr/> <hr/> <hr/> <hr/> <hr/> <hr/> <hr/>
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<ul style="list-style-type: none"> <li>· distinguish among the following volcanic features:</li> <li>- shield volcanoes, cinder cones, composite volcanoes, columnar jointing, volcanic domes, Java plateaus</li> </ul>	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	<hr/> <hr/> <hr/> <hr/> <hr/> <hr/> <hr/> <hr/>
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<ul style="list-style-type: none"> <li>· distinguish among the following types of lava by their composition and flow behaviours, and identify or predict the rock or feature formed when the lava cools:</li> <li>- ash flows or nuee ardente, pillow lava, aa, pahoehoe</li> </ul>	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	<hr/> <hr/> <hr/> <hr/> <hr/> <hr/> <hr/> <hr/>
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<ul style="list-style-type: none"> <li>· identify and describe batholiths, sills, dikes, xenoliths, stocks, and plutons</li> </ul>	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	<hr/> <hr/> <hr/> <hr/> <hr/> <hr/> <hr/> <hr/>
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*Introduction to Geology*

<p>· describe geology as a discipline</p>	<p><input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/></p>	<hr/> <hr/> <hr/> <hr/> <hr/> <hr/> <hr/> <hr/> <hr/> <hr/>
<p>· describe at least three aspects of geology that make it different from other sciences</p>	<p><input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/></p>	<hr/> <hr/> <hr/> <hr/> <hr/> <hr/> <hr/> <hr/> <hr/> <hr/>
<p>· differentiate between rocks and minerals</p>	<p><input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/></p>	<hr/> <hr/> <hr/> <hr/> <hr/> <hr/> <hr/> <hr/> <hr/> <hr/>

<p>· describe the formation of igneous, sedimentary, and metamorphic rocks, and classify rocks as igneous, sedimentary, or metamorphic</p>	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	<hr/> <hr/> <hr/> <hr/> <hr/> <hr/> <hr/> <hr/> <hr/> <hr/>
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<p>· interpret a rock cycle diagram</p>	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	<hr/> <hr/> <hr/> <hr/> <hr/> <hr/> <hr/> <hr/> <hr/> <hr/>
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<p>· demonstrate an understanding that uniformitarianism is a fundamental principle of geology</p>	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	<hr/> <hr/> <hr/> <hr/> <hr/> <hr/> <hr/> <hr/> <hr/> <hr/>
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<p>· demonstrate the ability to calculate the rates of geologic processes</p>	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	<hr/> <hr/> <hr/> <hr/> <hr/> <hr/> <hr/> <hr/> <hr/> <hr/>
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<p>· describe and utilize methods of obtaining, displaying, and analyzing local and regional information about the earth</p>	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	<hr/> <hr/> <hr/> <hr/> <hr/> <hr/> <hr/> <hr/> <hr/> <hr/>
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<p>· compare and evaluate various careers associated with geological technologies and sciences</p>	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	<hr/> <hr/> <hr/> <hr/> <hr/> <hr/> <hr/> <hr/> <hr/> <hr/>
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***Metamorphic Rocks and Processes***

· relate the types and characteristics of metamorphic rocks to parent rock, temperature, pressure, and chemical conditions



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· describe the features of the following metamorphic rocks: slate, phyllite, schist, gneiss, metaconglomerate (stretched pebble), quartzite, marble



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· contrast the two major categories of metamorphic rocks: foliated and non-foliated



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<p>· contrast the two types of metamorphism: contact and regional</p>	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	<hr/> <hr/> <hr/> <hr/> <hr/> <hr/> <hr/> <hr/> <hr/> <hr/>
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<p>· describe changes that occur in the country rock and in the intrusion at a contact</p>	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	<hr/> <hr/> <hr/> <hr/> <hr/> <hr/> <hr/> <hr/> <hr/> <hr/>
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<p>· relate metamorphic rock type to the concept of metamorphic grade</p>	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	<hr/> <hr/> <hr/> <hr/> <hr/> <hr/> <hr/> <hr/> <hr/> <hr/>
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**Minerals**

<p>· outline the importance and abundance of various elements in the earth's crust</p>	<p><input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/></p>	<hr/> <hr/> <hr/> <hr/> <hr/> <hr/> <hr/> <hr/>
<p>· demonstrate an ability to use the following properties in identifying minerals:</p> <ul style="list-style-type: none"><li>- simple crystal shape</li><li>- cleavage</li><li>- fracture</li><li>- hardness</li><li>- specific gravity (relative density)</li><li>- colour</li><li>- streak</li><li>- lustre</li><li>- special properties, such as reaction to dilute HCl</li><li>- magnetism</li></ul>	<p><input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/></p>	<hr/> <hr/> <hr/> <hr/> <hr/> <hr/> <hr/> <hr/>
<p>· use appropriate references and tests to describe and identify the following minerals:</p> <p>silicates and aluminosilicates:</p> <ul style="list-style-type: none"><li>- quartz and varieties of quartz</li><li>- potassium feldspar and plagioclase feldspar</li><li>- muscovite, biotite, and talc</li><li>- augite (pyroxene) and hornblende (amphibole)</li><li>- garnet</li><li>- asbestos</li><li>- olivine</li></ul> <p>oxides:</p> <ul style="list-style-type: none"><li>- hematite, limonite, magnetite</li></ul> <p>sulphides:</p> <ul style="list-style-type: none"><li>- pyrite, chalcopyrite, galena, sphalerite, molbdenite, bornite</li></ul> <p>carbonates and sulphates:</p> <ul style="list-style-type: none"><li>- calcite, malachite, azurite, gypsum</li></ul> <p>native elements, halides and phosphates:</p> <ul style="list-style-type: none"><li>- graphic, gold, halite, flourite, apatite</li></ul>	<p><input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/></p>	<hr/> <hr/> <hr/> <hr/> <hr/> <hr/> <hr/> <hr/>

**Sedimentary Rocks**

<p>· outline the origin and process of formation of sedimentary rocks</p>	<p><input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/></p>	<hr/> <hr/> <hr/> <hr/> <hr/> <hr/> <hr/> <hr/>
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<p>· contrast clastic sediments with chemical (precipitate or biochemical) sediments and the rocks they become</p>	<p><input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/></p>	<hr/> <hr/> <hr/> <hr/> <hr/> <hr/> <hr/> <hr/>
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<p>· describe the features of and identify the following sedimentary rocks:</p> <ul style="list-style-type: none"><li>- conglomerate</li><li>- breccia</li><li>- sandstone</li><li>- siltstone</li><li>- shale</li><li>- limestone</li><li>- chert</li><li>- gypsum</li><li>- rock salt</li><li>- coal</li></ul>	<p><input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/></p>	<hr/> <hr/> <hr/> <hr/> <hr/> <hr/> <hr/> <hr/>
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<ul style="list-style-type: none"> <li>· diagram and describe the following sedimentary features and use them to reconstruct hypothetical sedimentary environments:</li> <li>- sedimentary structures (stratification, crossbedding, ripple marks, mud cracks, graded bedding, varves)</li> <li>- particle size, shape, and sorting</li> <li>- fossils and organic structures</li> </ul>	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	<hr/> <hr/> <hr/> <hr/> <hr/> <hr/> <hr/> <hr/>
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***Earth Minerals***

***Mineral, Rock, and Energy Resources***

<ul style="list-style-type: none"> <li>· explain how hydrothermal activity can produce ore deposits</li> </ul>	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	<hr/> <hr/> <hr/> <hr/> <hr/> <hr/> <hr/> <hr/>
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<ul style="list-style-type: none"> <li>· describe how simple geochemical or geophysical data can be used to locate mineral, rock, or petroleum deposits</li> </ul>	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	<hr/> <hr/> <hr/> <hr/> <hr/> <hr/> <hr/> <hr/>
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<ul style="list-style-type: none"> <li>· describe the uses of mineral, rock, and energy resources of major economic importance in British Columbia, including: <ul style="list-style-type: none"> <li>- chalcopyrite, galena, gold, sphalerite, molybdenite, gypsum, limestone</li> <li>- construction materials, coal, oil and gas</li> </ul> </li> </ul>	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	<hr/> <hr/> <hr/> <hr/> <hr/> <hr/> <hr/> <hr/>
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<ul style="list-style-type: none"> <li>· deduce the origin of an orebody or a mineral or petroleum resource from data and geologic descriptions of the deposit</li> </ul>	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	<hr/> <hr/> <hr/> <hr/> <hr/> <hr/> <hr/> <hr/>
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<ul style="list-style-type: none"> <li>· describe the sequence of events through which oil and natural gas are believed to form</li> </ul>	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	<hr/> <hr/> <hr/> <hr/> <hr/> <hr/> <hr/> <hr/>
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<p>· explain how a variety of factors (e.g., price, concentration, accessibility, size, and environmental considerations) determine whether or not it is economically feasible to extract a given occurrence of a mineral, rock, or energy resource</p>	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	<hr/> <hr/> <hr/> <hr/> <hr/> <hr/> <hr/> <hr/>
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<p>· explain the role of permeability and porosity in creating oil and gas reservoirs and traps</p>	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	<hr/> <hr/> <hr/> <hr/> <hr/> <hr/> <hr/> <hr/>
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<p>· describe the sequence of stages in the formation of different grades of coal</p>	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	<hr/> <hr/> <hr/> <hr/> <hr/> <hr/> <hr/> <hr/>
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*Internal Processes and Structures*

*Earth's Interior*

<p>· give evidence for the fact that the earth is layered</p>	<p><input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/></p>	<hr/> <hr/> <hr/> <hr/> <hr/> <hr/> <hr/> <hr/> <hr/> <hr/>
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<p>· diagram or model the interior of the earth, labelling all principal parts and showing the approximate thickness of each layer</p>	<p><input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/></p>	<hr/> <hr/> <hr/> <hr/> <hr/> <hr/> <hr/> <hr/> <hr/> <hr/>
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<p>· differentiate among the layers of the earth and describe their characteristics</p>	<p><input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/></p>	<hr/> <hr/> <hr/> <hr/> <hr/> <hr/> <hr/> <hr/> <hr/> <hr/>
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***Isostasy***

· analyse the adjustment of the crust to changes in loads associated with volcanism, mountain building, erosion, and glaciation by using the concept of isostasy



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***Plate Tectonics***

· outline evidence for lithospheric plate motion and continental drift



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· explain what is meant by seafloor spreading and outline evidence to support it



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<p>· describe convergent, divergent, and transform types of plate boundaries</p>	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	<hr/> <hr/> <hr/> <hr/> <hr/> <hr/> <hr/> <hr/> <hr/> <hr/>
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<p>· suggest possible causes for the movements of the plates</p>	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	<hr/> <hr/> <hr/> <hr/> <hr/> <hr/> <hr/> <hr/> <hr/> <hr/>
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<p>· describe the origin of magma formed during plate tectonic processes</p>	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	<hr/> <hr/> <hr/> <hr/> <hr/> <hr/> <hr/> <hr/> <hr/> <hr/>
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<p>· relate volcanic activities and features to convergent, divergent, and intraplate settings</p>	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	<hr/> <hr/> <hr/> <hr/> <hr/> <hr/> <hr/> <hr/> <hr/> <hr/>
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<p>· describe the geologic activities that occur at lithospheric plate boundaries</p>	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	<hr/> <hr/> <hr/> <hr/> <hr/> <hr/> <hr/> <hr/> <hr/> <hr/>
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<p>· relate the rock cycle to plate tectonics</p>	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	<hr/> <hr/> <hr/> <hr/> <hr/> <hr/> <hr/> <hr/> <hr/> <hr/>
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*Seismology*

· describe fault creep and elastic rebound as they relate to seismic activity



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· distinguish between magnitude and intensity



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· compare and contrast the Richter and Mercalli scales



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<ul style="list-style-type: none"> <li>· manipulate seismograph data to determine the distance, location, and magnitude of an earthquake</li> </ul>	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	<hr/> <hr/> <hr/> <hr/> <hr/> <hr/> <hr/> <hr/>
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<ul style="list-style-type: none"> <li>· assess the seismic risks for a particular area using: <ul style="list-style-type: none"> <li>- geographic location</li> <li>- topography</li> <li>- ground strength</li> <li>- rock types</li> <li>- proximity to faults</li> <li>- construction design</li> </ul> </li> </ul>	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	<hr/> <hr/> <hr/> <hr/> <hr/> <hr/> <hr/> <hr/>
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<ul style="list-style-type: none"> <li>· evaluate various methods of earthquake prediction (e.g., dilatancy data, seismic gap, animal behavior)</li> </ul>	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	<hr/> <hr/> <hr/> <hr/> <hr/> <hr/> <hr/> <hr/>
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*Structural Geology*

· describe the factors that determine if a rock will behave in a plastic or brittle manner when stressed

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· distinguish between faults and joints

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· distinguish between dip-slip (normal, reverse, thrust), strike-slip (left lateral, right lateral) and transform faults

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<p>· relate compressional, tensional, and shear forces to the various types of faults and folds</p>	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	<hr/> <hr/> <hr/> <hr/> <hr/> <hr/> <hr/> <hr/> <hr/> <hr/>
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<p>· recognize and diagram normal, reverse, thrust, and strike-slip (transform) faults and identify these structures from maps or photographs</p>	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	<hr/> <hr/> <hr/> <hr/> <hr/> <hr/> <hr/> <hr/> <hr/> <hr/>
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<p>· interpret the dip and strike of an outcrop to determine subsurface structures</p>	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	<hr/> <hr/> <hr/> <hr/> <hr/> <hr/> <hr/> <hr/> <hr/> <hr/>
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<p>· recognize and diagram domes, basins, anticlines, synclines, and overturned folds and identify these structures from maps or photographs</p>	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	<hr/> <hr/> <hr/> <hr/> <hr/> <hr/> <hr/> <hr/> <hr/> <hr/>
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<p>· recognize and interpret an unconformity as a geologic structure</p>	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	<hr/> <hr/> <hr/> <hr/> <hr/> <hr/> <hr/> <hr/> <hr/> <hr/>
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<p>· show the interrelationships among a geologic map, a cross section, a block diagram, and the subsurface structure and geologic history of an area</p>	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	<hr/> <hr/> <hr/> <hr/> <hr/> <hr/> <hr/> <hr/> <hr/> <hr/>
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***Surficial Processes***

**Glaciers**

<p>· identify examples and distinguish between erosional and depositional glacial features:</p> <p>erosional features:</p> <ul style="list-style-type: none"><li>- U-shaped valley</li><li>- hanging valley</li><li>- cirque</li><li>- horn</li><li>- arete</li><li>- glacial striations</li></ul> <p>depositional features:</p> <ul style="list-style-type: none"><li>- glacial erratic</li><li>- moraine (ground, recessional, terminal, lateral, and medial)</li><li>- drumlin</li><li>- kame terrace</li><li>- esker</li></ul>	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	<hr/> <hr/> <hr/> <hr/> <hr/> <hr/> <hr/> <hr/>
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<p>· reconstruct past glacial positions using erosional and depositional features</p>	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	<hr/> <hr/> <hr/> <hr/> <hr/> <hr/> <hr/> <hr/>
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**Ground Water**

<p>· describe the nature and constituents of subsurface water, including water table, zone of saturation, zone of aeration, perched and confined water tables, aquifers, and impermeable layers</p>	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	<hr/> <hr/> <hr/> <hr/> <hr/> <hr/> <hr/> <hr/>
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<p>· demonstrate how the abundance, availability, and movement of subsurface water are directly related to the porosity and permeability of geologic materials</p>	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	<hr/> <hr/> <hr/> <hr/> <hr/> <hr/> <hr/> <hr/>
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<p>· construct a subsurface water profile from sample data</p>	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	<hr/> <hr/> <hr/> <hr/> <hr/> <hr/> <hr/> <hr/>
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<p>· describe how the following human activities affect the quality and quantity of groundwater:</p> <ul style="list-style-type: none"><li>- urbanization</li><li>- waste disposal</li><li>- agriculture</li><li>- conservation and reclamation</li></ul>	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	<hr/> <hr/> <hr/> <hr/> <hr/> <hr/> <hr/> <hr/>
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**Running Water**

<p>· identify the three types of stream load (solution, suspension, bedload) and describe how each moves in a stream</p>	<p><input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/></p>	<hr/> <hr/> <hr/> <hr/> <hr/> <hr/> <hr/> <hr/>
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<p>· relate stream velocity to sediment sorting</p>	<p><input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/></p>	<hr/> <hr/> <hr/> <hr/> <hr/> <hr/> <hr/> <hr/>
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<p>· relate such factors as load, gradient, discharge, channel shape, sediment composition, and human activities to erosion and deposition by streams</p>	<p><input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/></p>	<hr/> <hr/> <hr/> <hr/> <hr/> <hr/> <hr/> <hr/>
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<ul style="list-style-type: none"> <li>· contrast particle size and shape, degree of sorting and sedimentary structures of stream glacial, and wind deposits</li> </ul>	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	<hr/> <hr/> <hr/> <hr/> <hr/> <hr/> <hr/> <hr/>
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***Weathering and Erosion***

<ul style="list-style-type: none"> <li>· distinguish between weathering and erosion</li> </ul>	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	<hr/> <hr/> <hr/> <hr/> <hr/> <hr/> <hr/> <hr/>
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<ul style="list-style-type: none"> <li>· describe the processes and effects of physical (mechanical), chemical, and biological weathering</li> </ul>	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	<hr/> <hr/> <hr/> <hr/> <hr/> <hr/> <hr/> <hr/>
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<p>· relate Bowen's reaction series to a mineral's susceptibility to chemical weathering</p>	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	<hr/> <hr/> <hr/> <hr/> <hr/> <hr/> <hr/> <hr/> <hr/> <hr/>
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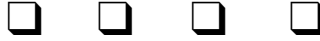
<p>· identify types and causes of mass wasting</p>	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	<hr/> <hr/> <hr/> <hr/> <hr/> <hr/> <hr/> <hr/> <hr/> <hr/>
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<p>· design or evaluate methods to control mass wasting</p>	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	<hr/> <hr/> <hr/> <hr/> <hr/> <hr/> <hr/> <hr/> <hr/> <hr/>
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*Time and the Fossil Record*

*Absolute Dating*

· explain how the half-lives of radioactive elements are used in estimating ages of materials



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· determine the age of a sample using radiometric data



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· evaluate the sources of error in estimating a radiometric age



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<ul style="list-style-type: none"> <li>· determine the approximate age range of a sedimentary rock from absolute age data about associated, intrusive, or extrusive igneous rocks</li> </ul>	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	<hr/> <hr/> <hr/> <hr/> <hr/> <hr/> <hr/> <hr/>
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***Geologic Time Scale***

<ul style="list-style-type: none"> <li>· sequence the major events in the earth's history, such as:</li> <li>- beginning of each geologic era</li> <li>- formation of oldest rocks</li> <li>- formation of earth</li> <li>- earliest recorded life</li> <li>- invertebrates dominated</li> <li>- first land plants</li> <li>- fishes dominated</li> <li>- formation of coal forests</li> <li>- reptiles dominated</li> <li>- amphibians dominated</li> <li>- mammals dominated</li> <li>- appearance of flowering plants</li> <li>- appearance of humans</li> <li>- Pleistocene glaciation</li> <li>- Pacific Coast orogeny</li> <li>- Rocky Mountain orogeny</li> </ul>	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	<hr/> <hr/> <hr/> <hr/> <hr/> <hr/> <hr/> <hr/>
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<ul style="list-style-type: none"> <li>· demonstrate the ability to use the geologic time scale to help interpret the history of a sequence of rocks</li> </ul>	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	<hr/> <hr/> <hr/> <hr/> <hr/> <hr/> <hr/> <hr/>
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## Relative Dating

· define relative age and absolute age, and differentiate between them



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· determine the relative ages of different formations using the principles of:  
- faunal succession  
- uniformitarianism  
- original horizontality  
- cross-cutting relationships  
- correlation  
- superposition  
- included fragments



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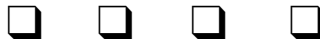
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· correlate sequences of rock with each other using guide fossils or rock data



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<p>· identify and interpret an unconformity as a break in the time record</p>	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	<hr/> <hr/> <hr/> <hr/> <hr/> <hr/> <hr/> <hr/> <hr/> <hr/>
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<p>· interpret the history of a sequence of rock units and structures</p>	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	<hr/> <hr/> <hr/> <hr/> <hr/> <hr/> <hr/> <hr/> <hr/> <hr/>
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***The Fossil Record***

<p>· identify the conditions necessary for the preservation of fossils</p>	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	<hr/> <hr/> <hr/> <hr/> <hr/> <hr/> <hr/> <hr/> <hr/> <hr/>
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<p>· differentiate between fossils and trace fossils</p>	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	<hr/> <hr/> <hr/> <hr/> <hr/> <hr/> <hr/> <hr/> <hr/> <hr/>
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<p>· describe the processes of original preservation, carbonization, replacement, permineralization, and mould and cast formations</p>	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	<hr/> <hr/> <hr/> <hr/> <hr/> <hr/> <hr/> <hr/> <hr/> <hr/>
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<p>· analyse the characteristics of a fossil that would make a good index (or guide) fossil</p>	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	<hr/> <hr/> <hr/> <hr/> <hr/> <hr/> <hr/> <hr/> <hr/> <hr/>
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<ul style="list-style-type: none"> <li>· identify and classify the following fossils using appropriate references:</li> <li>- foraminifera</li> <li>- mollusca</li> <li>- brachiopoda</li> <li>- echinodermata</li> <li>- artropoda (trilobites)</li> <li>- coelenterata (corals)</li> <li>- vertebrata</li> <li>- graptolites</li> <li>- conodonts</li> <li>- plants</li> </ul>	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	<hr/> <hr/> <hr/> <hr/> <hr/> <hr/> <hr/> <hr/> <hr/> <hr/>
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<ul style="list-style-type: none"> <li>· describe the probable environment suggested or indicated by a fossil assemblage</li> </ul>	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	<hr/> <hr/> <hr/> <hr/> <hr/> <hr/> <hr/> <hr/> <hr/> <hr/>
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<ul style="list-style-type: none"> <li>· relate the evidence of faunal succession from the fossil record to principles of evolution such as:</li> <li>- punctuated equilibrium</li> <li>- adaptive radiation</li> <li>- natural selection</li> </ul>	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	<hr/> <hr/> <hr/> <hr/> <hr/> <hr/> <hr/> <hr/> <hr/> <hr/>
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