

# 6

## Universe, Earth, Environment (Earth Science)

### Essential Question: How does energy impact Earth's atmosphere and surface?

| Enduring Knowledge   | Science Concepts   | GE | Evidence of Understanding   |
|--|--|----|---|
| <p><b><u>Earth Materials and the Rock Cycle:</u></b> The universe, earth and all earth systems have undergone change in the past, continue to change in the present and predicted to continue changing in the future.</p>        | <p>a. Rocks come from magma or lava, as well as from sediments that build up in layers. As all rocks from earth's surface weather, form sediments and become buried and heated (through pressure or direct heat), they may crystallize into new rock. Eventually those new rocks may be brought to the surface by forces that drive plate motions (the Rock Cycle).</p> <p>b. The earth is layered with a rigid shell, a hot mantle and a dense metallic core.</p>   | 46 | <p>Explaining the process of how rocks are forms (the Rock Cycle)</p> <p>Creating a model of the earth's structure explaining the nature of the layers</p>  |
| <p><b><u>Forces and Changes on the Earth's Surface:</u></b> The universe, earth and all earth systems have undergone change in the past, continue to change in the present and predicted to continue changing in the future.</p> | <p>a. Some changes on the earth can be very slow, such as weathering and mountain-building, and some can be very fast—such as volcanoes and earthquakes.</p> <p>b. Earth's rigid shell is composed of large plates that move at rates of centimeters a year Major geologic events, such as earthquakes, volcanic eruptions and mountain building, result from these plate motions.</p> <p>c. Thousands of layers of sedimentary rock confirm the long history of the changing surface of the earth and the changing life forms whose remains are found in successive layers (land forms —coastlines, mountains, rivers, canyons, deltas)</p> | 47 | <p>Identifying examples of geologic changes on the earth's surface, where possible in the local environment (include slow and fast changes)</p> <p>Plotting locations of volcanoes and earthquakes and explaining the relationship between location and plate movement</p> <p>Explaining the processes that occur when rocks are changed from one form to another</p> <p>Determining the relative age of fossils within sedimentary rocks from their location in the strata (i.e., which fossils within a sequence are older)</p> |

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| Concepts in Detail   | Potential Inquiries/Activities   | Resources/Notes |
|--|--|-----------------|
| <ul style="list-style-type: none"> <li>- All the materials that rocks are made of have always been on Earth.</li> <li>- Different rocks have different properties.</li> <li>- Weathering is the physical and chemical breakdown of rocks.</li> <li>- Rocks can be formed or altered through the application of heat and pressure.</li> <li>- Sediment can be joined through chemical processes.</li> <li>- Lava is liquid rock on the earth's surface. Magma is liquid rock beneath the earth's surface.</li> <li>- Processes of weathering, heating, and pressure can affect all types of rock. These are not strictly a "cycle".</li> <li>- Crust underlies the oceans.</li> </ul>   | <p>Create a rock collection, identifying whether the rocks are</p> <ol style="list-style-type: none"> <li>1) from cooled magma/lava</li> <li>2) metamorphic (buried and heated-changed)</li> <li>3) from compacted/cemented sediments.</li> </ol> <p>Then either take students out or bring in rocks from the environment. Have students try to identify them based on the classroom collection.</p> |                 |
| <ul style="list-style-type: none"> <li>- The earth has undergone many changes through geologic time and is still undergoing these changes.</li> <li>- Changes on Earth can be caused by meteorological, hydrologic, and geologic processes.</li> <li>- Topography can indicate different types of geologic change.</li> <li>- The earth's crust recycles as a plate goes under another plate, becomes molten and eventually, over geologic time, emerges and solidifies again.</li> <li>- A geological plate can ride over, submerge under, or push into another plate.</li> <li>- There are convection currents in the earth's mantle that are responsible for the movement of the plates.</li> <li>- Hot substances are less dense than cooler substances and therefore rise.</li> <li>- The earth's crust is continuous. Both the continents and ocean bottoms are part of the crust.</li> <li>- Earthquakes and volcanoes usually occur at plate boundaries.</li> <li>- Not all layers are in the original order because the layers may slide underneath or be folded.</li> <li>- The earth is 4.6 billion years old.</li> <li>- A fossil is a remnant or trace of an organism from a different geologic age.</li> <li>- Fossils are typically found in sedimentary layers.</li> <li>- Plate tectonics have caused plates to separate, thereby separating land forms that are similar, as well as fossil evidence that is similar.</li> <li>- Processes of weathering, heating, and pressures can affect all types of rock. These processes are not strictly a "cycle."</li> <li>- Different life forms have existed at different geologic periods.</li> </ul> | <p>Using clay plates, show what happens when plates converge, diverge, or rub against one another.</p>   |                 |