Problem-Based Learning Unit Template

Topic

Earth Science: Geology

Goals/Objectives/SOL

5.7 The student will investigate and understand how Earth's surface is constantly changing. Key concepts include

a) identification of rock types;
b) the rock cycle and how transformations between rocks occur;
c) Earth history and fossil evidence;
d) the basic structure of Earth's interior;
e) changes in Earth's crust due to plate tectonics;
f) weathering, erosion, and deposition; and
g) human impact.

The students will:

1. apply basic terminology to explain how Earth's surface is constantly changing.
2. draw and label the rock cycle and describe the major processes and rock types involved.
3. compare and contrast the origin of igneous, sedimentary, and metamorphic rocks.
4. identify rock samples (granite, gneiss, slate, limestone, shale, sandstone, and coal), using a rock classification key.
5. make plausible inferences about changes in Earth over time based on fossil evidence. This includes the presence of fossils of organisms in sedimentary rocks of Virginia found in the Appalachian Mountains, Piedmont, and Coastal Plain/Tidewater.
6. describe the structure of Earth in terms of its major layers — crust, mantle, and outer core and inner core — and how Earth's interior affects the surface.
7. differentiate among the three types of plate tectonic boundaries (divergent, convergent, and transform) and how these relate to the changing surface of Earth and the ocean floor (5.6).
8. compare and contrast the origin of earthquakes and volcanoes and how they affect Earth's surface.
9. differentiate between weathering, erosion, and deposition
10. compare weathering and erosion on different materials
11. create a plan to solve erosion and/or deposition problems that may be found.
12. design an investigation to locate, chart, and report weathering, erosion, and deposition at home and on the school grounds.
13. describe how people change Earth's surface and how negative changes can be controlled.

Theme

Earth's Surface

Problem Question

Develop a conservation plan in order to protect and utilize Natural Bridge now and in the future.

Scenario

On May 12, 2014, Governor Terry McAuliffe officially accepted the deed to Natural Bridge, transferring its ownership to the Commonwealth of Virginia. Plans are currently in place to have the site designated as a state park within the coming years. The Virginia Conservation Legacy Fund is looking to develop policies for Natural Bridge. You have been asked to develop a conservation plan to preserve and protect Natural Bridge for use today and for future generations.

Student Role

Students will be advisory consultants for The Virginia Conservation Legacy Fund, Inc.

Resources

Literature Connections:

- *If You Find a Rock*- Peggy Christianson
- Teaching Science Through Trade Books p. 229- 233
  Let's Go Rock Collecting- Roma Gans
  Teaching Science Through Trade Books 235-239
- *Fossils Tell of Long Ago*- Aliki
  Teaching Science Through Trade Books 247-251
- *Earthquakes* -Seymour Simon
  Teaching Science Through Trade Books 261-267

Virginia Museum of Natural History Programs
http://www.vmnh.net/student-tours-and-programs

- Weathering and Erosion
- Let's Make a Fossil!
- Rocks and Minerals Uncovered
- Crystals Everywhere!
- Discovering Fossils
- Shake, Rattle, and Roll

Virginia Tech Museum of Geosciences
http://www.outreach.geos.vt.edu/museum/

- Pegmatites
- Fossils
- Gemstones
- Minerals of Virginia

Culminating Activity

The students will present a conservation plan based on their findings to the Virginia Conservation Legacy Fund, Inc.