S.T.E.M. Lesson Plan
Geology

Geology in the Gorge

From the Himalayas to the deepest, darkest depths of the Mariana Trench, humans have been fascinated for centuries with how our planet came to be and what makes it "tick."

With such a revealing specimen in our own backyard, the New River Gorge is the subject of ACE's hands-on geology curriculum. The first half of the day includes interactive lessons that examine the erosion and evolution that has exposed formations and our planets geological character in this thousand-foot gorge. Students learn the natural history of the New River Gorge, the factors that cause change and how geology affects ecosystems and economies.

Part two of our day takes on a very different sort of discovery. Students have the opportunity to climb the very cliffs our planet spent millions of years compressing into rock. It's a tactile experience that drives home how our planet seems so unchanging but is in fact evolving all the time.

Objectives/Understandings:

- Explore the formation of observable landforms in the New River Gorge
- Discover how geological characteristics of an area influence what lives there
- Recognize factors that cause change within the system
- Explore prehistoric life by hunting for and observing fossils
- Research renewable and nonrenewable energy sources

Essential Questions/Guiding Questions:

- What are the parts of this landscape?
- What are the parts of this landscape?
- Are they changing?
- Are geology and ecology related?
- What fossils can be found in this landscape?
- What are the pros and cons of renewable and nonrenewable energy sources?

Activity Descriptions

Story of the New River Gorge – Students will learn how the New River Gorge came to be by acting out its geologic history.

Dynamic Lithosphere Game – An active vocabulary review game that highlights plate tectonics and fossil formation processes.

Fossil Hunting –Explore the past by finding fossils that formed 300 million years ago. Students will predict what life was like when these fossils were living creatures.

Soil Pits – Digging soil pits is a fun way to see how ecosystems are formed from the ground up. Students will explore how geology affects all life in the New River Gorge.

Plant Study – Get to know some of the most ancient plants on the planet. In this study of ferns and club mosses, students will become familiar with the plant families that form coal.

Activity Descriptions (continued)

Energy Debate – Coal is one of West Virginia's biggest economic resources. Students will learn and debate about using renewable versus nonrenewable resources and their affects on humans.

Rock Climbing – Using features formed by our moving earth, students will make their way up beginner climbing routes. They will discover why people come from all over the world to climb the unique sandstone of the New River Gorge.

Background

Soil surveys have been completed for Fayette and Raleigh counties (Gorman and Espy 1975) and Mercer and Summers counties (Sponaugle et al. 1984). Pauley and Pauley (no date) described soils near Gauley River National Recreation Area based on Gorman and Espy (1975). An updated soil survey is currently being performed for Fayette and Raleigh Counties (Tony Jenkins, Natural Resource Conservation Service, personal communication 2001).

Ehlke et al. (1982, 1983) summarized the above soil surveys that include the three parks. Soils place New River Gorge National River (Dekalb-Rock outcrop) and Gauley River National Recreation Area (Dekalb-Gilpin-Enist and the Gilpin-Ernest-Buckhanon) in the Eastern Allegheny Plateau and Mountains Land Resource Area (Austin 1965, U. S. Department of Agriculture 1981). Soils in Bluestone National Scenic River (Gilpin-Dekalb) place it in the Southern Appalachian Ridges and Valleys Land Resource Area.

Based on existing published information, moderately deep silt loams or sandy loams dominate the valley bottoms and lower slopes in the three parks. These soils are well drained and very stony. Most of the soils lie on very steep (40 to 70%) slopes and are of low to moderate fertility. Derived from shale and sandstone, they are well suited for tree growth, but have severe erosion potential when destabilized. The upper slopes, ridge tops, and tributaries contain sandstone outcrops and broken cliffs that are from 1 foot to over 100 feet high. Brown sandy loams are also found on the ridge tops. The updated soil survey of these areas is expected to provide more details about these forested landscapes than was included in the older, more agronomic-oriented publications. This information is expected to be available between 2005 and 2007 (Tony Jenkins, Natural Resources Conservation Service, personal communication 2001).

Source: http://www.nature.nps.gov/geology/parks/neri/

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Links:

USGS background info:
http://www.wvgs.wvnet.edu/www/geology/geology.htm

Great overview of NRG geology!
http://www.nature.nps.gov/geology/parks/neri/

WV Geologic Survey Educational Materials:
http://www.wvgs.wvnet.edu/www/geoeduc/geoeduc.htm

West Virginia 300 Millions Years Ago:
http://www.geocraft.com/WVFossils/Article1.html

Carboniferious Period explanation:
http://www.ucmp.berkeley.edu/carboniferous/carboniferous.php

Plant Fossils of West Virginia:
http://www.geocraft.com/WVFossils/Articles1.html

Geology Illustrations:
http://www.geo.wvu.edu/~renton/Geology101/index.html