



GEOLOGY AFFECTS ECOLOGY

Materials:

Activity One:

- ☆ various colors of playdoh or clay
- ☆ string
- ☆ relief map of Arkansas
- ☆ pictures of roadcuts and scenic views from the Ozark Mountains and the Ouachita Mountains of Arkansas

Rationale

Simulating the processes that created Arkansas's two mountain systems and discussing their differences can give students an understanding of the origins of these mountains, and of how the type of formation contributes to biological diversity.

Objectives

1. Students will learn how the Ozark and Ouachita Mountains were formed and how they differ in structure and biodiversity.
2. Students will begin to understand how the geology of an area is essential to an understanding of its natural diversity.
3. Students will learn how the components of an area act together to shape the environment.

Activity One: Mountain Building

PROCEDURE:

1. Introduce the lesson by showing students pictures of roadcuts and of scenic views from the Ozark and Ouachita Mountains. Ask them to point out how the two mountain systems are the same and how they are different.
2. Use playdoh or clay to demonstrate for students how each of these natural divisions formed. Flatten four or five different colors of playdoh/clay, and layer the strips in a stack. Explain that the layers represent marine sediments that slowly built up and eventually formed rock. Cut the stack in half and designate one half as the Ozarks, the other as the Ouachitas. Use string to cut into the edges of the Ozark "rock layers" at diagonals. As you cut, tell students that the string is water slowly cutting into the rock. This represents how rivers cut into the rock and helped form the Ozark Mountains. There was little folding, so the rock layers remained horizontal. Set the Ozarks model aside and demonstrate the formation of the Ouachitas using the second set of "rock layers." Explain how landmasses shifted and pushed the rock layers, demonstrating by pushing the playdoh/clay together so that the layers buckle and curve. Tell students that similar buckling
3. created the dramatic folds and twists that are apparent in many parts of the Ouachita Mountains.
3. Give each student several different colors of playdoh/clay balls. Instruct them to divide each ball into two halves. One ball should be formed into a model of the layered and eroded Ozarks, while the other should be pushed and buckled into a model of the Ouachitas. Instruct students to create mountain chains by connecting all of their Ozark models and all of their Ouachita models together. Do all of the color layers match in the chain? If not, ask students to explain how this happened. What kind of differences could this make to shape and diversity in a real mountain chain?
4. Have students look back at the roadcut and scenic vista pictures of the two mountain systems. Ask them to compare the pictures to their playdoh/clay mountains.
5. Discuss the following questions:
 - How does different type of mountain formation affect the topography of the land? (Uplifted Ozarks are flat-topped, while the squeezed Ouachitas are sharp-ridged).
 - How does the topography then affect the types of soil and plants that will exist in each system? (Soil thinner on mountainsides,

deeper in valleys and on top of flat mountains. Thinner soil is usually dryer due to runoff. Plants needing more moisture and having deeper roots will grow in the valleys and on the plateaus. Higher elevations will be colder, so plants needing warmer temperatures will occur at lower elevations. Rainfall is also affected by topography with most of the rain falling on the wind-facing slopes).

- Many fossils form from marine sediments. Thinking about the formation of the two mountain systems, which would you expect to have more fossils and why? (Ozarks received less pressure, therefore fewer fossils were destroyed).
- What can we learn by comparing the fossils of an area with the organisms living there today? (How the life forms and climate have changed over the years).

Activity Three: My Pet Mountains

PROCEDURE:

1. Ask students where they would rather live, in the Ozarks or in the Ouachitas. Divide them into two groups, the Ozark Pioneers and the Ouachita Settlers. Have/help each group develop a list of five to ten natural characteristics of their region. Discuss the following questions:
 - If your group could spend a week camped in the forest, what time of year would you rather go? Graph preferences by season and talk about why students made the choices they did.
 - What might you find to eat in the forest?
 - What could you do for fun?
 - What are some things you would need to be careful about?
 - Draw a picture of the prettiest or most unusual thing you think you would see while you were there.
2. Ask students to pretend that both of their groups, the Ozark Pioneers and the Ouachita Settlers, are actually members of the same large family who migrated to different areas. Have them meet between the two mountain systems, in the Arkansas River Valley, for a huge family reunion. What would each group tell the other about their home? What would each bring to the reunion dinner, or as souvenirs for the other group?

Extensions

1. Construct topographical maps of the Ozarks and the Ouachitas.
2. Have students design an animal or a plant specifically adapted for the Ozark environment or for the Ouachita environment. Let students describe their organisms to the rest of the class and explain how its adaptations fit the habitat.
3. Take a field trip to visit a pioneer cabin such as the one at the Territorial Restoration (soon to be Historic Arkansas Museum) in Little Rock, or at Petit Jean State Park, the Ozark Folk Center, or the Old Parker Plantation at Whitehall .

Correlation to National Science Standards

Unifying Concepts and Processes
Earth and Space Science

Correlation to Arkansas Frameworks

Science: K-4: E.S.2.2, E.S.2.3, E.S.3.4, L.S.1.2, L.S.2.8, L.S.2.10, L.S.3.1; 5-8: E.S.2.1, E.S.2.2, E.S.2.4, E.S.2.5, E.S.3.5, L.S.2.10, L.S.2.4, L.S.2.11; 9-12: E.S.2.4, E.S.2.7, E.S.2.9, E.S.2.10, E.S.3.7, L.S.2.7
Math: D.S.P.1.1.C
Social Studies: 1.1.3, 1.1.9, 2.1.1
Language Arts: W.1.1, W.1.5