Alabama Underfoot

Trace how geologic processes shape land and water

ESS.4.e "Obtain and communicate information about significant geologic characteristics in Alabama and the southeastern United States."

NAME _____ DATE _____

1 READ AND MARK

Read it twice

YOUR JOB Underline three processes that shaped the land, then circle a landform or water feature caused by each one. Write the same number beside each matching cause-and-effect pair.

A Journey Through Alabama's Geology

1. In northeastern Alabama, the Valley and Ridge province looks like long, parallel wrinkles across the land. Its sedimentary rock layers formed in ancient seas and were later squeezed when continents collided during the building of the Appalachian Mountains. The pressure folded some layers and broke others along faults. Over time, streams and weathering wore down softer rock faster than harder rock, leaving long valleys beside resistant ridges. Because some limestone dissolves in slightly acidic rainwater, caves and sinkholes also occur in parts of this region. A sinkhole can direct surface water underground, making protection of groundwater important.

2. Farther northwest, Alabama's Cumberland Plateau is part of the larger Appalachian Plateau that extends across the southeastern United States. Unlike the sharply folded rocks to its east, many plateau rock layers remain nearly horizontal. Rivers cut into those layers over millions of years, carving steep-sided valleys and leaving broad, high areas between them. Sandstone resists erosion better than some nearby shale, so it can form cliffs above slopes that wear away more quickly. The layered rocks also contain coal in parts of northern Alabama. Mining coal can disturb slopes and send sediment into streams if runoff is not controlled.

3. Travel south toward the Gulf of Mexico, and Alabama's Coastal Plain spreads across much of the state. Its layers of sand, clay, and limestone were deposited as shorelines shifted and rivers carried sediment toward the sea. These younger deposits are generally less deformed than the rock layers of the Valley and Ridge. Where rain soaks through permeable sand, groundwater can collect in buried layers called aquifers. Thick clay can slow that downward flow. Near the coast, waves and currents move sand, reshaping barrier islands that help shield inland areas from some storm waves. Moving sediment creates both useful land and changing hazards.

2 ANSWER WITH EVIDENCE

Use the passage

1. What caused long valleys to form beside resistant ridges in the Valley and Ridge province?

2. How did rivers shape the Cumberland Plateau, and how does its sandstone affect the slopes?

3. What two changes or actions deposited the Coastal Plain's layers of sand, clay, and limestone?

4. Compare one way water moves through rock in the Valley and Ridge with one way it moves through Coastal Plain deposits. What feature or condition makes each possible?

3 YOUR TURN

Your own words

Write a four- or five-sentence audio script for visitors traveling from northern Alabama toward the Gulf Coast. Name two regions, connect a geologic process to a landform in each region, and explain one practical effect for people.

ANSWER KEY

Alabama Underfoot

HIGH SCHOOL · ESS.4.e

PART 1 · READ AND MARK

Underline three processes that shaped the land, then circle a landform or water feature caused by each one. Write the same number beside each matching cause-and-effect pair. Accept any marking that follows this job and points at the right text.

PART 2 · ANSWERS

#	QUESTION	ANSWER
1	What caused long valleys to form beside resistant ridges in the Valley and Ridge province?	**Streams and weathering wore down softer rock faster than harder rock, leaving valleys beside ridges of more resistant rock.**
2	How did rivers shape the Cumberland Plateau, and how does its sandstone affect the slopes?	**Rivers carved steep-sided valleys into the plateau. Erosion-resistant sandstone can remain as cliffs above shale slopes that wear away faster.**
3	What two changes or actions deposited the Coastal Plain's layers of sand, clay, and limestone?	**Shifting shorelines and rivers carrying sediment toward the sea deposited the layers.**
4	Compare one way water moves through rock in the Valley and Ridge with one way it moves through Coastal Plain deposits. What feature or condition makes each possible?	**In the Valley and Ridge, water can enter sinkholes where limestone has dissolved. In the Coastal Plain, rain can soak through permeable sand into aquifers, while thick clay can slow its downward flow.**

PART 3 · YOUR TURN (SAMPLE ANSWER)

Our trip begins on Alabama's Cumberland Plateau, where rivers have cut steep-sided valleys into nearly horizontal rock layers. Farther south, we cross the Coastal Plain, built from sediment deposited as shorelines shifted and rivers carried material toward the sea. Near the Gulf, waves and currents reshape the sand of the Coastal Plain's barrier islands. These islands can shield inland places from some storm waves. Their changing shape also means coastal conditions do not stay the same.

For the marking task, accept any three accurate process-and-result pairs stated in the passage. For the audio script, accept different region choices if each process explains a landform and the practical effect is supported by the text.